

Original Research Article

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Correlation and Path Coefficient Analysis for Yield and Yield Attributing Characters in Chilli (*Capsicum annum* L.) Genotypes

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ABSTRACT

A field experiment entitled “Biometrical studies in chilli (*Capsicum annum*.L) carried out in RBD Design with three replication during the Kharif season 2016, at Instructional - Cum- Research Farm, Department of Horticulture ,College of Agriculture, Latur, V.N.M.K.V., Parbhani. The correlation and path analysis were studied in twenty genotypes in chilli for 14 different qualitative and quantitative characters . Correlation coefficients at genotypic and phenotypic level indicated that plant spread, fruit length, fruit diameter, fruit stalk length showed highly significant and positive genotypic and phenotypic correlation coefficient with fruit yield per plant. Reducing and non- reducing sugar showed highly significant and positive genotypic and phenotypic correlation coefficient with total sugar. Path coefficient analysis revealed that plant spread, fruit diameter, weight of seeds per fruit, was found positive and direct effect on fruit yield per plant, while stem girth, primary branches, days to first flowering was found high negative direct effect on fruit yield per plant. Fruit diameter was very high positive direct effect on fruit yield per plant. Stem girth and primary branches had very high negative direct effect on fruit yield per plant. Plant spread and weight of seeds per fruit was medium positive direct effect on fruit yield per plant. Days to first harvesting had low positive direct effect on fruit yield per plant. Plant height and days to first harvesting had negligible effecton fruit yield per plant.

Keywords

Correlation, Path coefficient analysis, Chilli, Yield Characters

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Introduction

Yield is a complex character controlled by the large number of contributing characters and their interaction. It is not only influenced by a number of related characters which are governed by few numbers of genes, but is also influenced to a greater extent by environment. The study of correlation coefficients will helps

in simultaneous selection for more than one character.

As the yield is dependent on many component characters, the total correlation is insufficient to explain the true association between the characters. In order to have clearer picture of yield components for effective selection programme, it would be desirable to consider

the relative magnitude of various characters. Path coefficient analysis will help for sorting out the total correlation into direct and indirect effects which is useful in selecting high yielding genotypes.

Considering the importance of the crop there is need to generate more information on nature and magnitude of variability for yield and other characters present in germplasm pool as it is an important basic pre-requisite for starting any systematic breeding programme in identifying superior lines or varieties.

Materials and Methods

The present investigation was carried out at Instructional -Cum -Research Farm, Department of Horticulture, College of Agriculture, and Latur during Kharif season of July 2016 to February 2017. The statistical design adapted was RBD with two Replications. Chilli seedlings were transplanted on 22th August, 2016 at the spacing of 60 cm x 45cm.

In each treatment there were twenty plants of each genotype in a replication. Five plants were randomly selected from each treatment to record observations. The experimental material comprised of 20 genotypes *viz.*, Guntur local, Phule jyothi, DCC-127, DCC-167, DCC-36, DCC-25, DCC-50, DCC-135, DCC-168, DCC-164, Pusajwala, Byadagi Dabbi, Byadagi Kaddi, Parbhani Tejas, Jalna Local, G-4, Beed Local-1, Beed Local-2, Hingoli Local and PBNC-1 were used. Observations on growth, yield, and quality characters were recorded on five randomly selected plants in each treatment.

Plant height, Plant spread, Primary branches, Stem girth, Days to first flowering, Days to 50% flowering, Days to first harvesting, Fruit length, Fruit diameter, Pericarp thickness,

Fruit stalk length, Weight of seeds per fruit, Number of fruits per plant (green), Yield per plant (green).

The Phenotypic correlation coefficient and genotypic correlation coefficient and direct and indirect effects were computed by using procedure given by Dewey and Lu (1959).

Results and Discussion

Plant spread, fruit length, diameter of fruit showed highly significant and positive genotypic and phenotypic correlation coefficients with fruit yield per plant. Reducing and non-reducing sugar showed highly significant and positive genotypic and phenotypic correlation coefficient with total sugar. Ascorbic acid is highly significant and positive correlation with T.S.S.

Path coefficient analysis revealed that, fruit diameter, weight of seeds per fruit, plant spread, and number of fruits per plant green found positive and direct effect on fruit yield per plant. While, stem girth and days to first flowering was found negative and direct effect on fruit yield per plant.

Diameter of fruit showed very high positive direct effect on fruit yield per plant. Stem girth had very high negative direct effect on fruit yield per plant. Plant spread was medium positive direct effect on fruit yield per plant. Days to first harvest had low positive direct effect on fruit yield per plant.

From the present path analysis study in chilli, it may be concluded that improvement in fruit yield per plant could be brought by selection for component characters like number of fruits per plant, plant spread, and number of primary branches per plant (Table 1 and 2).

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

Sl. No	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1.000	0.375*	-0.012	-0.15	0.287	0.308	0.005	0.123	0.223	-0.087	-0.163	-0.165	-0.369*	0.262
2		1.000	-0.068	0.086	0.021	0.133	0.125	0.090	0.456**	-0.01	0.043	0.088	-0.226	0.656**
3			1.000	0.311	-0.244	-0.029	0.028	0.045	-0.121	0.420*	0.275	0.260	0.318*	-0.149
4				1.000	-0.944**	0.233	0.286	0.319*	0.071	0.425*	0.366*	0.242	-0.145	0.277
5					1.000	-0.158	-0.269	-0.209	0.099	-0.29	-0.266	-0.923**	-0.025	-0.112
6						1.000	0.672*	-0.039	0.067	0.283	0.333*	0.255	-0.464**	0.266
7							1.000	-0.338*	-0.252	0.780**	0.312*	0.333*	-0.144	0.045
8								1.000	0.309	-0.252	0.162	0.227	0.233	0.429**
9									1.000	-0.041	0.165	0.061	-0.265	0.859**
10										1.000	0.564**	0.396*	-0.205	0.030
11											1.000	0.354*	-0.351*	0.250
12												1.000	-0.169	0.256
13													1.000	-0.230
14														1.000

*significant at p = 0.05 probability (0.312)

**significant at p = 0.01 probability (0.403)

1. Plant height (cm) 5. Days to first flowering 9. Fruit diameter (mm) 13. Number of fruits per plant (green)
 2. Plant spread (cm) 6. Days to 50% flowering 10. Pericarp thickness (mm) 14. Yield per plant (green)
 3. Primary branches 7. Days to first harvesting 11. Fruit stalk length (cm)
 4. Stem girth (mm) 8. Fruit length (cm) 12. Weight of seeds per fruit

Table.2 Direct (diagonal) and indirect effects of yield components on fruit yield at a genotypic level in chilli

	1	2	3	4	5	6	7	8	9	10	11	12		rG
1	0.048	0.018	-0.006	-0.007	0.014	0.015	0.003	0.060	0.010	-0.004	-0.008	-0.008	-0.018	0.262
2	0.117	0.312	-0.0214	0.027	0.006	0.041	0.039	0.028	0.142	-0.003	0.013	0.027	-0.070	0.656
3	0.002	0.011	-0.170	-0.053	0.041	0.005	-0.004	-0.007	0.020	-0.071	-0.047	-0.044	-0.054	-0.149
4	0.048	-0.027	-0.100	-0.322	0.304	-0.070	-0.092	-0.102	-0.023	-0.137	-0.118	-0.323	0.047	0.277
5	-0.042	-0.030	0.035	0.138	-0.146	0.020	0.039	-0.030	-0.014	0.042	0.039	0.135	0.003	-0.112
6	0.043	0.019	-0.004	0.033	-0.022	0.142	0.095	0.005	0.009	0.040	0.047	0.036	-0.066	0.266
7	0.002	0.005	-0.001	0.011	-0.011	0.027	0.041	0.014	-0.010	-0.032	0.012	0.013	-0.006	0.045
8	0.022	0.016	0.008	0.057	-0.037	-0.007	-0.061	0.180	0.055	-0.045	0.029	0.041	0.042	0.429
9	0.152	0.312	-0.083	0.049	0.068	0.046	-0.172	0.211	0.684	-0.028	0.113	0.042	-0.181	0.859
10	-0.006	-0.008	0.031	0.032	-0.220	0.021	0.059	-0.019	-0.003	0.075	0.042	0.030	-0.015	0.030
11	-0.012	0.003	0.020	0.027	-0.020	0.025	0.023	0.012	0.012	0.042	0.074	0.026	-0.026	0.250
12	-0.050	0.027	0.079	0.307	-0.283	0.078	0.102	0.069	0.019	0.121	0.108	0.306	-0.052	0.025
13	-0.061	-0.037	0.053	-0.024	-0.025	-0.077	-0.024	0.039	-0.0443	-0.030	-0.058	-0.028	0.167	-0.230

Residual effect = 0.250

*significant at p = 0.05 probability (0.312)

**significant at p = 0.01 probability (0.403)

Bold: Direct effect above and below diagonal: Indirect effect

1. Plant height (cm) 5. Days to first flowering 9. Fruit diameter (mm) 13. Number of fruits per plant (green)
 2. Plant spread (cm) 6. Days to 50% flowering 10. Pericarp thickness (mm) rG Correlation with Yield per plant (green)
 3. Primary branches 7. Days to first harvesting 11. Fruit stalk length (cm)
 4. Stem girth (mm) 8. Fruit length (cm) 12. Weight of seeds per fruit

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