

Studies on variability in certain intervarietal crosses of okra [*Abelmoschus esculentus* (L.) Moench]

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SUMMARY

A field experiment was conducted to study the genetic variability, heritability and genetic advance of seven characters namely, days of first flower, plant height, number of nodes per plant, number of fruits per plant, fruit length, single fruit weight and fruit yield per plant in the segregating generations of crosses Arka Anamika x MDU 1 and Parbhani Kranti x MDU 1. For fruit yield per plant in all the crosses, the variability in F₂ generation in general were high when compared to F₃ generation. High PCV and GCV were observed in all three crosses for number of nodes per plant, number of fruits per plant and single fruit weight. The traits single fruit weight and fruit yield per plant showed high heritability along with high genetic advance in all the crosses which indicated that is might be due to the predominance of additive gene effects.

Key Words : PCV, GCV, H², GA, Okra

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Okra [*Abelmoschus esculentus* (L.) Moench] is a common vegetable crop valued for its good source of iodine, calcium, iron and vitamins. Vegetable productions is quite inadequate to meet the daily requirement of Indian diet. Genetic variability helps to desirable genotypes. The genetic variation and genetic gain obtained by selection are studied by predicting the heritability and genetic advance.

MATERIALS AND METHODS

The five generations namely P₁, P₂, F₁, F₂ and F₃ of three crosses namely Arka Anamika x Parbhani Kranti, Arka Anamika x MDU 1 and Parbhani Kranti x MDU 1 were raised in RBD, replicated thrice during December 2004. A spacing of 45 cm between rows and 30 cm between plants was followed. 5 plants

in P₁, P₂ and F₁ generations, 200 plants in F₂ and F₃ generation were observed for all the three crosses in each replication. The standard procedure of analysis of GCV and PCV and heritable components for the experimental design were adopted to detect genetic differences among segregations generations.

RESULTS AND DISCUSSION

The experimental findings obtained from the present study have been discussed in following heads:

PCV and GCV :

The progress in economic characters depends on the magnitude and nature of their genotypic variability. The biological variations occurring in this crop offer great scope for genetic improvement through selection. Padda *et al.* (1970), Chandra *et al.* (1996); Saravanan (2001) and Senthil Kumar (2003) have reported existence of wide range of variation in Okra cultivars. The current interest in Okra improvement is towards the development of superior varieties for yield and related quantitative characters of polygenic inheritance. The potentiality of cross is measured not only be mean performance but also on the extent of variability.

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Table 1: PCV, GCV, heritability and genetic advance for yield and yield component characters in segregating generations (per cent)

Characters	Parameters	Cross 1			Cross 2			Cross 3		
		F ₂	F ₃	F ₃	F ₂	F ₃	F ₃	F ₂	F ₃	F ₃
Days of first flower	PCV	3.38	3.44	2.76	3.68	3.35	3.16			
	GCV	2.38	2.47	1.63	1.69	1.32	0.56			
	h ²	49.64	51.48	37.40	21.03	15.46	3.14			
	GA	11.39	11.47	10.85	10.63	10.44	10.08			
Plant height	PCV	15.85	14.30	16.67	13.31	17.23	16.42			
	GCV	12.97	11.65	13.80	9.14	15.33	13.96			
	h ²	62.72	66.38	68.56	47.18	79.21	72.29			
	GA	21.19	23.61	25.58	13.58	36.12	28.55			
Number of nodes per plant	PCV	48.95	44.19	24.40	23.84	28.91	28.74			
	GCV	38.96	38.24	20.20	20.71	20.86	20.79			
	h ²	74.06	74.89	73.42	75.49	54.14	52.31			
	GA	14.00	14.38	8.09	8.33	6.14	5.82			
Number of fruits per plant	PCV	59.96	59.42	28.44	24.60	33.41	24.49			
	GCV	52.50	51.94	20.94	20.78	25.08	24.81			
	h ²	76.65	76.38	54.19	41.14	43.70	38.50			
	GA	14.51	14.38	5.42	3.68	4.41	2.29			
Fruit length	PCV	15.11	15.13	16.03	16.97	12.89	14.12			
	GCV	11.01	10.89	12.46	13.96	12.45	13.92			
	h ²	53.04	51.80	42.55	86.97	93.40	97.15			
	GA	2.16	2.08	1.89	3.37	3.27	3.56			
Single fruit weight	PCV	37.50	35.76	28.92	28.96	29.64	25.35			
	GCV	31.83	30.03	29.75	28.38	25.73	24.74			
	h ²	68.18	75.31	36.01	38.37	28.18	23.49			
	GA	20.83	23.58	23.30	21.24	23.42	20.59			
Fruit yield per plant	PCV	19.08	18.40	19.01	18.08	15.31	15.26			
	GCV	16.14	10.82	15.01	19.68	13.30	12.31			
	h ²	34.57	34.57	51.02	48.66	32.60	32.90			
	GA	21.74	28.92	25.85	47.40	31.20	30.90			

All the crosses studied, the variability in F_2 generation for most of the traits in general was high when compared to F_3 generation. While considering the mean and variability of the segregating populations together, all the crosses exhibited differences in their mean values in respect with variability. Nevertheless all the crosses showed low expression and variability in the trait days to first flower. High PCV and GCV were observed for number of nodes per plant, number of fruits per plant and single fruit weight in all the crosses, whereas moderate PCV and GCV were recorded in all the crosses for the characters plant height, fruit length and fruit yield per plant (Table 1).

So, a wide range of variability was recorded for fruit yield per plant indicating that the population was amenable for selection. The difference between the genotypic and phenotypic variance for all the characters were low. This indicated that these characters were comparatively less influenced by the environment. Phenotypic, genotypic variances were however, low for the character days to first flower.

Heritability and genetic advance :

Heritability value alone provides no indication of the amount of genetic progress. According to Hanson (1961), heritability and genetic advance are complementary aspects. Ramanujam and Tirumalachar (1963) discussed the limitation of estimating heritability in broad sense and suggested that heritability in broad sense will be reliable, if accompanied by high genetic advance. In planned crop breeding programme aiming at effect of genetic variation present in the breeding material, it is always desirable to study the inheritance of economic traits for predicting the heritability and genetic advance in selection programmes (Burton, 1952; Johnson *et al.*, 1955).

In the present investigation, high heritability was seen in Arka Anamika x MDU 1 for fruit yield per plant and their components except in the trait days to first flower. These results are in conformity with earlier worker Saravanan (2001) and Kumar (2003).

For fruit yield per plant and single fruit weight showed high heritability along with high genetic in all the crosses

which indicate that it might be due to the predominance of additive gene effects (Panse, 1957). If, therefore, appears that selection in early generations for fruit yield per plant and single fruit weight should be effective and satisfactory for all practical purposes, whereas for day to first flower moderate genetic advance suggested that selection may not be effective for identification of desirable sergents for this fruit.

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