

# ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE

East Coast Zone

ANNUAL REPORT - AGRONOMY  
(2014 – 2015)



SUGARCANE RESEARCH STATION  
TAMILNADU AGRICULTURAL UNIVERSITY  
CUDDALORE – 607 001

# ANNUAL REPORT OF AICRP (S) FOR THE YEAR 2014-2015

## 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 : (Two)

Spring (Early)

Date of Planting : 12.03.2014

Date of Harvest : 05.03.2015

Autumn (Special)

Date of Planting : 10.05.2014

Date of Harvest : 15.05.2015

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 2014 – 15 in 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 Tables 1 & 2. Among the entries, the clone Co C 11 336 significantly registered the maximum germination of 84.19 and 78.23 per cent respectively during spring and autumn season and it was comparable with the standard Co C 24. The levels of nitrogen application did not show any significant results on germination.

The entry Co C 11 336 significantly registered maximum cane yield 138.5 and 133.2 t ha<sup>-1</sup> respectively during spring and autumn season and it was comparable with the standard Co C 24 with a cane yield of 131.2 t ha<sup>-1</sup> during spring season and 124.9 t ha<sup>-1</sup> in autumn season. The clone Co A 11 321 recorded the lowest cane yield of 118.4 and 111.7 t ha<sup>-1</sup> in the respective cropping seasons. Regarding the juice quality, the sugarcane variety Co 11 336 registered the highest commercial cane sugar (CCS) percent of 12.38 and 12.36 respectively in spring and autumn season, and it was on par with the standard Co C 24 in both the cropping seasons.

Among the levels of N applications, the prescription of 125 per cent of the recommended dose of N (375 kg ha<sup>-1</sup>) 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 (Spring season) (2014-15)**

Treatments	Germination (%)	Tillers ('000 ha <sup>-1</sup> )	Millable canes ('000 ha <sup>-1</sup> )	Individual cane weight (kg)	Cane yield (t ha <sup>-1</sup> )	CCS (%)	Sugar yield (t ha <sup>-1</sup> )
<b>Genotypes</b>							
CoC 10 336	80.43	198.17	119.51	1.40	129.8	12.32	15.99
CoC 11 336	84.19	221.97	128.82	1.48	138.5	12.38	17.15
Co A 11 321	78.85	173.80	115.05	1.31	118.4	12.08	14.30
Co A 11 323	79.69	182.23	110.20	1.28	121.2	12.14	14.71
Co C 24	82.28	185.89	125.45	1.41	131.2	12.21	16.02
<b>CD (p=0.05)</b>	3.90	5.21	4.23	0.05	6.80	0.43	0.78
<b>N Levels</b>							
75% RD N	74.26	179.22	108.50	1.20	102.1	12.38	12.64
100% RD N	77.01	185.51	114.16	1.39	115.4	12.41	14.32
125% RD N	80.00	189.72	124.72	1.45	136.8	12.85	17.58
<b>CD (p=0.05)</b>	NS	10.15	7.38	0.06	9.10	0.51	0.80

**Table -2. Performance of sugarcane genotypes under varied levels of N (Autumn season) (2014-15)**

Treatments	Germination (%)	Tillers ('000 ha <sup>-1</sup> )	Millable canes ('000 ha <sup>-1</sup> )	Individual cane weight (kg)	Cane yield (t ha <sup>-1</sup> )	CCS (%)	Sugar yield (t ha <sup>-1</sup> )
<b>Genotypes</b>							
CoC 10 336	74.25	179.89	116.06	1.36	122.9	12.17	14.97
CoC 11 336	78.23	187.29	122.33	1.47	133.2	12.36	16.46
Co A 11 321	73.52	164.38	110.89	1.32	111.7	12.05	13.46
Co A 11 323	75.35	173.40	104.12	1.30	113.5	12.11	13.75
Co C 24	76.25	177.95	119.62	1.42	124.9	12.30	15.36
<b>CD (p=0.05)</b>	3.20	6.01	5.30	0.06	5.12	0.40	0.61
<b>N Levels</b>							
75% RD N	70.26	139.64	108.15	1.24	97.10	12.34	11.98
100% RD N	75.36	154.17	112.08	1.36	105.98	12.37	13.11
125% RD N	79.65	162.61	117.64	1.40	126.80	12.80	16.23
<b>CD (p=0.05)</b>	NS	8.35	5.21	0.08	7.80	0.44	0.78

**Salient findings:**

The genotype CoC 11 336 significantly registered the maximum millable cane, individual cane weight, cane yield and sugar yield in both spring and autumn season. 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 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 : 12.02.2014

Date of Harvest : 04.03.2015

**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.*, T<sub>1</sub> - Control (No fertilizer), T<sub>2</sub> - N, T<sub>3</sub> - NP, T<sub>4</sub> - NPK, T<sub>5</sub> - NPK + S, T<sub>6</sub> - NPK + Zn, T<sub>7</sub> - NPK + Fe, T<sub>8</sub> - NPK + Mn, T<sub>9</sub> - NPK + S + Zn, T<sub>10</sub> - NPK + S + Zn + Fe, T<sub>11</sub> - NPK + S + Zn + Fe + Mn, T<sub>12</sub> - Soil test based fertilizer application and T<sub>13</sub> - FYM @ 20 t ha<sup>-1</sup>. All the recommended package of practices was adopted uniformly. The sulphur was applied as elemental sulphur @ 60 kg ha<sup>-1</sup>. Zinc was applied @ 50 kg ha<sup>-1</sup> as ZnSO<sub>4</sub>. Iron was applied as foliar spray with 1 per cent FeSO<sub>4</sub> thrice in weekly interval at vegetative stage. Magnesium was applied 100 kg of MnSO<sub>4</sub>. 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<sup>-1</sup> tiller population. The same treatment produced the maximum millable cane population of 1,29,600 ha<sup>-1</sup> and was on par with the treatment (T<sub>12</sub>) soil test based fertilizer application which recorded 1,26,400 ha<sup>-1</sup>. Regarding cane yield and sugar yield, the treatment (T<sub>11</sub>) NPK + S + Zn + Fe + Mn recorded the maximum of 156.4 t ha<sup>-1</sup> and 19.64 t ha<sup>-1</sup> and was on par with the treatment (T<sub>12</sub>) with 152.4 t ha<sup>-1</sup> and 19.07 t ha<sup>-1</sup> respectively. Regarding commercial cane sugar, the treatment (T<sub>11</sub>) NPK + S + Zn + Fe + Mn numerically recorded 12.56 per cent. The post harvest soil analysis indicated the treatment (T<sub>11</sub>) NPK + S + Zn + Fe + Mn increase the available NPK content of 189, 44 and 189 kg ha<sup>-1</sup> respectively and was comparable with soil test based fertilizer application (T<sub>12</sub>). The micro nutrient content in the soil was increased with treatment (T<sub>11</sub>) 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<sup>-1</sup> at 90 days after planting and is on par with soil test based fertilizer application with the tiller production of 1,93,700 ha<sup>-1</sup>. The same trend was also recorded at 120 and 180 days after planting with 1,86,200 ha<sup>-1</sup> and 1,72,100 ha<sup>-1</sup> 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<sup>-1</sup>. The same treatment (T<sub>11</sub>) 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<sub>10</sub> and T<sub>12</sub> 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<sub>11</sub>) NPK + S + Zn + Fe + Mn registered significantly higher yield of 154.6 t ha<sup>-1</sup> and it was on par with the treatment T<sub>10</sub> and T<sub>12</sub> with 152.4 and 148.3 t ha<sup>-1</sup> respectively.

### **Third crop 2013-14**

Application of NPK + S + Zn + Fe + Mn through inorganic fertilizers significantly recorded the maximum tiller population of 1,98,100 ha<sup>-1</sup> at 90 days after planting and is on par with soil test based fertilizer application with the tiller production of 1,93,700 ha<sup>-1</sup>. The same trend was also recorded at 120 and 180 days after planting with 1,82,500 ha<sup>-1</sup> and 1,74,000 ha<sup>-1</sup> 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.

Application of NPK + S + Zn + Fe + Mn through inorganic fertilizers significantly recorded the maximum millable cane population of 1,32,400 ha<sup>-1</sup> and was on par with the soil test based fertilizer application (T<sub>12</sub>) and NPK + S + Zn + Fe (T<sub>10</sub>) which registered the cane population of 1,27,300 ha<sup>-1</sup> and 1,26,000 ha<sup>-1</sup> respectively. The same treatment (T<sub>11</sub>) 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 T<sub>10</sub> and T<sub>12</sub> which recorded 290.00 cm, 2.98 cm and 1.70 kg and 296.20 cm, 2.92 cm and 1.72 kg respectively.

The result on yield parameters revealed that the treatment (T<sub>11</sub>) NPK + S + Zn + Fe + Mn registered significantly higher yield of 159.6 t ha<sup>-1</sup> and it was on par with the treatment T<sub>10</sub> and T<sub>12</sub> with 152.0 and 154.0 t ha<sup>-1</sup> respectively. The result on juice sucrose on 11<sup>th</sup> and 12<sup>th</sup> month indicated that the treatment (T<sub>11</sub>) NPK + S + Zn + Fe + Mn registered the maximum of 17.78 and 17.98 per cent on 11<sup>th</sup> and 12<sup>th</sup> month of sugarcane. The treatment T<sub>11</sub> registered numerically the maximum of 12.95 per cent CCS and was on par with the treatment T<sub>10</sub> and T<sub>12</sub> which recorded 12.72 and 12.80 per cent. The sugar yield showed the trend of cane yield T<sub>11</sub> significantly produced the maximum sugar yield of 22.82 t ha<sup>-1</sup> and it was comparable with the treatment T<sub>10</sub> and T<sub>12</sub> which registered 19.80 t ha<sup>-1</sup> and 19.01 t ha<sup>-1</sup>.

### **Progress made during 2014-15**

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 2,01,240 ha<sup>-1</sup> at 90 days after planting and is on par with soil test based fertilizer application with the tiller production of 1,93,450 ha<sup>-1</sup>. The same trend was also recorded at 120 and 180 days after planting with 1,89,140 ha<sup>-1</sup> and 1,75,240 ha<sup>-1</sup> of tiller population. The maximum plant height of 156.23 and 201.36 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 (2014-2015)**

Treatments	Germination (%)	Tiller Population ('000/ha)			Plant height (cm)	
		90 DAP	120 DAP	180 DAP	120 DAP	180 DAP
T <sub>1</sub>	68.53	106.20	98.24	87.35	63.54	104.23
T <sub>2</sub>	72.35	114.00	104.25	95.36	94.25	162.85
T <sub>3</sub>	73.12	122.30	111.26	103.59	126.35	158.60
T <sub>4</sub>	73.24	160.50	148.35	137.58	134.56	164.35
T <sub>5</sub>	73.52	156.25	141.25	129.89	135.12	165.24
T <sub>6</sub>	73.99	159.24	145.68	135.68	137.25	168.58
T <sub>7</sub>	72.24	163.68	156.80	144.56	140.25	171.25
T <sub>8</sub>	74.08	186.50	173.69	161.25	146.98	172.22
T <sub>9</sub>	73.45	185.40	178.50	165.89	155.69	176.35
T <sub>10</sub>	76.23	192.50	184.89	171.58	165.98	188.58
T <sub>11</sub>	79.58	201.24	189.14	175.24	156.23	201.36
T <sub>12</sub>	76.00	193.45	179.23	167.89	136.45	194.58
T <sub>13</sub>	73.00	147.98	133.56	94.56	125.64	175.66
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 1,29,350 ha<sup>-1</sup> and was on par with the soil test based fertilizer application (T<sub>12</sub>) and NPK + S + Zn + Fe (T<sub>10</sub>) which registered the cane population of 1,28,560 ha<sup>-1</sup> and 1,24,610 ha<sup>-1</sup> respectively. The same treatment (T<sub>11</sub>) also registered significantly higher cane length, cane girth and individual cane weight of 290.52 cm, 3.23 cm and 1.95 kg and was comparable with the treatment T<sub>10</sub> and T<sub>12</sub> which recorded 286.42 cm, 3.15 cm and 1.90 kg and 292.62 cm, 3.09 cm and 1.86 kg respectively.

**Table 2. Effect of different plant nutrients on yield characteristics of sugarcane (2014-15)**

Treatments	Millable cane ('000/ha)	Cane length (cm)	Cane girth (cm)	Individual cane weight (kg)
T <sub>1</sub>	65.31	160.31	1.98	0.80
T <sub>2</sub>	74.89	178.61	2.28	0.98
T <sub>3</sub>	90.35	201.01	2.30	1.19
T <sub>4</sub>	108.51	251.72	2.51	1.54
T <sub>5</sub>	112.62	257.02	2.70	1.68
T <sub>6</sub>	118.56	262.72	2.85	1.70
T <sub>7</sub>	120.10	266.42	2.93	1.81
T <sub>8</sub>	115.26	271.22	2.87	1.66
T <sub>9</sub>	121.34	276.72	2.84	1.85
T <sub>10</sub>	124.61	286.42	3.15	1.90
T <sub>11</sub>	129.35	290.52	3.23	1.95
T <sub>12</sub>	128.56	292.62	3.09	1.86
T <sub>13</sub>	100.25	190.71	2.32	1.29
CD (P = 0.05)	6.25	12.92	0.18	0.07



The result on yield parameters revealed that the treatment (T<sub>11</sub>) NPK + S + Zn + Fe + Mn registered significantly higher cane yield of 153.23 t ha<sup>-1</sup> and it was on par with the treatment T<sub>10</sub> and T<sub>12</sub> with 147.56 and 150.17 t ha<sup>-1</sup> respectively. The result on juice sucrose on 11<sup>th</sup> and 12<sup>th</sup> month indicated that the treatment (T<sub>11</sub>) NPK + S + Zn + Fe + Mn registered the maximum of 17.55 and 18.08 per cent on 11<sup>th</sup> and 12<sup>th</sup> month of sugarcane. The treatment T<sub>11</sub> registered numerically the maximum of 12.81 per cent CCS and was on par with the treatment T<sub>10</sub> and T<sub>12</sub> which recorded 12.28 and 12.75 per cent. The sugar yield showed the trend of cane yield T<sub>11</sub> significantly produced the maximum sugar yield of 19.63 t ha<sup>-1</sup> and it was comparable with the treatment T<sub>12</sub> which registered 19.15 t ha<sup>-1</sup>.

**Table 3. Effect of different plant nutrients on yield and quality characteristics of sugarcane (2014-15)**

Treatments	Juice sucrose (%)		CCS (%)	Cane Yield (t ha <sup>-1</sup> )	Sugar Yield (t ha <sup>-1</sup> )
	11 <sup>th</sup> month	12 <sup>th</sup> month			
T <sub>1</sub>	12.56	13.59	11.09	62.63	7.01
T <sub>2</sub>	13.41	14.82	11.41	92.77	10.59
T <sub>3</sub>	14.78	15.31	11.57	98.25	11.37
T <sub>4</sub>	14.83	16.42	11.59	122.36	14.18
T <sub>5</sub>	14.90	16.39	12.05	128.45	15.48
T <sub>6</sub>	15.23	16.59	12.58	134.52	16.92
T <sub>7</sub>	15.85	16.84	12.25	138.65	16.98
T <sub>8</sub>	15.29	16.03	12.15	130.36	15.84
T <sub>9</sub>	16.40	16.77	12.12	141.25	17.12
T <sub>10</sub>	17.12	17.52	12.28	147.56	18.12
T <sub>11</sub>	17.55	18.08	12.81	153.23	19.63
T <sub>12</sub>	17.39	17.54	12.75	150.17	19.15
T <sub>13</sub>	14.73	16.01	11.87	108.95	12.93
CD (P = 0.05)	0.84	0.78	0.53	6.85	0.82

The initial soil NPK status of the soil is 195.56 N kg ha<sup>-1</sup>; 25.46 P<sub>2</sub>O<sub>5</sub> kg ha<sup>-1</sup> and 240.35 K<sub>2</sub>O kg ha<sup>-1</sup>. The significant variation was observed in post harvest soil analysis. Application of NPK + S + Zn + Fe + Mn through inorganic fertilizers influenced the postharvest available nutrient status (Table 5) of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O which recorded 159.69, 23.61 and 261.23 kg ha<sup>-1</sup> respectively and it was on par with the treatment (T<sub>10</sub>) which recorded 158.52, 21.15 and 263.32 kg ha<sup>-1</sup>. The results on micro nutrients availability (Table 4) in the postharvest soil sample indicated that the treatment (T<sub>11</sub>) registered 8.08 ppm of Fe and it was on par with T<sub>12</sub> and T<sub>13</sub>. The treatment T<sub>11</sub> recorded higher Mn (8.89 ppm). With regard to Zn availability, T<sub>11</sub> registered the maximum of 1.82 ppm of Zn in soil and it was on

par with treatment T<sub>10</sub> which recorded 1.80 ppm. Regarding sulphur, the treatment T<sub>11</sub> registered the maximum of 62.62 kg ha<sup>-1</sup> and was comparable with the treatments T<sub>9</sub>, T<sub>10</sub> and T<sub>12</sub> treatments.

**Salient findings:**

The treatment (T<sub>11</sub>) recommended dose of NPK with S (60 kg ha<sup>-1</sup>) + Zn (ZnSO<sub>4</sub>: 50 kg ha<sup>-1</sup>) + Fe (FeSO<sub>4</sub>: 1 % foliar spray thrice in weekly interval) + Mn (MnSO<sub>4</sub>: 100 kg ha<sup>-1</sup>) produced higher cane yield (153.23 t ha<sup>-1</sup>) and it was comparable with the treatment T<sub>10</sub> and T<sub>12</sub>.

**Table 4. Effect of different plant nutrients on post harvest soil physical and chemical properties (2014-15)**

Treatments	OC (%)	EC (dSm <sup>-1</sup> )	pH	N (kg ha <sup>-1</sup> )	P (kg ha <sup>-1</sup> )	K (kg ha <sup>-1</sup> )	S (kg ha <sup>-1</sup> )	Fe (ppm)	Mn (ppm)	Zn (ppm)
T <sub>1</sub>	0.31	0.34	6.82	130.53	20.15	165.23	49.15	5.45	7.23	0.60
T <sub>2</sub>	0.33	0.35	6.91	138.21	21.24	171.25	51.23	5.95	8.90	0.81
T <sub>3</sub>	0.35	0.34	6.95	142.42	21.85	182.65	54.52	6.84	7.12	0.84
T <sub>4</sub>	0.38	0.36	7.11	146.60	22.44	269.36	55.25	5.50	8.62	0.78
T <sub>5</sub>	0.40	0.36	7.12	140.82	21.62	273.52	62.06	6.21	8.30	0.76
T <sub>6</sub>	0.42	0.37	7.01	144.55	23.15	264.85	52.69	6.26	7.49	1.98
T <sub>7</sub>	0.43	0.36	6.94	149.51	22.60	273.58	53.84	8.04	7.32	0.82
T <sub>8</sub>	0.43	0.35	6.90	150.45	21.90	265.23	54.25	5.68	9.45	0.81
T <sub>9</sub>	0.42	0.36	7.13	153.23	23.39	261.52	61.65	6.78	9.05	1.96
T <sub>10</sub>	0.44	0.36	7.09	158.52	21.15	263.32	62.81	7.35	8.34	1.80
T <sub>11</sub>	0.46	0.38	6.98	159.69	23.61	261.23	62.60	8.08	8.89	1.82
T <sub>12</sub>	0.44	0.35	7.12	159.56	24.09	268.21	63.62	7.78	8.04	0.89
T <sub>13</sub>	0.49	0.31	6.78	150.56	23.01	207.65	67.41	8.24	8.23	0.90
CD(P=0.05)	NS	NS	NS	6.05	1.40	11.20	4.82	0.45	0.62	0.06

## **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 : 13.03.2014

Date of Harvest : 23.03.2015

Treatments

T<sub>1</sub> - Un-primed cane node

T<sub>2</sub> - Treating cane node in hot water at 50° C for 2 hours

T<sub>3</sub> - Treating cane node in hot water (50° C) urea solution (3 %) for 2 hours

T<sub>4</sub> - Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio

T<sub>5</sub> - Conventional 3 bud sett planting

T<sub>6</sub> – 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 (T<sub>5</sub>) 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<sup>-1</sup> and 1,63,600 ha<sup>-1</sup> 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<sup>-1</sup> and 1,56,500 ha<sup>-1</sup> respectively.

Planting of three budded setts (T<sub>5</sub>) significantly recorded the higher millable cane population of 1,56,500 ha<sup>-1</sup>. 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.

### **Second crop 2013-2014**

Among the six treatments, sugarcane planting with three budded setts (T<sub>5</sub>) 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 (T<sub>5</sub>) significantly recorded the higher shoot count of 98,800 ha<sup>-1</sup> and 2,00,400 ha<sup>-1</sup> on 60 and 90 days after planting. The same treatment was also recorded the maximum shoot population of 1,96,100 ha<sup>-1</sup> and 1,86,000 ha<sup>-1</sup> 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<sup>-1</sup> and 1,72,100 ha<sup>-1</sup> respectively.

The results on growth and yield characteristics of sugarcane revealed that, sugarcane planted with three budded setts (T<sub>5</sub>) 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 (T<sub>5</sub>) which recorded 10.41 and 10.02 numbers and was comparable with the primed and sprouted cane node (Incubated for four days after priming) (T<sub>6</sub>) which recorded 9.10 and 8.80 numbers respectively. Planting of three budded setts (T<sub>5</sub>) significantly recorded the higher millable cane population of 1,60,200 ha<sup>-1</sup>. 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. 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 (T<sub>5</sub>) significantly recorded the higher cane yield and sugar yield of 165.4 t ha<sup>-1</sup> and 19.98 t ha<sup>-1</sup> respectively.

### **Progress made during 2014-15**

Among the six treatments, sugarcane planting with three budded setts (T<sub>5</sub>) recorded significantly the maximum germination of 69.82, 73.56 and 86.89 per cent at 20, 30 and 40 days after planting. There was no germination up to 10 DAP. Planting of three budded setts (T<sub>5</sub>) significantly recorded the higher shoot count of 99,250 ha<sup>-1</sup> and 2,02,350 ha<sup>-1</sup> on 60 and 90 days after planting and maximum of 1,70,250 ha<sup>-1</sup> at 150 DAP.

**Table 1: Effect of priming cane node for accelerating germination on growth and yield characteristics of sugarcane (2014-15)**

Treatments	Germination (%)			Shoot counting ('000/ha)			
	20 DAP	30 DAP	40 DAP	60 DAP	90 DAP	120 DAP	150 DAP
T <sub>1</sub>	42.50	57.23	68.45	53.22	105.30	98.25	91.25
T <sub>2</sub>	46.85	58.98	72.63	64.58	159.85	151.25	143.26
T <sub>3</sub>	54.20	63.56	76.24	69.25	165.23	152.00	147.82
T <sub>4</sub>	59.50	67.70	78.52	78.56	173.56	163.51	151.23
T <sub>5</sub>	69.82	73.56	86.89	99.25	202.35	182.35	170.25
T <sub>6</sub>	57.95	63.25	77.25	78.51	180.23	175.25	168.25
CD (P=0.05)	3.01	3.24	3.60	2.85	7.50	6.11	6.55

Planting of three budded setts (T<sub>5</sub>) significantly recorded the higher millable cane population of 1,28,240 ha<sup>-1</sup>. The same treatment has also recorded the maximum cane length, cane diameter and individual cane weight of 284.06 cm, 2.89 cm and 1.63 kg and it was on par with the primed and sprouted cane node (Incubated for four days after priming) which recorded 277.13 cm, 2.78 cm and 1.59 kg respectively. Numerically higher CCS(%) was recorded with the treatment T<sub>5</sub> (12.52 %).

**Table 2: Effect of priming cane node for accelerating germination on yield parameters and yield of sugarcane (2014-15)**

Treatments	Millable cane ('000/ha)	Cane length (cm)	Cane diameter (cm)	Individual cane weight (kg)	CCS (%)	Cane Yield (t ha <sup>-1</sup> )	Sugar Yield (t ha <sup>-1</sup> )
T <sub>1</sub>	78.20	234.53	2.11	1.12	11.28	89.7	10.12
T <sub>2</sub>	84.28	248.40	2.45	1.31	12.18	97.85	11.92
T <sub>3</sub>	89.51	251.10	2.60	1.43	12.02	111.3	13.38
T <sub>4</sub>	94.40	276.25	2.70	1.50	12.32	132.5	16.32
T <sub>5</sub>	128.24	284.06	2.89	1.63	12.52	148.4	18.58
T <sub>6</sub>	101.51	277.13	2.78	1.59	12.43	141.2	17.55
CD (P=0.05)	8.72	12.15	0.11	0.05	NS	6.11	0.62

The sugarcane planting with three budded sett (T<sub>5</sub>) significantly recorded the higher cane yield and sugar yield of 148.4 t ha<sup>-1</sup> and 18.58 t ha<sup>-1</sup> respectively.

### Salient findings

Planting of sugarcane with three budded setts (T<sub>5</sub>) significantly recorded all the growth, quality and yield parameters of sugarcane.

## **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 Planting : 13.03.2014

Date of Harvest : 25.03.2015

## **5. Technical summary of the project**

This experiment was conducted during 2014-15 with 13 treatments with combinations of inorganic fertilizers with micro nutrients and FYM. As per the AICRP technical programme, the first year experiment was laid out during 2011-12 and 2012-13 cropping seasons in Randomized Block Design with three replications. The following are the treatments viz., T<sub>1</sub>- No organic + 50 % RDF, T<sub>2</sub>- No organic + 100 % RDF, T<sub>3</sub>- No organic + soil test based recommendation, T<sub>4</sub>-Application of FYM/Compost @ 20 tonnes ha<sup>-1</sup> + 50 % RDF (inorganic source), T<sub>5</sub>-Application of FYM/Compost @ 20 tonnes ha<sup>-1</sup> + 100 % RDF (inorganic source), T<sub>6</sub>-Application of FYM/Compost @ 20 tonnes ha<sup>-1</sup> + inorganic nutrient application based on soil test (rating chart), T<sub>7</sub>- Application of FYM/Compost @ 10 tonnes ha<sup>-1</sup> + biofertilizer (*Azotobacter* + PSB) + 50 % RDF, T<sub>8</sub>- Application of FYM/Compost @ 10 tonnes ha<sup>-1</sup> + biofertilizer (*Azotobacter* + PSB) + 100 % RDF, T<sub>9</sub>- Application of FYM/Compost @ 10 tonnes ha<sup>-1</sup> + biofertilizer (*Azotobacter* + PSB) + soil test basis. All the recommended package of practices was adopted uniformly.

## **Progress made during 2014-15**

This experiment was laid out in Randomized Block Design during the fourth week of February 2013 with four replications. The objective of the experiment was to develop nutrient management strategy for sustaining soil health and sugarcane production. The soil of the

experimental site is sandy loam with pH of 7.4, organic carbon (0.42 %), bulk density (1.41 g cc<sup>-1</sup>) and infiltration rate (1.37 cm hr<sup>-1</sup>). The initial nutrient status of the soil is 181.0: 23.4: 232.5 NPK kg ha<sup>-1</sup>. The recommended dose of fertilizer is 300:100:200 NPK kg ha<sup>-1</sup>. Among the nine treatments application of treatment(T<sub>8</sub>) FYM @ 10 tonnes ha<sup>-1</sup> + biofertilizer (*Azotobacter* + PSB) + 100 % RDF found to record maximum germination percentage (92.00), tiller population (1,86,140 ha<sup>-1</sup>), millable canes (1,26,870 ha<sup>-1</sup>), CCS (12.86 %), cane yield (142.42 t ha<sup>-1</sup>) and sugar yield (18.32 t ha<sup>-1</sup>). The B:C ratio was found to be numerically high with the treatment T<sub>8</sub> (3.73) which was closely followed by the treatment T<sub>9</sub> (3.59).

Apart from the nutrient availability status the soil physical (bulk density and infiltration rate) and chemical (organic carbon, EC and pH) factors were not influenced by the treatments in the post-harvest soil sample. The highest soil nutrient availability of 171.26: 22.17: 278.33 N:P<sub>2</sub>O<sub>5</sub>:K<sub>2</sub>O kg ha<sup>-1</sup> was reported in the treatment T<sub>9</sub> which is at par with the treatment T<sub>8</sub>.

**Table 1. Effect of treatments on germination, growth, quality and yield of sugarcane (2014-15)**

Treatments	Germination (%)	Tillers ('000 ha <sup>-1</sup> )	Millable canes ('000 ha <sup>-1</sup> )	CCS (%)	Cane yield (t ha <sup>-1</sup> )	Sugar yield (t ha <sup>-1</sup> )	B:C ratio
T <sub>1</sub>	80.24	128.35	104.01	11.23	83.63	9.39	2.61
T <sub>2</sub>	86.52	141.25	108.23	11.75	113.85	13.38	3.27
T <sub>3</sub>	88.99	145.68	113.81	11.60	125.43	14.55	3.52
T <sub>4</sub>	87.24	156.80	117.82	11.36	98.44	11.18	2.53
T <sub>5</sub>	89.08	173.69	121.82	11.71	137.44	16.09	3.31
T <sub>6</sub>	91.45	178.50	122.46	12.05	140.08	16.88	3.30
T <sub>7</sub>	89.23	168.89	111.23	11.34	106.8	12.11	3.01
T <sub>8</sub>	92.00	186.14	126.87	12.86	142.42	18.32	3.73
T <sub>9</sub>	90.58	183.23	124.25	12.60	139.87	17.62	3.59
CD (p=0.05)	NS	7.12	6.12	NS	7.60	0.74	

### Salient findings

The treatment (T<sub>8</sub>) application of FYM/Compost @ 10 tonnes ha<sup>-1</sup> + biofertilizer (*Azotobacter* + PSB) + 100 % RDF registered significantly higher growth and yield parameters and it was comparable with soil test crop response including treatment T<sub>9</sub>.



**Table 2. Effect of different plant nutrients on post harvest soil physical and chemical properties (2014-15)**

Treatments	<b>B.D</b> (g cc <sup>-1</sup> )	<b>Infiltration</b> rate (cm hr <sup>-1</sup> )	<b>OC</b> (%)	<b>EC</b> (dSm <sup>-1</sup> )	<b>pH</b>	<b>N</b> (kg ha <sup>-1</sup> )	<b>P</b> (kg ha <sup>-1</sup> )	<b>K</b> (kg ha <sup>-1</sup> )
T <sub>1</sub>	1.56	1.49	0.34	0.33	6.78	131.56	20.56	183.25
T <sub>2</sub>	1.59	1.53	0.37	0.35	6.82	144.53	21.79	248.65
T <sub>3</sub>	1.52	1.52	0.39	0.36	6.89	146.27	21.85	251.24
T <sub>4</sub>	1.45	1.69	0.43	0.32	7.11	167.32	22.31	242.37
T <sub>5</sub>	1.40	1.74	0.45	0.38	7.15	178.12	22.65	274.15
T <sub>6</sub>	1.37	1.73	0.44	0.35	7.12	181.23	22.89	279.55
T <sub>7</sub>	1.45	1.65	0.41	0.33	6.93	152.29	21.72	228.31
T <sub>8</sub>	1.42	1.69	0.42	0.38	6.98	164.56	23.17	265.85
T <sub>9</sub>	1.39	1.71	0.42	0.37	6.95	171.26	22.17	278.33
CD(P=0.05)	NS	NS	NS	NS	NS	6.13	1.21	11.85

## **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 : Standing crop

## **Treatments**

### **A. Irrigation water / Method applied**

T<sub>1</sub> – Subsurface drip irrigation at 75 % Pan Evaporation (PE) – Irrigation once in two days

T<sub>2</sub> - Subsurface drip irrigation at 100 % Pan Evaporation (PE) -Irrigation once in two days

T<sub>3</sub> - Subsurface drip irrigation at 125 % Pan Evaporation (PE) – Irrigation once in two days

T<sub>4</sub> – Farmers Practice – Surface irrigation

### **B. Nitrogen levels**

T<sub>1</sub> – 100 % Recommended dose of nitrogen (RDN)

T<sub>2</sub> - 75 % Recommended dose of nitrogen (RDN)

T<sub>3</sub> - 50 % Recommended dose of nitrogen (RDN)

## **5. Technical summary of the project**

### **First crop 2014-15**

The drip materials for laying out of sub-surface drip irrigation been purchased. The experiment was taken up in during the year 2014. Now the plant crop is at harvest stage.