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CoC 99061-A new sugarcane variety for Tamil Nadu

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Abstract : CoC 99061 is an intervarietal hybrid of Co 6806 x Co 740. It is a mid late sugarcane variety with a duration of 330 - 360 days. It is an erect, medium thick cane with high yield potential. It is non lodging and non flowering. CoC 99061 recorded an average cane yield of 130.33 t/ha, CCS % of 11.94 (commercial cane sugar) and yield of 15.59 t/ha. It is moderately resistant to red rot disease and tolerant to borers. (*Key Words :* Sugarcane, CoC 99061, Variety).

Tamil Nadu ranks first in the world average yield of sugarcane with 99.3 t/ha. High yielding and high quality varieties have played a major role in the increase of the cane as well as sugar yield in Tamil Nadu over years. Mid late planting mostly suffers by the incidence of the Early shoot borer and none of the variety is resistant to early shoot borer. High temperature during maturity causes inversion of sucrose resulting in the deterioration of quality of canes. CoG 93076, Co 85019, Co 8021 and Co 6304 are the ruling varieties available under mid late season in which CoG 93076 is a medium quality cane and Co 6304, and Co 8021 are reported to be susceptible to red rot disease.

Hence attempt were made at Sugarcane Research Station, Cuddalore to find out superior

varieties for high yeild and quality. As a result, Coc 99061, a high yield and high quality variety over CoG 93076 was released during 1999 for cultivation in Tamil Nadu and Pondicherry.

Materials and Methods

The new sugarcane cultivar is an intervarietal of Co 6806 x Co 740. Hybridization was made at National Hybridization Garden, Sugarcane Breeding Institute, Coimbatore during 1989-90 and seedlings were raised from the fluff at Sugarcane Research Station, Cuddalore. In subsequent studies, the clone was identified and clonal number assigned as C 90025. Further yiedl trials conducted with this clone during 1990-95 in comparison with Co 6304 and CoG 93076, proved it as an alternative to CoG 93076. The clone was tested in 59 locations for two years during 1996-

Table 1. Performance of C 90025 plant crops in advanced yield trial (Mid Late) both plant and ratoon crops 1993-94, 1994-95.

S.No.	Clone / Variety	Cane yield [t / ha]	Juice quality			Sugar yield [t/ha]	Reaction to red rot
			Pol%	Purity%	CCS%		
Plant crop -I (1993-94)							
1.	C 90025	136.20	17.50	94.90	12.84	17.49	MR
2.	Co 6304	118.70	16.70	86.52	11.74	13.93	HS
3.	CoG 93076	115.90	16.50	91.46	11.91	13.80	MR
	CD	8.21	10.4	1.02	0.92	1.82	
Plant crop -II (1994-95)							
1.	C 90025	138.30	17.00	93.19	12.34	17.07	MR
2.	Co 6304	120.60	16.69	87.69	12.00	14.47	HS
3.	CoG 93076	117.90	17.00	88.36	12.08	14.24	MR
	CD	8.10	1.10	1.34	0.93	1.17	
Mean of Two Plant Crops							
1.	C 90025	137.25	17.25	94.25	12.59	17.28	
2.	Co 6304	119.65	16.83	87.11	11.87	14.20	
3.	CoG 93076	116.90	16.75	89.91	11.99	14.02	
	Per cent increase over						
1.	Co 6304	14.71	2.49	7.97	6.06	21.69	
2.	CoG 93076	17.41	2.99	4.60	5.00	23.25	

Table 2. Performance of C 90025 in ratoon crop in advance yield trial (Mid Late) 1994-95

S.No.	Clone / Variety	Cane yield [t / ha]	Juice quality			Sugar yield [t/ha]	Reaction to red rot
			Pol%	Purity%	CCS%		
Ratoon crop (1994-95)							
1.	C 90025	124.40	18.38	94.06	13.44	16.72	MR
2.	Co 6304	116.70	17.03	94.40	12.47	14.55	HS
3.	CoG 93076	115.47	18.00	95.84	13.25	15.29	MR
	CD	9.05	1.06	1.46	0.98	1.08	
Per cent increase over							
1.	Co 6304	6.60	7.93	--	7.78	14.91	
2.	CoG 93076	7.73	2.11	--	1.43	9.35	

Table 3. Performance of C 90025 in plant crops under CAE (Mid Late) 1996-97, 1997-98.

S.No.	Clone / Variety	Cuddalore region	Trichy region	Coimbatore region	Mean
Cane yield (t/ha)					
1.	C 90025	120.40	127.90	122.10	123.40
2.	Co 8021	104.80	114.50	130.60	116.10
3.	CoG 8519	103.50	118.30	116.10	112.60
4.	CoG 93076	108.60	115.10	122.90	115.10
	CD	5.45	8.30	8.72	6.45
CCS%					
1.	C 90025	12.47	11.00	10.41	11.21
2.	Co 8021	11.14	11.07	11.01	11.07
3.	Co 8519	11.71	11.60	12.24	11.52
4.	CoG 93076	11.53	11.01	10.67	11.07
	CD	0.75	0.20	0.85	0.67
Sugar yield (t/ha)					
1.	C 90025	15.01	14.06	12.62	13.89
2.	Co 8021	11.67	12.67	13.79	12.71
3.	Co 85019	12.62	13.56	12.92	13.03
3.	CoG 93076	12.08	12.67	13.15	12.63
	CD	1.34	1.19	1.17	0.81

Table 4. Performance of C 90025 in ratoon crop under CAE (Mid Late) 1997-98.

S.No.	Clone / Variety	Cuddalore region	Trichy region	Coimbatore region	Mean
Cane yield (t/ha)					
1.	C 90025	120.40	115.40	111.50	115.10
2.	Co 8021	104.80	97.50	78.90	93.70
3.	Co 85019	100.90	107.50	91.60	100.00
3.	CoG 93076	103.40	108.10	109.60	107.00
	CD	6.97	7.10	4.90	6.32
CCS%					
1.	C 90025	12.19	12.26	10.54	11.66
2.	Co 8021	11.58	11.35	10.57	11.16
3.	Co 85019	11.70	10.78	11.03	11.17
3.	CoG 93076	11.55	10.51	10.93	11.10
	CD	0.43	0.84	0.55	0.49
Sugar yield (t/ha)					
1.	C 90025	14.35	14.17	11.76	13.43
2.	Co 8021	12.02	11.05	10.36	11.14
3.	Co 85019	11.80	11.73	10.21	11.25
3.	CoG 93076	11.95	11.62	11.89	11.82
	CD	2.31	2.42	1.90	1.41

Table 5. Performance of C 90025 in ratoon crop under CAE (Mid Late) both plant and ratoon crops 1996-97/1997-98.

S.No.	Clone / Variety	Plant Crop			Ratoon Crop		
		Cane yield (t/ha)	CCS %	Sugar yield (t/ha)	Cane yield (t/ha)	CCS %	Sugar yield (t/ha)
1.	C 90025	123.40	11.29	13.89	115.10	11.66	13.43
2.	Co 8021	116.10	11.07	12.71	93.70	11.16	11.14
3.	Co 85019	112.60	11.52	13.03	100.00	11.17	11.25
4.	CoG 93076	115.10	11.07	12.63	107.00	11.10	11.82
	SE	2.11	0.20	0.25	2.02	0.13	0.42
	CD	6.45	0.67	0.81	6.32	0.49	1.41
Per cent increase over							
1.	Co 8021	5.91	1.94	8.49	18.59	4.28	17.05
2.	Co 85019	8.75	—	6.19	13.11	4.20	16.23
3.	CoG 93076	6.72	1.94	9.07	7.03	4.80	11.98

97 and 1997-98 under the Coordinated Agronomic Experiment (CAE). The clone C 90025 was also tested for its reaction to pests and diseases.

Results and Discussion

In Advanced Yield Trial [mean of two plant crops] C 90025 registered a mean cane yield of 137.25 t/ha as against 119.65 and 116.90 t/ha for Co 6304 and CoG 93076, accounting an increased yield of 14.71 and 17.41 per cent respectively. The CCS% was also highest in C 90025 (12.59) as compared to Co 6304 (11.87). With regard to sugar yield, C 90025 registered the highest sugar yield of 17.28 t/ha as against 14.20 t/ha for Co 6304 and 14.02 t/ha for CoG 93076 [Table 1].

In ratoon crop also, C 90025 recorded an increased cane yield of 124.40 t/ha as against 116.70 t/ha by Co 6304 and 115.47 t/ha by CoG 93076. With regard to CCS%, C 90025 registered the highest CCS% of 13.44 as compared to Co 6304 (12.47) and CoG 93076 (13.25). Regarding sugar yield, C 90025 recorded significantly higher sugar yield [16.72 t/ha] over the standards, Co 6304 and CoG 93076 which recorded sugar yield of 14.55 and 15.29 t/ha respectively [Table 2].

Under Coordinated Agronomic Experiments [mean of two plant crops], the clone C 90025 recorded the highest mean cane yield of 123.40 t/ha as against 112.60, 115.10 and 116.10 t/ha by Co 85019, CoG

Table 6. Performance of 90025 plant crop in AYT and CAE (Mid Late)

S.No.	Clone / Variety	AYT			CAE			MEAN		
		Cane yield (t/ha)	CCS %	Sugar yield (t/ha)	Cane yield (t/ha)	CCS %	Sugar yield (t/ha)	Cane yield (t/ha)	CCS %	Sugar yield (t/ha)
1.	C 90025	137.25	12.59	17.28	123.40	11.29	13.89	130.33	11.94	15.59
2.	CoG 93076	116.90	11.99	14.02	115.10	11.07	12.63	116.00	11.53	13.33
3.	Co 6304	119.65	11.87	14.20	NT	NT	NT	--	--	--
4.	Co 8021	NT	NT	NT	116.10	11.07	12.71	--	--	--
5.	Co 85019	NT	NT	NT	112.60	11.52	13.03	--	--	--
Per cent increase over										
1.	CoG 93076	17.41	5.00	23.25	7.21	1.99	9.98	12.35	3.56	16.95
2.	Co 6304	14.71	6.06	21.69	--	--	--	--	--	--
2.	Co 8021	--	--	--	6.29	1.99	9.28	--	--	--
4.	Co 85019	--	--	--	9.59	--	6.60	--	--	--

NT : Not Tested

Table 7. Performance of C 90025 ratoon crop in AYT and CAE (Mid Late)

S.No.	Clone / Variety	AYT			CAE			MEAN		
		Cane yield (t/ha)	CCS %	Sugar yield (t/ha)	Cane yield (t/ha)	CCS %	Sugar yield (t/ha)	Cane yield (t/ha)	CCS %	Sugar yield (t/ha)
1.	C 90025	124.40	13.44	16.72	115.10	11.66	13.43	119.75	12.55	15.08
2.	CoG 93076	115.47	13.25	15.29	107.00	11.10	11.82	111.24	12.18	13.56
3.	Co 6304	116.70	12.47	14.55	NT	NT	NT	--	--	--
4.	Co 8021	NT	NT	NT	93.70	11.16	11.14	--	--	--
5.	Co 85019	NT	NT	NT	100.00	11.17	11.25	--	--	--
Per cent increase over										
1.	CoG 93076	7.73	1.43	9.35	7.57	5.05	13.62	7.65	3.04	11.21
2.	Co 6304	6.60	7.78	14.91	--	--	--	--	--	--
2.	Co 8021	--	--	--	22.84	4.48	20.56	--	--	--
4.	Co 85019	--	--	--	15.10	4.39	19.38	--	--	--

NT : Not Tested

Table 8. Reaction of C 90025 to red rot and smut disease

Entry	Reaction by plug method						Per cent smut incidence and reaction
	Condition of top [ct]	Lesion width [w]	White spots [ws]	Nodal transgression [nt]	Total	Reaction	
C 90025	0.00	1.33	0.00	2.35	3.68	MR	18.8 MS
Standard to red rot							
Co 6304	1.00	3.00	2.00	3.00	9.00	HS	--
CoG 93076	0.00	1.40	0.00	2.40	3.80	MR	--
Co 8021	0.00	2.60	1.20	2.80	6.60	S	--
Co 85019	0.00	1.80	0.60	1.80	5.25	MR	--
Standard to smut							
Co 740	--	--	--	--	--	--	72.8 [HS]

MR - Moderately resistant, MS - Moderately susceptible, S - Susceptible, HS - Highly susceptible.

Table 9. Reaction of C 90025 to red rot and smut disease

Entry	Early shoot borer		Internode borer			Top Borer	
	Incidence (%)	Reaction	Canebasis (%)	Node basis (%)	Infestation Index		Reaction
C 90025	18.20	MS	23.00	14.90	3.42	Less susceptible	Stray
Co 8021 (Standard)	33.00	HS	42.00	16.80	7.06	HS	Moderate

Table 10. Morphological characters Variety : CoC 99061

1. Habit	: Erect, non-lodging	ii. Colour	: Dark green
2. Carriage	: Tight clasping erect with tip dropping	9. Joint	
3. Top	: Semi compact	i. Shape	: Cylindrical
4. Lamina		ii. Splits	: Absent
i. Colour	: Green	iii. Ivory Markings	: Present, thin lines
ii. Width	: Medium	iv. Weather Markings	: Present
5. Sheath		v. Growth ring	: Narrow, slightly swollen
i. Colour	: Green with pink tinge	vi. Root zone	: Medium, uniform, yellowish
ii. Spines	: Deciduous	vii. Wax band	: Even, very slightly present
iii. Splits	: Present	10. Bud	
iv. Wax coating	: Very sparsely present	i. Shape	: Ovate with flanges
6. Ligule	: Crescent shape	ii. Size	: Medium
7. Ligular process	: Present, asymmetrical lanceolate	iii. Bud groove	: Very sparsely present
8. Stalk		iv. Bud cushion	: Absent
i. Alignment	: Staggered, erect cane		

93076 and Co 8021 with an yield increase of 8.75, 6.72 and 5.91 per cent respectively. With regard to CCS%, the clone C 90025 registered the highest mean CCS% of 11.21 as compared to CoG 93076 and Co 8021 which recorded CCS% of 11.07. The clone C 90025 recorded the highest mean sugar yield of 13.89 t/ha as against 12.63, 12.71 and 13.03 t/ha by CoG 93076, Co 8021 and Co 85019 with an increase of 9.07, 8.49 and 6.19 per cent respectively [Tables 3 and 5].

In ratoon crop also, C 90025 recorded the mean cane yield of 115.10 t/ha as against 93.70, 100.00 and 107.00 t/ha by Co 8021, Co 85019 and CoG 93076 with an increase of 18.59, 13.11 and 7.03 per cent respectively. Regarding CCS% the clone C 90025 registered mean CCS% of 11.66 when compared to CoG 93076 (11.10), Co 8021 (11.16) and Co 85019 (11.17). With regard to mean sugar yield, the clone C 90025 out yielded the check varieties by registering 13.43 t/ha with an increase in the mean sugar yield

of 11.98, 16.23 and 17.05 per cent over CoG 93076, Co 85019 and Co 8021 respectively [Table 4 and 5].

Over all performance of C 90025 as compared to CoG 93076 is furnished in Tables 6 and 7.

In plant crop, C 90025 registered cane yield of 130.33 t/ha as against 116.00 t/ha by CoG 93076 accounting for 12.35 per cent increase in cane yield. Regarding CCS%, C 90025 recorded CCS% of 11.94 as against 11.53 by CoG 93076 accounting an increase of 3.56 per cent. C 90025 recorded sugar yield of 15.59 t/ha as compared to 13.33 t/ha by CoG 93076 registering 16.95 per cent increase in sugar yield.

In ratoon crop also, C 90025 recorded cane yield of 119.75 t/ha as against 111.24 t/ha by CoG 93076 with an increase of 7.65%. With regard to CCS%, it registered 12.55 as compared to 12.18 by CoG 93076 with an increase of 3.04 per cent. Regarding sugar yield, C 90025 recorded 15.08 t/ha against 13.56 t/ha by CoG 93076 with an increase of 11.21 per cent.

The clone C 90025 was tested in 62 trials both in AYT and CAE with a common standard CoG 93076 and it excelled CoG 93076 in respect of cane yield, CCS% and sugar yield. Based on the superior performance, the clone C 90025 was released as CoC 99061 during January 1999. It gave an average cane yield of 130.33 t/ha, CCS% of 11.94 sugar yield of 15.59 t/ha. It is moderately resistant to red rot disease and tolerant to borers (Tables 8 and 9). The distinguishing morphological characters of the variety CoC 99061 (C 90025) is furnished in Table 10.

Salient Features

Mid late variety (330-360 days)
Erect, medium thick cane
Non lodging, Non flowering
High cane yield (130.33 t/ha)
High CCS% (11.94), High sugar yield (15.59 t/ha)
Moderately resistant to red rot
Tolerant to borers.
Good ratooner.

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Economic viability of ratooning rice

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Abstract : A study was conducted at TNAU, Coimbatore to assess the effect of ratooning on the yield, yield parameters and income of medium duration rice cultivars viz., IR20, CO43, ADT38 and Ponni under lock-lodge technology and conventional method of ratooning. Although there was not much difference in the regeneration of stubbles between lock-lodging and conventional ratooning, the braiding and lodging technique (lock-lodging) was found to be superior to the conventional method in favourably influencing all yield parameters except productive tiller number per hill. All the four medium duration rice varieties produced significantly higher grain yield (2443 to 3106 kg ha⁻¹) under lock-lodge ratooning as against the yield recorded (1285 to 1704 kg ha⁻¹) in conventional ratooning thus resulting in higher income from the new technology of rice ratooning. Co 43 was consistently superior. The lock-lodge ratooning also proved its superiority by registering high C:B ratio (2.39) compared to the conventional ratoon practice (1.40) and the main crop (1.93). (*Key Words : Rice, Agro-climatic zones, Yield, income*).

Rice is the staple food for more than half of the world's population. The rice production needs to be doubled in the next 15-20 years to meet the food demand for ever increasing population. Crop intensification and higher yield are the possible ways to bridge the gap between the production and consumption. Particularly in densely populated Tropical Asia, it warrants immediate attention because there is very little new land area available for rice cultivation (Chauhan et al., 1985). Ratooning offers good scope for increasing rice production and making the land productive with limited resources.

Although, rice ratooning has been tried in many countries like India (Balasubramanian et al., 1970), Japan (Ishikawa, 1964) and United states (Evatt and Beachell, 1960), it is practiced only in limited areas. Ratooning of rice needs evaluation as a means of making the land productive after the dry season crop in irrigated areas and after the rainy season crop in rainfed areas (Bahar and De Datta, 1977). However, rice ratooning has so far received genotypes with good ratooning ability. Braiding and lodging (lock-lodging) the stubbles after the harvest of main crop, a novel ratooning technique, helps in achieving profuse tillering,