

ANNUAL REPORT OF AICRP (S) FOR THE YEAR 2013-2014

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 workout 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. Seasons : (Two)

1. Spring (Early)

Date of Planting : 16.01.2013

Date of Harvest : 06.02.2014

2. Autumn (Special)

Date of Planting : 15.05.2013

Date of Harvest : 20.05.2014

ii. Genotypes : (Four) CoA 09 321, CoA 08 323, CoC 09 336, CoC 08 336

iii. Varieties : (Two) CoC 24 and Co 86032

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

5. Technical summary of the project

This project was initiated during 2010 – 11 in randomized block design with three replications. Three AVT sugarcane genotypes *viz.*, C20038, C260628 and C 260764 were compared with the standards Co 86032 and CoC (SC) 23. In addition, the effect of three levels of nitrogen fertilization (75, 100 and 125 per cent of recommended dose) was also studied. The soils of the experimental sites were sandy loam with pH of 7.6 and 7.8 respectively. The initial nutrient statuses of the soil at both the sites were low in available nitrogen, high in phosphorus and medium in potassium. The recommended dose of NPK for East Coast Zone was 275:63:113 kg ha⁻¹ respectively.

a) First plant crop (2010 -2011)

Among the entries the AVT genotype C 260628 recorded the maximum germination per cent of 75.2 per cent, indicates that early vigour of the genotype. In production of tiller, CoC 23 significantly registered the maximum mean tiller population of 1,86,700 ha⁻¹ and it was on par with the clone C 260628. Irrespective of the varieties, application of 125 per cent of the recommended nitrogen along with recommended dose of P&K significantly registered the higher values of growth and yield parameters. The entry C 260628 significantly registered the maximum cane yield of 133.6 and 127.6 t ha⁻¹ respectively in spring and autumn season and it was comparable with the clone C 20038 with a cane yield of 129.0 t ha⁻¹ in spring season and 123.8 t ha⁻¹ in autumn season. The standard Co 86032 and the clone C 260764 recorded the lowest cane yield of 120.4 and 112.2 t ha⁻¹ in the respective cropping seasons. Regarding the juice quality, the sugarcane variety Co 86032 significantly registered the highest commercial cane sugar (CCS) per cent of 12.14 and 12.23 respectively in spring and autumn seasons. Among the levels of nitrogen, the prescription of 125 per cent of the recommended dose of nitrogen significantly registered higher values of yield components, cane and sugar yield as compared to 75 and 100 per cent of recommended dose of nitrogen.

b) Second plant crop 2011 -2012

The clone C260628 significantly registered the maximum germination of 78.4 per cent. The variety CoC 23 significantly registered the maximum mean tiller population 1,88,900 ha⁻¹ and it was on par with the clone C 260628 which recorded 1,86,700 ha⁻¹. Irrespective of the

varieties, the application of 125 per cent of recommended nitrogen along with recommended dose of P&K numerically registered the maximum tillers of 1,79,500 ha⁻¹. The entry C 260628 significantly registered maximum cane yield of 130.7 and 131.3 t ha⁻¹ respectively in spring and autumn seasons and it was comparable with the clone C20038 with a cane yield of 126.9 t ha⁻¹ in spring season and 124.6 t ha⁻¹ in autumn seasons. Regarding the juice quality, the sugarcane variety Co 86032 registered the highest commercial cane sugar (CCS) per cent of 12.43 and 12.47 respectively in spring and autumn seasons and was on par with the entry C 260628 with 12.23 and 12.34 per cent commercial cane sugar. Among the levels of nitrogen, the prescription of 125 per cent of the recommended dose of N significantly registered higher values of yield components, cane and sugar yield as compared to 75 and 100 per cent of recommended dose of nitrogen. The 125 per cent recommended N gave the maximum cane yield of 129.4 and 130.9 t/ha respectively in both the seasons.

c) Third plant crop 2012 -2013

The third year experiment was laid out during 2012 – 13 in randomized block design with three replications. Three sugarcane genotypes *viz.*, C20038, C260628 and C 260764 were compared with the standards Co 86032 and CoC (SC) 23. In addition, the effect of three levels of nitrogen fertilization (75, 100 and 125 per cent of recommended dose) was also studied.

. Among the entries, the clone C260628 significantly registered the maximum germination of 80.2 per cent. The levels of nitrogen application did not showed any significant results on germination. The clone C260628 significantly registered the higher tiller population 1,92,600 ha⁻¹. Irrespective of the varieties, the application of 125 per cent of recommended nitrogen along with recommended dose of P&K numerically registered the maximum tillers of 1,91,900 ha⁻¹.

The entry C 260628 significantly registered the maximum millable cane (1,27,900 ha⁻¹), individual cane weight (1.46 kg), cane yield (138.9 t ha⁻¹) and sugar yield (17.16 tha⁻¹) in spring season. The same entry was also recorded significantly the maximum millable cane (1,32,700 ha⁻¹), individual cane weight (1.58 kg), cane yield (138.7 t ha⁻¹) and sugar yield (17.77 t ha⁻¹) in autumn season. Regarding the juice quality, the sugarcane variety Co 86032 registered the highest commercial cane sugar (CCS) per cent of 12.65 and 13.26 respectively in spring and autumn seasons and was on par with the entry C 260628 which recorded 12.35 and 12.82 per cent commercial cane sugar.

Among the levels of nitrogen, 125 per cent recommended nitrogen gave the maximum millable cane (1,28,100 ha⁻¹), individual cane weight (1.36 kg), cane yield (132.6 t ha⁻¹) and sugar yield (15.72 tha⁻¹) in spring season. The same treatment also recorded significantly the maximum millable cane (1,27,100 ha⁻¹), individual cane weight (1.42 kg), cane yield (133.1 t ha⁻¹) and cane yield (16.16 t ha⁻¹) in autumn season. Regarding the juice quality, the 125 per cent of nitrogen application recorded the highest commercial cane sugar (CCS) per cent of 12.52 and 12.80 respectively in spring and autumn seasons and was on par with the 100 per cent nitrogen which recorded 12.19 and 12.48 per cent commercial cane sugar.

Progress made during 2013-14

The experiment was laid out during 2013 – 14 in randomized block design with three replications. Three sugarcane genotypes viz., CoA09 321, CoA 08 323, CoC 09 336 and CoC 08 336 were compared with the standards Co 86032 and CoC (SC) 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 Tables 1 & 2. Among the entries, the clone CoC 09 336 significantly registered the maximum germination of 81.25 per cent. The levels of nitrogen application did not show any significant results on germination. The clone C260628 significantly registered the higher tiller population 1,93,400 ha⁻¹. Irrespective of the varieties, the application of 125 per cent of recommended nitrogen along with recommended dose of P&K numerically registered the maximum tillers of 1,90,200 ha⁻¹.

The entry CoC 09 336 significantly registered the maximum millable cane (1,30,000 ha⁻¹), individual cane weight (1.52 kg), cane yield (146.4 t ha⁻¹) and sugar yield (17.16 t ha⁻¹) in spring season. The same entry was also recorded significantly the maximum millable cane (1,35,800 ha⁻¹), individual cane weight (1.70 kg), cane yield (148.0 t ha⁻¹) and sugar yield (17.77 t ha⁻¹) in autumn season. Regarding the juice quality, the sugarcane variety CoC 09 336 registered the highest commercial cane sugar (CCS) per cent of 12.65 and 13.26 respectively in spring and autumn seasons and was on par with the entry CoC 24 which recorded 12.35 and 12.82 per cent commercial cane sugar.

Among the levels of nitrogen, the prescription of 125 per cent of the recommended dose of nitrogen significantly registered higher values of yield components, cane and sugar yield as

compared to 75 and 100 per cent of recommended dose of nitrogen. The 125 per cent recommended nitrogen gave the maximum millable cane (1,35,400 ha⁻¹), individual cane weight (1.48 kg), cane yield (138.9 t ha⁻¹) and sugar yield (16.25 t ha⁻¹) in spring season. The same treatment also recorded significantly the maximum millable cane (1,34,000 ha⁻¹), individual cane weight (1.54 kg), cane yield (141.6 t ha⁻¹) and sugar yield (16.21 t ha⁻¹) in autumn season. Regarding the juice quality, the 125 per cent of nitrogen application recorded the highest commercial cane sugar (CCS) per cent of 12.60 and 12.94 respectively in spring and autumn seasons and was on par with the 100 per cent nitrogen which recorded 12.19 and 12.62 per cent commercial cane sugar.

Table -1. Performance of sugarcane genotypes under varied levels of N (Spring season) – (2013-14)

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							
Co A 09 321	73.80	182.00	120.30	1.33	124.8	11.62	14.71
Co A 08 323	68.30	170.30	115.80	1.21	118.5	11.56	14.40
CoC 09 336	81.25	193.40	130.00	1.52	146.4	12.65	17.16
CoC 08 336	65.40	168.10	110.20	1.10	114.2	11.12	13.38
CoC 24	78.16	187.2	123.50	1.41	135.0	12.35	14.82
Co 86032	76.50	185.0	121.10	1.38	128.0	12.00	14.27
CD (p=0.05)	4.00	5.20	5.75	0.07	8.00	0.50	0.70
N Levels							
75% RD N	70.75	168.40	104.10	1.22	110.2	10.88	13.50
100% RD N	76.12	180.80	124.70	1.31	126.3	12.19	15.60
125% RD N	78.40	190.20	135.40	1.36	138.9	12.52	16.25
CD (p=0.05)	NS	12.12	6.80	0.08	9.25	0.72	0.85

Table -2. Performance of sugarcane genotypes under varied levels of N (Autumn season) – (2013-14)

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							
CoA 09 321	71.00	160.00	117.00	1.40	126.60	12.25	15.62
CoA 08 323	65.50	149.80	113.40	1.30	119.90	11.32	13.43
CoC 09 336	78.70	172.40	135.80	1.70	148.00	13.26	17.77
CoC 08 336	62.80	146.90	108.00	1.21	116.80	11.12	13.41
CoC 24	75.40	166.30	120.60	1.52	137.20	12.82	16.05
Co 86032	73.50	162.50	117.00	1.40	130.00	12.05	15.70
CD (p=0.05)	2.12	4.00	5.60	0.06	5.92	0.53	0.86
N Levels							
75% RD N	68.00	147.00	107.50	1.30	112.00	11.10	14.00
100% RD N	73.00	160.40	123.30	1.45	128.50	12.62	15.40
125% RD N	75.90	170.50	134.00	1.54	141.60	12.94	16.21
CD (p=0.05)	1.70	4.98	7.25	0.07	8.25	0.70	0.92

Salient findings:

The genotype CoC 09 336 significantly registered the maximum millable cane, individual cane weight, cane yield and sugar yield in both spring and autumn season. Regarding the juice quality, the clone CoC 09 336 registered the highest commercial cane sugar (CCS) per cent in spring and autumn seasons and was on par with the entry 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. 64. Response of sugarcane crop to different plant nutrients in varied agro ecological Situations

2. Location:

Sugarcane Research Station, Cuddalore

3. Objective:

To study differential response of sugarcane crop to different nutrients

4. Details of technical programme:

Place of the technical project : Sugarcane Research Station, Cuddalore

Irrigated / Rainfed : Irrigated

Design : RBD

Replication : Three

Treatments : 12

Variety : CoC 24

Date of Planting : 20.02.2013

Date of Harvest : 10.03.2014

5. Technical summary of the project:

This experiment was conducted with 13 treatments with combinations of inorganic fertilizers with micro nutrients and FYM. As per the AICRP technical programme, the first year experiment was laidout during 2011-12 and 2012-13 cropping seasons in Randomized Block Design with three replications. The following are the treatments *viz.*, T₁ - Control (No fertilizer), T₂ - N, T₃ - NP, T₄ - NPK, T₅ - NPK + S, T₆ - NPK + Zn, T₇ - NPK + Fe, T₈ - NPK + Mn, T₉ - NPK + S + Zn, T₁₀ - NPK + S + Zn + Fe, T₁₁ - NPK + S + Zn + Fe + Mn, T₁₂ -Soil test based fertilizer application and T₁₃ - FYM @ 20 t/ha. All the recommended package of practices was adopted uniformly. The sulphur was applied as elemental sulphur @ 60 kg ha⁻¹. Zinc was applied @ 50 kg ha⁻¹ as ZnSO₄. Iron was applied as foliar spray with 1 per cent FeSO₄ thrice in weekly

interval at vegetative stage. Magnesium was applied 100 kg of MnSO_4 . The NPK was applied as per the recommended dose.

First crop 2011-2012

The first year results revealed that all the treatments recorded good germination and were not significant. Application of NPK + S + Zn + Fe + Mn through inorganic fertilizers recorded significantly the maximum of 1,93,700 ha^{-1} tiller population. The same treatment produced the maximum millable cane population of 1,29,600 ha^{-1} and was on par with the treatment (T_{12}) soil test based fertilizer application which recorded 1,26,400 ha^{-1} . Regarding cane yield and sugar yield, the treatment (T_{11}) NPK + S + Zn + Fe + Mn recorded the maximum of 156.4 t ha^{-1} and 19.64 t ha^{-1} and was on par with the treatment (T_{12}) with 152.4 t ha^{-1} and 19.07 t ha^{-1} respectively. Regarding commercial cane sugar, the treatment (T_{11}) NPK + S + Zn + Fe + Mn numerically recorded 12.56 per cent. The post harvest soil analysis indicated the treatment (T_{11}) NPK + S + Zn + Fe + Mn increase the available NPK content of 189, 44 and 189 kg ha^{-1} respectively and was comparable with soil test based fertilizer application (T_{12}). The micro nutrient content in the soil was increased with treatment (T_{11}) NPK + S + Zn + Fe + Mn which recorded 75.63, 2.13, 15.65 and 15.63 ppm of S, Zn, Fe and Mn respectively.

Second crop 2012-2013

Application of NPK + S + Zn + Fe + Mn through inorganic fertilizers significantly recorded the maximum tiller population of 1,96,200 ha^{-1} at 90 days after planting and is on par with soil test based fertilizer application with the tiller production of 1,93,700 ha^{-1} . The same trend was also recorded at 120 and 180 days after planting with 1,86,200 ha^{-1} and 1,72,100 ha^{-1} of tiller population. The maximum plant height of 162.32 and 194.23 cm was recorded in application of NPK + S + Zn + Fe + Mn through inorganic fertilizers on 120 and 180 days after planting.

Application of NPK + S + Zn + Fe + Mn through inorganic fertilizers significantly recorded the maximum millable cane population of 1,28,600 ha^{-1} . The same treatment (T_{11}) also registered significantly higher cane length, cane girth and individual cane weight of 292.12 cm, 3.12 cm and 1.60 kg and was comparable with the treatment T_{10} and T_{12} which recorded 290.56 cm, 2.85 cm and 1.54 kg and 289.63 cm, 2.95 cm and 1.55 kg respectively. The result on yield parameters revealed that the treatment (T_{11}) NPK + S + Zn + Fe + Mn registered significantly

higher yield of 154.6 t/ha and it was on par with the treatment T₁₀ and T₁₂ with 152.4 and 148.3 t/ha respectively.

Progress made during 2013-14

The data on growth and yield parameters of sugarcane, initial and post harvest soil analysis data were recorded and presented in table 1, 2, 3, 4 and 5. The results indicated that, germination was not significant among the treatments. Application of NPK + S + Zn + Fe + Mn through inorganic fertilizers significantly recorded the maximum tiller population of 1,98,100 ha⁻¹ at 90 days after planting and is on par with soil test based fertilizer application with the tiller production of 1,93,700 ha⁻¹. The same trend was also recorded at 120 and 180 days after planting with 1,82,500 ha⁻¹ and 1,74,000 ha⁻¹ of tiller population. The maximum plant height of 164.90 and 200.60 cm was recorded in application of NPK + S + Zn + Fe + Mn through inorganic fertilizers on 120 and 180 days after planting.

Table 1. Effect of different plant nutrients on growth characteristics of sugarcane (2013 – 14)

Treatments	Germination (%)	Tiller Population ('000/ha)			Plant height (cm)	
		90 DAP	120 DAP	180 DAP	120 DAP	180 DAP
T ₁ -Control (No fertilizer)	70.1	102.0	96.0	86.2	62.0	102.6
T ₂ – N	72.5	137.2	127.2	94.0	92.2	160.4
T ₃ – NP	72.5	145.0	135.5	102.3	123.5	159.2
T ₄ –NPK	72.8	171.2	160.2	140.4	133.3	163.0
T ₅ – NPK + S	73.0	173.1	162.0	136.2	133.9	164.0
T ₆ – NPK + Zn	73.2	173.7	164.9	140.0	135.1	166.0
T ₇ – NPK + Fe	74.1	174.0	166.8	144.0	139.2	168.1
T ₈ – NPK + Mn	74.0	174.7	168.9	158.3	148.2	170.5
T ₉ – NPK + S + Zn	74.2	176.3	170.2	166.4	157.5	173.2
T ₁₀ –NPK + S + Zn + Fe	78.6	185.2	178.5	172.2	164.9	190.4
T ₁₁ – NPK + S + Zn + Fe + Mn	80.5	198.1	188.1	182.5	157.2	200.6
T ₁₂ –Soil test based fertilizer application	78.2	193.7	183.0	174.0	112.7	194.2
T ₁₃ – FYM @ 20 t ha ⁻¹	74.0	140.5	132.2	100.6	110.5	178.3
CD (P = 0.05)	NS	7.85	8.52	7.40	7.20	8.50

Application of NPK + S + Zn + Fe + Mn through inorganic fertilizers significantly recorded the maximum millable cane population of 1,32,400 ha⁻¹ and was on par with the soil test based fertilizer application (T12) and NPK + S + Zn + Fe (T10) which registered the cane population of 1,27,300 ha⁻¹ and 1,26,000 ha⁻¹ respectively. The same treatment (T11) also registered significantly higher cane length, cane girth and individual cane weight of 298.10 cm, 3.33 cm and 1.86 kg and was comparable with the treatment T10 and T12 which recorded 290.00 cm, 2.98 cm and 1.70 kg and 296.20 cm, 2.92 cm and 1.72 kg respectively.

Table 2. Effect of different plant nutrients on yield characteristics of sugarcane (2013 – 14)

Treatments	Millable cane ('000/ha)	Cane length (cm)	Cane girth (cm)	Individual cane weight (kg)
T ₁ -Control (No fertilizer)	60.2	158.0	1.82	0.68
T ₂ – N	76.6	176.3	2.23	0.72
T ₃ – NP	92.0	198.7	2.25	1.02
T ₄ –NPK	111.5	254.3	2.36	1.37
T ₅ – NPK + S	105.2	259.6	2.54	1.40
T ₆ – NPK + Zn	99.6	265.3	2.68	1.45
T ₇ – NPK + Fe	108.0	269.0	2.70	1.45
T ₈ – NPK + Mn	108.4	275.8	2.70	1.48
T ₉ – NPK + S + Zn	113.8	281.3	2.79	1.46
T ₁₀ –NPK + S + Zn + Fe	126.0	290.0	2.98	1.70
T ₁₁ – NPK + S + Zn + Fe + Mn	132.4	298.1	3.33	1.86
T ₁₂ –Soil test based fertilizer application	127.3	296.2	2.92	1.72
T ₁₃ – FYM @ 20 t ha ⁻¹	118.1	190.4	2.31	1.65
CD (P = 0.05)	5.65	15.10	0.12	0.06

The result on yield parameters revealed that the treatment (T11) NPK + S + Zn + Fe + Mn registered significantly higher yield of 159.6 t/ha and it was on par with the treatment T10 and T12 with 152.0 and 154.0 t/ha respectively. The result on juice sucrose on 11th and 12th month indicated that the treatment (T11) NPK + S + Zn + Fe + Mn registered the maximum of 17.78 and 17.98 per cent on 11th and 12th month of sugarcane. The treatment T11 registered numerically the maximum of 12.95 per cent CCS and was on par with the treatment T10 and T12 which recorded 12.72 and 12.80 per cent. The sugar yield showed the trend of cane yield T11 significantly produced the maximum sugar yield of 22.82 t ha⁻¹ and it was comparable with the treatment T10 and T12 which registered 19.80 t ha⁻¹ and 19.01 t ha⁻¹.

Table 3. Effect of different plant nutrients on yield and quality characteristics of sugarcane (2013 – 14)

Treatments	Juice sucrose (%)		CCS (%)	Cane Yield (t/ha)	Sugar Yield (t/ha)
	11 th month	12 th month			
T ₁ -Control (No fertilizer)	10.24	12.02	8.38	53.1	4.10
T ₂ – N	13.25	15.04	10.78	92.6	9.50
T ₃ – NP	14.52	15.14	10.90	120.4	12.00
T ₄ –NPK	14.64	16.25	11.42	131.0	14.85
T ₅ – NPK + S	14.78	16.22	11.88	131.3	15.62
T ₆ – NPK + Zn	15.72	16.42	12.01	131.5	15.80
T ₇ – NPK + Fe	15.98	16.67	12.20	133.1	16.26
T ₈ – NPK + Mn	16.12	16.86	12.35	138.2	17.07
T ₉ – NPK + S + Zn	16.23	16.60	12.58	140.3	17.55
T ₁₀ –NPK + S + Zn + Fe	17.15	17.35	12.72	152.0	19.80
T ₁₁ – NPK + S + Zn + Fe + Mn	17.78	17.98	12.95	159.6	22.82
T ₁₂ –Soil test based fertilizer application	17.22	17.42	12.80	154.0	19.01
T ₁₃ – FYM @ 20 t ha ⁻¹	14.56	16.25	11.56	98.6	11.43
CD (P = 0.05)	0.80	0.82	0.58	7.65	0.75

The initial soil analysis showed insignificant differences among the treatments for most of the soil physical and chemical properties. The significant variation was observed in post harvest soil analysis. Application of NPK + S + Zn + Fe + Mn through inorganic fertilizers significantly increased the uptake of N, P and K which recorded 182.62, 32.25 and 269.23 kg ha⁻¹ respectively and it was on par with the treatment (T₁₀) which recorded 174.36, 30.36 and 263.32 kg ha⁻¹. The results on micro nutrients in post harvest soil sample indicated that the treatment (T₁₁) registered 15.65 PPM of Fe and it was on par with T₁₀ and T₆. The treatment T₁₁ recorded higher Mn (15.63 PPM). With regard to Zn treatment, T₁₀ registered the maximum of 1.98 PPM of Zn in soil and was on par with treatment T₁₁ which recorded 1.96 PPM. Regarding sulphur, the treatment T₁₁ registered the maximum of 75.63 PPM and was comparable with the treatments T₁₀, T₉ and T₅ which recorded 73.89, 74.56 and 74.65 PPM respectively.

Table 5. Effect of different plant nutrients on post harvest soil physical and chemical properties (2013 – 14)

Treatments	OC (%)	EC (dSm ⁻¹)	pH	Available N(kg ha ⁻¹)	Available P(kg ha ⁻¹)	Available K(kg ha ⁻¹)	Available Fe(PPM)	Available Mn(PPM)	Available Zn(PPM)	Available S(PPM)
T ₁	0.20	0.32	6.80	124.36	16.25	155.23	5.36	7.23	0.63	45.26
T ₂	0.26	0.34	7.10	128.94	20.36	161.25	6.02	10.98	0.76	54.32
T ₃	0.28	0.35	7.30	138.65	24.56	172.65	6.32	10.12	0.91	60.23
T ₄	0.28	0.35	7.20	145.63	24.62	259.36	7.45	11.26	0.88	63.25
T ₅	0.29	0.34	7.40	153.65	25.36	263.52	7.63	12.35	0.89	74.56
T ₆	0.31	0.34	7.60	160.23	24.65	264.85	12.08	11.89	1.82	65.23
T ₇	0.33	0.33	7.30	161.23	25.89	263.58	7.26	10.62	0.91	66.53
T ₈	0.35	0.33	7.20	160.23	26.68	265.23	8.12	12.42	0.92	64.25
T ₉	0.35	0.33	7.60	162.35	27.58	264.52	8.68	11.25	1.85	74.65
T ₁₀	0.36	0.32	7.70	174.36	30.36	263.32	15.23	12.12	1.99	73.89
T ₁₁	0.40	0.37	7.80	182.62	32.25	269.23	15.65	15.63	1.96	75.63
T ₁₂	0.38	0.32	7.60	179.69	28.65	251.21	13.78	12.00	0.98	71.26
T ₁₃	0.48	0.28	6.90	132.65	18.26	197.65	5.86	9.23	0.72	48.65
CD(P=0.05)	0.03	0.01	0.39	8.05	1.31	11.20	0.45	0.51	0.06	3.00

Salient findings:

The treatment (T₁₁) NPK + S + Zn + Fe + Mn registered significantly higher growth and yield parameters and it was comparable with the treatment T₁₀ and T₁₂.

1.Serial No. and Title

AS 66. Priming cane node for accelerating germination

2.Location

Sugarcane Research Station, Cuddalore

3.Objective

1. To find out suitable cane node priming technique.
2. To assess the effect of cane node acceleration of germination

4.Details of Technical programme

Place of the technical project: Sugarcane Research Station, Cuddalore

Irrigated / Rainfed : Irrigated

Design : RBD

Replications : Four

Variety : CoC 24

Date of Planting : 25.02.2013

Date of Harvest : 12.03.2014

Treatments

T₁ - Un-primed cane node

T₂ - Treating cane node in hot water at 50° C for 2 hours

T₃ - Treating cane node in hot water (50° C) urea solution (3 %) for 2 hours

T₄ - Priming cane node with cattle dung, cattle urine and water in 1 : 2 : 5 ratio

T₅ - Conventional 3 bud sett planting

T₆ – Primed and sprouted cane node (Incubated for four days after priming)

5. Technical summary of the project

First crop 2012-2013

Among the six treatments, sugarcane planting with three budded setts (T₅) recorded significantly the maximum germination of 62.6, 65.7 and 82.6 per cent at 20, 30 and 40 days after planting. The same treatment was also recorded the maximum shoot population of 1,72,300 ha⁻¹ and 1,63,600 ha⁻¹ on 120 and 150 days after planting respectively and was on par with the primed and sprouted cane node (Incubated for four days after priming) which recorded 1,67,900 ha⁻¹ and 1,56,500 ha⁻¹ respectively.

Planting of three budded setts (T₅) significantly recorded the higher millable cane population of 1,56,500 ha⁻¹ and 1,98,. The same treatment has also recorded the maximum cane length, cane diameter and individual cane weight of 282.56 cm, 2.98 cm and 1.49 kg and

was on par with the primed and sprouted cane node (Incubated for four days after priming) which recorded 284.57 cm, 2.96 cm and 1.52 kg respectively.

Progress made during 2013-2014

This experiment was laid out in Randomized Block Design during the fourth week of February 2013 with four replications. The objectives of the experiment are to find out suitable cane node priming technique and assess the effect of cane node on acceleration of germination in sugarcane crop. The treatment schedule consisted of unprimed cane node as control, treating cane node in hot water at 50°C for 2 hours, treating cane node in hot water at 50°C with 3 per cent urea solution for 2 hours, priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio, conventional 3 budded sett planting and primed and sprouted cane node (Incubated for four days after priming).

Among the six treatments, sugarcane planting with three budded setts (T5) recorded significantly the maximum germination of 68.8, 71.4 and 85.2 per cent at 20, 30 and 40 days after planting. There was no germination up to 10 DAP. Planting of three budded setts (T5) significantly recorded the higher shoot count of 98,800 ha⁻¹ and 2,00,400 ha⁻¹ on 60 and 90 days after planting. The same treatment was also recorded the maximum shoot population of 1,96,100 ha⁻¹ and 1,86,000 ha⁻¹ on 120 and 150 days after planting respectively and was on par with the primed and sprouted cane node (Incubated for four days after priming) which recorded 1,80,000 ha⁻¹ and 1,72,100 ha⁻¹ respectively..

Table 1: Effect of priming cane node for accelerating germination on growth and yield Characteristics of sugarcane (2013 – 14)

Treatments	Germination (%)				Shoot counting ('000/ha)			
	10 DAP	20 DAP	30 DAP	40 DAP	60 DAP	90 DAP	120 DAP	150 DAP
T ₁	0.40	40.6	46.0	49.8	52.0	105.3	100.1	92.6
T ₂	0.57	48.5	50.8	62.0	62.1	160.2	154.2	149.4
T ₃	0.62	53.7	56.2	65.8	68.1	167.5	162.6	154.3
T ₄	0.68	58.4	61.7	72.3	77.0	175.8	170.0	163.8
T ₅	0.72	68.8	71.4	85.2	98.8	200.4	196.1	186.0
T ₆	0.60	56.8	62.5	70.4	78.5	185.1	180.8	172.1
CD (P=0.05)	0.03	2.80	3.00	3.60	3.65	8.50	7.75	7.00

The results on growth and yield characteristics of sugarcane revealed that, sugarcane planted with three budded setts (T5) recorded significantly the higher per clump shoot count of 4.58 and 11.12 numbers at 60 and 90 days after planting respectively. At 120 and 150

days after planting, the per clump shoot count was the maximum in sugarcane planted with three budded setts (T5) which recorded 10.41 and 10.02 numbers and was comparable with the primed and sprouted cane node (Incubated for four days after priming) (T6) which recorded 9.10 and 8.80 numbers respectively. Planting of three budded setts (T5) significantly recorded the higher millable cane population of 1,60,200 ha⁻¹. The same treatment has also recorded the maximum cane length, cane diameter and individual cane weight of 285.16 cm, 2.98 cm and 1.56 kg and was on par with the primed and sprouted cane node (Incubated for four days after priming) which recorded 280.32 cm, 2.75 cm and 1.50 kg respectively.

Table 2: Effect of priming cane node for accelerating germination on growth and yield Characteristics of sugarcane (2013 – 14)

Treatments	Per clump shoot count (No.)				Millable cane ('000/ha)	Cane length (cm)	Cane diameter (cm)	Individual cane weight (kg)
	60 DAP	90 DAP	120 DAP	150 DAP				
T ₁	1.25	6.10	5.55	5.24	73.20	210.53	2.08	0.88
T ₂	2.43	8.25	7.89	7.10	102.50	244.40	2.50	1.30
T ₃	2.85	9.30	8.80	8.52	118.60	253.10	2.62	1.45
T ₄	3.41	9.21	8.62	8.31	146.40	266.92	2.74	1.49
T ₅	4.58	11.12	10.41	10.02	160.20	285.16	2.98	1.56
T ₆	3.60	9.90	9.10	8.80	149.50	280.32	2.75	1.50
CD (P=0.05)	0.15	0.64	0.45	0.70	6.52	14.50	0.12	0.06

Table 3: Effect of priming cane node for accelerating germination on growth and yield Characteristics of sugarcane (2013 – 14)

Treatments	Brix	Pole (%)	Purity	CCS (%)	Cane Yield (t/ha)	Sugar Yield (t/ha)
T ₁	17.60	15.60	88.65	11.25	70.7	7.85
T ₂	18.84	16.51	87.20	12.20	101.8	12.00
T ₃	18.92	16.82	88.12	12.12	116.3	13.95
T ₄	19.40	17.58	90.50	12.56	148.5	18.25
T ₅	19.62	17.84	91.25	12.42	165.4	19.98
T ₆	19.41	17.70	91.20	12.50	153.1	18.79
CD (P=0.05)	NS	NS	NS	NS	7.25	0.75

The quality characteristics of sugarcane indicated that, not significant on brix, pole and purity and also commercial cane sugar percent. The sugarcane planting with three budded sett (T5) significantly recorded the higher cane yield and sugar yield of 165.4 t ha⁻¹ and 19.98 t ha⁻¹ respectively.

Salient findings

Planting of sugarcane with three budded setts (T₅) significantly recorded all the growth, quality and yield parameters of sugarcane.

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

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

First crop 2013-2014

The drip materials for laying out of sub-surface drip irrigation been purchased this year. This experiment will be laid out during the ensuing spring season of 2014.