



Path Analysis of Some Yield Contributing Traits in Ash Gourd (*Benincasa hispida*(Thumb)Cogn.)

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ABSTRACT

A total of forty ash gourd collected from different parts of India were studied during kharif season of 2007 and 2008. The data for correlation and path coefficient analysis were recorded for eight characters viz., days to first male flowering, days to first female flowering, number of node at which first male flower appears, number of node at which first female flower appears, number of male flowers, number of female flowers, number of fruits and total fruit yield/plant. The results revealed that genotypic coefficient of variation was lower than corresponding phenotypic coefficient of variation for all the characters studied. High estimates of heritability was recorded for days to first female flowering, days to first male flowering, yield/plant and node at which first female flower appears. Majority of the characters possessed higher genotypic correlations than their corresponding phenotypic values. It may be suggested that an indo-type plant of ash gourd for maximization of fruit yield should have early female flower appearance, number of female flowers and number of fruits.

Key words : *Benincasa hispida*, Path analysis, Yield traits.

Correlation of characters is a measure of strength of relationship between a group of characters. The estimation of correlation coefficient is an important step in planning selection experiments as it forms the basis for developing a selection index. A breeder is interested to assess the correlated response of the yield components in selection programmes besides the yield *par se* because yield is a function of not only its components but also their inter-relationships. Path coefficient analysis is used to determine the direct effect of each independent character among a group of metric traits. This will be useful to work at cause and effect relationship so that the selection will be more effective. An attempt was made in this study to find out the various effects of yield components on fruit yield of ash gourd.

MATERIAL AND METHODS

A total of forty genotypes of ash gourd collected from different parts of India were studied for two years during the kharif season of 2007 and 2008 at the research farm of Regional Research and Technology Transfer Station, Chiplima, Sambalpur in a Randomised Block Design with three replications. Row to row and hill to hill

distances were maintained at 3m and 0.5m respectively. All the recommended agronomic practices were followed to raise a good crop. The data for correlation and path coefficient analysis were recorded on ten randomly selected plants from each genotype in each replication for eight characters viz., days to first male flowering, days to first female flowering, number of node at which first male flower appears, number of node at which first female flower appears, number of male flowers, number of female flowers, number of fruits and total fruit yield/plant. The statistical analysis was carried out on pooled data over two years. The genotypic coefficient of variability (GCV) and phenotypic coefficient of variability(PCV) were worked out as per Burton(1952). Correlation coefficients and path coefficient analysis were calculated as per Goulden (1959) and Dewey and Lu (1959) respectively.

RESULTS AND DISCUSSION

The analysis of variance revealed highly significant differences among the genotypes for all the characters studied indicating high variability in the material used for the present study. The genotypic coefficient of variation was lower than

the corresponding phenotypic coefficient of variation for all the characters studied. The GCV was high for total yield/plant(55.01), number of male flower/plant(40.07), number of female flowers/plant(29.21) and number of fruits/plant(27.23)(Table-1). Low GCV was observed for days to first female flowering(13.84). High estimates of heritability was recorded for days to first female flowering, days to first male flowering, total yield/plant and number of nodes at which first female flower appears. Genetic advance estimates revealed high values for total fruit yield/plant(20.13), and number of node at which first female flower appears(11.65) along with high heritability estimates, hence selection for these traits will be useful while selection a suitable plant type in reliable information on nature, extent and direction of selection. The knowledge of genetic correlation for fruit yield and its components among themselves becomes very important when the breeder is confronted in problems of combining high yield potential with desirable agronomic traits. Data

on genotypic and phenotypic correlation coefficients of various characters with fruit yield among themselves (Table 2) reveals that in general a close agreement existed between genotypic and phenotypic correlation coefficients, thus indicating significant environmental influences.

Majority of characters possessed higher genotypic correlation than their corresponding phenotypic values. The yield/plant exhibited significant positive correlation with days to first male flowering, days to first female flowering, number of male flowers, number of female flowers and number of fruits/plant. The results are in conformity with the findings of Kutty and Dharamti(2004) in bittergourd and Rakhli and Rajamony(2005) in culinary melon. Thus, selection for these traits would be fruitful. Node at which first male flower appears had no significant correlations with days to first male and female flowering.

Proper understanding of correlations is very useful in determining the components of complex

Table 3. Direct(diagonal) and indirect effect of yield components on fruit yield in Ash gourd at genotypic level (Residual effect=0.4784).

Character	Days to first male flowering	Days to first female flowering	Number of node at which first male flower appears	Number of node at which first female flower appears	Number of male flowers	Number of female flowers	Number of fruits/plant	Genotypic correlation with yield
Days to first male flowering	-0.097	-0.087	-0.075	0.035	-0.127	-0.093	-0.034	-0.478
Days to first female flowering	-0.094	-0.090	-0.083	0.049	-0.125	-0.102	-0.031	-0.476
Number of node at which first male flower appears	-0.025	-0.025	-0.295	0.270	-0.004	-0.075	0.025	-0.129
Number of node at which first female flower appears	-0.011	-0.014	-0.252	0.317	0.003	-0.060	0.026	0.039
Number of male flowers	0.049	0.044	0.004	0.041	0.252	0.100	0.067	0.557
Number of female flowers	0.049	0.049	0.119	-0.102	0.135	0.186	0.102	0.538
Number of fruits/plant	-0.010	0.009	-0.023	0.026	0.053	0.059	0.321	0.454

trait like yield and their degree of association. The path coefficient analysis provides an effective means of finding out direct and indirect cause of association and permits a critical examination of specific forces acting to produce a given correlation and measures the relative importance of each causal factor. In order to achieve a clear picture of inter-relationship, the direct and indirect effects were worked out using path analysis at genotypic level.(Table-3)

As yield is influenced by many factors, selection based on simple correlation without taking into consideration, the interaction between the component characters may sometimes prove misleading. Days to male flowering and days to first female flowering though had high positive significant correlations with fruit yield, yet the path analysis revealed that their direct contribution to fruit yield was negative.. Similar findings were also reported by Srivastava and Srivastava 1976; Mangal *et.al.*, 1979; Singh *et al.*, 1986; and Vijay,O.P.,1987 in different cucurbits for various yield component characters like days to first female flowering, number of female flowers, node at which first female flower appears and number of fruits/plant etc.

In view of above findings, it may be suggested that the plant of ash gourd for maximization of fruit yield should have early female flowers appearance, more number of female flowers and more number of fruits.

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