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Comparative performance of chilli (*Capsicum annuum* L.) genotypes for quantitative and qualitative traits under temperate conditions of Kashmir

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Abstract

The present investigation was carried out at Vegetable Experimental Field, Division of Vegetable Science, SKUAST-Kashmir Shalimar, KVK Pulwama and KVK Budgam during kharif 2021-22. During the study a comparative performance of seventy-eight chilli genotypes (parents and crosses) were evaluated for maturity, yield attributing and quality traits with the purpose of identifying genotypes with high yielding ability, better quality and significant variation were found among the genotypes for the traits studied. Mean performance of parents and crosses for maturity, yield and quality traits depicted the existence of sufficient amount of variation in the given set of genotypes thereby indicating a good scope for improvement of the population through various breeding procedures.

Keywords: Chilli, mean, parents, crosses, quality

Introduction

Chilli (*Capsicum annuum* L.), ($2n=2X=24$) belonging to the family Solanaceae (Nightshade), is a native of Tropical Africa (Mexico) and is grown throughout world for its green and red ripe fruits. The crop was introduced in India by Portuguese in late 15th century. India is the largest producer and consumer of chillies in the world. It is highly valued for its green or red ripe fruits with characteristic pungency, colour and flavour. The fruits are an excellent source of health-related phytochemical compounds, such as vitamin C (143.7 μ g), vitamin A (292.04 IU), vitamin E (0.69 mg), vitamin K (14 μ g) per 100g, minerals like Calcium, Phosphorus and Iron, alkaloid capsaicin/capsicuin ($C_{18}H_{27}NO_3$) and red pigment capsanthin ($C_{40}H_{56}O_3$) (Kerketta *et al.*, 2018) [7]. It has also acquired a great importance because of the presence of which permits better distribution of colour and flavour in foods. Evaluation of genotypes (parents versus crosses) by estimation of mean performance per se especially for qualitative traits gives an idea about their suitability to a region to find out the best genotypes that can be recommended after further evaluation for the region.

Materials and Methods

The experimental material for present study consists of twelve diverse genotypes of chilli (*Capsicum annuum* L.) maintained by Division of Vegetable Science, SKUAST-Kashmir, Shalimar. 66 F_1 crosses were generated through 12 \times 12 diallel mating design (excluding reciprocals) at Vegetable Experimental Field, Division of Vegetable Science, SKUAST-Kashmir shalimar, during kharif 2021. The set of 78 *viz.*, crosses (66) along with their parents (12) were evaluated in randomized complete block design at Experimental Farm, Division of Vegetable Science, SKUAST-K Shalimar, Krishi Vigyan Kendra, Malangpora and Krishi Vigyan Kendra, Budgam during kharif 2022. The row to row and plant to plant spacing was maintained at 60 \times 45 cm. Recommended package of practices were adopted to raise a healthy crop. The observations were recorded for days to 50% flowering, days to first fruit set, days to first fruit harvest, days to last fruit harvest, plant height (cm), plant spread (cm), number of primary branches plant⁻¹, fruit length (cm), fruit diameter (cm), pericarp thickness (mm), pedicel length (cm), number of fruits plant⁻¹, average fresh fruit weight (g), average dry fruit weight (g), dry fruit yield plant⁻¹ (g), dry fruit yield hectare⁻¹ (q), vitamin-C content (mg 100⁻¹ g), capsaicin content (mg g⁻¹), oleoresin (ASTA Units), TSS ($^{\circ}$ Brix), FRAP Assay (mmol g⁻¹) and DPPH activity (%).

Results and Discussion

The mean performance of twelve parents and sixty-six crosses of chilli for various quantitative and quality attributing traits is given in Table 1 which clearly indicated that genotypes differed significantly for all the traits under study. The estimates of mean values from Table 1 revealed that no genotype was superior for all the characters under study. Data on average number of days taken for flowering revealed that cross AVPP-0506 × AVPP-0206 was earliest taking 37.74 days for 50% flowering followed by AVPP-0514 × AVPP-0206 (38.34 days) and AVPP-0105 × AVPP-0206 (38.43 days). The average days to 50% flowering was 41.59 days. Data on number of days to first fruit set revealed that AVPP-0506 × AVPP-0206 (41.93 days) followed by AVPP-0514 × AVPP-0206 (42.20) and AVPP-0411 × Kashi Anmol (42.57 days). The average number of days to first fruit set of all genotypes was 45.28 days. For days to first fruit harvest AVPP-0514 × AVPP-0206 (64.72 days) recorded the lowest number of days followed by AVPP-0514 × AVPP-0409 (65.52 days) and AVPP-0303 × AVPP-0411 (65.53 days). The average for days to first fruit harvest of all the genotypes was 68.62 days. For days to last fruit harvest AVPP-0409 (141.37 days) recorded the lowest number of days for last fruit harvest followed by AVPP-0514 × AVPP-0206 (142.83 days) and AVPP-9813 (143.16 days). The average days for last harvest of all the genotypes was 145.69 days. Highest plant height of 86.62 cm was observed in AVPP-0506 × AVPP-0206 followed by AVPP-0303 × AVPP-9905 (83.51 cm) and AVPP-0514 × AVPP-0206 (83.04 cm). The average plant height of all the genotypes was 74.84 cm. Maximum spread was observed in AVPP-0514 × AVPP-0206 (61.79 cm) followed by AVPP-0506 × AVPP-0206 (60.43 cm) and AVPP-0206 × AVPP-0409 (59.74 cm). The average plant spread of all the genotypes was 52.93 cm. Maximum number of primary branches plant⁻¹ was recorded in the cross AVPP-0206 × Kashi Anmol (4.81) followed by AVPP-0506 × AVPP-0206 (4.80) and AVPP-0514 × AVPP-0206 (4.80). The average number of primary branches plant⁻¹ of all the genotypes was 4.25. Highest fruit length was observed in AVPP-0514 × AVPP-0206 (15.20 cm) followed by AVPP-0506 × AVPP-0206 (15.13 cm) and AVPP-0105 × AVPP-0206 (15.03 cm). The average fruit length of all the genotypes was 13.48 cm. Fruit diameter was found highest in the cross AVPP-0506 × AVPP-0206 (2.40 cm) followed by AVPP-0514 × AVPP-0206 (2.37 cm) and AVPP-0105 × AVPP-0206 (2.34 cm). The average fruit diameter of all the genotypes was 2.08 cm. Maximum pericarp thickness was recorded in cross AVPP-0506 × AVPP-0409 (0.77 mm) followed by AVPP-0506 × AVPP-0206 (0.71 mm) and AVPP-0105 × AVPP-0206 (0.70 mm). The average pericarp thickness of all the genotypes was 0.62 mm. The highest pedicel length was recorded in cross AVPP-0506 × AVPP-0206 (4.82 cm) followed by AVPP-0514 × AVPP-0206 (4.80 cm) and AVPP-0105 × AVPP-0206 (4.72 cm). The average pedicel length of all the genotypes was 3.97 cm. AVPP-0105 × AVPP-0409 (113.02) followed by AVPP-0506

× AVPP-0206 (112.84) and AVPP-0514 × AVPP-0206 (110.09) recorded maximum number of fruits plant⁻¹. The average number of fruits plant⁻¹ of all the genotypes was 91.12. The crosses AVPP-0105 × AVPP-0409 (10.84 g) followed by AVPP-0303 × AVPP-0206 (10.75 g) and AVPP-0411 × Kashi Anmol (10.67 g) exhibited highest average fresh fruit weight. The average fresh fruit weight of all the genotypes was 9.23 g. While as, AVPP-0409 (1.69 g) followed by AVPP-0506 × AVPP-0206 (1.65 g) and AVPP-0206 × Kashi Anmol (1.62 g) exhibited highest average dry fruit weight. The average dry fruit weight of all the genotypes was 1.20 g. Highest fruit yield plant⁻¹ was recorded for the cross AVPP-0506 × AVPP-0206 (169.02 g) followed by AVPP-0514 × AVPP-0206 (169.00 g) and AVPP-0105 × AVPP-0206 (168.89 g). The average fruit yield plant⁻¹ of all the genotypes was 117.37 g. While as, AVPP-0506 × AVPP-0206 (62.16 q) followed by AVPP-0514 × AVPP-0206 (62.00 q) and AVPP-0206 × Kashi Anmol (61.05 q) recorded the highest fruit yield hectare⁻¹. The average fruit yield hectare⁻¹ of all the genotypes was 42.11 q.

Highest TSS was recorded for the cross AVPP-0206 × Kashi Anmol (4.04 °brix) followed by AVPP-0105 × AVPP-0409 (4.03 °brix) and AVPP-9813 × AVPP-0514 (4.03 °brix). The average TSS of all the genotypes was 3.89°brix. The cross AVPP-0514 × Kashi Anmol (143.27 mg 100g⁻¹) recorded the highest vitamin C content followed by AVPP-0514 × AVPP-0409 (142.31 mg 100g⁻¹) and AVPP-0514 × AVPP-0206 (141.41 mg 100g⁻¹). The average vitamin C content of all the genotypes was 119.65 mg 100g⁻¹. Highest oleoresin content was recorded for the cross AVPP-9813 × AVPP-0206 (166.50 ASTA units) followed by AVPP-9813 × AVPP-9905 (161.41 ASTA units) and AVPP-0105 × AVPP-0206 (161.26 ASTA units). The average oleoresin content of all the genotypes was 142.96 ASTA units. The cross AVPP-0206 × Kashi Anmol (36.34%) recorded the highest DPPH power followed by AVPP-0206 × AVPP-0409 (36.30%) and AVPP-0514 × AVPP-0206 (36.04%). The average DPPH power of all the genotypes was 31.57%. Maximum FRAP activity was recorded for the cross AVPP-0514 × AVPP-0206 (6.48 mmolg⁻¹) followed by AVPP-0206 × Kashi Anmol (6.46 mmolg⁻¹) and AVPP-0206 × AVPP-0409 (6.27 mmolg⁻¹). The average FRAP activity of all the genotypes was 4.15 mmolg⁻¹. Maximum capsaicin content was recorded for the cross AVPP-0514 × AVPP-0506 (3451.48 mg g⁻¹) (followed by AVPP-9905 × AVPP-0506 (3352.55 mg g⁻¹) and AVPP-0512 × AVPP-0206 (3342.49 mg g⁻¹). The average capsaicin content of all the genotypes was 2988.54 mg g⁻¹.

A similar pattern of wide range of variations existing for various qualitative traits has also been reported in chilli by various workers like Farhad *et al.* (2008) [4], Patel *et al.*, (2009) [11], Gupta *et al.* (2009) [5], Chattopadhyay *et al.* (2011) [3], Zehra (2014) [13], Janaki *et al.* (2015) [8], Pandiyaraj (2017) [10], Jogi *et al.* (2017) [7], kerketta *et al.* (2018) [9], Ain (2018) [1], Sultan *et al.* (2020) [12], Akhter *et al.* (2021) [2] and Indrabi *et al.* (2022) [6].

Table 1: Mean performance of genotypes for quality traits in Chilli (*Capsicum annum L.*) (Data pooled over environments)

Genotypes	Days to 50% flowering	Days to first fruit set	Days to first fruit harvest	Days to last fruit harvest	Plant height (cm)	Plant spread (cm)	No. of primary branches plant ⁻¹	Fruit length (cm)	Fruit diameter (cm)	Pericarp thickness (mm)	Pedicle length (cm)	No. of fruits plant ⁻¹	Average fresh fruit weight (g)	Average dry fruit weight (g)	Dry fruit yield plant ⁻¹ (g)	Dry fruit yield hectare ⁻¹ (q)
AVPP-0303 × AVPP-0411	41.37	45.12	65.53	146.03	78.56	52.77	4.41	12.72	1.86	0.67	4.68	91.51	8.80	1.29	131.13	47.26
AVPP-0303 × AVPP-0512	42.79	45.89	67.81	149.23	77.55	54.55	4.53	12.21	2.05	0.59	4.11	95.48	10.04	1.21	126.23	45.21
AVPP-0303 × AVPP-0105	41.47	44.28	68.57	145.22	74.49	54.60	4.64	12.32	1.98	0.61	4.20	89.50	9.85	1.25	126.20	45.28
AVPP-0303 × AVPP-9813	41.26	44.06	68.36	146.07	81.48	59.41	4.71	12.51	1.78	0.60	4.62	96.53	8.28	1.25	132.45	47.25
AVPP-0303 × AVPP-9905	42.82	45.22	68.95	147.49	83.51	55.69	4.39	12.61	1.97	0.63	3.95	95.52	8.35	1.27	131.43	47.19
AVPP-0303 × AVPP-0514	43.40	46.84	69.04	143.96	75.92	49.76	4.45	14.87	1.99	0.62	4.22	86.49	8.22	1.26	121.18	43.27
AVPP-0303 × AVPP-0506	39.53	43.10	67.99	145.75	80.54	51.57	4.55	12.86	2.00	0.61	4.22	85.43	10.23	1.24	115.22	41.20
AVPP-0303 × AVPP-0206	41.36	43.82	68.09	147.70	77.59	50.61	4.79	13.83	2.14	0.64	4.11	94.42	10.75	1.14	118.25	42.24
AVPP-0303 × AVPP-0409	40.48	42.61	67.40	147.74	76.50	54.71	4.37	14.26	1.85	0.57	3.80	92.46	8.47	1.19	120.17	43.14
AVPP-0303 × DABBI	39.88	44.51	69.40	145.03	70.81	45.70	3.55	11.60	2.04	0.62	3.57	80.35	8.32	1.14	97.23	34.27
AVPP-0303 × Kashi Anmol	44.49	46.21	68.35	145.02	82.51	51.74	4.44	13.01	2.08	0.65	4.32	98.47	9.79	1.25	134.22	48.27
AVPP-0411 × AVPP-0512	44.74	46.09	67.59	148.73	72.56	52.55	4.41	13.79	2.24	0.62	4.49	90.47	8.33	1.11	109.25	39.24
AVPP-0411 × AVPP-0105	43.03	45.87	68.72	143.47	76.60	50.61	4.72	13.01	2.21	0.67	4.77	93.45	9.72	1.13	114.22	41.17
AVPP-0411 × AVPP-9813	42.02	44.70	68.29	145.71	76.67	53.49	4.64	14.00	2.16	0.64	4.31	88.51	9.30	1.14	109.28	39.22
AVPP-0411 × AVPP-9905	41.58	46.73	68.65	143.59	73.40	52.68	4.62	13.99	2.10	0.69	3.97	91.45	9.83	1.13	111.15	39.31
AVPP-0411 × AVPP-0514	42.82	45.32	68.31	150.51	72.42	53.57	4.53	14.29	2.24	0.58	4.15	90.39	8.40	1.15	110.25	39.34
AVPP-0411 × AVPP-0506	42.11	44.74	68.94	147.65	73.33	55.62	4.58	13.13	2.13	0.66	4.40	89.55	10.24	1.10	108.14	38.32
AVPP-0411 × AVPP-0206	38.95	43.34	66.11	146.80	79.40	57.75	4.79	13.36	2.24	0.58	3.98	87.44	10.08	1.10	105.24	37.32
AVPP-0411 × AVPP-0409	40.19	44.26	68.21	146.07	78.61	58.57	4.49	13.35	2.08	0.60	4.26	84.44	7.46	1.09	100.18	35.32
AVPP-0411 × DABBI	41.36	45.17	69.62	145.69	74.40	49.66	3.41	13.31	2.05	0.55	3.13	88.53	9.75	1.06	101.20	36.19
AVPP-0411 × Kashi Anmol	39.26	42.57	68.58	145.94	73.98	52.73	4.73	13.39	2.29	0.68	2.82	94.44	10.67	1.10	112.32	40.24
AVPP-0512 × AVPP-0105	41.34	45.82	69.13	147.75	76.80	50.88	4.42	14.41	2.03	0.65	4.32	88.61	9.06	1.10	104.28	37.29
AVPP-0512 × AVPP-9813	39.47	43.66	68.30	146.52	79.51	51.53	4.48	13.37	1.75	0.64	4.65	86.00	8.37	1.10	101.24	36.26
AVPP-0512 × AVPP-9905	39.51	43.34	67.71	145.14	72.84	50.77	4.50	13.69	2.15	0.62	4.40	90.47	9.07	1.09	104.22	37.29
AVPP-0512 × AVPP-0514	40.36	44.95	67.44	147.85	74.52	51.74	4.49	14.35	2.14	0.67	3.18	88.49	9.03	1.10	103.15	37.17
AVPP-0512 × AVPP-0506	41.04	46.43	68.14	145.53	78.48	59.81	4.58	14.50	2.07	0.73	4.20	92.42	9.33	1.07	102.19	36.29
AVPP-0512 × AVPP-0206	39.58	43.97	67.48	147.81	77.65	57.66	4.67	13.79	2.26	0.68	4.22	88.54	9.69	1.11	103.27	37.35
AVPP-0512 × AVPP-0409	41.05	45.75	68.72	146.31	78.71	58.20	4.75	13.89	2.07	0.64	4.13	91.63	7.62	1.10	109.25	39.27
AVPP-0512 × DABBI	45.62	46.73	70.25	144.53	71.42	45.65	3.84	13.13	2.15	0.57	3.50	84.54	7.48	1.09	97.26	34.39
AVPP-0512 × Kashi Anmol	44.09	47.04	68.46	145.86	74.48	56.59	4.53	14.66	2.16	0.63	3.57	99.55	10.32	1.21	130.16	47.23
AVPP-0105 × AVPP-9813	41.53	44.57	69.10	142.97	75.70	53.56	3.62	14.08	2.17	0.60	3.50	93.49	8.42	1.15	113.27	40.33
AVPP-0105 × AVPP-9905	41.05	45.22	68.91	147.10	77.56	55.65	4.44	13.31	2.15	0.55	4.65	88.46	10.28	1.20	113.14	40.32
AVPP-0105 × AVPP-0514	40.46	45.83	68.27	145.19	75.55	56.72	4.64	13.98	2.15	0.61	4.13	88.57	10.13	1.20	115.17	41.27
AVPP-0105 × AVPP-0506	40.59	44.80	67.55	146.80	76.67	55.65	4.52	13.16	1.77	0.67	3.95	87.01	8.87	1.26	119.24	42.35
AVPP-0105 × AVPP-0206	38.43	43.31	66.14	147.39	80.55	59.12	4.75	15.03	2.34	0.70	4.72	113.02	10.60	1.46	168.89	61.02

AVPP-0105 × AVPP-0409	41.78	45.13	67.98	145.66	72.79	54.49	4.68	14.34	2.07	0.63	4.68	95.48	10.84	1.23	126.15	45.23
AVPP-0105 × DABBI	41.16	45.43	68.14	144.10	73.90	45.70	3.47	14.25	1.94	0.52	3.99	85.37	7.57	1.10	100.24	36.19
AVPP-0105 × Kashi Anmol	40.42	44.76	69.06	144.84	73.65	58.75	4.42	13.41	1.98	0.68	4.06	100.62	9.44	1.20	129.27	46.35
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AVPP-9905 × AVPP-0206	43.64	45.04	68.73	142.83	67.07	54.40	4.76	14.01	2.20	0.68	4.61	104.52	9.56	1.24	139.10	50.18
AVPP-9905 × AVPP-0409	40.62	43.60	66.61	145.26	74.23	53.67	4.79	13.91	1.91	0.58	3.44	90.51	8.36	1.15	110.15	39.23
AVPP-9905 × DABBI	40.73	45.23	69.18	145.71	74.87	45.65	3.67	10.32	2.09	0.55	3.32	79.56	7.94	1.10	94.23	33.39
AVPP-9905 × Kashi Anmol	40.42	46.62	69.59	143.57	79.58	58.72	4.65	13.93	2.14	0.63	4.49	97.58	9.57	1.22	126.33	45.36
AVPP-0514 × AVPP-0506	40.33	44.15	69.08	144.56	78.73	53.54	4.40	13.99	2.22	0.60	4.15	89.54	9.35	1.24	118.28	42.40
AVPP-0514 × AVPP-0206	38.34	42.20	64.72	148.50	83.04	61.79	4.80	15.20	2.37	0.69	4.80	110.09	10.50	1.48	169.00	62.00
AVPP-0514 × AVPP-0409	40.80	43.99	65.52	148.96	77.07	59.46	4.43	14.08	2.30	0.64	4.12	93.50	8.13	1.21	121.33	43.41
AVPP-0514 × DABBI	44.28	48.20	69.82	147.36	74.55	50.56	3.71	14.43	1.92	0.52	3.99	89.47	8.05	1.12	106.27	38.24
AVPP-0514 × Kashi Anmol	39.44	43.12	67.40	146.26	75.07	54.98	4.46	13.87	1.88	0.68	4.61	91.53	10.29	1.29	127.29	45.38
AVPP-0506 × AVPP-0206	37.74	41.93	65.69	146.19	86.62	60.43	4.80	15.13	2.40	0.71	4.82	112.84	10.49	1.65	169.02	62.16
AVPP-0506 × AVPP-0409	40.38	46.05	69.85	148.14	67.69	49.70	4.01	14.87	1.82	0.77	3.95	89.20	9.16	1.30	124.30	44.37
AVPP-0506 × DABBI	45.25	48.29	68.91	142.60	70.93	52.37	3.35	13.25	2.00	0.59	3.99	84.46	7.87	1.06	95.26	34.31
AVPP-0506 × Kashi Anmol	41.69	45.06	68.22	146.22	72.18	56.64	4.47	14.76	2.10	0.65	4.43	97.61	9.94	1.30	136.34	49.31
AVPP-0206 × AVPP-0409	39.32	42.59	66.14	149.27	74.14	59.74	4.39	14.24	2.18	0.61	4.12	97.51	10.17	1.19	127.33	46.29
AVPP-0206 × DABBI	40.05	46.33	69.93	145.03	76.97	46.68	3.42	12.28	1.89	0.55	3.82	84.43	9.34	1.14	103.26	36.40
AVPP-0206 × Kashi Anmol	40.53	44.25	68.20	144.78	81.25	59.17	4.81	14.99	2.31	0.69	4.50	109.98	10.55	1.62	168.00	61.05
AVPP-0409 × DABBI	40.98	45.95	69.05	144.54	68.95	48.77	3.80	12.99	1.85	0.69	3.99	81.55	8.38	1.08	92.32	33.31
AVPP-0409 × Kashi Anmol	40.41	44.92	68.58	145.87	78.81	50.74	4.71	14.69	2.16	0.59	4.30	98.50	9.27	1.22	127.25	45.38
DABBI × Kashi Anmol	40.53	45.36	69.25	142.97	78.58	44.60	3.20	12.63	1.69	0.65	3.12	85.58	8.26	1.04	93.35	33.32
AVPP-0303	44.90	48.81	70.67	144.20	72.46	49.78	3.78	12.98	1.94	0.60	3.00	88.46	9.29	1.24	117.24	42.28
AVPP-0411	43.59	47.98	71.66	145.14	70.92	49.50	3.73	12.78	1.99	0.64	3.49	83.47	9.18	1.23	110.35	39.37
AVPP-0512	44.68	48.06	70.84	143.57	74.52	50.51	3.69	13.06	1.97	0.52	3.15	81.47	9.35	1.30	114.36	41.28
AVPP-0105	42.23	47.89	71.53	144.60	71.97	49.91	4.06	12.16	2.07	0.65	3.39	88.53	9.94	1.34	126.25	45.30
AVPP-9813	42.24	46.24	70.12	143.16	70.50	48.56	4.04	11.75	2.03	0.62	3.82	87.45	8.64	1.26	116.29	41.39
AVPP-9905	43.97	47.85	69.42	143.87	63.61	48.21	3.44	13.36	2.00	0.65	3.50	83.59	8.75	1.14	101.29	36.34
AVPP-0514	41.13	44.53	69.45	146.29	71.00	49.69	3.56	12.77	2.02	0.55	4.01	79.54	9.33	1.32	111.37	40.30
AVPP-0506	40.32	44.13	69.04	145.60	69.08	49.87	3.57	12.80	1.89	0.55	3.81	84.43	9.77	1.37	123.38	44.39
AVPP-0206	42.92	46.78	68.91	144.55	74.54	51.10	4.13	11.67	2.14	0.65	3.03	91.48	9.47	1.36	132.24	47.33
AVPP-0409	44.73	45.28	69.73	141.37	60.26	50.38	3.45	12.15	2.17	0.62	2.49	88.53	9.02	1.69	109.32	39.33
DABBI	44.21	48.57	74.69	144.56	70.18	41.52	3.11	11.83	1.80	0.50	3.49	78.40	7.03	1.06	88.32	31.33
Kashi Anmol	44.54	48.60	73.02	145.33	62.93	50.46	3.34	12.46	1.91	0.60	2.97	96.51	9.33	1.24	126.32	45.38
Mean	41.59	45.28	68.62	145.69	74.84	52.93	4.25	13.48	2.08	0.62	3.97	91.12	9.23	1.20	117.37	42.11
C.V %	3.65	3.20	1.86	1.08	4.56	6.46	8.98	6.02	7.14	10.71	9.86	6.83	9.26	8.40	11.78	12.30
S.Em±	0.50	0.48	0.42	0.52	1.13	1.14	0.12	0.27	0.04	0.02	0.13	2.07	0.28	0.03	4.61	1.72
C.D at 5%	1.40	1.34	1.18	1.46	3.16	3.16	0.35	0.75	0.13	0.06	0.36	5.76	0.79	0.09	12.80	4.79

Genotypes	TSS (°B)	Vit-C (mg 100 ⁻¹ g)	Oleoresin (ASTA units)	DPPH (%)	FRAP (mmol g ⁻¹)	Capsaicin (mg g ⁻¹)
AVPP-0303 × AVPP-0411	3.86	108.60	138.46	33.46	3.93	2970.35
AVPP-0303 × AVPP-0512	3.83	95.40	139.09	33.28	3.75	2969.41
AVPP-0303 × AVPP-0105	3.90	99.17	139.31	33.47	3.62	2965.52
AVPP-0303 × AVPP-9813	3.88	110.47	140.22	33.67	3.88	2981.63
AVPP-0303 × AVPP-9905	3.90	106.04	140.34	33.12	3.85	2982.49
AVPP-0303 × AVPP-0514	3.76	104.85	136.46	33.49	3.87	2985.65
AVPP-0303 × AVPP-0506	3.77	106.95	139.34	33.02	3.78	2982.00
AVPP-0303 × AVPP-0206	3.90	106.37	142.33	34.31	4.59	2995.58
AVPP-0303 × AVPP-0409	3.89	107.82	136.54	33.15	3.42	2981.52
AVPP-0303 × DABBI	3.72	114.87	126.57	29.63	3.62	2981.40
AVPP-0303 × Kashi Anmol	3.72	114.87	131.46	33.46	3.88	2991.58
AVPP-0411 × AVPP-0512	3.91	96.95	142.32	31.58	4.57	2961.52
AVPP-0411 × AVPP-0105	3.91	100.88	143.44	33.67	4.32	2989.56
AVPP-0411 × AVPP-9813	3.90	101.03	146.37	33.93	4.59	2986.24
AVPP-0411 × AVPP-9905	3.82	107.30	142.37	31.41	4.30	2959.35
AVPP-0411 × AVPP-0514	3.89	110.90	142.56	32.66	4.73	2981.49
AVPP-0411 × AVPP-0506	4.00	105.81	144.54	31.60	4.42	2995.86
AVPP-0411 × AVPP-0206	3.92	106.92	151.45	33.70	5.99	2989.54
AVPP-0411 × AVPP-0409	3.83	104.62	141.58	31.36	4.03	2931.53
AVPP-0411 × DABBI	3.82	101.22	126.68	28.73	3.88	2921.37
AVPP-0411 × Kashi Anmol	3.74	111.90	126.76	31.72	4.89	2928.48
AVPP-0512 × AVPP-0105	3.76	105.88	146.58	31.45	3.71	3189.45
AVPP-0512 × AVPP-9813	3.77	113.69	149.29	30.54	3.72	3291.34
AVPP-0512 × AVPP-9905	3.77	108.88	141.47	30.58	3.31	3210.50
AVPP-0512 × AVPP-0514	3.78	115.85	141.71	31.54	4.02	3281.33
AVPP-0512 × AVPP-0506	3.83	111.73	142.54	30.53	3.60	3146.22
AVPP-0512 × AVPP-0206	3.82	111.86	151.45	32.69	4.72	3342.49
AVPP-0512 × AVPP-0409	3.81	104.56	140.32	30.69	3.74	2986.27
AVPP-0512 × DABBI	3.80	105.90	139.42	28.64	3.65	2511.56
AVPP-0512 × Kashi Anmol	3.93	111.26	141.39	30.51	3.50	2857.65
AVPP-0105 × AVPP-9813	3.89	124.87	154.56	31.54	3.95	3010.50
AVPP-0105 × AVPP-9905	3.91	126.24	154.50	31.75	3.58	3102.24
AVPP-0105 × AVPP-0514	3.89	126.41	154.45	32.32	4.43	3109.56
AVPP-0105 × AVPP-0506	3.90	125.24	154.47	31.56	4.00	3026.16
AVPP-0105 × AVPP-0206	3.86	126.34	161.26	33.57	5.02	3206.42
AVPP-0105 × AVPP-0409	4.03	124.39	154.63	31.44	3.79	3006.52
AVPP-0105 × DABBI	3.80	125.44	154.43	29.65	3.49	2981.23
AVPP-0105 × Kashi Anmol	3.86	131.17	152.47	31.36	3.88	2990.21
AVPP-9813 × AVPP-9905	3.84	124.57	161.41	31.51	3.85	2994.63
AVPP-9813 × AVPP-0514	4.03	131.39	161.09	32.70	4.65	2985.46
AVPP-9813 × AVPP-0506	4.01	132.38	161.23	31.44	3.85	3030.61
AVPP-9813 × AVPP-0206	4.00	131.28	166.50	33.91	5.14	2995.28
AVPP-9813 × AVPP-0409	4.01	131.32	156.32	31.43	3.95	2860.44
AVPP-9813 × DABBI	3.85	132.42	146.46	28.63	3.53	2808.28
AVPP-9813 × Kashi Anmol	3.89	133.43	146.38	31.45	3.91	3258.57
AVPP-9905 × AVPP-0514	4.02	125.50	141.41	31.44	4.00	3134.70
AVPP-9905 × AVPP-0506	4.02	125.44	147.49	30.79	3.78	3352.55
AVPP-9905 × AVPP-0206	3.98	125.52	149.28	31.51	5.76	3106.43
AVPP-9905 × AVPP-0409	4.00	126.59	144.36	31.39	3.91	3110.81
AVPP-9905 × DABBI	3.86	126.16	139.44	28.66	3.39	3290.54
AVPP-9905 × Kashi Anmol	3.73	128.24	146.36	30.55	3.79	3106.37
AVPP-0514 × AVPP-0506	3.99	141.25	137.41	33.44	4.91	3451.48
AVPP-0514 × AVPP-0206	3.96	141.41	146.48	36.04	6.48	3186.54
AVPP-0514 × AVPP-0409	3.92	142.31	145.67	33.15	4.19	3281.23
AVPP-0514 × DABBI	3.83	141.28	135.57	32.28	4.17	2989.57
AVPP-0514 × Kashi Anmol	3.96	143.27	134.33	33.79	4.51	3204.53
AVPP-0506 × AVPP-0206	4.02	131.39	146.36	30.78	6.02	3190.44
AVPP-0506 × AVPP-0409	3.92	131.39	142.45	31.33	3.78	3111.34
AVPP-0506 × DABBI	3.83	131.28	143.35	30.21	3.60	3105.47
AVPP-0506 × Kashi Anmol	4.01	132.35	141.40	30.66	4.64	3084.46
AVPP-0206 × AVPP-0409	4.02	133.34	164.35	36.30	6.27	3005.20
AVPP-0206 × DABBI	4.02	131.28	141.45	33.04	6.12	3004.15
AVPP-0206 × Kashi Anmol	4.04	132.52	166.34	36.34	6.46	3004.52
AVPP-0409 × DABBI	3.93	132.27	126.47	31.01	3.75	1791.48
AVPP-0409 × Kashi Anmol	3.83	132.72	131.53	32.62	4.02	2457.62
DABBI × Kashi Anmol	3.83	115.96	96.51	22.67	3.30	1951.41

AVPP-0303	3.97	95.29	137.46	32.59	3.08	2970.48
AVPP-0411	3.92	91.22	141.64	30.84	4.19	2921.33
AVPP-0512	3.89	120.26	131.34	30.14	3.12	3043.49
AVPP-0105	3.96	122.37	152.54	30.84	3.16	2998.80
AVPP-9813	3.78	118.66	153.81	32.04	3.73	2986.45
AVPP-9905	3.87	123.69	141.64	29.99	3.09	3097.54
AVPP-0514	3.96	131.25	134.44	32.76	4.29	3186.41
AVPP-0506	3.97	121.56	140.73	28.89	3.15	3044.87
AVPP-0206	3.95	131.56	161.64	33.49	6.11	3407.57
AVPP-0409	3.98	118.15	131.56	30.81	3.37	2568.54
DABBI	3.80	110.36	95.66	16.91	2.52	1793.55
Kashi Anmol	3.84	136.78	107.53	28.72	3.61	2551.57
Mean	3.89	119.65	142.96	31.57	4.15	2988.54
C.V.	1.53	0.61	0.53	2.03	4.30	1.20
SE(m)	0.03	0.42	0.43	0.37	0.10	0.03
C.D at 5%	0.09	1.19	1.22	1.03	0.28	0.01

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