Original Research Article

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Correlation and Coefficient Analysis in Chilli (*Capsicum annuum* L.)

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ABSTRACT

Keywords

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The correlation and coefficient analysis were studied in sixteen genotypes in chilli for 16 different qualitative and quantitative characters. Correlation coefficients at genotypic and phenotypic levels indicated that fruit weight per plant was positively and significantly correlated with fruit yield per plot, number of fruits per plant, fruit length, number of primary branches per plant and average fruit weight but negative and significant association was found with days to 50% flowering indicating that early flowering and early picking might be associated with increasing the fruits yield per plant. The remaining character are number of fruits per plant and fruit length, while as highest negative direct effect on fruit yield per plant was exerted by number of branches per plant and pedicel length. Therefore, selection should be practiced for fruit weight, number of fruits per plant and fruit length for direct improvement of fruit yield per plant.

Introduction

Chilli (*Capsicum annuum* L.) $2n=24$ is an important spice cum vegetable crop in India. It belongs to family solanaceae, which has about 90 genera and 2000 species. In India, only two species viz., *Capsicum annuum* and *Capsicum frutescens* are cultivated varieties. Chilli is mainly cultivated in tropical and sub tropical countries viz. India, Africa, Japan, Mexico, Turkey, USA etc, it is referred to as chillies, Chile, hot peppers, bell peppers, red peppers, pod peppers, cayenne peppers, paprika, pimento, and capsicum in different parts of the world. Chilli fruit are rich source of Vitamin A, C and E. Pungency of chilli is due to a crystalline acrid volatile alkaloid

called capsaicin, present in the placenta of fruit which has diverse prophylactic and therapeutic uses in allopathic and ayurvedic medicine. The red colour of chilli is due to the pigment capsanthin. However, under complex situation, correlation alone becomes insufficient to explain relationships among characters analysis of economic yield and yield components.

Materials and Methods

The experimental material consisted of 6 lines viz., BSPRL-066, BSPRL-171, BSPRL-188, BSPRL-189, BSPRL-224, BSPRL-226 and 10 testers viz., PBNC-1, Parbhani Tejas, Pusa Jwala, Phule Jyoti, Kokan Kirti, Pusa

Sadabahar, Bydagi, Bydagi-341, Teja, G-4 and three standard hybrid check BSS-355, BSS-378, BSS-273. Hybridization was done during 2017-18 and evaluation was done by during 2018-19 *kharif*.

The experiment was laid out at All India Coordinated Research project on Vegetable crops, Vasantrao Naik Marathvada Krishi Vidyapeeth Parbhani in randomized block design with two replications. The experiment consisted of 16 parents and 60 hybrids. Each entry was planted in four rows of 30 plants each with spacing of 60 x 45 cm and the crop raised as per the recommended package of practices.

The observations on green fruit yield and its 17 important component traits were recorded from five randomly selected plants from each treatment; However in green chilli is meager to the study on correlation and coefficient analysis.

Results and Discussion

The correlation coefficient at both genotypic and phenotypic levels indicated that fruit yield per plant was significantly and positively correlated with fruit weight at edible maturity, number of fruits per plant, fruit length, number of branches per plant and number of picking per plant (Table 1&2).

Table.1 Genotypic correlation coefficient for different yield contributing characters in chilli

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.0000	0.1273*	0.2741	0.2007**	0.0501**		0.2467***	0.3039***	0.4156*	0.0726**	0.2414**	0.2997**	0.2981**	0.1794**	0.0669**	0.2846**
2		1.0000	0.2360**	0.2570*	0.2453**	0.4604*	-0.2910	-0.0379***	-0.7700*	0.1392**	0.2446**	0.1600**	-0.2831*	-0.4382*	0.2381**	0.1035***
3			1.0000	0.9496**	0.4943**	0.0368***	-0.1846**	-0.1918***	-0.5381*	0.1165**	-0.0608*	-0.0621*	0.0083**	-0.1268*	-0.0224*	-0.1056**
4				1.0000	0.4864*	0.0961***	-0.2285**	-0.2254***	-0.4514	0.1480**	-0.0417*	-0.0614*	-0.0426*	-0.1457	0.0518**	-0.0984**
5					1.0000	0.1311	-0.3525**	-0.1051***	-1.5742	0.2118**	-0.0558*	-0.0448*	-0.2670*	-0.4818*	0.0160**	-0.1068**
6						1.0000	-0.2472	-0.0689**	-0.1471	0.1079**	0.2528**	0.0981**	-0.3353*	-0.0547*	0.2127**	0.1739***
7							1.0000	0.6761	1.4635	-0.0583*	0.4137**	0.5417**	0.8551**	0.4280**	0.2133**	0.4708**
8								1.0000	0.6703	0.2932**	0.4810**	0.5736**	0.4315**	0.3839**	0.3675**	0.4695***
9									1.0000	-1.6598	1.0541**	1.1765**	1.3709**	1.4314**	-0.2393*	1.0718**
10										1.0000	0.0250***	0.0894**	-0.1206*	-0.0527*	-0.0179*	-0.0309*
11											1.0000	0.9446**	0.4093*	0.2112**	0.6763**	0.8980
12												1.0000	0.4624**	0.1494**	0.7259**	0.9074**
13													1.0000	0.5182**	0.1908**	0.4778*
14														1.0000	0.1037**	0.3154*
15															1.0000	0.6901
16																1.0000

1) Plant height 2) NP branches/plant 3) days to first flower 4) days to 50% flower 5) days to first fruit ripening 6) N of fruit / plant 7) Fruit weight (g) 8) Fruit length (cm) 9) Fruit diameter (mm) 10) Pedicel length(cm) 11) Fruit weight / plant (g) 12) Fruit yield / plot (kg) 13) Dry fruit weight (g) 14) N of seed/ fruit 15) N of picking/ plant 16) Dry fruit yield / plot (kg)

Table.2 Phenotypic correlation coefficient for different yield contributing characters in chilli

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.0000	0.0857	0.2726***	0.1968*	0.0505	0.0000.1876-0.1888*	0.2333**	0.2863***	0.1030	0.573	0.2392**	0.2979***	0.2229***	0.1316	0.0549	0.2585**
2		1.0000	0.1741*	0.2000*	0.1844*	0.3626***	-0.2252**	-0.0517	-0.0891	0.0628	0.1825*	0.1251	-0.1355	-0.2593**	0.1225	0.0548
3			1.0000	0.9277***	0.4885***	0.0319	-0.1644*	-0.1734*	-0.1003	0.0812	-0.0576	-0.0600	0.0045	-0.0746	-0.0147	-0.0929
4				1.0000	0.4833***	0.0974	-0.2327**	-0.2150**	-0.1660*	0.0532	-0.0488	-0.0609	-0.0464	-0.1116	0.0007	-0.0869
5					1.0000	0.1269	0.3434***	-0.0992	0.3962***	0.1248	-0.0587	-0.0422	-0.2110**	0.3519***	0.0025	-0.1006
6						1.0000	-0.2325**	-0.0748	-0.0448	0.0678	0.2375**	0.0944	-0.2472**	-0.0491	0.1552	0.1473
7							1.0000	0.6160***	0.5684***	0.1286	0.4229***	0.4928***	0.6735***	0.3042***	0.2788***	0.4303***
8								1.0000	0.2541**	0.2510**	0.4623***	0.5148***	0.3336***	0.2456**	0.3068***	0.3995***
9									1.0000	0.1198	0.3397***	0.2411**	0.4348***	0.2413**	-0.2180**	0.2569**
10										1.0000	0.0728	0.0465	-0.0686	-0.0360	-0.1969*	-0.0195
11											1.0000	0.9193***	0.3336***	0.1406	0.5845***	0.8216***
12												1.0000	0.3247***	0.1193	0.5559***	0.8249***
13													1.0000	0.2395**	0.1738*	0.3173***
14														1.0000	0.0026	0.1966*
15															1.0000	0.5344***
16																1.0000

1) Plant height 2) NP branches/plant 3) days to first flower 4) days to 50% flower 5) days to first fruit ripening 6) N of fruit / plant 7) Fruit weight (g) 8) Fruit length (cm) 9) Fruit diameter (mm) 10) Pedicel length(cm) 11) Fruit weight / plant (g) 12) Fruit yield / plot (kg) 13) Dry fruit weight (g) 14) N of seed/ fruit 15) N of picking/ plant 16) Dry fruit yield / plot (kg)

From the results on correlation coefficient analysis, it was evident that number of fruits per plant, fruit weight at edible maturity and fruit length had high positive direct effect on fruit yield per plant, fruit yield per plot at phenotypic and genotypic levels whereas days to 50% flowering, number of picking per plant high positive direct effect at genotypic level only (Table 1).

Similar results were reported by Gupta *et al.*, (2009), Ullah *et al.*, (2011), Chattopadhyay *et al.*, (2011), Kumar *et al.*, (2012), and Yatung *et al.*, (2014), for fruit weight, fruit yield per plant, number of fruits per plant, fruit length and number of branches per plant whereas Kumar *et al.*, (2012) also reported the significant and positive correlation between fruit yield. Positive and significant correlation of fruit yield per plant was observed with days to 50% flowering at both genotypic and phenotypic level also been reported by Basavaraj (1997), Nandapuri *et al.*, (1970), and Dhahiya *et al.*, (1991).

References

Thamburaj, S. and Singh, N. 2003. A chapter written by Deshpande, A. A. Chilli and

Capsicum.“ In Text book on Vegetable, Tuber Crops and Spices”. Published by ICAR, 45-70 p.

Sunderaraj, D.D. and Thulasidas, G. 1976. Botany of field crops. *The Mac Millan Company of India Limited*, New Delhi.382-389 p.

Anonymous, 2018. Annual Report of National Horticulture Board, Gurgaon, www.nhb.org.in

Ukkund, Krishna C., Patil, M. P., Madalageri, M. B., Mulage, Ravindra and Jagadeesh, R.C. 2007.Character association and path analysis studies in green chilli for yield and yield attributes (*Capsicum annum* L.). *Karnataka J. Agric. Sci.* 20 (10): 99-101.

Dewey, D.R. and Lu, K. H. 1959. A correlation and path coefficient analysis of components of crested wheat grass seed production. *Agron. J.* 51: 515-518.

Gupta, A. M., Singh, D. and Kumar, A. 2009. Genetic variability, genetic advance and correlation in chilli (*Capsicum annum* L.). *The Indian J. Agric. Sci.* 79 (3): 221-223.

Ullah, M. Z., Hasan, M. J., Saki, A.I., Rahman, A.H. M. A. and Biswas, P. L. 2011. Association of correlation and

- cause-effect analysis among morphological traits in chilli (*Capsicum frutescence* L.). *Internal. J. Biores.* 10(6):19-24.
- Chattopadhyay, A., Sharangi, A. B., Dai, N. and Dutta, S. 2011. Diversity of Genetic Resources and Genetic Association Analysis of Green and Dry Chillies of Eastern India. *Chilean J. Agric. Res.* 71(3): 350-356.
- Kumar, D., Bahadur, V., Rangare, S. B. and Singh, D. 2012. Genetic variability, heritability and correlation studies in chilli (*Capsicum annuum* L.). *Hort Flora Res. Spectrum.* 1(3): 248-252.
- Yatung, T., Dubey, Rakesh K. R., Singh, V., Upadhyay, G. and Pandey, A. K. 2014. Selection parameters for fruit yield and related traits in chilli (*Capsicum annuum* L.). *Bangladesh J. Bot.* 43(3): 283- 291.
- Basavaraj, N. 1997. Genetic variability and genetics of quantitative and quality characters in green chilli (*Capsicum annuum* L.) genotypes. *Ph. D. thesis*, University of Agricultural Sciences, Dharwad, India.
- Nandapuri, K.S., Gupta, V. P. and Thakar, P. C. 1970. Correlation studies in chillies. *J. Res. Punjab Agric. Uni.* 7: 301-303.
- Dahiya, M. S., Pandita, M. L. and Vashista, R. N. 1991. Correlation and path analysis in chilli (*Capsicum frutescence* L.). *Haryana J. Hort. Sci.* 20: 244-249.
- Sujata, S. R., Nehru, S. D. and Sailaja, H. 2003. Association of morphological parameter with fruit yield and their component analysis in chilli. *Karnataka J. Agric. Sci.* 16(3): 465-468.
- Kumar, B. K., Munshi, A. D., Subodh, J. and Kaur, C. 2003. Correlation and path coefficient analysis for yield and biochemical characters in chilli. *Capsicum and Eggplant Newsletter.* 22: 67-70.
- Mishra, S., Lal, R. K., Darokar, M. P. and Khanuja, S. P. S. 2010. Genetic Association and Path-coefficient Analysis of the Economic Traits in the Chilli (*Capsicum annuum* L.). *Elect. J. Plant Bree.* 1(3): 346-350.
- Rathod, R. P., Deshmukh, D. T., Hode, P. and Gonge, V. S. 2002. Correlation and Path analysis in chilli (*Capsicum annuum* L.). *Haryana J. Hort. Sci.* 31(1/2): 141-143.
- Jabeen, N., Sofi, P. A. and Wani, S. A. 2009. Character association in Chilli (*Capsicum annuum* L.). *Revista UDO Agricola.* 9 (3): 487-490.

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