Plant Archives Vol. 20 Supplement 1, 2020 pp. 1629-1630 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

ASSOCIATION ANALYSIS IN SUGARCANE (*SACCHARUM OFFICINARUM* L.) HYBRIDS

V. Anbanandan, R. Narayanan*, P. Karthikeyan, S. Ranjithrajaram and J. Pranay Reddy

Department of Genetics and Plant Breeding, Faculty of Agriculture, Annamalai University, Tamil Nadu, India.

Abstract

Correlation studies among six characters were studied in eighteen hybrids along with its nine parents (six lines and three testers). The study revealed that sugar yield per plot showed significant positive correlation with cane yield per plot followed by other characters. Hence emphasis should be given while selection on Brix percent, sucrose percent, and cane yield to increase sugar yield in sugarcane (*Saccharum officinarum* L.).

Key words: Correlation coefficient, *Saccharum officinarum* L. ***Key words:*** Sugarcane, yield, hybrids.

Introduction

Sugarcane is an important commercial crop grown in the tropical and subtropical areas of the world. It is an important source of sugar as other sweeteners. This crop accounts for about sixty percent of the world's requirement of sugar**.** Sugarcane is also a major source of by-products, which provide raw material for the distilleries, pulp and paper industries (Brian Purchase, 1995). Improvement in sugarcane production depends on the choice of traits for selection and manipulation. Correlation studies used to measure the intensity and direction of trait association. Since, selection is usually concerned with improving a group of traits simultaneously, an understanding of *inter se* correlations is of prime importance to the breeder. Hence, in the present investigation an attempt was made to understand the nature of association existing in sugar contributing traits.

Materials and methods

Six lines namely *Saccharum officinarum* L *cv.* Badila (L1), CoC 671 (L2), CoC 85061 (L3), CoC 92061 (L4), Co 86032 (L5) and CoG 93076 (L6) and three testers *viz.*, *Saccharum spontaneum* (T1), *Erianthus arundinaceus* (T2) and *Miscanthus sacchariflorus* (T3) were crossed in L x T fashion and obtained eighteen hybrids (Table 1). All the parents and its hybrids were raised in a Randomized Block Design with three replications in 5 rows plots of 6m length with spacing of 80 × 30cm. The recommended agronomic practices and need based plant protection measures were judiciously followed. They were evaluated for six characters including cane yield and its attributing characters *viz.,* Brix percent, sucrose percent, purity coefficient, commercial cane sugar (CCS) percent, cane yield per plot and sugar yield per plot.

The genotypic correlations among the characters were estimated as per the method suggested by Goulden (1952).

Results and Discussion

Genotypic correlation coefficients between sugar yield and its five component traits namely, Brix percent, sucrose percent, purity coefficient, commercial cane sugar percent and cane yield per plot are presented in Table 2. Sugar yield per plot was significantly and positively correlated with all the characters (Brix percent, sucrose percent, purity coefficient, commercial cane sugar percent and cane yield per plot). Similar observation were earlier reported by Bhide (1969), Singh and Khan (1995) and Hapase and Repale (1999). Brix percent was significantly positively correlated with sucrose percent, purity coefficient, commercial cane sugar percent and cane yield per plot. Sahi and Patel (1975), Reddy and Reddy (1987) and Choudhary and Singh (1994) recorded similar findings. Purity coefficient was significantly and positively correlated with commercial cane sugar percent and cane yield per plot. Commercial cane sugar percent was significantly and positively associated with cane yield

***Author for correspondence :** E-mail : narayanan1979@gmail.com

Table 1: Details of lines, testers and crosses taken up for study.

S. No.		Particulars
	Lines	
1.	L1	*Saccharum officinarum* L cv. Badila
2.	L2	CoC 671
3.	L3	CoC 85061
4.	L4	CoC 92061
5.	L5	Co 86032
6.	L6	CoG 93076
	Testers	
7.	T1	*Saccharum spontaneum*
8.	T2	*Erianthus arundinaceus*
9.	T3	*Miscanthus sacchariflorus*
	Crosses	
10.	L1 × T1	*Saccharum officinarum* L cv. Badila x *Saccharum spontaneum*
11.	L2 × T1	CoC 671 x *Saccharum spontaneum*
12.	L3 × T1	CoC 85061 x *Saccharum spontaneum*
13.	L4 × T1	CoC 92061 x *Saccharum spontaneum*
14.	L5 × T1	Co 86032 x *Saccharum spontaneum*
15.	L6 × T1	CoG 93076 x *Saccharum spontaneum*
16.	L1 × T2	*Saccharum officinarum* L cv. Badila x *Erianthus arundinaceus*
17.	L2 × T2	CoC 671 x *Erianthus arundinaceus*
18.	L3 × T2	CoC 85061 x *Erianthus arundinaceus*
19.	L4 × T2	CoC 92061 x *Erianthus arundinaceus*
20.	L5 × T2	Co 86032 x *Erianthus arundinaceus*
21.	L6 × T2	CoG 93076 x *Erianthus arundinaceus*
22.	L1 × T3	*Saccharum officinarum* L cv. Badila x *Miscanthus sacchariflorus*
23.	L2 × T3	CoC 671 x *Miscanthus sacchariflorus*
24.	L3 × T3	CoC 85061 x *Miscanthus sacchariflorus*
25.	L4 × T3	CoC 92061 x *Miscanthus sacchariflorus*
26.	L5 × T3	Co 86032 x *Miscanthus sacchariflorus*
27.	L6 × T3	CoG 93076 x *Miscanthus sacchariflorus*

per plot. This is in accordance with Balton *et al.,* (1985). It is clear from the above fact that, sugar yield per plot was highly correlated with cane yield per plot followed by other characters. It revealed that more emphasis should be given while selection on cane yield, Brix percent and sucrose percent to increase sugar yield in sugarcane.

References

Balton, K.R., B.B. Chaudhary and S.P. Kadian (1985). Studies on correlation and path coefficient analysis of quality attributes in sugarcane. *Agric. Sci. Digest India,* **5(2):** 87-89.

Bhide, V.S. (1969). Biometrical studies in the aspects of quality and yield and its components in *Saccharum officinarum* L. *Ph.D. Thesis,* Agra. Univ., Agra, India.

Brian Purchase (1995). Products from sugarcane. *Sugarcane,* **2:** 14-21.

Choudhary, A.K. and J.R.P. Singh (1994). Correlation and path coefficient studies in early maturing clones of sugarcane (*Sacc.* Spp. complex) *Co-op. Sugar,* **25(7-8):** 305-307.

Goulden, CH. (1952). Methods of statistical analysis. John Wiley and Sons, Inc., New York.

Hapase, R.S. and J.M. Repale (1999). Variability, correlation and path analysis in sugarcane. *Proc. Sugarcane Tech. Assoc. India,* **61:** 130-141.

Reddy, C.R. and M.V. Reddy (1987). Interrelationship of cane yield with its components. Sugarcane spring supplement, 13-16.

Sahi, B.K. and K.A. Patel (1975). Correlation study of quality and yield contributing characters in early maturing cultivars. *Indian Sugars.,* **30(7):** 21-24.

Singh, Khan A.Q. (1995). Selection indices and path analyses for cane yield. *Sugarcane,* **3:** 9-11.

Table 2: Genotypic correlation among sugar yield and its components.

Characters	Brix percent	Sucrose percent	Purity coefficient	CCS percent	Cane yield per plot	Sugar yield per plot
Brix %	—	0.99**	0.85**	0.99**	0.96**	0.96**
Sucrose %			0.89**	0.99**	0.97**	0.96**
Purity coefficient				0.90**	0.85**	0.77**
CCS %					0.97**	0.96**
Cane yield per plot						0.97**