

Estimation of response to selection in chilli (*Capsicum annuum* L.)

ABSTRACT

The present investigation was executed at Main Experiment Station of Department of Vegetable Science, Acharya Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj), Ayodhya (U.P.) during Rabi 2019-20, with objectives to estimate the genetic variability among the available germplasm of chilli. Experimental material for the study consisted of 36 genotypes including one check (KA-2). The experiment was conducted in Randomized Completely Block Design with three replications. Observations were recorded on 10 quantitative traits viz. days to 50% flowering, plant height (cm), number of primary branches per plant, days to maturity (Mature Green Stage), days to maturity (Red Ripe Stage), fruit length (cm), fruit diameter (mm), average fruit weight (g) and fruit yield per plant. Fruit yield per plant was positively and significantly associated with average fruit weight and number of fruits per plant while primary branch per plant, fruit length and plant height showed negative and significant correlation with fruit yield per plant and selection for these traits with positive correlation would be effective for yield improvement in chilli.

Keyword-Chilli and correlation

1. INTRODUCTION

Chilli is one of the most important vegetable crop grown throughout India. It belongs to family *Solanaceae* with chromosome number $2n=24$. It is grown for exports as well as for domestic market. Chilli is one of the most important and the largest produced spice crop in Asia. Major chilli growing countries in world are India, China, Ethiopia, Myanmar, Mexico, Peru, Vietnam, Pakistan, Ghana, and Bangladesh. India tops among all of these in exporting chillies. It contributes about 33% of the total spice export from India and share about 16% of the world spice trade. The major chilli growing states of India are Andhra Pradesh, Karnataka, Maharashtra, Orissa, Tamil Nadu, Madhya Pradesh, West Bengal and Rajasthan.

Chilli pulp is pickled in strong vinegar or brine. Extracts of chilli are used in the production of ginger beer and other beverages. Cayenne pepper is incorporated in poultry feeds; a green chilli are rich in Rutin which has pharmaceutical use. Pungency of chilli is due to capsaicin. The pigment (colour) in chilli is due to capsanthin also contains many other oleoresins.

Chilli contains a range of essential nutrients and bioactive compounds which are known to exhibit antioxidant, antimicrobial, antiviral, anti-inflammatory and anticancer properties. It is an excellent source of Vitamin A, B, C, E and P (Quresh *et al.*, 2015). It is also a good source 'oleoresin', which permits better distribution of colour and flavour in foods (Chattopadhyay *et al.*, 2011).

The productivity of chilli in India is low due to lack of superior genotypes or improved cultivars. Yield is

the result of the expression and association of several plant growth components. In any crop improvement programme, it is a prerequisite to critically assess the interrelationship for yield and its contributing characters. Correlation studies provide a better understanding of the association of different characters with yield. Correlation studies provide information about the nature and magnitude of various associations among the traits.

2. MATERIAL AND METHODS

The present investigation was executed at Main Experiment Station of Department of Vegetable Science, Acharya Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj), Ayodhya (U.P.) during Rabi 2019-20. Experimental material for the study consisted of 36 genotypes including one check (KA-2). Each entry was retransplanted in the plot size of 1.2 m x 3 m in Randomized Complete Block Design in three replications with spacing of 60 x 50 cm. All the recommended agronomic package of practices and plant protection measures were followed to raise a good crop. Observations were recorded on 10 quantitative traits viz. days to 50% flowering, plant height (cm), number of primary branches per plant, days to maturity (Mature Green Stage), days to maturity (Red Ripe Stage), fruit length (cm), fruit diameter (mm), average fruit weight (g) and fruit yield per plant.

The simple correlation between different characters at genotypic and phenotypic level were looked out between character as suggested by Searle (1965).

3. RESULT AND DISCUSSION

The nature and magnitude of association between yield and its component traits is necessary for effective selection in advance generations. Nature of population under consideration and the magnitude of correlation coefficient could often be influenced by the choice of the individuals upon which the observations are made. Correlations between character pairs are due to linkage of genes or pleiotropy of genes. Therefore, selection of one trait influence the other linked or pleiotropically affected traits. Considerable importance has been attached to correlation studies in the plant improvement because they are helpful in making effective selection.

The phenotypic and genotypic correlation coefficient computed among the ten characters under study had been presented in table 1 and 2. In general, genotypic correlation coefficients were higher than the corresponding phenotypic correlation coefficients, suggesting therefore, a strong inherent relationship in different pairs of characters in chilli genotypes. The most

important trait fruit yield per plant had exhibited highly significant and positive phenotypic correlation with average fruit weight (0.539) and number of fruits per plant (0.331) while highly significant and negative correlation with primary branches per plant (-0.340) followed by fruit length (-0.321) and plant height (-0.277). Primary branches per plant had exhibited highly significant and positive correlation with plant height (0.389) while highly significant and negative correlation with number of fruits per plant (-0.352). Numbers of fruits per plant showed highly significant and negative correlation with fruit length (-0.334) and plant height (-0.323). Fruit diameter exhibited highly significant and negative correlation with fruit length (-0.338), days to maturity (RRS) (-0.323) and days to maturity (MGS) (-0.277). Fruit length showed highly significant and positive correlation with days to maturity (RRS) (0.493). Most important positive and significant association was estimated between fruit yield per plant and average fruit weight (0.539). Primary branch per plant was also found to have significant and positive correlation with plant height (0.389). This showed that traits having significant positive correlation with fruit yield per plant also showed significant and positive correlations with some other traits as well as. Similar association of traits in chilli had also been reported by **Pujar et al. (2017)**, **Vidya et al. (2018)**, **Srinivas et al. (2020)** and **Chavan et al. (2021)**.

Table-2: Estimates of genotypic correlation coefficient among ten characters in chilli

Traits	Daysto50%Flowering	DaystoMaturity(MGS)	DaystoMaturity(RRS)	Plantheight	Fruitlength	Fruitdiameter	Numberoffruits per plant	Averagefruitweight	Primarybranches per plant	Fruityield per plant
Daysto50%Flowering	1	0.244	0.227	0.138	0.151	-0.001	-0.079	-0.305*	0.086	-0.213
Daystomaturity(MGS)		1	0.336*	-0.014	0.206	-0.657**	0.045	-0.277*	-0.315*	-0.294*
Daystomaturity(RRS)			1	0.085	0.722**	-0.614**	-0.24	0.098	0.293*	-0.179
Plantheight (cm)				1	0.103	0.104	-0.351*	-0.095	0.411**	-0.293*
Fruitlength(cm)					1	-0.473**	-0.375*	-0.202	0.288*	-0.348*
Fruitdiameter						1	-0.046	0.056	0.081	0.06
Numberoffruitsperplant							1	-0.132	-0.378*	0.339*
Averagefruitweight								1	-0.051	0.554**
Primarybranchesperplant									1	-0.349*
Fruityieldperplant										1

Significant at 5% & 1%

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