



# Performance of Different Genotypes of Chilli (*Capsicum annum*) under Allahabad Agro-Climatic Condition

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## ABSTRACT

The investigation was carried out at the Vegetable Research Farm in the Department of Horticulture, Allahabad Agricultural Institute-Deemed University, Allahabad to evaluate the performance of 20 genotypes under Allahabad agro-climatic conditions. All twenty genotypes were tested in a randomized block design with 3 replications. The observations were recorded on 14 quantitative traits and 3 qualitative traits i.e. plant height at 100 d, 120 d, days to 1st flowering, days to 50 per cent flowering, days to 1st green fruit harvest, average fruit length, average fruit diameter, average green fruit yield/plant, days to 1st red ripe fruit harvest, average weight of red ripe fruit yield, number of seeds/fruit, weight of seeds/ fruit, ascorbic acids, oleoresin (%) and capsaicin content (%). The earliest day to 1st flowering amongst genotypes was recorded with the Pusa Jawala (31.66) followed by LCA 301 (32), JCA 9(32.33) and the maximum days to 1st flowering were noticed in LCA 333 (41.66). Days to 50 per cent flowering was also observed significant among genotypes. The minimum days to first green fruit harvest was recorded in LCA 357 (79.00) followed by LCA 404 (80.66) and Pusa Jawala (81.33) while genotype LCA 301 (96.33) took maximum days to first green fruit harvest. There were significant differences among genotypes for capsaicin (%) content. The maximum capsaicin (%) was found in IC 413702 (0.62%) followed by Pbc 1438 (0.51%) and IC-383079(0.47%), while JCA 9(0.16%) was found with minimum capsaicin.

**Key words:** : Ascorbic acid, Chilli, Correlation, Path coefficient, Flowering , Green fruit yield, Oleoresin.

## INTRODUCTION

Chilli (*Capsicum annum*) is one of the most important vegetable as well as spice crop, belongs to family Solanaceae. It is a self pollinated crop bearing a pod like fruit (berry) and has a predominant position among the spices grown all over India. It is being grown for green/red chillies in Uttar Pradesh during summer, rainy and winter seasons. The important chemical constituents of chilli fruits include vitamins, pungency, colouring matter oleoresin contents, which are particularly important for food and spice industries. Chillies are mostly used as spices but sometimes it is also used as vegetables. Fruits are used in pickles, sauces, ketchups, chutneys and oleoresin. The

present investigation was carried out to evaluate the performance of 20 genotypes under Allahabad agro-climatic conditions.

## MATERIALS AND METHODS

A field experiment was conducted during August-December, 2006 at the Vegetable Research Farm in the Department of Horticulture. It is situated at 25.750 latitude and 81.500E longitude and 98 m above mean sea level (MSL). The experimental field has an even topography with a gentle slope and good drainage. The soil samples were drawn from each replication of experimental plot at 15 cm depth before the sowing of the crop and a composite sample was prepared to determine the physical and

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chemical properties of soil. The Allahabad region has a sub-tropical and semi-arid climate and the temperature rise up to 45°C to 48°C in summer and goes down to as low as 2.50°C during winter. The present investigation was carried out to find out the variation in different stage and growth in Chilli. The different genotypes tested were Pusa Jawala, SM 20, JCA 9, IC 413702, IC 383079, Japani long, Pbc 1438, LCA 206, LCA 301, LCA304, LCA 312, LCA 324, LCA 333, LCA 334, LCA 357, LCA 404, CO56861, Kashi Anmol, EC 492576 and Utkal Ragini taken from Indian Institute of Vegetable Research, Varanasi.

Observations were recorded with respect to Plant height (days), 1st flowering (days), 50 per cent flowering (days), 1st green fruit harvest (days), average weight of green fruits (g), average fruit length (cm), average fruit diameter (cm), average green fruit yield/plant (g), 1st ripe fruit harvest (days), average weight of red ripe (g), average red ripe fruit yield (g), number of seed/fruit, weight of seeds/fruit (g), ascorbic acid (mg/100g), Oleoresin (%), Capsaicin (%) and qualitative parameters. Ascorbic acid was estimated titrimetrically using 2-6 dichlorophenol indophenols method (Sadasivam and Manickam, 1992). Oleoresin and Capsaicin content (%) was determined by Folin-Dennis method (Mathew *et al*, 1971) in chilli powder.

The data were pooled and statistically calculated for analysis of the R.B.D. design, mean, Range and Analysis of variance described by Panse and Sukhatme (1967).

## RESULTS AND DISCUSSION

The perusal of data (Table 1) showed that a large amount of variability was present in plant height. The maximum plant height was observed in LCA 206 (51.83cm) and the minimum in Kashi Anmol (37.53cm) against the population mean of 41.96 cm. All the genotypes under study exhibited higher mean values as compared to general mean (41.96), while Pusa Jawala (39.76cm) and LCA 304 (42.9CM) showed lower mean values. Significant

differences were found for days to 1st flowering amongst different genotypes.

The earliest day to 1st flowering amongst genotypes was recorded with the Pusa Jawala (31.66) followed by LCA 301 (32), JCA 9(32.33) and the maximum days to 1st flowering were noticed in LCA 333 (41.66). Days to 50 per cent flowering was also observed significant among genotypes. Japani Long (58.00) and LCA 334 (57.33) took maximum days to 50 per cent flowering and the minimum days were recorded with the genotype SM 20 (51.66).

Significant differences were found for days to first green fruit harvest among various genotypes. The minimum days to first green fruit harvest was recorded in LCA 357 (79.00) followed by LCA 404 (80.66) and Pusa Jawala (81.33) while genotype LCA 301 (96.33) took maximum days to first green fruit harvest. Significantly the maximum weight of green fruit was recorded in EC 492576 (22.93g), followed by LCA 206 (18.88g), IC 38079 (18.65g) and JCA 9 (11.69g), while genotype Pusa Jawala (8.22g) was found to be with minimum weight of green fruit. Maximum fruit length was observed significant in IC 413702 (12.16cm) followed by SM 20 (11.50 cm), Pusa Jawala (10.5 cm) and LCA 206 (9.56cm) and the minimum fruit length was recorded in Pbc 1438 (4.33cm).

There were significant differences amongst different genotypes for the diameter. The maximum fruit diameter was observed in LCA 206 (2.63cm) followed by SM 20 (2.46cm) and LCA404 (2.40cm), while LCA 312(1.23cm) was found with minimum fruit diameter. Significantly the maximum average green fruit yield was found in SM 20 (168.42g) followed by Pusa Jawala (143.98g) and Utkal Ragani(140.43g), while LCA 301 (34.72G) was found with minimum green fruit yield. Days to first ripe fruit harvest was also recorded significant. LCA 404 took maximum days (130.00) followed by SM 120.00) and Kashi Anmol (120.00), whereas CO 5686 1 took minimum days for first ripe fruit harvest (103.00).

**Table 1. Mean performance of different genotypes for various characters in Chillies.**

Genotype	Plant ht at 120 d	Days to 1st flowering	Days to 50% flowering	Days to 1st green fruit harvest	Av. wt. of green fruits (g)	Av. fruit length (cm)	Av. fruit diameter (cm)	Av. green fruit yield/plant (g)	Days to 1st ripe fruit harvest	Av. wt. of red ripe	Av. red ripe fruit yield	No. of seed/ fruit	Wt. of seeds/ fruit	Ascorbic acid (mg/ 100g)	Oleoresin(%)	Capsaicin(%)
Pusa Jawala	39.76	31.66	55.00	81.33	8.22	10.5	1.60	143.98	110.66	11.50	125.55	31.66	0.616	52.51	16.52	0.23
SM-20	40.33	36.33	51.66	85.00	9.75	11.5	2.46	168.42	120.00	10.81	102.89	31.33	0.633	42.55	14.50	0.33
JCA-9	39.16	32.33	51.66	85.00	9.75	11.5	2.46	168.42	116.66	12.48	91.57	64.00	0.713	19.49	16.92	0.16
LCA-206	51.83	38.66	53.66	83.33	18.88	9.56	2.63	97.74	49.10	37.33	52.33	80.66	9.66	8.16	2.40	0.67
LCA-404	49.10	37.33	52.33	80.66	9.60	8.16	2.40	65.67	130.00	26.78	68.47	39.00	0.563	38.05	13.60	0.43
IC-413702	47.76	36.66	52.66	84.66	9.60	8.3	1.86	53.083	115.00	20.63	49.80	40.00	0.676	33.92	16.91	0.62
Japani long	40.20	40.33	58.00	90.00	5.37	9.5	2.33	71.30	111.33	11.87	68.61	52.66	0.523	19.32	13.51	0.41
Pbc-1438	48.33	40.66	58.00	90.00	5.37	9.5	2.33	71.33	104.00	23.52	95.99	55.66	0.738	40.95	9.30	0.51
IC-383079	48.03	39.00	54.66	85.00	18.65	12.16	2.06	69.21	111.00	19.79	57.37	38.66	0.84	28.10	11.17	0.47
LCA-333	51.73	41.66	64.66	83.66	8.09	8.83	2.26	39.42	116.66	12.48	33.17	33.66	0.670	32.85	14.62	0.25
LCA-334	50.66	39.00	57.33	80.66	18.16	9.16	1.33	49.63	117.33	16.35	46.57	41.66	0.813	26.10	13.20	0.35
CO-5686-1	42.00	39.33	52.00	81.66	8.32	8.66	1.73	68.20	103.00	13.01	63.28	111.0	1.056	28.21	15.11	0.32
Kashi Anmol	37.53	40.33	55.00	89.66	8.24	9.66	1.76	133.42	120.00	10.52	101.14	51.00	0.756	25.10	13.54	0.20
LCA-357	42.00	39.66	55.00	79.00	12.05	8.33	2.36	35.39	119.00	11.69	34.05	51.33	0.703	46.18	10.53	0.20
EC-492576	45.46	40.66	56.66	84.21	22.93	9.16	2.03	42.93	122.33	13.20	41.29	86.00	1.010	104.82	14.94	0.23
Utkal Ragini	40.23	41.33	56.00	86.21	9.79	4.73	1.53	140.43	111.33	13.42	116.18	31.00	0.640	24.71	15.35	0.22
LCA-324	41.00	35.00	52.66	94.33	9.85	5.00	1.63	39.42	116.33	11.27	102.21	40.33	0.710	25.19	13.48	0.31
LCA-312	44.66	40.33	55.33	94.66	9.93	4.73	1.23	44.30	111.66	13.06	91.50	37.66	0.630	46.49	11.25	0.25
LCA-301	39.33	32.00	52.66	96.33	9.10	5.63	1.63	34.72	115.33	18.99	80.30	41.66	0.713	37.41	13.49	0.20
LCA304	42.66	33.00	51.66	93.66	8.75	6.90	2.30	53.88	15.49	77.17	47.95	0.71	36.73	13.95	16.23	0.62
Grand mean	44.09	37.76	54.83	86.24	11.40	8.06	77.65	114.53	15.49	77.17	47.95	0.71	36.73	13.95	16.23	0.62
F-test	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
SEm(+)	1.34	0.87	0.96	1.96	0.47	0.29	1.58	1.78	0.74	1.08	1.37	0.02	0.58	0.58	0.26	0.52
C.D.at 5%	4.12	3.83	2.50	2.77	3.03	1.37	2.13	4.55	5.11	2.13	3.11	3.95	0.06	0.06	0.48	2.31

Significant differences were found for red ripe fruit weight. The maximum average weight of red ripe fruit was observed in LCA 404 (26.78g), followed by Pbc 1438 (23.52g) and IC 413702 (20.63g), while Kashi Anmol (10.52g) was found minimum weight of red ripe fruit. Significantly the maximum red ripe fruit yield was found in Pusa Jawala (125.55g) followed by Utkal Ragini (116.18g) and SM 20(102.89g), while LCA 333 (33.17g) was found with minimum red ripe fruit yield.

The number of seeds/fruit was also found significant. The maximum average number of seeds/fruit was observed in CO 5681 1 (111.00) followed by EC 492576 (86.00) and JCA 9 (64.00), while Utkal Ragini(31.00) was recorded with minimum average number of seeds/fruit. Significantly maximum average weight of seeds/fruit was recorded in CO 5681 1 (1.05g) followed by EC 492576 (1.010g) and LCA 334 (0.813g), while Japani Long((0.523) recorded minimum average weight of seeds/fruit. There were significant differences among genotypes for ascorbic acid contents. The maximum ascorbic acid 104.82mg/100g was found in EC 492576 (104.82mg), followed by Pusa Jawala (52.51mg) and LCA 312 (46.49), while LCA 206 was found with minimum ascorbic acid (16.71mg). For Oleoresin (%) content there were significant differences. The maximum oleoresin (%) content was recorded I JCA 9(16.92%) followed by IC 413702(16.91%) and Pusa Jawala (16.52%), while LCA 357 was observed with minimum oleoresin content. There were significant differences among genotypes for capsaicin (%) content. The maximum capsaicin (%) was found in IC 413702 (0.62%) followed by Pbc 1438 (0.51%) and IC-383079(0.47%), while JCA 9(0.16%) was found with minimum capsaicin.

Varietal variation in capsaicin content in hot chilli (*Capsicum chinense*) have been reported by Cherian (2000).

## CONCLUSION

Based on performance SM 20, JCA 9, Pusa Jawala, Utkal Ragini and Kashi anmol exhibited high fruit yield per plant. Among all the genotypes SM 20 was found to be highest yielder i.e. 168.42 g/plant. There were significant differences among genotypes for capsaicin (%) content and the maximum capsaicin was found in IC 413702 followed by Pbc 1438 and IC 383079, while JCA 9 was found with minimum capsaicin. The maximum ascorbic acid was found in EC 492576 followed by Pusa Jawala and LCA 312, while LCA 206 was found with minimum ascorbic acid. LCA 404 took maximum days followed by SM 20 and Kashi Anmol whereas CO 5686 1 took minimum days for first ripe fruit harvest.

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