GENETIC VARIABILITY IN *ABELMOSCHUS CAILLEI* L.

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Abstract : Studios on parameters of variability, correlation and path coefficient analysis of fruit yield in *Abelmoschus caillei* L- revealed that characters such as number of branches per plant, number of nodes per plant, plant height and fnlit length had maximum coefficient of variation. Higher values of heritability and genetic advance were simultaneously estimated for fruit yield per plant and fruits per plant. Yield per plant had high positive significant correlation with fruits per plant, fruit length, fruit weight, plant height and number of internodes on main stem. Path analysis revealed positive direct effect on fruit yield per plant through fruits per plant followed by plant height.

Key words : *Abelmoschus caillei* L, correlation, genetic advance, heritability and path coefficient.

INTRODUCTION

A semi-wild okra species presently considered as *Abelmoschus caillei* L, and popular as 'thamaravenda' is cultivated to a small extent in Kerala. Practically no crop improvement work has been attempted on this crop. A successful crop improvement programme depends on the nature and magnitude of genetic variability, the degree of transmission of characters, their inter-relationship and direct and indirect effect on yield. In okra (*Abelmoschus esculentus* L.) Mishra and Singh (1985) and Rambabu and Rao (1996) reported positive and significant correlation between number of pods and yield. The present study was undertaken to evaluate the genetic variability and to estimate correlation among the biometric traits and their direct and indirect effect on pod yield.

MATERIALS AND METHODS

Twenty two genotypes of thamaravenda collected from different parts of Kerala and NBPGR Regional Station, Vellanikkara, Trichur were raised in a randomised block design with two replications at the Department of Olericulture, College of Horticulture, Vellanikkara during the year 1994. The plot consisted of 4.5 m row of 60 cm spacing, the plants were raised in the row 45 cm apart. Observations were recorded on five randomly selected plants in each row on parameters like days to flowering, plant height, number of nodes per plant, number of branches per plant, internodal length, fruit length, fruit girth, fruit weight, fruits per plant, number of seeds per fruit, 100 seed weight and fruit yield per plant. The phenotypic coefficient of variation (PCV) and genotypic coefficient of variation (GCV) was estimated according to Burton (1952) while heritability in broad sense was calculated as per Burton and Devane (1953). The expected genetic advance was calculated by the method as per Lush (1949) and Johnson *et al.* (1955). The correlation coefficient and path coefficient analysis were worked out by the method suggested by Singh and Chaudhary (1979).

RESULTS AND DISCUSSION

Significant differences were noticed in almost all characters indicating that genotypes differed significantly for yield as well as other components (Table 1). The coefficient of variation was higher for characters such as number of branches per plant, number of nodes per plant, plant height and fruit length. Mishra and Singh (1985) obtained similar results for number of fruits per plant and yield per plant. As the above chracters showed high range of variation, they could be given

Table 1. Variability and genetic parameters for yield contributing characters in *A. caillei*

Characters	Pod yield g/plant	No, of pods / plant	Plant height, cm	No. of nodes / plant	No. of branches / plant	Pod girth, cm	Pod length, cm	No. of seed / pod	100 seed weight
Range	85.5 - 723.3	4.3 - 25.6	70.5 - 159.4	4.9 - 24.7	1.95 - 4.40	7.47 - 12.75	9.45 - 12.75	32.10 - 69,96	4,32 - 8.27
Mean	285.5± 25.7	113± 0,9	108.7± 8.2	18.2± 1.53	2.79± 0.37	10.63± 0.52	12.50± 0,85	50,2± 3.02	6,47± 0.05
CV (%)	9.0	8.0	8.60	12.0	13.3	4.85	6.8	6.0	0.8
CD (0.05)	53.57	1.88	17.10	3.2	0.77	1.07	1.77	6.29	0.11
Genotypic variance	42005.7*	49.76	1482.6	42.72	0.45	2.54	6.36	190.55	1.61
Phenotypic variance	42667.2*	50,58*	1550.1*	45,03*	0.59*	2.81*	7.08*	199.69*	1,62*
Error variance	661.5	0.82	67.5	2,34	1.14	0.27	0.72	9.14	13.90
GCV	S0.8	44.3	25.0	15.1	17,08	10.62	14.27	19.44	13.90
PCV	S1.6	45.0	26,2	15.9	21,64	11.68	15,81	20.36	13.92
GA	293.9	10.1	53.7	9.0	0.78	2.11	3.32	19.21	1.85
Heritability	97.4	97.0	92.2	90.0	62.3	82.7	81.5	91.3	99.7

*Significant at 1 per cent level

Table 2. Genotypic correlation coefficient among yield and its components in *A. caillei*

Characters involved	<Correlation coefficient
Yield and fruits per plant	0.91*
Yield and fruit length	0.67*
Yield and fruit weight	0.40*
Yield and plant height	0.23*
Yield and number of internodes on main stem	0.39*
Yield and main stem diameter	-0.04
Yield and petiole length	0.05
Yield and fruit girth	-0,49
Yield and fruit ridges	-0.52
Plant height and number of internodes (m main stem	0.44*
Fruits per plant and number of internodes on main stem	0.51*

* Significant at 1 per cent level

preference in the selection for crop improvement. Fruit yield per plant and fruits per plants showed the highest genotypic and phenotypic variance respectively.

Fruit yield per plant and fruits per plant recorded simultaneously higher heritability and genetic advance compared to the other traits. It shows that these characters can be improved by selection. It has been established that when heritability estimates are used in conjunction with the selection differential ie., the amount of which the mean of selected groups exceeds the mean of entire group, the utility of heritability estimate k increased. However, the broad sense heritability reflects additive, non additive and dominant gene effects and it would be reliable only if accompanied by high genetic advance, Johnson (1955)has suggeste 1

Table 3. Direct and indirect effect of yield component of fruit yield in *A. caillei*

SI. No.	Plant height	No. of intemodes	Intemodal length	Days to flower	Fruit length	Fruit girth	Fruit ridges	Fruits / plant	Correlation with yield
Plant height	0.252	-0.100	-0.048	-0.013	-0.025	-0.001	-0.009	0.195	0.229
No. of intemodes	0,122	-0.207	-0,007	-0.005	0.034	-0.009	0.031	0.425	0.385
Internodal length	0.111	-0.014	-0.109	-0.029	-0.068	-0,009	-0.029	-0.263	-0.453
Days to flower	-0.031	0.009	0,029	0.108	0.064	-0.006	0.024	-0.145	0.043
Fruit length	-0.045	-0.050	0.054	0.049	0.139	-0,012	0.068	0.391	0.671
Fruit girth	-0.009	0.066	0.037	-0.023	-0.058	0.028	-0.049	-0.347	-0.494
Fruit ridges	-0.025	0.066	-0.037	-0.028	-0,990	0.014	-0.096	-0.357	-0.519
Fruits / plant	0.058	-0.104	0.034	-0,019	0,064	-0.012	0.040	0.846	0.911

Figures on the main diagonal indicates direct effect

that high heritability estimate associated with high genetic advance, if considered together are more useful than the heritability alone, Thakur et al. (1981) noticed high heritability and high genetic advance as per cent of mean together for plant height and pod yield in okra.

It is evident from the genotypic correlation coefficient, between yield per plant and its components (Table 2) that yield per plant had high positive significant correlation with fruits per plant, fruit length, fruit weight, plant height and number of intemodes on main stem. Plant height showed significant and positive correlation with number of intemodes on the main stem. Number of intemodes on main stem had significant positive correlation with fruits per plant. Similar inter-relationship of components with pod yield and among themselves has been reported by Mishra and Singh (1987) in okra.

Path-coefficient analysis was worked out to determine the true component on pod yield (Table 3) and it was found that highest positive direct effect was shown by fruits per plant followed by plant height. Though plant height showed a positive direct effect on yield, its indirect effect on yield through all the yield contributing factors were negative except for fruits per plant. The number of internodes, internodal length and number of ridges on fruits showed negative direct effect on yield. Mishra and Singh (1987) and Lakshmi *et al.* (1996) obtained similar direct and indirect effects of components on yield in okra.

From the results of the present study it can be concluded that the characters, number of fruits per plant, number of intemodes on main stem, fruit length, fruit weight and plant height are directly related to the increase in the yield and therefore the selection pressure should be focused on these traits in the future crop improvement programmes.

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