

Original Research Article

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Genotypic and Phenotypic Correlation Studies in Chilli (*Capsicum annuum* L.) Genotypes for Yield and Yield Attributing Characters

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ABSTRACT

Keywords

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Field experiment was conducted at Horticulture Research and Extension Station, Haveri (Devihosur), University of Horticultural Sciences, Bagalkot (Karnataka) during *Kharif* season of 2016-2017 to know the genotypic and phenotypic association between sixteen yield and yield attributing characters in green chilli. Thirty two advanced lines were evaluated along with Byadgi Dabbi, ByadgiKaddi, G-4, Pusa jwala and GC-69/68 as checks. Correlation coefficients indicated that fruit yield per plant was significant and positively correlated with fruit weight, number of fruits per plant, fruit length, plant height, plant spread. Since, these associations of characters are in desirable direction indicating higher contribution of these characters towards yield but negative and significant association was found with days to days to first flowering, 50 per cent flowering, stalk to fruit ratio and ascorbic acid content indicating that early flowering and early picking might be associated with increasing the fruits yield per plant.

Introduction

Chilli (*Capsicum annuum* L.) important vegetable as well as spice crop. In India, there is no home which does not consume chilli either as green or dry. It finds a place in pharmaceuticals also. India is the major green chilli growing country in the world having an area of 140.04 thousand hectare with production of 1687.83 thousand tons. In India, Karnataka is the major growing state where area under green chilli is 43.66 thousand hectare and production is 596.13 thousand tons followed by Bihar (39.49 thousand hectare and 478.1313 thousand ton) and

Andhra Pradesh (10.88 thousand ha and 167.24 thousand ton) as reported by Anon., 2015 [1].

Maximum diversity can be noticed among different cultivars available in India and outside with respect to shape, size, yield, quality and other traits. Identification of a variety better suited for a particular region and its improvement is of immediate task to exploit its potential.

The improvement can be brought out after confirming the association of most important character yield with other yield attributing

characters. Hence, an experiment was conducted at Horticulture Research and Extension Station, Haveri (Devihosur), University of Horticultural Sciences, Bagalkot (Karnataka) during *Kharif* season of 2016-2017 to know the genotypic and phenotypic association between sixteen yield and yield attributing traits in green chilli.

Materials and Methods

Field experiment conducted during *Kharif* season of 2016-2017 at Horticulture Research and Extension Station, Haveri (Devihosur), University of Horticultural Sciences, Bagalkot (Karnataka) with Thirty two advanced lines (F₉) along with Byadgi Dabbi, ByadgiKaddi, G-4, Pusa jwala and GC-69/68 as checks. The trial was laid out on randomized complete block design (RCBD) with two replications, in medium black soil.

Thirty eight days old seedlings were transplanted at spacing of 60 cm × 60 cm. All the recommended cultural practices were followed to raise good chilli crop (Anon., 2013) [2]. Five randomly selected plants in each experimental plot were used for recording observations on vegetative, yield and yield attributing parameters.

The data was subjected to statistical analysis by adopting complete randomized block design (Panse and Sukhatme, 1967) [3] and the phenotypic correlation coefficient and genotypic correlation coefficient were computed by using *INDOSTAT* software.

Results and Discussion

In the present investigation the relation of yield with yield attributing characters as well as among themselves was examined using genotypic and phenotypic correlation analysis.

The genotypic correlation was higher than the phenotypic correlation indicating high heritable nature of characters.

The yield attributing characters like number of fruit per plant (0.717 and 0.819 respectively), fruit length (0.456 and 0.554 respectively), and fruit weight (0.478 and 0.627 respectively) had highly significant positive correlation with yield per plant at phenotypic and genotypic level respectively (Table 1 and 2).

Since, these associations of characters are in desirable direction indicating higher contribution of these characters towards yield.

Similar results were also reported by Chaudhary *et al.*, (2013) [4], Vijay *et al.*, (2015) [5] and Srividya *et al.*, (2017) [6] in chilli.

Plant height at 120 days showed highly significant and positive correlation with yield per plant at phenotypic (0.510) and genotypic (0.704) level, while plant spread showed highly significant positive association ($p=0.01$) with yield per plant at phenotypic (0.571) and genotypic (0.996) level and Stalk to fruit ratio showed highly significant and negative correlation with yield per plant at phenotypic (-0.806) and negative correlation at genotypic (-0.982) level. Similar results were reported by Ullah *et al.*, (2011) [7] and Chaudhary *et al.*, (2013) [4].

In conclusion from the present study it was concluded that the yield was positively associated with most of the traits. On the basis of present study it is evident that characters *viz.*, number of fruits per plant, fruit length, fruit weight and other yield attributing characters have contributed for yield may be directly or through other characters which will help the breeders for further crop improvement.

Table.1 Genotypic Correlations for vegetative, yield and yield attributing characters in green chilli

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.000	0.942**	0.162	0.685**	-0.427**	-0.454**	0.598**	0.242*	0.050	0.267*	-0.015	-0.751**	-0.130	-0.365**	-0.010	0.704**
2		1.000	0.266*	0.968**	-0.459**	-0.689**	0.974**	0.302**	0.075	0.348**	-0.428**	-0.992**	-0.118	-0.390**	-0.263*	0.996**
3			1.000	0.743**	-0.030	0.614**	0.146	-0.425**	-0.390**	-0.489**	0.163	0.029	-0.024	0.162	-0.104	-0.370**
4				1.000	-0.725**	0.209	0.747**	0.037	-0.327**	-0.213	0.128	-0.612**	-0.138	-0.225*	-0.360**	0.352**
5					1.000	-0.206	-0.072	-0.785**	-0.343**	-0.229*	0.160	0.250*	0.194	0.310**	-0.070	-0.406**
6						1.000	-0.041	-0.537**	-0.119	-0.358**	-0.189	0.508**	-0.470**	0.487**	-0.154	-0.361**
7							1.000	0.237*	-0.202	-0.057	-0.005	-0.768**	-0.141	-0.171	-0.039	0.819**
8								1.000	0.219	0.471**	0.331**	-0.404**	-0.032	-0.235*	-0.092	0.554**
9									1.000	0.859**	-0.614**	-0.192	0.097	-0.156	-0.193	0.299**
10										1.000	-0.159	-0.437**	0.272*	-0.400**	-0.048	0.627**
11											1.000	0.002	0.265*	0.014	0.191	-0.006
12												1.000	-0.092	0.508**	-0.037	-0.982**
13													1.000	0.107	0.190	0.038
14														1.000	-0.120	-0.454**
15															1.000	-0.047
16																1.000

**1. Plant height (120DAT)
2. Plant spread (120 DAT)
3. Primary branches**

**4. Secondary branches
5. Days to first flowering
6. Days to fifty percent flowering**

**7. Number of fruits per plant
8. Fruit length (cm)
9. Fruit diameter (cm)
10. Average fruit weight**

**11. Stalk length (cm)
12. Stalk to fruit ratio
13. Chlorophyll content (mg/100g)**

**14. Ascorbic acid content (mg/100g)
15. Capsaicin content (%)
16. Yield per plant (g)**

Table.2 Phenotypic Correlations for vegetative, yield and yield attributing characters in green chilli

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1.000	0.697 **	-0.117	0.227	0.039	-0.196	0.468 **	0.200	0.076	0.240 *	-0.058	-0.601 **	-0.097	-0.265 *	-0.014	0.510**
2		1.000	-0.104	0.307 **	0.022	-0.084	0.553 **	0.258*	0.158	0.182	-0.032	-0.602 **	-0.060	-0.214	-0.148	0.571**
3			1.000	0.652 **	0.022	0.187	0.060	-0.241 *	-0.215	-0.317**	0.031	0.069	-0.006	0.094	-0.061	-0.187
4				1.000	0.056	0.096	0.414**	0.017	-0.168	-0.149	0.005	-0.294 *	-0.062	-0.134	-0.177	0.268*
5					1.000	0.079	0.007	-0.225	-0.020	-0.130	-0.035	0.137	0.118	0.180	-0.047	-0.078
6						1.000	-0.068	-0.120	0.009	-0.243 *	-0.028	0.355**	-0.264 *	0.300 **	-0.093	-0.216
7							1.000	0.192	-0.156	-0.051	-0.020	-0.760 **	-0.139	-0.165	-0.035	0.717**
8								1.000	0.213	0.349 **	0.189	-0.303 **	-0.018	-0.183	-0.053	0.456**
9									1.000	0.617 **	-0.275 *	-0.131	0.086	-0.125	-0.162	0.200
10										1.000	-0.029	-0.437 **	0.250 *	-0.375 **	-0.045	0.478**
11											1.000	-0.011	0.161	0.002	0.109	0.042
12												1.000	-0.084	0.492 **	-0.033	-0.806**
13													1.000	0.106	0.189	0.035
14														1.000	-0.121	-0.367**
15															1.000	-0.028
16																1.000

1. Plant height (120DAT)	4. Secondary branches	7.Number of fruits per plant	11.Stalk length (cm)	14. Ascorbic acid content (mg/100g)
2. Plant spread (120 DAT)	5. Days to first flowering	8.Fruit length (cm)	12.Stalk to fruit ratio	15. Capsaicin content (%)
3. Primary branches	6. Days to fifty percent flowering	9.Fruit diameter (cm)	13.Chlorophyll content (mg/100g)	16.Yield per plant (g)
		10. Average fruit weight		

References

1. Anonymous (2015) Indian Horticultural Database. <http://www.nhb.gov.in>.
2. Anonymous (2013) Improved cultivation practices of vegetables (Kannada), University of Horticultural Sciences, Bagalkot. pp. 130-131.
3. Panse VG, Sukhatme PV (1957) The application of genetics to plant breeding. IV. The inheritance of quantitative characters and plant breeding. *J. Genet* 40: 283-302.
4. Choudhary BS, Samadia DK (2013) Variability and character association in chilli land races and genotypes under arid environment. *Indian J. Hort* 61(2): 132-136.
5. Vijaya HM, Gowda APM, Umesha K, Lingaiah HB, Nehru SD (2015) Evaluation and correlation studies in chilli (*Capsicum annuum* L.) genotypes for quality parameters. *Progressive Horticulture* 47 (2): 341-343.
7. Srividya S, Kumar SR, Yasin GM (2017) Association analysis in chilli genotypes for dry fruit yield. *International J.Hort* 7(7):47-53.
8. Ullah MZ, Hassan MJ, Saki AI, Rahman MA, Biswas PL (2011) Association of correlation and cause-effect analysis among morphological traits in chili (*Capsicum frutescens* L.). *International J. Bio. Res* 10 (6):19-24.
9. Chattopadhyay A, Sharangi AB, Dai N, Dutt S (2011) Diversity of genetic resources and genetic association analyses of green and dry chillies of eastern India. *Chilean J. Agric. Res* 71 (3): 350-355.
10. Yatung T, Dubey RK, Singh V, Upadhyaya GY, Pandey AK (2014) Selection parameters for fruit yield and related traits in chilli (*Capsicum annuum* L.). *Bangladesh J. Bot.* 43(3): 283-291.

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