Indian J. Hort., **50**(1) : 68-72, 1993

CORRELATION AND PATH COEFFICIENT ANALYSIS IN POINTED GOURD

A.K. SINGH*, R.D. SINGH AND J.P. SINGH

Department of Vegetable Science, N.D. University of Agriculture & Technology, Faizabad 224 229

INTRODUCTION

Pointed gourd (*Trichosanthes dioica* Roxb.) is an important dioecious vegetable crop belonging to the family cucurbitaceae. The natural variation in most of the yield contributing traits of this crop is considerably high and there is need to restructure the variation in the material for higher yield. Correlation studies between yield and other traits of the crop will be of interest to breeders in planning the hybridization programme and evaluating the individual plants in segregating populations. But it does not give an exact position of the relative importance of direct and indirect effect of the various characters on yield. Path analysis helps in partioning of correlation coefficient into direct and indirect effects of various traits on yield or any other attributes. Therefore, present study deals with association of important quantitative characters and the path coefficient analysis between the components of yield in pointed gourd.

MATERIALS AND METHODS

Seeds of thirty six pointed gourd hybrids were sown in August 1986 on 15 cm raised nursery beds. Seedlings were ready for transplanting after one month of sowing. Seedlings were dug along with earth ball and shifted to already prepared pits of size of 30 × 30 × 30 cm, filled with soil, compost and sand mixed in equal proportion. Row to row and plant-to-plant spacings were 3 × 1.5 m. The experiment was laid out in completely randomized block design with three replications at Instructional Farm of Narendra Deva University of Agriculture and Technology, Faizabad. Observations were recorded on available female plants for days to first flower opening, days to first picking, length of the vine (m), number of branches per plant, number of fruits per plant, length of the fruit (cm), diameter of the fruit (cm), average fruit weight (g), number of seeds per fruit and total yield per plant (g). Phenotypic and genotypic correlations were computed by using the formula of Johnson *et al.* (2) and path coefficient by Dewey and Lu (1).

RESULTS AND DISCUSSION

In general, the genotypic and phenotypic correlation coefficient between yield and its components indicated that the magnitude of genotypic correlation coefficient were

TABLE 1

Estimates of correlation coefficients among ten characters in 36 F_1s of pointed gourd

		Days to first picking	Length of vine (m)	No. of branches/ plant	No. of fruits/ plant (cm)	Length of fruit (cm)	Diameter of fruit	No. of seeds/ fruit (g)	Av. fruit weight	Total yield plants (g)
Day to first flower opening										
Days to first flower opening	(P)	0.881**	0.034	-0.168	0.015	0.103	0.194	0.278	0.169	0.105
	(G)	1.000**	0.046	-0.209	0.041	0.121	0.255	0.329*	0.260	0.094
Days to first picking	(P)		0.039	-0.141	-0.025	0.123	0.191	0.315	0.212	0.046
	(G)		0.118	-0.247	-0.045	0.134	0.248	0.394*	0.294	0.024
Length of vine (m)	(P)			-0.078	-0.027	-0.034	-0.338**	-0.095	0.034	-0.170
	(G)			-0.312	-0.108	-0.049	-0.491**	-0.081	0.001	-0.058
No. of branches/ plant	(P)				-0.043	-0.179	0.053	-0.075	-0.105	-0.170
	(G)				0.017	-0.338*	0.169	-0.140	-0.382	-0.196
No. of fruits/ plant	(P)					-0.174	-0.084	-0.205	0.030	0.880**
	(G)					-0.216	-0.119	-0.283	0.006	0.970**
Length of fruit (m)	(P)						0.183	-0.521**	0.447**	-0.168
	(G)						0.184	-0.571**	0.473**	-0.188
Diameter of the fruit (m)	(P)							0.395**	0.082	0.059
	(G)							0.425**	0.092	0.083
No. of seeds/ fruit	(P)								0.636**	-0.167
	(G)								0.713**	-0.231
Av. fruit weight (g)	(P)									0.065
	(G)									0.073
Total yield/ plant (g)	(P)									
	(G)									

** Significant at 5% and 1 per cent respectively

TABLE 2

Direct and indirect effects of nine characters on fruit yield per plant phenotypic and genotypic levels

Characters		Days to first flower opening	Days to first picking	Length of vine (m)	No. of branches/ plant	No. of fruits/ plant	Length of fruit (cm)	Diameter of fruit (cm)	No. of seeds/ fruit	Av. fruit weight (g)
Days to first flower opening	(P)	0.121	–0.052	0.003	0.021	0.013	–0.006	0.006	–0.019	0.011
	(G)	0.169	–0.199	0.005	0.056	0.040	–0.013	0.022	0.022	0.005
Days to first picking	(P)	0.107	–0.059	0.003	0.018	–0.021	–0.007	0.006	–0.011	0.014
	(G)	0.169	–0.198	0.002	0.067	–0.043	–0.014	0.021	0.027	–0.006
Length of vine (m)	(P)	0.004	–0.002	0.012	0.010	–0.023	0.002	–0.011	0.003	0.023
	(G)	0.007	–0.023	0.021	0.084	–0.105	0.005	–0.043	0.005	0.020
No. of branches per plant	(P)	0.020	0.008	–0.009	–0.001	–0.036	0.011	0.001	0.002	–0.007
	(G)	0.035	0.049	–0.006	–0.270	0.016	0.036	0.014	–0.009	0.008
No. of fruits/ plant	(P)	0.001	0.001	–0.003	0.005	0.853	0.011	–0.002	–0.019	–0.012
	(G)	0.007	0.008	–0.002	0.004	0.968	0.023	–0.010	0.007	–0.003
Length of fruit (cm)	(P)	0.012	–0.007	–0.004	0.023	–0.149	–0.064	0.006	–0.019	0.030
	(G)	0.020	–0.026	–0.001	0.095	–0.209	–0.108	0.016	0.039	–0.010
Diameter of fruit (cm)	(P)	0.023	–0.011	–0.007	–0.006	–0.071	–0.011	0.032	0.015	0.005
	(G)	0.043	–0.093	–0.10	–0.045	–0.116	–0.020	0.087	0.029	0.007
No. of seeds/ fruit	(P)	0.033	–0.018	0.001	0.009	–0.175	–0.062	0.013	–0.038	0.042
	(G)	0.053	–0.078	–0.001	0.037	–0.274	–0.033	0.037	0.069	–0.012
Av. fruit weight (g)	(P)	0.020	–0.012	0.004	0.013	0.026	–0.028	0.002	–0.024	0.067
	(G)	0.049	–0.058	0.002	0.103	0.005	–0.057	0.008	0.049	0.022

higher than the phenotypic coefficient in most of the traits (Table 1). This indicate the inherent association among various characters studied. Yield per plant was positively correlated with number of fruits indicating that selection for latter may lead to production of high yielding genotypes. These results are in consonance with the finding of Singh (5) in pointed gourd, Panwar *et al.* (3) in sponge gourd and Rana (4) in pumpkin. The positive association of days to first flower opening with days to first picking, length of the fruit with number of seeds per fruit and average fruit weights, diameter of the fruit with number of seeds per fruit and number of seeds per fruit with average fruit weight observed in present investigation corroborates with the findings of Singh (5).

Direct and indirect effects of all the traits on total yield per plant was estimated at phenotypic and genotypic levels (Table 2). Number of fruit per plant followed by days to first flower opening had highest direct positive effect on fruit yield, suggesting thereby a good scope of improvement of this trait by selecting the plant types bearing more number of fruit and early flowering. Days to first picking showed positive contribution to yield via days to first flower opening followed by average fruit weight via number of branches per plant. Srivastava and Srivastava (6) also reported indirect effect of lateral branches on yield in bitter gourd. Based on the direct and indirect effects of different yield components on yield, it appears that it would be rewarding to lay stress on number of fruits per plant, days to first picking, average fruit weight and number of branches per plant.

SUMMARY

Correlation and path coefficient analysis in thirty six hybrids of pointed gourd indicated that yield per plant was positively correlated with number of fruits per plant at both genotypic and phenotypic levels. Path coefficient analysis revealed that maximum weightage should be given to number of fruits per plant, days to first picking, average fruit weight and number of branches per plant for improvement of yield in pointed gourd.

ACKNOWLEDGEMENT

The authors wish to thank the Director of Research, Narendra Deva University of Agriculture and Technology (Kumarganj), Faizabad for providing necessary facilities.

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