

TAMIL NADU AGRICULTURAL UNIVERSITY

From
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To
The Project Coordinator
AICRP on Sugarcane
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Rae Bareli road, Dilkusha (post)
Lucknow – 226 002

No.P&H/SRS/CDL/AICRP(S)/Agronomy/Annual Report /2016 dt.15.06.2016

Sir,

Sub : Sugarcane Research Station, Cuddalore – AICRP on Sugarcane-Annual report-
Agronomy - 2015-2016- Submitted - regarding,

I submit to enclose herewith the Annual report of AICRP on Sugarcane pertaining to
Agronomy division of this centre for the period of 2015-2016 for your kind perusal.

Professor and Head

Copy to the PI, Division of Crop Production, AICRP on Sugarcane, IISR-Lucknow-226002

Copy submitted to the Director of Research, TNAU, Coimbatore-641 003

Copy submitted to the Director, Directorate of Crop Management Studies, TNAU,
Coimbatore-641 003

Copy submitted to the Director, Tamil Nadu Rice Research Institute, Aduthurai- 612 101

ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE

East Coast Zone

ANNUAL REPORT - AGRONOMY
(2015 – 2016)



SUGARCANE RESEARCH STATION
TAMILNADU AGRICULTURAL UNIVERSITY
CUDDALORE – 607 001

ANNUAL REPORT OF AICRP (S) FOR THE YEAR 2015-2016

Sugarcane Research Station, Cuddalore (East Coast Zone)

Discipline: Agronomy

1. Serial No. and Title

AS 42. Agronomic evaluation of promising sugarcane genotypes

2. Location

Sugarcane Research Station, Cuddalore

3. Objective 1

To work out the Agronomy of sugarcane genotypes of Advanced Varietal Trials (AVT)

4. Details of technical programme

Place of the technical project : Sugarcane Research Station, Cuddalore

Irrigated / Rainfed : Irrigated

Design : RBD

Replications : Three

Treatments:

i. Season :

Date of Planting : 19.02.2015

Date of Harvest : 11.01.2016

ii. Genotypes : (Four) CoC 10 336, CoC 11 336, CoA 11 321, and CoA 11 323

iii. Varieties : (One) CoC 24

iv. Levels of fertilizers : Three (75, 100 and 125 % of recommended N)

5. Technical summary of the project

The experiment was laid out during 2015-2016 in a randomized block design with three replications. Four AVT sugarcane genotypes viz., Co C 10 336, Co C 11 336, Co A 11 321 and Co A 11 323 were compared with the standard Co C 24. In addition, the effect of three levels of nitrogen fertilization (75, 100 and 125 per cent of recommended dose) was also studied.

The data documented on varied growth, yield and quality parameters for the respective cropping seasons are presented in Table 1. Among the entries, the clone CoC 11 336 significantly registered the maximum germination of 83.88 per cent and it was comparable with the standard Co C 24. The levels of nitrogen application did not shown any significant results on germination.

The entry Co C 11 336 significantly registered maximum cane yield 137.1 The clone Co A 11 321 recorded the lowest cane yield of 120.6 t ha⁻¹. Regarding the juice quality, the sugarcane variety Co 11 336 registered the highest commercial cane sugar (CCS) percent of 12.52 and it was on par with the standard check Co C 24.

Among the levels of N applications, the prescription of 125 per cent of the recommended dose of N (375 kg ha⁻¹) significantly registered higher values of yield components, cane and sugar yield compared to 75 and 100 per cent of recommended dose of nitrogen.

Table -1. Performance of sugarcane genotypes under varied levels of N

Treatments	Germination (%)	Tillers ('000 ha ⁻¹)	Millable canes ('000 ha ⁻¹)	Individual cane weight (kg)	Cane yield (t ha ⁻¹)	CCS (%)	Sugar yield (t ha ⁻¹)
Genotypes							
CoC 10 336	81.41	159.6	110.3	1.38	131.2	12.34	16.19
CoC 11 336	83.88	178.9	127.2	1.45	137.1	12.52	17.16
Co A 11 321	79.56	131.8	104.6	1.28	120.6	12.32	14.86
Co A 11 323	82.12	148.0	106.4	1.30	129.2	12.41	16.03
Co C 24	83.03	156.6	123.8	1.42	133.2	12.30	16.38
CD (p=0.05)	NS	5.42	4.23	0.05	5.50	NS	0.78
N Levels							
75% RD N	73.87	150.9	109.5	1.18	126.3	12.34	15.59
100% RD N	76.13	158.2	117.2	1.36	130.0	12.42	16.15
125% RD N	79.25	160.2	126.5	1.44	133.4	12.46	16.62
CD (p=0.05)	NS	7.80	6.27	0.07	6.30	NS	0.80

Salient findings:

The genotype CoC 11 336 significantly registered the maximum millable cane, individual cane weight, cane yield and sugar yield. Also in the juice quality, the clone CoC 11 336 registered the highest commercial cane sugar (CCS) per cent and was on par with the local check CoC 24. Prescription of 125 per cent of the recommended dose of nitrogen significantly registered higher values of yield components, cane and sugar yield compared to 75 and 100 per cent of recommended dose of nitrogen.

1.Serial No. and Title

AS 68. Impact of integrated application of organics and inorganics in improving soil health and sugarcane productivity

2.Location

Sugarcane Research Station, Cuddalore

3.Objective

To develop nutrient management strategy for sustaining soil health and sugarcane production.

4.Details of Technical programme

Place of the technical project: Sugarcane Research Station, Cuddalore

Irrigated / Rainfed : Irrigated

Design : RBD

Replications : Three

Variety : CoC 24

Date of Ratooning : 25.03.2015

Date of Harvest : 28.01.2016

5. Technical summary of the project

This experiment was initiated during 2014-15 with 13 treatments with combinations of inorganic fertilizers with micro nutrients and FYM. In the ratoon the following are the treatments were imposed. The treatments consisted of T₁- Chopped trash @ 10 t/ha + 50% RDF, T₂- Chopped trash @ 10 t/ha + 100% RDF, T₃- Chopped trash @ 10 t/ha + soil test based NPK, T₄- FYM @ 20 t/ha + 50% RDF, T₅- FYM @ 20 t/ha + 100% RDF, T₆- FYM @ 20 t/ha + soil test based NPK, T₇- FYM @ 10 t/ha + biofertilizer (*Azotobacter* + PSB) + 50 % RDF, T₈- FYM @ 10 t/ha + biofertilizer (*Azotobacter* + PSB) + 100 % RDF, T₉- FYM @ 10 t/ha + biofertilizer (*Azotobacter* + PSB) + soil test based NPK. All the other recommended package of practices was adopted uniformly. The data on growth, yield parameters, yield and quality were recorded and presented in Table.1. All the recommended package of practices was adopted uniformly.

Progress made during 2015-16

This experiment was continued in the same undisturbed plots for ratoon crop with three replications. The objective of the experiment was to develop nutrient management strategy for sustaining soil health and sugarcane production. The initial soil status of the experimental site is sandy loam with pH of 7.4, organic carbon (0.42 %), bulk density (1.41 g cc⁻¹) and infiltration rate (1.37 cm hr⁻¹). The initial nutrient status of the soil is 181.0: 23.4:

232.5 NPK kg ha⁻¹. The recommended dose of fertilizer is 300:100:200 NPK kg ha⁻¹. In plant crop the application of FYM @ 10 t/ha + biofertilizer (*Azotobacter* + PSB) + 100 % RDF (T₈) registered significantly maximum tillers (1,56,230 ha⁻¹), millable canes (1,26,870 ha⁻¹), CCS (12.86 %), cane yield (142.42 t ha⁻¹) sugar yield (18.32 t ha⁻¹) and B:C ratio (3.59).

In first ratoon crop (Table 1) also the treatment T₈ application of FYM @ 10 t/ha + biofertilizer (*Azotobacter* + PSB) + 100 % RDF significantly registered maximum millable canes (1,30,500 ha⁻¹); cane yield (140.0 t ha⁻¹). However data on the CCS per cent revealed insignificant difference among the treatment. The B:C ratio was found to be numerically high with the treatment T₈ (3.87) which was closely followed by the treatment T₉ (3.71).

Table 1. Effect of treatments on germination, growth, quality and yield of sugarcane

Treatments	Tillers ('000 ha ⁻¹)	Millable canes ('000 ha ⁻¹)	CCS (%)	Cane yield (t ha ⁻¹)	Sugar yield (t ha ⁻¹)
T ₁	121.31	99.56	11.12	81.20	9.03
T ₂	134.26	112.5	11.25	110.6	12.44
T ₃	138.77	116.1	11.27	119.6	13.48
T ₄	133.51	111.7	11.09	97.60	10.82
T ₅	145.42	119.6	11.31	134.7	15.23
T ₆	148.11	124.6	11.17	138.7	15.49
T ₇	138.44	110.0	11.14	104.4	11.63
T ₈	156.23	130.5	11.35	140.0	15.89
T ₉	152.54	125.0	11.19	137.5	15.39
CD (p=0.05)	7.24	5.11	NS	8.12	0.68

Salient findings

The treatment (T₈) application of FYM/Compost @ 10 tonnes ha⁻¹ + biofertilizer (*Azotobacter* + PSB) + 100 % RDF registered significantly higher growth and yield parameters and it was comparable with soil test crop response including treatment T₉.

1.Serial No. and Title

AS 67. Optimization of fertigation schedule for sugarcane through micro irrigation Technique under different agro-climatic conditions.

2.Location

Sugarcane Research Station, Cuddalore

3.Objective

To economize water use in cultivation and improve sugarcane productivity

4.Details of Technical programme

Place of the technical project: Sugarcane Research Station, Cuddalore

Irrigated / Rainfed : Irrigated

Design : Strip Plot

Replications : Three

Variety : CoC 24

Date of Planting : 26.06.2014

Date of Harvest : 26.08.2015

Treatments

A. Irrigation water / Method applied

T₁ – Subsurface drip irrigation at 75 % Pan Evaporation (PE) – Irrigation once in two days

T₂ - Subsurface drip irrigation at 100 % Pan Evaporation (PE) -Irrigation once in two days

T₃ - Subsurface drip irrigation at 125 % Pan Evaporation (PE) – Irrigation once in two days

T₄ – Farmers Practice – Surface irrigation

B. Nitrogen levels

T₁ – 100 % Recommended dose of nitrogen (RDN)

T₂ - 75 % Recommended dose of nitrogen (RDN)

T₃ - 50 % Recommended dose of nitrogen (RDN)

5. Technical summary of the project

The first year experimentation was laid out during June 2014 (special season) in Strip Plot Design with four replications. Drip laterals were laid out about 10 cm below the depth of the sett placement. Drip and surface irrigations were initiated one month after planting. The crop was harvested and the data on millable canes, cane yield, irrigation water applied and IWUE were presented in table 1.

Table 1. Performance of sugarcane under different irrigation methods and nitrogen levels

Treatments	Millable cane ('000/ha)	Cane yield (t/ha)	Irrigation water applied(ha-cm)	IWUE (kg/ha-cm)	CCS (%)
Irrigation					
I ₁ -SSDI at 75 % PE	123.0	122.0	82.6	1477	12.12
I ₂ -SSDI at 100 % PE	132.1	133.8	110.2	1214	12.23
I ₃ -SSDI at 125 % PE	136.0	139.4	137.7	1013	12.25
I ₄ -Flood irrigation	127.9	129.4	161.0	803.6	12.24
CD(p=0.05)	4.18	5.56		48.1	NS
Nitrogen levels					
N ₁ -100 % RDN	134.2	139.8	-	1200	12.23
N ₂ -75 % RDN	130.1	131.6	-	1132	12.19
N ₃ -50 % RDN	124.9	122.1	-	1048	12.11
CD(p=0.05)	1.16	4.73		44.6	NS

Irrigating the sugarcane with sub surface drip at 125 % PE significantly out yielded all other treatments. However, the maximum irrigation water use efficiency (1477 kg/ha-cm) was recorded with sub surface drip at 75 % PE which was significantly higher than other irrigation treatments. Among the nitrogen levels significantly maximum millable canes (1,34,200 ha⁻¹), cane yield (139.8 tha⁻¹) and IWUE (1200 kg/ha-cm) were recorded with 100 % recommended dose of nitrogen application.

Salient findings:

Highest sugarcane yield of 139.4 t/ha was recorded with 125% PE for irrigation. However, irrigation water use efficiency (IWUE) was highest at 1477 kg/ha-cm when fertigation was done and the amount of irrigation water was kept as 75 per cent of pan evaporation. Among the nitrogen levels 100 per cent application of nitrogen through sub surface drip fertigation recorded the maximum cane yield (139.8 t/ha).

1. Serial No. and Title

AS-69. Use of plant growth regulators (PGRs) for enhanced yield and quality of sugarcane

2. Location

Sugarcane Research Station, Cuddalore

3.Objectives

1. To accelerate rate and extent of sugarcane germination through the use of PGRs
2. To assess the effect of PGRs on sugarcane growth, yield and juice quality

4. Details of the technical programme

Place of the technical project: Sugarcane Research Station, Cuddalore

Design : RBD

Replications : Three

Variety : CoC 24

Date of Planting :19.02.2015

Date of Harvest : 11.01.2016

Replications : Three

5. Technical summary of the project

The experiment was laid out during 2015-2016 in a randomized block design (RBD) with three replications. The treatments are as follows viz., T₁: Conventional planting/ Farmers' practice (3-bud setts); T₂: Planting of setts after overnight soaking in water; T₃:Planting of setts after overnight soaking in 50 ppm ethrel solution; T₄-Planting of setts after overnight soaking in 100 ppm ethrel solution; T₅:T₁+GA₃ spray (35 ppm) at 90, 120 and 150 DAP; T₆:T₂+ GA₃ spray (35 ppm) at 90, 120 and 150 DAP; T₇: T₃ + GA₃ (35 ppm) spray at 90, 120 and 150 DAP and T₈: T₄ + GA₃ (35 ppm) spray at 90, 120 and 150 DAP.

The data on varied growth, yield parameters, yield and quality were recorded analysed and presented in Table 1.

Table.1 Effect of plant growth regulators on growth, yield and quality of sugarcane

Treatments	Germination (%)	Millable canes ('000 ha ⁻¹)	Cane yield (t ha ⁻¹)	CCS (%)
T ₁	74.43	134.9	131.5	11.11
T ₂	78.19	138.8	130.6	11.19
T ₃	80.43	144.9	137.6	11.36
T ₄	83.07	149.5	140.3	11.45
T ₅	75.28	142.4	136.9	11.12
T ₆	77.86	146.3	139.5	11.23
T ₇	81.05	153.2	143.6	11.49
T ₈	82.19	160.2	146.6	11.61
CD(p=0.05)	NS	4.41	2.18	NS

Eventhough, numerically higher germination percentage (83.07 %) was recorded with the T₄ treatment, the maximum millable canes (1,60,200 /ha), cane yield (146.6 t/ha) and CCS per cent (11.61%) were recorded with T₈ treatment (Planting of setts after overnight soaking in 100 ppm ethrel solution and GA₃ @ 35 ppm spray at 90, 120 and 150 DAP).

Salient findings: Adoption of overnight soaking of setts in 100 ppm ethrel solution along with GA₃ (35 ppm) spray at 90, 120 and 150 DAP recorded the maximum millable canes and cane yield.