Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.5140

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **6 (1):** 390-394 (2018)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Correlation Analysis for Seed Yield in Different Genotypes of Chilli (*Capsicum annum* L.)

Geeta Gaur*, Mukesh Topwal and Durvesh Kumar Singh

Department of Vegetable Science, College of Agriculture,

G. B. Pant University of Agric. and Tech, Pantnagar, 263 145, U. S. Nagar, Uttarakhand, India

*Corresponding Author E-mail: geetagaur27279@gmail.com

Received: 5.07.2017 | Revised: 12.08.2017 | Accepted: 19.08.2017

ABSTRACT

The present investigation was conducted to find out the association among 25 different qualitative and quantitative characters in 95 chilli genotypes during the year 2007-08. The correlation study indicated that the fruit yield / plant was positively and significantly correlated with the number of fruits/ plant, weight of fruits / plant, fruit body length, fruit periphery, root weight, seed yield/plant, fruit stalk length, seed weight /fruit, number of seeds / fruit and ascorbic acid content but fruit yield was found to be negatively associated with the percent fruit dry weight, husk weight and days to 50 % fruit ripening. Therefore, these characters may be taken into account during the process of selection for improvement of the fruit yield / plant.

Key words: *Capsicum Annum, Genotypes, Fruit, Seed Yield*

INTRODUCTION

Chilli (*Capsicum annum* L.) is one of the most important spices cum vegetable crop grown in India with great export potential[24]. The Capsicum genus belongs to the Solanaceae family and includes 27 recognized species[1]. It is grown for use as a vegetable (green chilli), spice (dry chilli), condiment, sauce and pickle under tropical, sub-tropical and temperate climates[8]. Chilli, both in the green and ripe stages, is an important condiment used for imparting pungency, which is due to an active principle 'capsaicin', an alkaloid present in the placenta, which can directly scavenge various free radicals[2]. Knowledge of correlation studies helps the plant breeder to ascertain the real components of yield and provide an effective basis of selection. Correlation study determines the mutual relationship between various plant characters and determines the components characters on which selection is based for genetic improvement of a particular character[20].

MATERIAL AND METHODS

The present investigation was carried out in 2007 at Vegetable Research Centre of G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand in a Augmented Design with 93 genotypes of chilli for 25 different quantitative characters *viz.*, Plant height (cm), Stem diameter (cm), No.

Cite this article: Gaur, G., Topwal, M. and Singh, D.K., Correlation Analysis for Seed Yield in Different Genotypes of Chilli (*Capsicum annum* L.), *Int. J. Pure App. Biosci.* **6(1):** 390-394 (2018). doi: http://dx.doi.org/10.18782/2320-7051.5140

of Branches per plant, No of fruits per plant, Weight of fruits/plant(g), Fruit body length (cm), Fruit stalk length (cm), Fruit periphery (cm), Days to 50% Flowering, Days to 50 % fruit ripening, Root weight (g/p), Shoot weight (g/p), Per cent fruit Dry weight (%), Seed weight/100 g fruit, Husk weight (g), 100 seed weight (mg), Seed weight/ fruit (mg), No. of seeds/plant, Seed :husk ratio, Seed yield per plant (g), LCV incidence (%), Anthracnose (%), Incidence of Nematode (%), Ascorbic acid (mg/100g) and Total fruit yield (q/ha). The trial was conducted in open field conditions at spacing of 50 × 50 cm. All the recommended cultural operations were followed to grow a successful crop. Observations were recorded on five selected plants from each genotype in each replication. Correlation analysis was carried out as per the formulae suggested by Searle[21]. The significance of correlation coefficient the calculated against t-value, compared with tabulated t-value on n-2 degree of freedom [23].

RESULT AND DISCUSSION

The extent of variability either naturally occurring induced in the genetic material for various characters would provide an important opportunity to plant breeder for any crop improvement programme. The knowledge regarding inter relationship among characters would direct the breeder to select specific component characters whose selection would result in simultaneous improvement for the complex characters which are positively correlated with their component traits. Selection for yield per se may not be effective, since, the expression of yield is multiplicative interaction of several fitness characters. This expression is not only polygenically governed but it also influence by the fluctuating environmental factors. It would be, therefore, imperative to have adequate information on the correlation among different components as well as the association of these components with the yield. Grafius[6], stated that there are no genes for yield per se but only for the components of the yield. Any improvement in a positive component of a yield or combinations of components would results in the improvement of yield. Thus, the knowledge of yield contributing components and their interrelations are important for improving the efficiency of selection. In the present experiment, the study of correlation among different characters revealed that, in general, the genotypic correlation coefficient was somewhat more than the phenotypic correlation. This indicated that little role of environment in the expiration of genetic relationship of the characters in the phenotype. Similar finding was reported by Legg and Lippert[11], Ram[15], Rathod *et al*.[18]. and Kumar *et al*.[10].

In the present investigation, positive and significant correlation of fruit yield was recorded with the number of fruits per plant, weight of fruits per plant, fruit body length, fruit periphery, root weight, seed yield per plant, fruit stalk length, seed weight per fruit, Number of seeds per fruit, and ascorbic acid content. On the other hand, significant but negative correlation recorded with percent fruit dry weight, husk weight, days to 50 % fruit ripening (Table 1). These results are conformity with the results obtained by Pawade *et al*.[14], Mohammed *et al*.[12], and Rathod *et al*.[19]. They reported positive correlation between plant height and number of fruits per plant and Chouvey *et al*.[3], Dahiphale *et al*.[4], found significant correlation between fruit yield per plant and number of fruits per plant and they also reported that number of seeds per fruit, fruit circumference and fruit stalk length had direct positive effect on the yield. Whereas Stem diameter has positive and non significant association with total fruit yield, weight of fruits per plant, fruit body length, and fruit stalk length. These results are in accordance with the findings of Rani and Singh[17], who have reported that stem diameter has indirect effect on fruit stalk and root mass. Stem diameter confirmed the importance in influencing the total fruit yield. The similar types results were also reported by Gupta[7]. Number of branches per plant showed the significant and positive correlation with the root weight per plant, and shoot weight per

plant. Whereas Number of fruits per plant showed the highly significant and positive association with the weight of fruits per plant, root weight per plant, shoot weight per plant, seed yield per plant and total fruit yield. These results are in agreement with the findings of the results of Pawade *et al*.[14], Rani[16], and Munshi *et al*.[13], according to them, numbers of fruits per plant were positively and significantly correlated with weight of fruits per plant and red ripen fruit yield. Weight of fruits per plant was positively and significantly correlated with the total fruit yield per plant. Similar results have also been reported by Das and Chaudhary[5], Munshi *et al*.[13], they concluded that number of fruit per plant and weight of fruits per plant should be selected when breeding done for higher yield. Fruit body length was positively and significantly correlated with the fruit stalk length, fruit periphery and total fruit yield. These results are in accordance with the findings of Singh *et al*.[22], who have obtained the similar type results, that fruit length was positively correlated with total fruit yield /plant which were also supported by Dahiphale *et al*.[4], Khurana *et al*.[9], and Pawade *et al*.[14]. Per cent fruit dry weight was positively and significantly correlated with the seed weight in 100 g of fruits, husk weight. This indicated that dry chilli yield depends upon the characters like husk weight and seed weight where as seed weight or seed yield was associated with the Percent fruit dry weight. Whereas Seed yield per plant showed the highly significant and positive correlation with the total fruit yield, number of seeds per fruit, Seed weight in 100 g of fruits, number of fruits per plant, weight of fruits per plant, fruit periphery, and fruit body length.

Table 1: Correlation Studies among different characters in Chilli genotypes

Traits	PH	SD	NBP	NFP	WFP	FBL	FSL	FP	DF	DR	RW	SW	DFW	FSW	HW	SW	SWF	NSP	SYP	LCV	AA	TY
PH	-	0.547**	0.564**	-0.033	0.055	0.134	0.322**	-0.22	-0.60	-0.124	0.294**	0.523**	0.028	0.006	0.029	-0.081	-0.064	0.063	0.007	0.117	0.007	0.055
SD		*	0.500**	-0.045	0.083	0.170	0.160	-0.068	0.093	0.078	0.258*	0.463**	-0.049	0.068	-0.074	-0.024	-0.030	-0.006	0.132	0.202	0.001	0.083
NBP			*	0.194	0.137	0.040	0.126	-0.030	0.148	0.009	0.559**	0.607**	-0.053	-0.048	-0.048	0.086	-0.090	-0.183	0.036	-0.013	-0.034	0.137
NFP				*	0.671**	0.013	-0.001	0.142	-0.073	-0.280**	0.449**	0.277**	-0.346**	-0.236*	-0.322**	0.045	0.094	0.060	0.428**	-0.335**	0.160	0.671**
WFP					*	0.428**	0.212*	0.394**	0.019	-0.218*	0.356**	0.176	-0.433**	-0.198	-0.429**	-0.006	0.212*	0.239*	0.810**	-0.172	0.218*	1.00**
FBL						*	0.482**	0.333**	0.057	-0.048	0.220*	0.095	-0.256*	-0.228*	-0.223*	-0.094	0.048	0.168	0.244*	-0.108	0.148	0.428**
FSL							*	0.267**	0.106	-0.071	0.315**	0.235*	-0.247*	-0.264*	-0.204	-0.119	-0.049	0.111	-0.004	-0.029	0.063	0.212*
FP								*	-0.127	0.274**	0.086	-0.031	-0.163	-0.130	-0.046	-0.205*	0.135	0.423**	0.286**	-0.061	0.128	0.394**
DF									*	0.314**	0.162	0.101	-0.121	-0.002	-0.133	-0.027	-0.122	-0.138	0.039	0.065	-0.122	0.019
DR										*	0.104	-0.204*	0.080	0.054	0.073	0170	0.042	-0.167	-0.139	0.081	-0.200	-0.218*
RW											*	0.604**	-0.237*	-0.179	-0.216*	0.012	-0.043	-0.065	0.174	-0.327**	0.075	0.356**
SW												*	0.117	0.002	-0.130	-0.002	-0.166	0.143	0.078	0.120	0.119	0.176
DFW													*	0.524**	0.973**	-0.063	-0.087	0.006	-0.185	0.185	-0.308**	-0.433**
FSW														*	0.303**	-0.149	-0.026	0.174	0.326**	0.086	-0.128	-0.198
HW															*	0.33	-0.092	-0.052	-0.293**	0.184	-0.308**	-0.429**
SW																*	-0.562**	-0.504**	-0.069	-.0164	0.048	-0.006
SWF																	*	0.382**	0.174	-0.124	-0.017	0.212*
NSP																		*	-0.294**	-0.003	0.079	0.239*
SYP																			*	-0.115	0.171	0.810**
LCV																				*	-0.120	-0.172
AA																					*	0.218*
TY																						*

*Significant at 5 % level of significance ** Significant at 1 % level of significance

Where, PH= Plant height, SD= Stem diameter, NBP=No. of Branches/Plant, NFP= No of fruits per plant, WFP=Weight of fruits/plant, FBL= Fruit body length (cm), FSL= Fruit stalk length (cm), FP= Fruit periphery (cm), DF= Days to 50% Flowering, DR= Days to 50 % fruit ripening, RW= Root weight (g/p , SW=Shoot weight (g/p), DFW= Per cent fruit Dry weight , FSW= Seed weight/100 g fruit, HW= Husk weight (g), SW= 100 seed weight (mg), SWF= Seed weight/ fruit (mg), NSP= No. of seeds/plant , SYP= Seed yield per plant (g), LCV= LCV incidence (%) , AA= Ascorbic acid (mg/100g), TY= Total fruit yield (q/ha).

REFERENCES

1. Baral, J. B. And Bosland, P.: An updated synthesis of the Capsicum genus. Capsicum and Eggplant News, **21**, 11–21 (2002.).
2. Bhattacharya, A., Chattopadhyay, A., Mazumdar, D., Chakravarty, A. and Pal, S. Antioxidant constituents and enzyme activities in chilli peppers. *International Journal of Vegetable Science* **16(3):** 201-211 (2010).
3. Chauvey, V. K., Chaudhary, M. L. and Saha, B. C. Correlation and path analysis in chilli, *Bangladesh Horticulture*., **14(1):** 9-13 (1986).
4. Dahiphale, V. V., Rodge, R. P. and Sondge, V. D. Correlation and regression studies of chilli. *Journal of Maharastra Agricultural University* **16**(2):285-286 (1991).
5. Das, S. and Chaudhary, D. N. Studies of correlation and path coefficient in summer chilli, *Journal of Applied Biology* **9(1):** 5-7 (1999).
6. Graffius, B. Components of yield in oats. a geometrical interpretation *Agran,J*. **48:** 419-423 (1956).
7. Gupta, M. K. Performance of chilli (*Capsicum annuum* L.) genotypes under tarai condition of Uttarakhand. MSc. (Ag.) Thesis, submitted to G.B.P.U.A & T., Pantnagar (U.S.Nagar), 110 P (2003).
8. Hazra, P., Chattopadhyay, A., Karmakar, K. and Dutta, S. Modern technology in vegetable production. New India Publishing Agency, New Delhi, India p. 478. (2011).
9. Khurana, S. C., Pandita, M. L., Thakral, K. K. and Singh, C. B. Correlation and path analysis studies in chilli. *Maharashtra Journal of Horticulture*. **7(1):** 76-80 (1993).
10. Kumar, B. K., Munshi, A. D. Subod, J. and Kaur, C. Correlation and path coefficient analysiss for yield and biochemical characters in chilli. *Capsicum and Eggplant. Newsletter*. **22:** 67-70 (2003).
11. Legg, Paul D. and Lippert, L.F. Estimates of genetic and environmental variability in cross between to strains of pepper (*Capsicum annuum* L.). *American Socety of Horticulture Science, Proceedings.* **89:** 443-448 (1966).
12. Mohammad, I., Ganiger, V. M. and Yenjerappa, S. T. Genetic variability heritability, genetic advance and correlation studies in chilli. *Karanataka Journal of Agricultural Sciences.* **14(3):** 784-787 (2001).
13. Munshi, A. D., Behra, T. K. and Singh, G. Correlation and path coefficient analysis in chilli. *Indian Journal of Horticulture Science*. **55(2):** 157-159 (2000).
14. Pawade, S. B., Santake, M. B., Shinde, N. N. and Borikar, S. T. Studies on correlation and path analysis for some characters in local chilli (*Capsicum annuum* L.) Types from Nagpur district. *P.K.V. Res. Jour*., **1:** 93-94 (1995).
15. Ram, B., Genitic studies in chilli. Ph. D. (Hort.) Thesis, G.B.Pant University of Agriculture and Technology, Pantnagar, Nanital, India. 105 P. (1982).
16. Rani, P. U. Association of morphological and quality parameters with fruit yield and their relationship in chilli (*Capsicum annuum* L.). *Karanataka J. Agric. Sci*., **10(10):** 75-78 (1997).
17. Rani, P. U. and Singh, D. P. stem diameter and its importance in breeding for fruit yield in chilli and evaluation of genetic stock. *Indian Journal of Tropical Agriculture*., **18(4):** 327-334 (2000).
18. Rathod, R. P., Deshmukh, D. T., Hode, P. B. and Gonge, V. S. Correlation and path analysis in chilli. (*Capsicum annuum* L.) *Haryana J. of Hort. Sci.*, **31.1/2:** 141-143 (2002).
19. Rathod, R. P., Deshmukh, D. T., Sable, N. H. and Rathod, N. G. Genetic variability studies in chilli. (*Capsicum annuum L.). Journal of soils and crop.* **12(2):** 210-212 (2002).
20. Robinson, H. F., Comstock, R. E. and Harvey, P. H., Estimates of heritability and degree of dominance in corn. *Agronomy Journal*., **41:** 353-359 (1949).

21. Searle, S. R. Phenotypic, genotypic and environmental correlation Biometrics. **17:** 474-480 (1961).
22. Singh, B., Rajput, C. B. S. and Singh, B. Component analysis in chillies. Progressive *Horticulture*.**24**.**1-2:** 32-37 (1992).
23. Snedecor, G. W. and Cochran, W. G. Statistical methods. 6th ed. Oxford and IBH Pub. Co. *Colcutta*, 469 (1967).
24. Ukkund, K. C., Madalageri, M. B., Patil, M. P., Mulage, R. and Kotlkal, Y. K. Variability Studies in Green Chilli (*Capsicum annuum* L.). *Karnataka J. Agric. Sci*., **20(1):** 102 – 104 (2007).