

SHORT COMMUNICATION

Co 99006 - AN EARLY SEASON SUGARCANE VARIETY FOR NORTH WESTERN TAMIL NADU

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Abstract

Five promising early season sugarcane clones along with two standard varieties were tested for their adaptability in the North Western Agro-climatic Zone of Tamil Nadu. The trials were conducted in farmers holdings of three sugar mills located at Palacode (Dharmapuri district), Kethandapatti (Vellore district) and Mohanur (Salem district) during 2010-11 and 2011-12 planting seasons with two plant and one ratoon crops. Data on growth (germination %, tiller number), yield attributes (number of millable canes, cane height, cane diameter, internode number, internode length), juice quality (CCS %), cane yield and sugar yield at harvest were recorded. The results indicated that the clone Co 99006 exhibited good performance for cane and sugar yield in the given environment and was identified to be suitable for commercial cultivation in North Western Zone of Tamil Nadu.

Key words: Sugarcane, Co 99006, early season variety, Tamil Nadu

Introduction

Sugarcane, a C4 plant belonging to Gramineae family, is an important cash crop in many countries and is cultivated worldwide in more than 20 M ha. It is grown from 37°N to 31°S spreading over tropical and sub-tropical conditions (Reddy 2004). In India, sugarcane is grown in nearly 5 M ha with average cane yield of 67.5 t/ha. Among the states, Tamil Nadu ranks first states in terms of productivity with 108.9 t/ha. Continuous research on selection and identification of promising newer sugarcane clones for a particular agro-climatic region through experimental field trials at specific locations will be one of the appropriate approaches for realizing sustainable sugarcane productivity and high returns to the farmers. Regardless of pronounced development in sugarcane research and expansion

of sugar industry, low productivity is being recorded in the Indian subcontinent. One of the solutions suggested to overcome this problem is planting of improved cane varieties specific to particular locations (Chattha and Ensunullah 2003; Kadam et al. 2007). The selection of suitable variety alone can improve the cane yield by around 30% (Kathiresan et al. 2001). However, the success of a variety depends on its adaptability to the specific agro-climatic conditions of the region to realize maximum yield. The present study was conducted to find out a suitable early season sugarcane clone for commercial cultivation in North Western agro-climatic ecosystem of Tamil Nadu.

Field experiments were carried out under Coordinated Agronomic Experiments (CAE) in sugarcane scheme of Tamil Nadu Agricultural

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University in farmers' holdings located under the jurisdiction of Dharmapuri District Cooperative Sugar Mills Limited (DDCSM), Palacode, Tirupattur Cooperative Sugar Mills Limited (TCSM), Kethandapatti and Salem Cooperative Sugar Mills Limited (SCSM), Mohanur, located in Dharmapuri, Vellore and Salem districts respectively, of North Western zone of Tamil Nadu.

Experiments were conducted during 2010-11 and 2011-12 with two plant and one ratoon crops in each of the three sugar mill locations. A set of five new promising sugarcane clones, of which three clones were from Sugarcane Breeding Institute (SBI), Coimbatore *viz.*, Co 99006, Co 99008 and Co 2000-12, and one clone each from Sugarcane Research Station (SRS), Cuddalore and SRS, Melalathur *viz.*, CDL 2008-04 and GYM 2008-01, respectively were tested along with two standard checks *viz.*, Co 86032 and CoC (SC) 24. The experiments were laid out in randomized block design (RBD) with three replications and a plot comprising five rows of 5 m length spaced 80 cm apart. A seed rate of 75,000 two budded setts/ha was followed. The soils of the experimental sites were characterized by sandy clay loam with neutral pH, normal EC, low available nitrogen, medium available phosphorus and high available potassium. Recommended dosage of N, P₂O₅ and K₂O fertilizers were applied and all the agronomic practices *viz.*, weed control, earthing-up and propping were carried out as per standard package of practices. Irrigation was given as and when required through furrow irrigation system. Observations on germination percentage on 30 days after planting (DAP) and tiller production on 90 DAP were recorded. The data on yield attributes *viz.*, number of millable canes, cane length, cane diameter, number of internodes and internode length were recorded at harvest. The cane yields recorded in test plots were converted to quantity per hectare. Five canes were randomly selected from each plot at the time of harvest and crushed in a small power

crusher and juice was analyzed for brix, pol (%) and purity (%) as per standard methods suggested by Meade and Chen (1977). CCS % was calculated based on the formula $(Pol \times 1.05) - (Brix \times 0.3)$. The data collected on the above parameters were statistically analyzed as per the procedure suggested by Panse and Sukhatme (1978).

The data on germination percentage and tiller production was recorded for two plant crops over three sugar mill locations. The pooled data analysis revealed significant differences in germination % and tiller production among the clones under study, except in second plant crop where the germination % was not statistically significant (Table 1). Among the clones tested, clone Co 99006 ranked the top for mean germination % and tiller production

Cane height, cane diameter and number of millable canes (NMC) are known to be the major contributing factors for high cane yield. The cane characters such as number of millable canes, cane length, cane diameter, number of internodes and internode length revealed significant differences among the clones tested (Tables 1 & 2). Co 99006 exhibited maximum number of NMCs in both first and second plant crops and was significantly superior to other clones in the trial for NMC. Clone Co 99006 also recorded the highest cane length of 2.56 m and 2.69 m in plant and ratoon crops, respectively and was significantly superior to the standard varieties. CoC (SC) 24 recorded the maximum cane diameter in both plant and ratoon crops. The internode number and internode length showed significant differences among the clones tested. Co 99006 recorded maximum internode number of 24.3 and 23.4 in plant and ratoon crops, respectively. The next best clone with higher internode number was Co 99008 in plant and Co 86032 in ratoon crops. Similarly, the internode length was more in Co 99006 in plant and ratoon crops and was significantly superior to the rest of the clones and standards (Co 86032 and CoC 24).

Table 1. Growth performance of early maturing clones during 2010-12 (mean of three locations)

Clones	Germination % in plant crop*	Number of tillers ('000/ha)		Number of millable canes ('000/ha)	
		Plant	Ratoon	Plant	Ratoon
Co 99006	70.3	143.4	145.8	66.5	70.3
Co 99008	62.9	125.4	123.9	62.5	62.9
Co 2000-12	64.8	133.7	125.5	63.9	64.8
CDL 2008-04	68.1	132.6	129.7	64.9	68.1
GYM 2008-01	68.1	136.3	135.8	64.6	68.1
CoC (SC) 24	65.2	132.6	130.9	63.3	65.2
Co 86032	67.3	135.8	135.4	64.4	67.3
SED (5%)	1.7	2.1	2.2	2.7	1.7
CD	3.8	4.5	4.8	NS	3.8

*Mean of two plant crops

Table 2. Cane characters of early maturing clones during 2010-12 (mean of three locations)

Clones	Cane length (cm)		Cane diameter (m)		Internode (cm)		Internode number	
	Plant	Ratoon	Plant	Ratoon	Plant	Ratoon	Plant	Ratoon
Co 99006	2.56	2.69	2.79	2.86	24.33	23.40	15.72	14.23
Co 99008	2.17	2.09	2.46	2.43	22.97	21.07	13.50	12.97
Co 2000-12	2.28	2.45	2.60	2.58	21.88	20.87	13.38	12.77
CDL 2008-04	2.27	2.31	2.60	2.68	21.71	20.73	13.02	12.33
GYM 2008-01	2.29	2.23	2.61	2.62	20.76	20.20	12.97	12.37
Co C (SC) 24	2.22	1.96	3.16	3.13	20.52	19.80	12.70	12.67
Co 86032	2.38	2.51	2.51	2.57	22.94	21.67	14.20	12.99
SED (5%)	0.06	0.11	0.06	0.10	0.62	0.78	0.68	0.55
CD	0.13	0.24	0.12	0.22	1.36	1.72	1.48	1.19

Significant differences in cane yield were observed among the clones and standard checks (Table 3). The clone Co 99006 remained on top with maximum mean cane yield of 157.5 t ha⁻¹ in plant and 140.2 t ha⁻¹ in ratoon, respectively. The clone GYM 2008-01 recorded lowest cane yield in both plant and ratoon crops. Commercial cane sugar percent, the factor of importance both for millers and breeders

(Parasuraman et al. 2011; Prabhakar et al. 2012), showed significant differences among the new promising clones tested and the standards. The highest CCS % was observed in Co 99006 in both plant and ratoon crops recording 12.94 % and 12.69 %, respectively. It was followed by the clone Co 99008 registering 12.65 % and 12.59 % in plant and ratoon crops, respectively. The clones Co 99006 and

**Table 3. Yield attributes of early maturing clones during 2010-12
(mean of three locations)**

Clones	Cane yield (t/ha)		CCS (%)		Sugar yield(t/ha)	
	Plant	Ratoon	Plant	Ratoon	Plant	Ratoon
Co 99006	157.5	140.2	12.94	12.59	20.4	17.7
Co 99008	142.0	121.6	12.65	12.63	18.0	15.4
Co 2000-12	139.3	120.6	11.92	11.69	16.6	14.1
CDL 2008-04	141.1	130.4	11.80	12.06	16.6	15.7
GYM 2008-01	135.2	130.2	11.97	11.80	16.2	15.4
Co C (SC) 24	141.7	132.6	12.00	11.71	17.0	15.5
Co 86032	142.8	132.5	12.74	12.30	18.2	16.3
SED (5%)	3.5	4.0	0.12	0.24	0.3	0.5
CD	7.8	8.7	0.28	0.51	0.8	1.0

Co 99008 were on par whereas the clones CDL 2008-04 and Co 2000-12 recorded the lowest CCS % in plant and ratoon crops respectively. Sugar yield, the function of cane yield and corresponding recoverable sugar %, was the highest for Co 99006 with 20.4 t ha⁻¹ and 17.7 t ha⁻¹ in plant and ratoon crops, respectively.

Conclusion

The early maturing clone Co 99006 had shown significantly superior performance for cane and sugar yield over other clones and standards tested at three locations in two plant crops and a ratoon in the given environment which indicated its suitability for commercial cultivation in North Western Agro Climatic Zone of Tamil Nadu.

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