

# VARIABILITY AND HERITABILITY OF YIELD AND QUALITY COMPONENTS IN THE RATOON CROP OF SUGARCANE

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**Abstract:** Evaluation of the first ratoon crop of 48 hybrid sugarcane varieties in RBD with three replications at the Sugarcane Research Station, Thiruvalla revealed that certain characters viz., germination count on the 45th day, shoot count on the 180th day, number of millable canes per plot and cane yield per plot had high genotypic coefficient of variation, heritability in the broad sense and genetic advance. Hence they are amenable to genetic improvement through selection and may be considered as dependable selection criteria for the improvement of cane and sugar yields in the first ratoon crop of sugarcane.

## INTRODUCTION

The information on variability and heritability of characters is useful for identifying the characters which can be used as reliable criteria during selection programmes for the improvement of yield. In an asexually propagated crop like sugarcane the estimates of heritability in the broad sense are meaningful, since all the genetic variability is usable between asexual generations by means of selection (Hogarth, 1971).

## MATERIALS AND METHODS

Forty eight clones of sugarcane hybrid varieties were evaluated in RBD with three replications at the sugarcane Research Station, Thiruvalla, Kerala. Each plot consisted of three rows of 3 m in length planted with 12 numbers of three budded setts per row. After the harvest of the plant crop, the stubbles were retained and the ratoon crop was raised. The data on cane yield, sugar yield and other characters such as germination count on the 45th day, shoot count on the 180th day, number of millable canes per plot, cane weight, length of cane, number and length of internode, girth of cane, extraction per cent, brix, pol, purity and ccs percentage

at 12th month were recorded. The data were analysed and the genetic parameters like genotypic and phenotypic coefficients of variation (GCV and PCV) were estimated as per Burton (1952). The heritability in the broad sense ( $H^2$ ) and the generic advance (GA) as percentage of mean were estimated by the methods of Jain (1982) and Allard (1960) respectively. The quality characters were estimated following Spencer and Meade (1945).

## RESULTS AND DISCUSSION

The genetic parameters such as genotypic and phenotypic coefficients of variations, heritability in the broad sense, and genetic advance along with mean and range of different characters are presented in Table 1. The germination count on the 45th day recorded high genotypic coefficient of variation (36.5) followed by sugar yield per plot (35.7), indicating the presence of large amount of variability. Moderate to high heritability along with high genetic advance was recorded for characters like germination count on the 45th day, sugar yield per plot, shoot count on the 180th day, cane yield per plot and number of millable canes per plot, in-

Table 1. Estimates of genetic parameters in the first ratoon crop of sugarcane

Sl. No.	Characters	Mean	SE	Range	Coefficients of variation		Heritability	Genetic advance
					Geno- typic	Pheno- typic		
1	Germination count per plot (45th day)	82.5	11.52	27.3 - 195.7	36.5	43.8	69.5	62.7
2	Shoot count per plot (180th day)	100.3	9.86	48.0 - 160.7	22.1	27.9	62.6	36.0
3	Number of millable canes per plot	72.0	9.31	36.0 - 113.0	19.7	29.8	48.6	29.8
4	Weight of cane (kg)	1.2	0.14	0.7 - 1.7	17.0	25.9	43.3	23.1
5	Length of cane (m)	2.2	0.15	1.6 - 2.7	7.8	14.4	29.3	8.7
6	Number of internodes	21.2	1.48	16.3 - 29.4	13.6	18.2	55.9	20.9
7	Number of internodes (cm)	12.1	0.77	9.2 - 17.2	12.7	16.8	56.9	19.7
8	Girth of cane (cm)	7.7	0.32	6.0 - 8.9	8.7	11.4	58.4	13.7
9	Cane yield per plot (kg)	61.3	9.68	17.3 - 117.7	29.3	40.1	53.5	44.2
10	Extraction per cent at 12th month (%)	55.98	3.43	46.97 - 80.13	5.8	12.5	21.4	5.5
11	Brix at 12 month (%)	18.0	0.86	14.8 - 21.9	8.1	11.6	48.8	11.7
12	Pol at 12 month (%)	16.0	1.04	12.5 - 20.1	10.3	15.3	45.1	14.2
13	Purity at 12th month (%)	70.5	2.15	80.7 - 94.2	2.4	5.8	17.7	2.1
14	CCS at 12th month (%)	11.1	0.84	8.3 - 14.2	11.1	17.3	41.6	14.8
15	Sugar yield per plot (kg)	6.8	1.14	1.9 - 13.8	35.7	46.1	60.0	56.9

dicating that selection based on the above characters will be effective for increasing the cane and sugar yields. The high heritability and high genetic advance obtained for the above characters are in conformity with the results of Rao *et al.* (1967), Balasundaram and Bhagyalakshmi (1978) and Singh and Sangwan (1980) in plant crop. Relatively high heritability and low genetic advance observed for characters such as girth of cane, length of internode, number of internodes, brix, pol and ccs percentages at the time of harvest are in agreement to the reports of Rao *et al.* (1967) and Balasundaram and Bhagyalakshmi (1978) in plant crop. Both heritability and genetic advance were low for extraction per cent and purity percentage suggesting that these characters are highly influenced by the environmental factors. It can be concluded from this study that characters such as germination count on the 45th day, number of millable canes per plot and cane yield per plot having high genotypic coefficient of variation, heritability and genetic advance are amenable to genetic improvement through selection. Therefore, the above characters may be considered during selection programmes for the improvement of cane and sugar yields in the first ratoon crop of sugarcane.

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