



Character association and path analysis in brinjal (*Solanum melongena* L.)

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Abstract : An experiment on correlation and path analysis involving fifteen F_2 ss and eight parents of brinjal (*Solanum melongena* L.) was conducted during *Rabi* 2012-13. Association of fruit yield per plant with number of fruits per cluster and number of fruits per plant were found positive and highly significant at genotypic level. Path co-efficient analysis revealed that length of fruit, number of fruits per cluster, plant height, days to last picking, average weight of fruit and number of fruits per plant would be selection criteria for yield improvement in brinjal.

Key Words : Brinjal, Correlation, Path analysis, Character association

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INTRODUCTION

Correlation and path co-efficient analysis are the important biometrical technique to determine the yield components. The characters that are positively correlated with yield are of considerably important to plant breeder for selection purpose. Although the correlation co-efficients indicates the nature of association among the different traits, path analysis splits the correlation co-efficients into measure of direct and indirect effects thus providing understanding of the direct and indirect contribution of each characters towards yield. Keeping this in view, the present investigation was carried out to understand genetic analysis in F_2 generation of brinjal.

MATERIAL AND METHODS

Fifteen F_2 's along with eight parents were used for the present study. These genotypes were planted in randomised

block design with two replications keeping net plot size 4.5m × 3.3m at 60 cm × 60 cm spacing. Observations were recorded on five randomly selected plants for all eleven components like days to initiation of flowering, days to first picking, length of fruit, width of fruit, number of fruits per cluster, plant height, number of primary branches per plant, days to last picking, average weight of fruit, number of fruits per plant and fruit yield per plant. The correlation and path co-efficient was computed by using the formula of Dewey and Lu (1959); Jadhao *et al.* (2009); Kalpana *et al.* (2010); Lohakare *et al.* (2008); Singh *et al.* (2011); Singh (2005).

RESULTS AND DISCUSSION

The analysis of variance indicated highly significant differences among the genotypes for all the characters. The phenotypic and genotypic correlation co-efficient between fruit yield per plant and ten other metric traits are presented in Table 1 showed significant and positive correlation with

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Table1: Correlation co-efficient among different attributes in brinjal

Sr. No.	Characters		Days to initiation of flowering	Days to first picking	Length of fruit (cm)	Width of fruit (cm)	Number of fruits per cluster	Plant height (cm)	Number of primary branches per plant	Days to last picking	Average weight of fruit (g)	Number of fruits per plant	Fruit yield per plant (g)
1.	Days to initiation of flowering	P	1	0.948**	-0.174	0.012	0.179	0.093	0.250	-0.187	0.167	-0.060	-0.029
		G	1	0.997**	-0.327*	-0.196	0.390**	0.200	0.675**	0.132	0.099	0.006	-0.011
2.	Days to first picking	P		1	-0.117	-0.012	0.103	0.131	0.222	-0.132	0.163	-0.053	-0.036
		G		1	-0.292*	-0.234	0.235	0.289	0.668**	0.238	0.105	0.061	0.067
3.	Length of fruit (cm)	P			1	-0.126	-0.095	0.135	-0.207	-0.127	0.034	-0.101	-0.034
		G			1	-0.172	-0.156	0.287	-0.547**	-0.206	-0.116	-0.103	-0.054
4.	Width of fruit (cm)	P				1	-0.262	-0.361*	-0.047	0.296*	0.665**	-0.570**	-0.044
		G				1	-0.265	-0.715**	-0.148	0.424**	0.764**	-0.592**	-0.075
5.	Number of fruits per cluster	P					1	-0.058	0.284	-0.508**	-0.212	0.534**	0.317*
		G					1	-0.112	0.545**	-0.678**	-0.344*	0.565**	0.318*
6.	Plant height (cm)	P						1	0.149	0.112	-0.060	0.256	0.291*
		G						1	0.108	0.101	-0.411**	0.293*	0.103
7.	Number of primary branches per plant	P							1	0.108	-0.063	0.268	0.132
		G							1	-0.077	-0.187	0.527**	0.286
8.	Days to last picking	P								1	0.315*	-0.234	0.038
		G								1	0.438**	-0.320*	-0.042
9.	Average weight of fruit (g)	P									1	-0.487**	0.335*
		G									1	-0.643**	0.184
10.	Number of fruits per plant	P										1	0.593**
		G										1	0.613**
11.	Fruit yield per plant (g)	P											1
		G											1

* and ** indicate significance of values at P=0.05 and P=0.01, respectively
P: Phenotypic, G : Genotypic

Table 2: Path analysis at phenotypic level of different characters for direct and indirect effects in brinjal

Sr. No.	Characters	Days to initiation of flowering	Days to first picking	Length of fruit (cm)	Width of fruit (cm)	Number of fruits per cluster	Plant height (cm)	Number of primary branches per plant	Days to last picking	Average weight of fruit (g)	Number of fruits per plant	Fruit yield per plant (g)
1.	Days to initiation of flowering	0.101	-0.207	0.0009	-0.00006	-0.001	0.011	-0.017	0.003	0.14	-0.059	-0.028
2.	Days to first picking	0.096	-0.219	0.00061	0.00006	-0.0007	0.015	-0.015	0.002	0.137	-0.052	-0.036
3.	Length of fruit (cm)	-0.017	0.025	-0.005	0.00064	0.00068	0.016	0.014	0.002	0.028	-0.099	-0.034
4.	Width of fruit (cm)	0.001	0.002	0.00065	-0.005	0.001	-0.043	0.003	-0.004	0.559	-0.559	-0.044
5.	Number of fruits per cluster	0.018	-0.022	0.00049	0.001	-0.007	-0.007	-0.02	0.008	-0.178	0.524	0.317
6.	Plant height (cm)	0.009	-0.028	-0.0007	0.001	0.00042	0.12	-0.01	-0.001	-0.05	0.251	0.291
7.	Number of primary branches per plant	0.025	-0.048	0.001	0.00024	-0.002	0.018	-0.07	-0.001	-0.052	0.262	0.133
8.	Days to last picking	-0.019	0.028	0.00066	-0.001	0.003	0.013	-0.007	-0.016	0.264	-0.229	0.036
9.	Average weight of fruit (g)	0.016	-0.035	-0.0002	-0.003	0.001	-0.007	0.004	-0.005	0.841	-0.477	0.334
10.	Number of fruits per plant	-0.006	0.011	0.00052	0.002	-0.003	0.03	-0.018	0.003	-0.409	0.981	0.591

Note: Bold figures indicate direct effects

Residual effect= 0.10844

Table 3: Path analysis at genotypic level of different characters for direct and indirect effects in brinjal

Sr. No.	Characters	Days to initiation of flowering	Days to first picking	Length of fruit (cm)	Width of fruit (cm)	Number of fruits per cluster	Plant height (cm)	Number of primary branches per plant	Days to last picking	Average weight of fruit (g)	Number of fruits per plant	Fruit yield per plant (g)
1.	Days to initiation of flowering	-0.071	-0.194	-0.023	0.054	0.0701	0.029	-0.021	0.009	0.127	0.006	-0.013
2.	Days to first picking	-0.074	-0.195	-0.02	0.065	0.042	0.043	-0.021	0.016	0.134	0.072	0.062
3.	Length of fruit (cm)	0.023	0.057	0.071	0.048	-0.028	0.042	0.017	-0.014	-0.149	-0.122	-0.055
4.	Width of fruit (cm)	0.013	0.045	-0.012	-0.279	-0.047	-0.106	0.004	0.029	0.98	-0.702	-0.075
5.	Number of fruits per cluster	-0.027	-0.046	-0.011	0.074	0.179	-0.016	-0.016	-0.046	-0.441	0.67	0.320
6.	Plant height (cm)	-0.014	-0.056	0.020	0.201	-0.021	0.149	-0.003	0.006	-0.527	0.347	0.102
7.	Number of primary branches per plant	-0.047	-0.131	-0.038	0.041	0.097	0.016	-0.031	-0.005	-0.241	0.625	0.286
8.	Days to last picking	-0.009	-0.046	-0.014	-0.118	-0.121	0.015	0.002	0.068	0.562	-0.379	-0.040
9.	Average weight of fruit (g)	-0.007	-0.020	-0.008	-0.213	-0.061	-0.061	0.005	0.030	1.284	-0.763	0.186
10.	Number of fruits per plant	-0.001	-0.011	-0.007	0.165	0.101	0.043	-0.016	-0.022	-0.826	1.186	0.612

Note: Bold figures indicate direct effects

Residual effect= -0.02961

number of fruits per plant, average weight of fruit, number of fruits per cluster and plant height at phenotypic level while number of fruits per cluster and number of fruits per plant at genotypic level. These results are in conformation with Prasath *et al.* (2001) and Ghosh *et al.* (2010).

Path analysis provides an aid for sorting out the total correlation into direct and indirect effect of different quantitative traits on yield. The result of path analysis at phenotypic level (Table 2) revealed that the characters days to initiation of flowering, plant height, average weight of fruit and number of fruits per plant had positive direct effect on fruit yield while at genotypic level (Table 3), path analysis revealed that the characters length of fruit, number of fruits per cluster, plant height, days to last picking, average weight of fruit and number of fruits per plant had positive direct effect on fruit yield per plant. Bachhav (2008), Prasath *et al.* (2001) and Randhawa *et al.* (1993) observed similar result in brinjal.

Result of the present study thus indicate that selection based on number of fruits per cluster, plant height, average weight of fruit and number of fruits per plant can bring out fruit yield improvement in brinjal.

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