



**Mahatma Phule Krishi  
Vidyapeeth, Rahuri  
(Maharashtra)**

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**ALL INDIA CO-ORDINATED RESEARCH  
PROJECT  
ON  
SUGARCANE BREEDING**

**ANNUAL REPORT  
(2016-17)**

**COMPILED  
BY**

**Dr. R.M.Garkar**

**Sugarcane Breeder (AICRP)**

**CENTRAL SUGARCANE RESEARCH STATION,  
PADEGAON – 415 521, TAL. PHALTAN,  
DIST. SATARA (MAHARASHTRA STATE)**

**CENTRAL SUGARCANE RESEARCH STATION, PADEGAON**

**SUGARCANE BREEDING**

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# **INTRODUCTION**

# INTRODUCTION

Sugarcane is the most important cash crop of Maharashtra. Sugar industry plays a pivotal role in the socio-economic and educational development in the rural areas of the state. Maharashtra sugar industry has been growing for the last 68 years without any impediments. During 2016-17, the area under sugarcane is 6.20 lakh ha. in Maharashtra with the total cane production of 372.45 lakh tons, average productivity is 68.04 t/ha and average sugar recovery is 11.24 % and the sugar production is 41.87 lakh ton. The decline in area, production, recovery and productivity is because of severe drought situation during 2015-16 and 2016-17 in the state. The productivity of sugarcane has attained a stationary phase from the last 10-15 years. Therefore, the further emphasis needs to be given on increasing the productivity while reducing the cost of production without increasing the area.

In spite of favourable climatic conditions, for last 6 decades the average sugarcane productivity of Maharashtra moving around 75 to 85 t/ha. Maharashtra is ranking 1<sup>st</sup> place in sugarcane recovery. This year in Maharashtra about 88 co-operative and 62 private sugar factories generating employment, electricity, ethanol production, bio- compost and number of other chemicals. Thus, sugarcane and sugar industry is the backbone for economic development in Maharashtra.

The number of experiments on different aspects of sugarcane cultivation was carried out and the recommendations are made for sugarcane growers. Sugarcane grows all the year round and thus passes through fluctuations in climatic factors such as very high temperature in summer and very low minimum temperature in winter, the ultimate yield of the crop are profoundly influenced by the weather elements. The global warming and climate variation may have influenced the planting time, crop productivity and sugar recovery percentage. Considering the climatic conditions the preseasonal sugarcane planting is recommended during 15<sup>th</sup> October to 30<sup>th</sup> November.

Considering the reasons for the low cane growth and yield performance may be due to macro and micronutrient deficiencies in soil or in plants. The macro and micronutrients are necessary for normal growth and development of the sugarcane crop. Though small quantity of micronutrients are needed, their unavailability may limit the crop growth considerably. The technology of spraying of multimacronutrient and multimicronutrient along with recommended dose of sugarcane has been developed. Silicate plays vital role in disease resistant and non lodging character in sugarcane crop. It is very difficult to take Silicate from soil, therefore considering the unavailability the technology is developed to make available silicate by means of application of silicate solubilizing bacteria in soil.

A number of outreach programmes were organized to transfer various technologies developed by the CSRS, Padegaon to the farmers and extension agencies through “**Rashtriya Krishi Vikas Yojana**”, “**Tribal Sub Plan**” and “**Farmers FIRST**” projects sponsored by Govt. of India and Gov. of Maharashtra for increasing sugarcane productivity of the farmers.

**Table 1. The area, production, productivity, sugar production and sugarcane recovery in Maharashtra from 2000-01 to 2016-17**

Year	Area ('000' ha)	Sugarcane production (Lakh ton)	Sugarcane productivity (t /ha)	Sugar production (Lakh ton)	Sugar recovery (%)
2000-01	595	495.89	83.30	67.05	11.64
2001-02	578	451.40	78.10	56.13	11.60
2002-03	599	370.15	61.80	65.19	11.66
2003-04	443	256.68	57.90	30.39	10.91
2004-05	324	204.75	63.20	22.62	11.45
2005-06	501	388.53	77.60	51.98	11.68
2006-07	1049	785.68	74.90	90.95	11.40
2007-08	1093	884.37	80.90	87.63	11.91
2008-09	768	606.48	79.00	46.00	11.46
2009-10	756	641.59	84.90	70.66	11.54
2010-11	964	788.38	81.80	90.52	11.31
2011-12	1022	834.16	81.60	78.03	11.55
2012-13	800	700.00	87.50	79.50	11.40
2013-14	1054	886.37	82.00	77.20	11.41
2014-15	1055	929.00	88.00	104.26	11.27
2015-16	835	741.68	88.74	83.79	11.30
2016-17	620	372.45	68.04	41.87	11.24

Due to severe drought condition during 2015-16 and 2016-17 the drastic reduction in sugarcane production and sugar production. Also there is decline in per hectare productivity which will affect the economy of the state in 2-3 future years.

Seed is the most important basic input in crop production. Quality seed increases crop productivity by 10-15 per cent. Therefore, alongwith research, this research station is producing the healthy and quality breeder seed of released sugarcane varieties. In the year 2016-17, **53.50 ha** area was under seed production of different varieties and **21.82 Lakhs** of **two-eye budded setts** as well as **3.03 Lakhs** of **single eye bud polytray plantlets** were distributed to the Sugar Factories, State Department of Agriculture, farmers and other research organizations.

# **SEASON AND CLIMATE**

# Central Sugarcane Research Station, Padegaon

## Season & Climate

(2015-17)

The Central Sugarcane Research Station, Padegaon is located in tropical zone, geographically at an elevation of 556 m above mean sea level on 18°-12"N latitude and 74°-10"E longitude.

The total rainfall received during June, 2015 to April, 2017 (21 months) was 994.6 mm in 57 rainy days as against the normal rainfall of 661.2 mm (21 months) indicating that the rainfall received during the season was 50.42 % more than the normal. The data on climatic parameters during the crop season (June, 2015 to April, 2017 ) along with averages based on last 84 years (1932-33 to 2016-17) recorded at the meteorological observatory located at this research station are presented in Table 2 and graphically shown in Fig.1. The effect of the season on sugarcane at various growth phases has been elucidated below.

### **1) Germination phase for Adsali crop (July. to Sept., 2015)**

The rainfall received during germination phase was 288.7 mm in 19 rainy days as against the normal of 167.5 mm. The average maximum temperature during this period was 31.6°C and minimum temperature was 22.3°C. The maximum and minimum temperature was slightly higher than average temperature. The average relative humidity (morning) during this phase was 88.7 % which was 0.99 % less than the normal.

### **2) Tillering phase (Oct-Dec., 2015) for *Adsali* and Germination phase for Preseason crop:**

Total rainfall received during tillering phase was 176.7 mm which was 73.4 % greater than the normal (101.9 mm) of last 84 years. The average maximum and minimum temperatures during this phase were 31.9 °C and 18.0°C, respectively. It was relatively higher than the normal. The morning relative humidity was 95.0 % as against the normal 92.4 %. High humidity was not favorable for the tillering of *Adsali* sugarcane hence the productivity of *Adsali* sugarcane crushed during 2016-17 was slightly decreased. High humidity was also favorable for good germination of preseason sugarcane. However the tillering is affected due to unavailability of irrigation water.

### **3) Early growth (*Adsali*)/Tillering (Preseason) and Germination phase (*Suru*) (Jan-Mar.2016)**

During this phase the average maximum temperature was 34.2°C and average minimum temperature was 15.3°C, which was more than the normal i.e 14.2 °C. These temperatures were favourable for *Adsali* crop growth. Due to higher humidity (89.0 %) than the average (86.7 %), tillering of preseasonal sugarcane and germination/tillering of *Suru* sugarcane was also satisfactory.

#### **4) Desiccation phase (April to May, 2016)**

The mean maximum temperature was lower (38.1°C) than the normal (38.5°C) while the mean minimum temperature (20.4°C) was more than the normal (21.0°C). The rainfall of 20.6 mm was received during this phase. The growth of the crop is affected due to unavailability of irrigation to the crop.

#### **5) Grand growth (*Adsali*)/Early growth phase (Preseason and *Suru*) (June to Sept., 2016)**

During this phase, the average maximum and minimum temperatures were 29.8°C and 22.1°C, respectively and slightly lower than normal i.e. optimum for crop growth. The total rainfall received during this phase was 400.2 mm in 25 rainy days as against the normal rainfall of 229.6 mm. The 74.3 % more rainfall was received than the normal. During grand growth period through the rainfall received was more but in the month of June and July the long dryspell (more than 3 week) were observed which affected the crop growth.

#### **6) Flowering and Maturity (*Adsali* and Preseason) Grand growth phase (*Suru*) (Oct to Dec 2016)**

During this phase, the mean maximum and minimum temperatures were 31.1°C and 13.3 °C, respectively. The minimum temperature was higher than the normal (15.0 °C). Total rainfall received during this phase was 101.0 mm in 4 rainy days as against 97.3 mm average of last 84 years. The high humidity and optimum temperatures favored early flowering for all season planted crop. The 3.7 % more rainfall was received than the normal.

During Jan 2017 to April 2017, the mean maximum and minimum temperatures were 37.1 °C and 13.3 °C, respectively. The optimum maximum and minimum temperatures were higher than normal and dry season favored maturity and sugar recovery of sugarcane crop. The overall crop growth during this year is satisfactory.



**Table 2. Average weather parameters at CSRS, Padegaon during June 2015 to April 2017.**

Sr. No.	Temperature (°C)		Humidity (%)		Sunshine (Hrs.)	Rainfall (mm)	Rainy days
	Max.	Min.	Mor.	Eve.			
June 15	32.6	22.8	89	63	5.8	145.6	10
<b>1. Germination phase for <i>Adsali</i> crop (Jul. to Sept., 2015)</b>							
July 15	31.3	23.0	83	67	5.6	7.0	1
Aug 15	31.1	22.1	92	78	5.2	0.0	0
Sept 15	31.4	21.3	91	76	5.9	136.1	8
<b>Average</b>	<b>31.60</b>	<b>22.30</b>	<b>88.75</b>	<b>71.00</b>	<b>5.63</b>	<b>72.18</b>	<b>4.75</b>
<b>Last 84 yrs avg</b>	<b>30.48</b>	<b>21.97</b>	<b>89.03</b>	<b>69.78</b>	<b>5.03</b>	<b>167.55</b>	
<b>2. Tillering phase (Oct-Dec., 2015) for <i>Adsali</i>/Germination phase for Preseason crop</b>							
Oct 15	32.8	21.4	94	71	7.4	130.9	4
Nov 15	31.3	18.0	95	77	7.4	45.8	1
Dec 15	31.8	14.8	96	75	8.5	0.0	0
<b>Average</b>	<b>31.97</b>	<b>18.07</b>	<b>95.00</b>	<b>74.33</b>	<b>7.77</b>	<b>58.90</b>	<b>1.67</b>
<b>Last 84 yrs avg</b>	<b>31.33</b>	<b>16.93</b>	<b>92.45</b>	<b>60.37</b>	<b>8.13</b>	<b>101.90</b>	
<b>3. Early growth (<i>Adsali</i>)/Tillering (Preseason) and Germination phase (<i>Suru</i>) (Jan-Mar.2016)</b>							
Jan 16	30.4	11.3	91	54	8.4	0.0	0
Feb 16	34.8	15.9	84	36	7.8	3.2	1
Mar 16	37.5	18.8	92	45	7.9	4.2	1
<b>Average</b>	<b>34.23</b>	<b>15.33</b>	<b>89.00</b>	<b>45.00</b>	<b>8.03</b>	<b>2.47</b>	<b>0.67</b>
<b>Last 84 yrs avg</b>	<b>33.12</b>	<b>14.22</b>	<b>86.70</b>	<b>46.25</b>	<b>8.87</b>	<b>29.68</b>	
<b>4. Desiccation phase (April to May, 2016)</b>							
April 16	40.9	22.3	90	44	8.5	0.0	0
May 16	39.2	23.8	88	50	9.3	20.6	2
<b>Average</b>	<b>38.11</b>	<b>20.48</b>	<b>89.00</b>	<b>46.33</b>	<b>8.61</b>	<b>7.69</b>	<b>0.89</b>
<b>Last 84 yrs avg</b>	<b>38.51</b>	<b>21.09</b>	<b>82.55</b>	<b>47.87</b>	<b>9.36</b>	<b>33.99</b>	
<b>5. Grand growth (<i>Adsali</i>)/Early growth phase (Preseason and <i>Suru</i>) (June to Sept., 2016)</b>							
June 16	33.6	23.2	89	68	4.6	99.2	6
July 16	29.9	22.4	95	92	1.6	52	7
Aug 16	29.6	22.8	95	92	4.1	102.4	5
Sept 16	30.1	21.3	94	92	3.4	146.6	7
<b>Average</b>	<b>29.87</b>	<b>22.17</b>	<b>94.67</b>	<b>92.00</b>	<b>3.03</b>	<b>100.33</b>	<b>6.33</b>
<b>Last 84 yrs avg</b>	<b>30.48</b>	<b>22.13</b>	<b>90.03</b>	<b>79.10</b>	<b>4.22</b>	<b>229.67</b>	
<b>6. Flowering and Maturity (<i>Adsali</i> and Preseason)/Grand growth phase (<i>Suru</i>) (Oct-Dec, 2016)</b>							
Oct 16	31.2	19.0	94	89	7.0	96.1	4
Nov 16	30.9	11.1	91	74	8.4	0.0	0
Dec 16	31.2	9.9	91.5	73.0	8.0	4.9	0
<b>Average</b>	<b>31.10</b>	<b>13.33</b>	<b>92.17</b>	<b>78.67</b>	<b>7.80</b>	<b>33.67</b>	<b>1.33</b>
<b>Last 84 yrs avg</b>	<b>31.45</b>	<b>15.07</b>	<b>91.38</b>	<b>67.93</b>	<b>8.25</b>	<b>97.33</b>	
Jan 17	29.8	9.8	89.6	63.4	7.8	0.0	4.7
Feb 17	34.2	11.6	91.0	68.2	9.0	0.0	6.9
Mar 17	37.6	12.0	91.1	74.1	8.2	0.0	6.5
April 17	39.5	16.5	87.2	78.7	8.7	0.0	7.8
<b>Average</b>	<b>37.10</b>	<b>13.37</b>	<b>89.77</b>	<b>73.67</b>	<b>8.63</b>	<b>0.00</b>	<b>7.07</b>
<b>Last 84 yrs avg</b>	<b>35.65</b>	<b>13.28</b>	<b>86.73</b>	<b>55.08</b>	<b>8.87</b>	<b>3.75</b>	

**The incidence of pests and diseases, in general, was as under.**

**Table 3. Incidence of insect pests on sugarcane during 2016-17**

<b>Sr. No.</b>	<b>Name of pest</b>	<b>Extent of incidence (%)</b>
1	Early shoot borer	5-15 %
2	Internode borer	18-20 %
3	Top shoot borer	In traces to low
4	Mealy bugs	20-30 %
5	Woolly aphids	In traces to high (on very few stools in field)
6	Scale insect	In traces to low
7	White fly	In traces
8.	Sugarcane Pyrilla	In traces

**Table 4. Incidence of diseases on sugarcane during 2016-17**

<b>Sr. No.</b>	<b>Name of disease</b>	<b>Extent of incidence (%)</b>
1	Rust	5-30 %
2	G.S.D	5-10 %
3	Smut	8 %
4	Brown spot	5-20 %
5	Pokka Boeing	10 %
6	Ring Spot	5 %
7	Yellow Leaf Disease (YLD)	5 %
8	Pine apple disease	trace

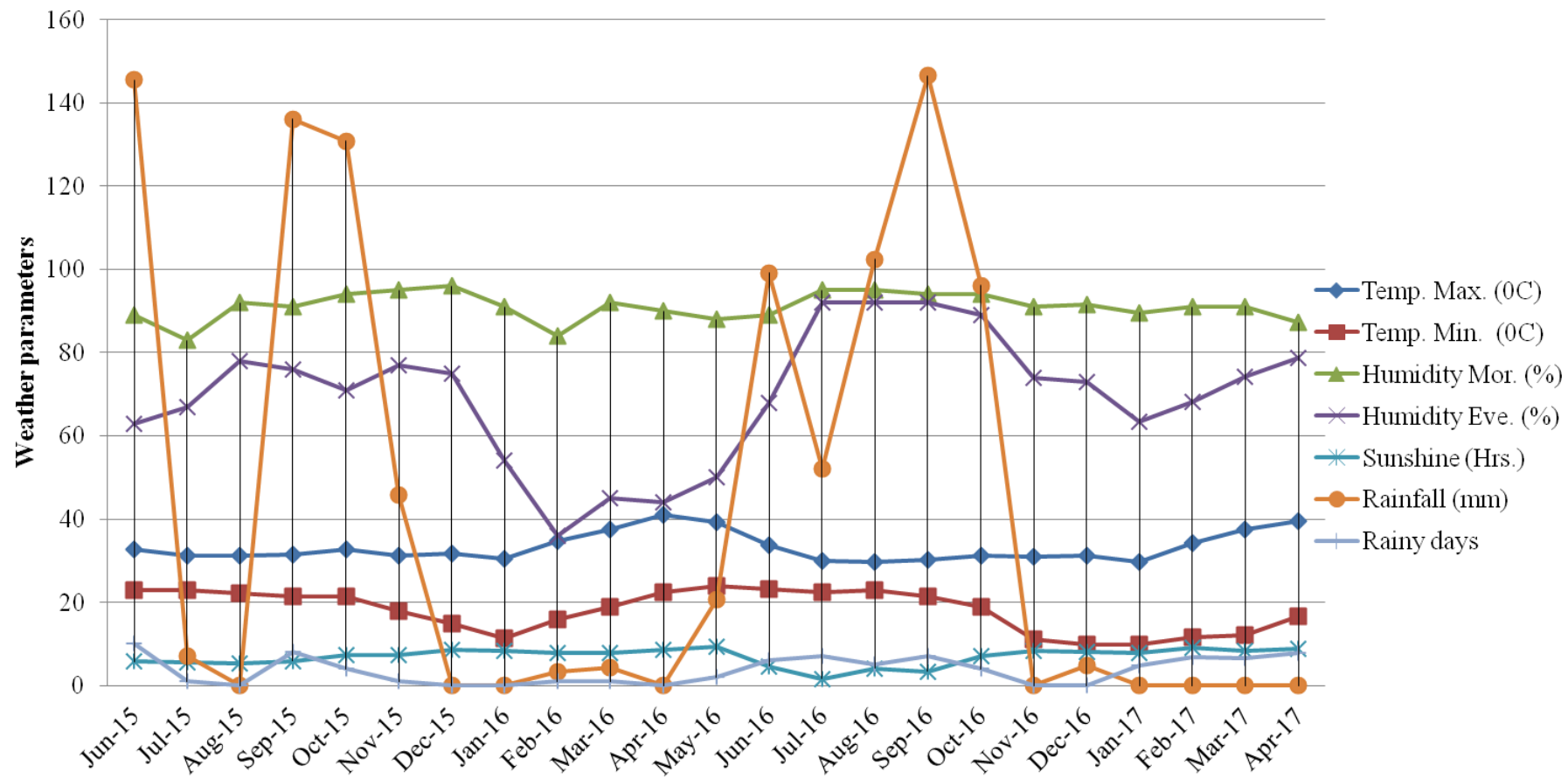


Fig. 1 Weather parameters at CSRS, Padegaon during June 2015 to April 2017

# **STAFF POSITION**

**ALL INDIA CO-ORDINATED RESEARCH PROJECT ON SUGARCANE  
CENTRAL SUGARCANE RESEARCH STATION, PADEGAON**

**Dr. Suresh M. Pawar  
Sugarcane Specialist**

**Staff Position: 2016-17**

**A) AICRP(S) Scheme**

<b>Sr. No.</b>	<b>Name</b>	<b>Designation</b>
<b>Sugarcane Breeder</b>		
1	Dr.R.M.Garkar	Sugarcane Breeder
<b>Sugarcane Agronomist</b>		
2.	Dr. P.M. Chaudhari	Junior Agronomist
<b>Assistant Entomologist</b>		
3	Dr. M.P. Badgajar	Assistant Entomologist
<b>Assistant Pathologist</b>		
4	Shri. S.V.Nalawade	I/c Assistant Pathologist
<b>Technical Assistant (04)</b>		
1	Shri. S. U. Deshmukh	Technical Assistant
2	Shri. K. C. Ombase	On study leave since 30.07.2015
3	Shri. S.K.Ghodke	Technical Assistant
4	Smt.M.M.Keskar	---,,---
<b>Lab. Assistant (02)</b>		
1	Shri. A. M. Dubal	Lab. Assistant
2	Shri. L. P. Sawant	---,,---

**B) STATE SCHEME**

1	Dr. T.J.Bhor	Senior Research Assistant
2	Shri. D. S. Thorave	Junior Research Assistant
3	Shri. A.B.Bhosale	Agril. Assistant
4	Shri. M M. Bhuse	Agril. Assistant

**SANCTIONED GRANTS  
AND  
EXPENDITURE**

**Table: 5. Year wise sanctioned grants and expenditure of last 5 years of AICRP (S)**

Sr. No.	Year	Sanctioned grants (Rs. Lakhs)				Expenditure Rs. (lakhs)			
		Recurring with T.A.	Non recurring	Pay and Allowances	Total	Recurring with T.A.	Non recurring	Pay and Allowances	Total
1	2012-13	8.00	--	118.69	126.79	7.17	--	52.46	59.63
2	2013-14	8.00	--	72.72	80.72	7.00	--	61.25	68.25
3	2014-15	8.00	--	56.56	64.56	6.23	--	57.18	63.41
4	2015-16	8.00	--	35.85	43.85	5.27	--	61.58	66.85
5	2016-17	8.00	--	44.06	52.06	5.35	--	48.81	54.16

**DECISION &  
ACTION TAKEN  
REPORT**



# Central Sugarcane Research Station, Padegaon

## Decision and Action Taken Report 2016-17

Action taken on the suggestions made in the 31<sup>st</sup> Biennial Workshop of All India Coordinated Research Project on Sugarcane was held at the Vasantdada Sugar Institute, Pune on November 16-17, 2016.

S.N.	Decision	Action taken
1	AVT (I Plant) trials should be harvested in time and ratooning operations should be carried out properly for raising a good ratoon crop.	Action was taken
2	The varieties notified by the CVRC for a particular zone are generally notified by the states under the zone. However, some states are not immediately releasing such varieties for cultivation in respective state. Hence the State Agricultural Universities should conduct the adaptability trials of the varieties released by the CVRC in respective states, as per the requirements, for releasing such varieties (from other states / universities / institutes) in their respective states. Centres will supply the seeds of new varieties to the SAUs for conducting adaptability trials.	The adaptability trails of the varieties released by the CVRC will be conducted in the state.
3	In Peninsular Zone, early and midlate trials will be combined to conduct a common IVT. Accordingly, Initial Varietal Trial will be conducted with 37 entries and three standards during 2017-18 in alpha statistical design.	Action was taken
4	In Peninsular Zone, AVT (I-Plant) will be conducted with 8 entries viz., Co 12007, Co 12008, Co 12009, Co 12012, Co 12019, Co 12024, CoM 12085 and VSI 12121 and three standards (Co 86032, CoSnk 05103, CoC 671) during the year 2017-18.	Action was taken
5	Soft copy of the new proposal for inclusion in ZVT should be sent immediately to PI (Crop Improvement) for future reference.	Care will be taken while submitting the proposals
6	The format for proposing new entries was discussed for submitting / presenting data uniformly and the centres should present the data as per the format from next year onwards	The proposal of new entries was presented as per the new format.

# **RESEARCH HIGHLIGHTS**

## Research highlights

### AICRP (S) Programme (2016-17)

#### 1) **Name of Trial: Initial Varietal Trial – (Early)**

In this trial, eight entries were evaluated along with three standards viz. CoC 671, Co 94008 and Co 85004. Among the standards CoC 671 recorded highest CCS yield (10.71 t/ha) followed by Co 85004 (9.61). MS 13081 was the best entry for CCS yield with 16.99 t/ha followed by Co 13002 (13.41 t/ha), Co 13004 (13.5 t/ha) and CoN 13072 (12.91 t/ha) which were significantly superior to the best standard CoC 671. For cane yield CoC 671 was the best standard (82.67 t/ha) and the entries MS 13081(127.36 t/ha), Co 13002 (101.53 t/ha), CoSnk 13102 (100.48 t/ha) and Co 13004 (100.42 t/ha) recorded significantly superior cane yield. Juice sucrose % was the significantly superior in the entries CoN 13072 (19.04), Co 13002 (18.80) and MS 13081 (18.79) than the best standard Co 85004 (17.75). The entries Co 13002 (15.13 %) and MS 13081(14.78 %) were at par with best standard CoC 671 (14.82 %) for sucrose % at 8 month. Considering the cane yield and juice quality the entries MS 10001, Co 13002 and Co 13004 were found to be promising.

#### 2) **Advanced Varietal Trial (Early) –I Plant :**

In this trial, five entries were evaluated along with three standards viz. CoC 671, Co 94008 and Co 85004. Among the standards CoC 671 recorded highest CCS yield (10.59 t/ha) followed by Co 85004 (9.78). The entry CoM 11082 (16.80 t/ha) was significantly superior for CCS yield than the best standard CoC 671. The entry CoM 11082 (126.22 t/ha) recorded significantly higher cane yield over the best standard CoC 671 (85.77 t/ha). Juice sucrose % was the higher in the entries CoM 11082 (19.19) and Co 11004 (18.43) than the best standard CoC 671 (18.24). The entries CoM 11081 (15.16 %) and CoM 11082 (14.91 %) recorded higher sucrose % than the best standard CoC 671 (14.74 %) at 8 month. Considering the cane yield and juice quality the entries CoM 11082 and CoM 11081 were found to be promising.

#### 3) **Advanced Varietal Trial (Early) –II Plant :**

In this trial, eight entries were evaluated along with three standards viz. CoC 671, Co 94008 and Co 85004. Among the standards Co 94008 recorded highest CCS yield (9.74 t/ha) followed by CoC 671 (9.63). All the entries except Co 10006 were significantly superior for CCS yield to the best standard Co 94008. For cane yield also Co 94008 was the best standard (82.82 t/ha) and all the entries except Co 10006 were significantly superior to the best standard Co 94008. Juice sucrose % was the significantly superior in the entries CoT 10367 (18.90), Co 10026 (18.56) and Co 10027 (18.54) than the best standard CoC 671 (17.63). The entry CoT 10366 (16.32 %) was superior to the best standard CoC 671 (15.80 %) for sucrose % at 8 month. Considering the cane yield and juice quality the entries Co 10026, CoT 10367 and Co 10027 were found to be promising.

#### 4) **Advanced Varietal Trial (Early) –Ratoon :**

In this trial, eight entries were evaluated along with three standards *viz.* CoC 671, Co 94008 and Co 85004. Among the standards Co 85004 recorded highest CCS yield (8.62 t/ha) followed by CoC 671 (8.21). The entries Co 10026 (14.70 t/ha), CoT 10367 (13.13 t/ha), Co 10027 (11.91 t/ha), Co 10024 (11.59 t/ha) and Co 10005 (10.76 t/ha) were significantly superior for CCS yield to the best standard Co 85004. For cane yield, the entries Co 10026 (105.39 t/ha), CoT 10367 (95.19 t/ha), Co 10024 (84.16 t/ha) were significantly superior to the best standard Co 85004. Juice sucrose % was higher in the entries CoT 10367 (19.47), Co 10026 (19.43) and Co 10024 (19.20) than the best standard CoC 671 (19.00). Considering the cane yield and juice quality in ratoon the entries Co 10026, CoT 10367, Co 10024 and Co 10027 were found to be promising.

#### **Pooled results of I Plant, II Plant and Ratoon (AVT Early):**

The pooled mean of I Plant, II Plant and Ratoon showed that among the standards Co 85004 recorded highest CCS yield (10.67 t/ha). All the entries except Co10006 recorded higher CCS yield than the best standard Co 85004. All the entries except Co10006 recorded higher cane yield than the best standard Co 85004 (79.39 t/ha). Juice sucrose % at harvest was higher in the entries CoT 10367 (18.78) and Co 10026 (18.65) than the best standard CoC 671 (18.61). Considering the cane yield, CCS yield and juice quality the entries Co 10026, CoT 10367 and Co 10027 were found to be promising.

#### 5) **Initial Varietal Trial – (Midlate) :**

In this trial, twenty entries were evaluated along with two standards *viz.* Co 86032 and Co 99004. Among the standards Co 86032 recorded highest CCS yield (17.00 t/ha). CoM 11086 (18.47 t/ha) was the best entry for CCS yield followed by Co 11019 (16.32 t/ha), Co 11012 (16.16 t/ha), Co 11005 (15.61 t/ha) and CoM 11085 (15.51 t/ha) which were significantly superior to the best standard Co 86032. For cane yield, the entries CoM 11086 (124.54 t/ha), Co 11019 (114.76 t/ha), CoM 11085 (112.37 t/ha), Co 11012 (111.93 t/ha) and Co 11005 (107.81 t/ha) recorded significantly superior cane yield than the best standard Co 86032. Juice sucrose % was the significantly superior in the entries CoM 11086 (20.71), Co 11012 (20.29), Co 11005 (20.19) and Co 11019 (20.08) than the best standard Co 86032 (19.21). The entries Co 11012 (18.35 %) and CoM 11085 (18.21 %) recorded higher sucrose % at 10 month over the best standard Co 99004 (17.80). Considering the cane yield and juice quality the entries CoM 11086, Co 11019, Co 11012, Co 11005 and CoM 11085 were found to be promising.

#### 6) **Advanced Varietal Trial – (Midlate I Plant) :**

In this trial, six entries were evaluated along with two standards *viz.* Co 86032 and Co 99004. Among the standards Co 86032 recorded highest CCS yield (14.16 t/ha). The entries Co 13008 (21.31 t/ha) and Co 13009 (20.12 t/ha) were significantly superior to the best standard Co 86032 for CCS yield. For cane yield, the entry Co 13008 (149.81 t/ha) recorded significantly superior cane yield than the best standard Co 86032 (122.86 t/ha). At 12 month, the juice sucrose % was numerically higher in the entries Co 13020 (20.81), CoSnk 13103 (20.49) and Co 13009 (20.47) than the best standard Co 99004 (19.96) at 12 month. None of the entries recorded higher sucrose % at 10 month over the best standard Co 99004 (18.17). However, the entries Co 13014 (17.71), Co 13008 (17.51), Co 13016 (17.27), PI 10132 (17.27), CoSnk 13103 (17.20),

Co 13020 (16.97), CoSnk13105 (16.88) and CoSnk 13106 (16.78) recorded numerically higher sucrose % at 10 month than the standard Co 86032 (16.75) Considering the cane yield, CCS yield and juice quality the entries Co 13008 Co 13009 and CoSnk 13103 were found to be promising.

**7) Advanced Varietal Trial – (Midlate II Plant) :**

In this trial, eleven entries were evaluated along with two standards *viz.* Co 86032 and Co 99004. Among the standards Co 86032 recorded highest CCS yield (14.91 t/ha). The entries PI 10132 (20.24 t/ha), Co 10033 (18.44 t/ha), CoT 10369 (18.10 t/ha), and Co 10031 (18.05 t/ha) were significantly superior to the best standard Co 86032 for CCS yield. For cane yield, the entries PI 10132 (136.83 t/ha), Co 10033 (134.63 t/ha), CoT 10369 (122.94 t/ha), and Co 10031 (120.25 t/ha) recorded significantly superior cane yield than the best standard Co 86032 (108.43 t/ha). Juice sucrose % at 12 month was higher in the entries Co 10031 (21.02), PI 10132 (20.73) and CoT 10369 (20.53) than the best standard Co 99004 (20.16). None of the entries recorded higher sucrose % at 10 month over the best standard Co 99004 (17.39). However, the entries PI 10132 (17.28), Co 10031 (17.10), Co 10015 (16.89), CoT 10369 (16.59) and CoT 10368 (16.30) recorded numerically higher sucrose % at 10 month than the standard Co 86032 (16.19). Considering the cane yield, CCS yield and juice quality the entries PI 10132, Co 10033, CoT 10369 and Co 10031 were found to be promising.

**8) Advanced Varietal Trial – (Midlate Ratoon) :**

In this trial, eleven entries were evaluated along with two standards *viz.* Co 86032 and Co 99004. Among the standards Co 86032 recorded highest CCS yield (13.51 t/ha). The entries PI 10132 (19.02 t/ha) was significantly superior to the best standard Co 86032 for CCS yield. For cane yield, the entries PI 10132 (128.28 t/ha) and CoT 10369 (104.28 t/ha) were superior to the best standard Co 86032 (93.55 t/ha). Juice sucrose % at 11 month was higher in the entries Co 10031 (21.55), PI 10132 (20.74) and CoT 10369 (20.21) than the best standard Co 86032 (20.16). Considering the cane yield, CCS yield and juice quality the entries PI 10132, CoT 10369 and Co 10033 were found to be promising.

**Pooled results of I Plant, II Plant and Ratoon (AVT Midlate):**

The pooled mean of I Plant, II Plant and Ratoon showed that among the standards Co 86032 recorded highest CCS yield (15.69 t/ha). The entries PI 10132 (19.87 t/ha), CoT 10369 (17.64 t/ha), Co 10033 (16.71 t/ha) and Co 10031 recorded higher CCS yield than the best standard Co 86032 (15.69 t/ha). The entries, PI 10132 (132.12 t/ha), Co 10033 (122.07 t/ha) and CoT 10369 (121.05 t/ha) recorded superior cane yield than the best standard Co 86032 (110.34 t/ha). Juice sucrose % at harvest was higher in the entries PI 10132 (21.12), Co 10031 (21.05), CoT 10369 (20.46) and Co 10017 (20.11) than the best standard Co 86032 (19.92). Considering the cane yield, CCS yield and juice quality the entries PI 10132, CoT 10369 and Co 10033 were found to be promising.

## **9) Evaluation and identification of climate resilient ISH and IGH genetic stocks (Ratoon Crop)**

Fifteen ISH / IGH clones and two standards were evaluated under drought condition by withdrawing irrigation between 60 and 150 days after planting. Crop yield is mainly dependent on the interplay of various physiological and biochemical functions of the plant in addition to the impact of the environment. In this study, the mean cane and CCS yield is significantly reduced due to drought. The mean reduction in cane yield due to drought was 28.82 % and it ranged from 13.17 % (AS 04 - 2097) to 46.22 % (SA 04-472). Among the standards CoM 0265 recorded highest cane yield under normal and drought condition (96.86, 71.97 t/ha). The entry SA 04- 409 (72.82 t/ha) recorded numerically higher cane yield than the best check CoM 0265 under drought condition. Considering the mean of control and drought treatment, the standard CoM 0265 recorded the highest cane yield (84.42 t/ha). Nine entries and two standards recorded below average (<28.82 %) reduction in cane yield.

The entry SA 04- 409 (10.34 t/ha) recorded numerically higher cane yield than the best check CoM 0265 (9.53 t/ha) under drought condition. Considering the mean of normal and drought treatment, the entry SA 04- 409 (12.17 t/ha) recorded highest CCS yield.

Considering the mean of control and drought treatment the highest CCS % (14.47 %) was recorded by the entry SA 04-409. Among the standards, CoM 88121 was superior for sucrose % (19.88 %). Among the test entries, the entry SA 04-409 (1.12 kg) recorded numerically higher average cane weight than the check CoM 88121 under drought condition. The mean reduction in single cane weight due to drought was 16.49 %. Among the test entries, the entry SA 04-245 (135190) recorded highest number of millable canes (NMC) under drought condition.

**APPROVED TECHNICAL  
PROGRAMME 2016-17**

## **APPROVED TECHNICAL PROGRAMME FOR THE YEAR (2016-17)**

### **A) All India Coordinated Research Project on Sugarcane (AICRP):**

1. Initial Varietal Trial (Early)
2. Advanced Varietal Trial (Early I plant)
3. Advanced Varietal Trial (Early II plant)
4. Advanced Varietal Trial (Early Ratoon)
5. Initial Varietal Trial (Midlate)
6. Advanced Varietal Trial (Midlate I plant)
7. Advanced Varietal Trial (Midlate II plant)
8. Advanced Varietal Trial (Midlate Ratoon)
9. Evaluation and identification of climate resilient ISH and IGH genetic stocks (Ratoon)
10. Evaluation and identification of climate resilient ISH and IGH genetic stocks (I Plant)
11. Seed multiplication for supply to AICRP centre for Initial Varietal Trial

### **B) Sugarcane Hybridization Programme during 2016-17:**

<b>S.N.</b>	<b>Name of centre</b>	<b>Crosses</b>	<b>P.C.</b>	<b>G.C.</b>	<b>Total</b>
1	SBI, Coimbatore	34	07	06	47
2	ARS, Agali	10	00	08	18
3	CSRS, Padegaon	12	00	00	12
4	ARS, Radhanagari	15	00	08	23
	<b>Total</b>	<b>71</b>	<b>07</b>	<b>22</b>	<b>100</b>

#### **1) Sugarcane crosses effected at SBI, Coimbatore during 2016 – 17**

<b>SBI Coimbatore Station crosses</b>			
<b>Sr. No.</b>	<b>Cross</b>		
1	CoN 05071	X	LG 04605
2	CoLk 8102	X	Bo 130
3	LG 02100	X	Co 61298
4	CoLk 8102	X	Co 61298
5	UP 9530	X	Co 61298
6	Co 86002	X	Bo 130
7	CP 62-23	X	Co 87268
8	Co 8353	X	Co 06037
9	CoN 05072	X	Co 87268
10	Co 89036	X	Co 62198
11	Co 86002 self		
12	CoSnk 03-044	X	Co 8208
13	CP 52-1	X	Co 87268
14	Co 86002	X	Co 87268
15	Bo 91	X	Co 62198
16	CoSnk 03-044	X	Bo 130
17	ISH 100	X	Co 62198



18	Co 0240	X	Co 62198
19	Co 92006	X	Co 775
20	Co 98008	X	CoM 9217
21	CoN 98133	X	LG 06839
22	Co 88013	X	CoH 70
23	Co 92013	X	Co 0209
24	Co 98008	X	CoPant 97222
25	CoN 05072	X	Co 89003
26	Co 94012	X	Co 11004
27	Co 8371	X	CoC 8001
28	Co 8371	X	Co 97015
29	Co 94012	X	Co 88025
30	Co 88025 self		
31	MS 6847	X	Co 94008
32	CoBln 03174	X	Co 0233
33	Co 85002	X	Co 775
34	Co 88025	X	Co 775

<b>Polycrosses</b>		
<b>Sr.No.</b>	<b>Female</b>	<b>Male</b>
1	CoV 89101	Co 775
2	CoA7602	Co 99006
3	Co 2000-10	Co 86011
4	ISH 100	ISH 69
5	86V46	Co 94008
6	Co 85002	CoT 8201
7	Co 8371	CoV 92102 Co 93009

<b>General Collection</b>	
<b>Sr. No.</b>	<b>Female</b>
1	Co 94008
2	C 79218
3	Co 86249
4	85R186
5	CoC 671
6	Co 88025

<b>Sugarcane crosses effected at ARC, Agali during 2016 – 17</b>			
<b>Sr. No.</b>	<b>Cross</b>		
1	MS 6847	X	Co 94008
2	CoM 0265	X	Co 89003
3	CoM 0265	X	CoC 671
4	CoM 0265	X	Co 92020
5	CoM 0265	X	Co 88013

6	Co 99006	X	Co 85015
7	CoM 6806	X	87 R 401
8	CoC 671	X	Co 06027
9	Co 06030	X	Co 7318
10	Co 86032	X	CoC 671

<b>General Collection</b>			
<b>Sr. No.</b>	<b>Female</b>		
1	CoM 0265		
2	Co 86032		
3	Co 0209		
4	CoA 05321		
5	CoH 70		
6	Co 06022		
7	Co 98006		
8	CoS 93278		

**2) Sugarcane crosses effected at CSRS, Padegaon, Maharashtra during 2016– 17**

<b>Sr. No.</b>	<b>Cross</b>		
1	Co 10033	X	Co 94008
2	MS 10001	X	CoM 0265
3	Co 11007	X	MS 10001
4	Co 10024	X	Co 94008
5	CoM 0265	X	Co 94012
6	Co 94012	X	CoSnk 05104
7	CoC 671	X	CoSnk 05104
8	Co 62175	X	Co 94008
9	CoC 671	X	Co 94008
10	CoM 0265	X	CoC 671
11	CoM 08030	X	Co 94012
12	CoM 0265	X	CoM 08030

**3) Sugarcane crosses effected at ARS, Radhanagari, Maharashtra during 2016 – 17**

<b>S. N.</b>	<b>Cross</b>		
1	Co 6304	X	CoM 0254
2	CoM 0238	X	CoM 0254
3	MS 6847	X	Co 94012
4	Co 62174	X	CoSnk 03044
5	Co 8371	X	Co 94012
6	Co 419	X	Co 775
7	MS 0219	X	Co 94012
8	PDN 14004	X	Co 7914
9	MS 0602	X	Co 775

10	Co 62175	X	M 0602
	<b>Self</b>		
1	Co 775		
2	Co 94012		
3	CoM 0254		
4	Co 419		
5	MS 0602		
	<b>General Collection</b>		
1	MS 6847		
2	VSI 434		
3	Trimurti		
4	CoM 88121		
5	Co 7125		
6	Co 62174		
7	CoC 671		
8	Co 94012		

**C) Ground Nursery:**

Total **8500** seedlings were transplanted in ground nursery on 24/11/2016

<b>Crosswise Seedlings raised during 2016 -17</b>				
<b>SBI, Coimbatore - Station crosses</b>				
<b>S. N.</b>	<b>Cross</b>			<b>Seedling transplanted in the field</b>
1	CoSnk 05103	X	NCo310	4
2	CoSnk 05103	X	Co 62198	0
3	CoN 05071	X	Bo 130	0
4	CoLk 8102	X	Co 61298	180
5	Co 8353	X	Co 61298	60
6	Bo 91	X	Co 61298	240
7	Co 8353	X	NCo310	1
8	CoN 05071	X	LG 04605	0
9	CoSnk 05103	X	LG 05828	1
10	Co 87272	X	Q 65	0
11	LG 02100	X	Co 62198	14
12	CoN 05071	X	Co 89029	2
13	UP 9530	X	Co 62198	60
14	LG 95053	X	Co 1158	180
15	CoN 05071	X	ISH 69	0
16	Bo 91	X	CoPant 97222	415
17	Co 8213	X	Co 62399	160
18	ISH 100	X	Co 1158	0
19	CoN 05071	X	Co 06037	0
20	Co 06035	X	Co 775	12

21	Co 92013	X	CoH 104	120
22	CoM 6806	X	Co 775	360
23	CoM 9217	X	Co 1148	600
24	CoM 6806	X	CoH 104	730
25	CoM 9217	X	BO 17	640
26	CoM 9220	X	CoH 70	180
27	CoH 104	X	Bo 17	120
28	CoC 671	X	CoH 70	8
<b>Total</b>				<b>4087</b>

<b>Zonal crosses</b>				
<b>S.N.</b>	<b>Cross</b>			<b>Seedling transplanted in the field</b>
1	ISH 41	X	Co 94008	180
2	Co 0312	X	Co 0209	180
3	CoV 94101	X	Co 97015	0
4	CoC 671	X	CoT 8201	0
5	CoM 0265	X	CoC 671	0
6	CoC 671	X	Co 94008	9
7	Co 86032	X	Co 94005	180
<b>Total</b>				<b>549</b>

<b>Polycrosses</b>			
<b>S.N.</b>	<b>Female</b>	<b>Males</b>	<b>Seedling transplanted in the field</b>
1	Co 94012	Co 775	5
2	CP 52-68	Co 99006	60
3	CoC 90063	Co 86011	3
4	CoV 89101	ISH 69	840
5	Co 7201	Co 94008	240
6	CoA7602	CoT 8201	60
7	Co 2000-10	CoV 92102	18
8	ISH 100	Co 93009	3
9	86V46		60
10	CoC 671		7
11	CoM 0265		60
12	Co 85002		120
13	Co 8371		480
<b>Total</b>			<b>1956</b>
<b>General Collection</b>			
<b>S.N.</b>	<b>Clone</b>		<b>Seedling transplanted in the field</b>
1	CoC 671		1
2	Co 94012		1
3	CoM 9220		120
4	ISH 29		9
5	Co 87004		600
6	Co 8013		200

7	CoT 8201		350
8	ISH 301		180
9	CoSi 06		240
10	CoOr 05346		60
11	C 87271		60
<b>Total</b>			<b>1821</b>

**ARS, Agali seedlings raised during 2016-17**

S. N.	Cross			Seedling transplanted in the field
1	Bo 99	X	CoM 9217	74
2	CoC 671	X	Co 0233	5
3	Co 7201	X	Co 89003	3
<b>Total</b>				<b>82</b>

**CSRS, Padegaon seedlings raised during 2016-17**

S. N.	Cross			Seedling transplanted in the field
1	CoM 8516	X	CoC 671	0
2	CoM 0265	X	Co 94008	0
3	MS 6847	X	CoC 671	0
4	Co 94008	X	MS 10001	0
5	MS 10001	X	CoM 0265	0
6	CoM 0265	X	CoC 671	3
7	CoM 0265	X	MS 10001	0
8	MS 6847	X	Co 94012	0
9	Co 94008	X	Co 94012	0
10	Co 10033	X	CoC 671	0
<b>Total</b>				<b>3</b>

**ARS, Radhanagari seedlings raised during 2016-17**

S. N.	Cross			Seedling transplanted in the field
1	MS 6847	X	Co 94012	0
2	MS 6847	X	CoM 0254	0
3	MS 6847	X	CoM 08030	0
4	MS 6847	X	MS 0602	0
5	CoM 0238	X	CoM 0254	0
6	CoM 11004	X	Co 94012	0
7	MS 0209	X	MS 0602	0
8	Co 6304	X	CoM 0254	0
9	CoM 11001	X	527/85	0
10	Co 8371	X	Co 775	0
11	CoM 88121	X	Co 94012	2
12	CoM 0219	X	CoM 9318	0
13	CoM 09029	X	85R186	0
14	Co 6304	X	CoM 08030	0
<b>Total</b>				<b>2</b>
<b>Grand Total</b>				<b>8500</b>

# **AICRP TRIALS**

## Research report of AICRP trials (2016-17)

### 1) Name of Trial: Initial Varietal Trial – (Early)

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	3
<b>Treatments</b>	8 + 3 = 11
<b>Plot Size:</b>	
<b>Gross</b>	6 M X 6 R
<b>Net</b>	5 M x 4 R
<b>Planting date</b>	12.01.2016
<b>Harvesting date</b>	13.10.2016
<b>Table No.</b>	6

#### Results: Table: - 6

In this trial, eight entries were evaluated along with three standards *viz.* CoC 671, Co 94008 and Co 85004. Among the standards CoC 671 recorded highest CCS yield (10.71 t/ha) followed by Co 85004 (9.61). MS 13081 was the best entry for CCS yield with 16.99 t/ha followed by Co 13002 (13.41 t/ha), Co 13004 (13.5 t/ha) and CoN 13072 (12.91 t/ha) which were significantly superior to the best standard CoC 671. For cane yield CoC 671 was the best standard (82.67 t/ha) and the entries MS 13081(127.36 t/ha), Co 13002 (101.53 t/ha), CoSnk 13102 (100.48 t/ha) and Co 13004 (100.42 t/ha) recorded significantly superior cane yield. Juice sucrose % was the significantly superior in the entries CoN 13072 (19.04), Co 13002 (18.80) and MS 13081 (18.79) than the best standard Co 85004 (17.75). The entries Co 13002 (15.13 %) and MS 13081(14.78 %) were at par with best standard CoC 671 (14.82 %) for sucrose % at 8 month. Considering the cane yield and juice quality the entries MS 10001, Co 13002 and Co 13004 were found to be promising.

## 2 ) Name of Trial: Advanced Varietal Trial (Early) –I Plant

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	3
<b>Treatments</b>	5 + 3 = 8
<b>Plot Size:</b>	
<b>Gross</b>	6 m x 8R
<b>Net</b>	5 m x 6R
<b>Planting date</b>	7.1.2016
<b>Harvesting date</b>	8.10.2016
<b>Table. No.</b>	7

### Results: Table. : 7

In this trial, five entries were evaluated along with three standards viz. CoC 671, Co 94008 and Co 85004. Among the standards CoC 671 recorded highest CCS yield (10.59 t/ha) followed by Co 85004 (9.78). The entry CoM 11082 (16.80 t/ha) was significantly superior for CCS yield than the best standard CoC 671. The entry CoM 11082 (126.22 t/ha) recorded significantly higher cane yield over the best standard CoC 671 (85.77 t/ha). Juice sucrose % was the higher in the entries CoM 11082 (19.19) and Co 11004 (18.43) than the best standard CoC 671 (18.24). The entries CoM 11081 (15.16 %) and CoM 11082 (14.91 %) recorded higher sucrose % than the best standard CoC 671 (14.74 %) at 8 month. Considering the cane yield and juice quality the entries CoM 11082 and CoM 11081 were found to be promising.



### 3 ) Name of Trial: Advanced Varietal Trial (Early) –II Plant

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	3
<b>Treatments</b>	8 + 3 = 11
<b>Plot Size:</b>	
<b>Gross</b>	6 m x 8R
<b>Net</b>	5 m x 6R
<b>Planting date</b>	14.01.2016
<b>Harvesting date</b>	14.10.2016
<b>Table. No.</b>	8

#### Results: Table. : 8

In this trial, eight entries were evaluated along with three standards *viz.* CoC 671, Co 94008 and Co 85004. Among the standards Co 94008 recorded highest CCS yield (9.74 t/ha) followed by CoC 671 (9.63). All the entries except Co 10006 were significantly superior for CCS yield to the best standard Co 94008. For cane yield also Co 94008 was the best standard (82.82 t/ha) and all the entries except Co 10006 were significantly superior to the best standard Co 94008. Juice sucrose % was the significantly superior in the entries CoT 10367 (18.90), Co 10026 (18.56) and Co 10027 (18.54) than the best standard CoC 671 (17.63). The entry CoT 10366 (16.32 %) was superior to the best standard CoC 671 (15.80 %) for sucrose % at 8 month. Considering the cane yield and juice quality the entries Co 10026, CoT 10367 and Co 10027 were found to be promising.

#### 4 ) Name of Trial: Advanced Varietal Trial (Early) – Ratoon

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	3
<b>Treatments</b>	8 + 3 = 11
<b>Plot Size:</b>	
<b>Gross</b>	6 m x 8R
<b>Net</b>	5 m x 6R
<b>Ratooning date</b>	29.2.2016
<b>Harvesting date</b>	29.11.2016
<b>Table. No.</b>	9

#### Results: Table. : 9

In this trial, eight entries were evaluated along with three standards *viz.* CoC 671, Co 94008 and Co 85004. Among the standards Co 85004 recorded highest CCS yield (8.62 t/ha) followed by CoC 671 (8.21). The entries Co 10026 (14.70 t/ha), CoT 10367 (13.13 t/ha), Co 10027 (11.91 t/ha), Co 10024 (11.59 t/ha) and Co 10005 (10.76 t/ha) were significantly superior for CCS yield to the best standard Co 85004. For cane yield, the entries Co 10026 (105.39 t/ha), CoT 10367 (95.19 t/ha), Co 10024(84.16 t/ha) were significantly superior to the best standard Co 85004. Juice sucrose % was higher in the entries CoT 10367 (19.47), Co 10026 (19.43) and Co 10024 (19.20) than the best standard CoC 671 (19.00). Considering the cane yield and juice quality in ratoon the entries Co 10026, CoT 10367, Co 10024 and Co 10027 were found to be promising.

### Pooled results of Advanced Varietal Trial (Early) – I Plant, II Plant and Ratoon

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	4
<b>Treatments</b>	8+3=11
<b>Plot Size:</b>	
<b>Gross</b>	6 m x 8R
<b>Net</b>	5 m x 6R
<b>Table. No.</b>	10

#### Results: Table. : 10

The pooled mean of I Plant, II Plant and Ratoon showed that among the standards Co 85004 recorded highest CCS yield (10.67 t/ha). All the entries except Co10006 recorded higher CCS yield than the best standard Co 85004. All the entries except Co10006 recorded higher cane yield than the best standard Co 85004 (79.39 t/ha). Juice sucrose % at harvest was higher in the entries CoT 10367(18.78) and Co 10026 (18.65) than the best standard CoC 671(18.61). Considering the cane yield, CCS yield and juice quality the entries Co 10026, CoT 10367 and Co 10027 were found to be promising.

##### 5) Name of Trial: Initial Varietal Trial – (Midlate)

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	2
<b>Treatments</b>	20 + 2 = 22
<b>Plot Size:</b>	
<b>Gross</b>	6 M x 6 R
<b>Net</b>	5 M x 4 R
<b>Planting date</b>	31.12.2015
<b>Harvesting date</b>	31.1.2017
<b>Table. No.</b>	11

##### Results: Table: - 11

In this trial, six entries were evaluated along with two standards *viz.* Co 86032 and Co 99004. Among the standards Co 86032 recorded highest CCS yield (14.16 t/ha). The entries Co 13008 (21.31 t/ha) and Co 13009 (20.12 t/ha) were significantly superior to the best standard Co 86032 for CCS yield. For cane yield, the entry Co 13008 (149.81 t/ha) recorded significantly superior cane yield than the best standard Co 86032 (122.86 t/ha). At 12 month, the juice sucrose % was numerically higher in the entries Co 13020 (20.81), CoSnk 13103 (20.49) and Co 13009 (20.47) than the best standard Co 99004 (19.96) at 12 month. None of the entries recorded higher sucrose % at 10 month over the best standard Co 99004 (18.17). However, the entries Co 13014 (17.71), Co 13008 (17.51), Co 13016 (17.27), PI 10132 (17.27), CoSnk 13103 (17.20), Co 13020 (16.97), CoSnk 13105 (16.88) and CoSnk 13106 (16.78) recorded numerically higher sucrose % at 10 month than the standard Co 86032 (16.75). Considering the cane yield, CCS yield and juice quality the entries Co 13008 Co 13009 and CoSnk 13103 were found to be promising.

**6) Name of Trial: Advanced Varietal Trial – (Midlate I Plant)**

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	3
<b>Treatments</b>	6 + 2 = 8
<b>Plot Size:</b>	
<b>Gross</b>	6 M x 8 R
<b>Net</b>	5 M x 6 R
<b>Planting date</b>	06.01.2016
<b>Harvesting date</b>	07.01.2017
<b>Table. No.</b>	12

**Results: Table: - 12**

In this trial, twenty entries were evaluated along with two standards *viz.* Co 86032 and Co 99004. Among the standards Co 86032 recorded highest CCS yield (17.00 t/ha). CoM 11086 (18.47 t/ha) was the best entry for CCS yield followed by Co 11019 (16.32 t/ha), Co 11012 (16.16 t/ha), Co 11005 (15.61 t/ha) and CoM 11085 (15.51 t/ha) which were significantly superior to the best standard Co 86032. For cane yield, the entries CoM 11086 (124.54 t/ha), Co 11019 (114.76 t/ha), CoM 11085 (112.37 t/ha), Co 11012 (111.93 t/ha) and Co 11005 (107.81 t/ha) recorded significantly superior cane yield than the best standard Co 86032. Juice sucrose % was the significantly superior in the entries CoM 11086 (20.71), Co 11012 (20.29), Co 11005 (20.19) and Co 11019 (20.08) than the best standard Co 86032 (19.21). The entries Co 11012 (18.35 %) and CoM 11085 (18.21 %) recorded higher sucrose % at 10 month over the best standard Co 99004 (17.80). Considering the cane yield and juice quality the entries CoM 11086, Co 11019, Co 11012, Co 11005 and CoM 11085 were found to be promising.

## 7) Name of Trial: Advanced Varietal Trial – (Midlate II Plant)

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	2
<b>Treatments</b>	11 + 2 = 13
<b>Plot Size:</b>	
<b>Gross</b>	6 M x 8 R
<b>Net</b>	5 M x 6 R
<b>Planting date</b>	29.12.2015
<b>Harvesting date</b>	29.1.2017
<b>Table. No.</b>	13

### Results: Table: - 13

In this trial, eleven entries were evaluated along with two standards *viz.* Co 86032 and Co 99004. Among the standards Co 86032 recorded highest CCS yield (14.91 t/ha). The entries PI 10132 (20.24 t/ha), Co 10033 (18.44 t/ha), CoT 10369 (18.10 t/ha), and Co 10031 (18.05 t/ha) were significantly superior to the best standard Co 86032 for CCS yield. For cane yield, the entries PI 10132 (136.83 t/ha), Co 10033 (134.63 t/ha), CoT 10369 (122.94 t/ha), and Co 10031 (120.25 t/ha) recorded significantly superior cane yield than the best standard Co 86032 (108.43 t/ha). Juice sucrose % at 12 month was higher in the entries Co 10031 (21.02), PI 10132 (20.73) and CoT 10369 (20.53) than the best standard Co 99004 (20.16). None of the entries recorded higher sucrose % at 10 month over the best standard Co 99004 (17.39). However, the entries PI 10132 (17.28), Co 10031 (17.10), Co 10015 (16.89), CoT 10369 (16.59) and CoT 10368 (16.30) recorded numerically higher sucrose% at 10 month than the standard Co 86032 (16.19). Considering the cane yield, CCS yield and juice quality the entries PI 10132, Co 10033, CoT 10369 and Co 10031 were found to be promising.

**8) Name of Trial: Advanced Varietal Trial – Midlate (Ratoon)**

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	2
<b>Treatments</b>	11 + 2 = 13
<b>Plot Size:</b>	
<b>Gross</b>	6 M x 8 R
<b>Net</b>	5 M x 6 R
<b>Planting date</b>	29.2.2016
<b>Harvesting date</b>	30.1.2017
<b>Table. No.</b>	14

**Results: Table: - 14**

In this trial, eleven entries were evaluated along with two standards *viz.* Co 86032 and Co 99004. Among the standards Co 86032 recorded highest CCS yield (13.51 t/ha). The entries PI 10132 (19.02 t/ha) was significantly superior to the best standard Co 86032 for CCS yield. For cane yield, the entries PI 10132 (128.28 t/ha) and CoT 10369 (104.28 t/ha) were superior to the best standard Co 86032 (93.55 t/ha). Juice sucrose % at 11 month was higher in the entries Co 10031 (21.55), PI 10132 (20.74) and CoT 10369 (20.21) than the best standard Co 86032 (20.16). Considering the cane yield, CCS yield and juice quality the entries PI 10132, CoT 10369 and Co 10033 were found to be promising.

### Pooled results of Advanced Varietal Trial (Midlate) – I Plant, II Plant and Ratoon

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	2
<b>Treatments</b>	11+2=13
<b>Plot Size:</b>	
<b>Gross</b>	6 m x 8R
<b>Net</b>	5 m x 6R
<b>Table. No.</b>	15

#### Results: Table. : 15

The pooled mean of I Plant, II Plant and Ratoon showed that among the standards Co 86032 recorded highest CCS yield (15.69 t/ha). The entries PI 10132 (19.87 t/ha), CoT 10369 (17.64 t/ha), Co 10033 (16.71 t/ha) and Co 10031 recorded higher CCS yield than the best standard Co 86032 (15.69 t/ha). The entries, PI 10132 (132.12 t/ha), Co 10033 (122.07 t/ha) and CoT 10369 (121.05 t/ha) recorded superior cane yield than the best standard Co 86032 (110.34 t/ha). Juice sucrose % at harvest was higher in the entries PI 10132 (21.12), Co 10031 (21.05), CoT 10369 (20.46) and Co 10017 (20.11) than the best standard Co 86032 (19.92). Considering the cane yield, CCS yield and juice quality the entries PI 10132, CoT 10369 and Co 10033 were found to be promising.



**9) Name of Trial: Evaluation and identification of climate resilient ISH and IGH genetic stocks (Ratoon Crop)**

<b>Details</b>	Padegaon
<b>Design</b>	Split plot design
<b>Replications</b>	2
<b>Treatments</b>	15 + 2 = 17
<b>Plot Size: Gross</b>	6 M x 2 R
<b>Date of ratooning</b>	6.3.2016
<b>Harvesting date</b>	6.2.2017
<b>Table. No.</b>	16

**Results: Table: - 16**

Fifteen ISH / IGH clones and two standards were evaluated (Table No.16) under drought condition by withdrawing irrigation between 60 and 150 days after planting. Crop yield is mainly dependent on the interplay of various physiological and biochemical functions of the plant in addition to the impact of the environment. In this study, the mean cane and CCS yield is significantly reduced due to drought. The mean reduction in cane yield due to drought was 28.82 % and it ranged from 13.17 % (AS 04 - 2097) to 46.22 % (SA 04-472). Among the standards CoM 0265 recorded highest cane yield under normal and drought condition (96.86, 71.97 t/ha). The entry SA 04- 409 (72.82 t/ha) recorded numerically higher cane yield than the best check CoM 0265 under drought condition. Considering the mean of control and drought treatment, the standard CoM 0265 recorded the highest cane yield (84.42 t/ha). Nine entries and two standards recorded below average (<28.82 %) reduction in cane yield.

The entry SA 04- 409 (10.34 t/ha) recorded numerically higher cane yield than the best check CoM 0265 (9.53 t/ha) under drought condition. Considering the mean of normal and drought treatment, the entry SA 04- 409 (12.17 t/ha) recorded highest CCS yield.

Considering the mean of control and drought treatment the highest CCS % (14.47 %) was recorded by the entry SA 04-409. Among the standards, CoM 88121 was superior for sucrose % (19.88 %). Among the test entries, the entry SA 04-409 (1.12 kg) recorded numerically higher average cane weight than the check CoM 88121 under drought condition. The mean reduction in single cane weight due to drought was 16.49 %. Among the test entries, the entry SA 04-245 (135190) recorded highest number of millable canes (NMC) under drought condition.

**10) Name of Trial: Evaluation and identification of climate resilient ISH and IGH genetic stocks (I Plant Crop)**

<b>Details</b>	Padegaon
<b>Design</b>	Alpha design
<b>Replications</b>	2
<b>Treatments</b>	27 + 3 = 30
<b>Plot Size: Gross</b>	6 M x 2 R
<b>Date of planting</b>	10.2.2016
<b>Harvesting date</b>	10.1.2017
<b>Table. No.</b>	17

**Results: Table: - 17**

**TECHNICAL PROGRAMME  
2017-18 &  
SEED MULTIPLICATION**

## **B) All India Coordinated Research Project on Sugarcane (2017-2018):**

### **1. Initial Varietal Trial**

Entries (37)	:	Co 14002, Co 14003, Co 14004, Co 14006, CoN 14071, CoN14072, CoSnk 14101, CoSnk 14102, CoT 14366, CoT 14367, MS 14081, MS 14082, Co 13021, Co 13022, Co 14008, Co 14009, Co 14012, Co 14016, Co 14022, Co 14023, Co 14025, Co 14026, Co 14027, Co 14030, Co 14031, Co 14032, CoN 14073, CoN 14074, CoSnk 14103, CoTI14111, CoTI 14112, CoVC14061, CoVC 14062, PI 14131, PI 14132, VSI 14121, VSI 14122
Standards (3)	:	Co 86032, CoC 671, CoSnk 05103
Design	:	Alpha design (Filed layout enclosed)
Replications	:	Two
Plot size	:	Gross: 6m x 6r x 1.2 m Net : 5m x 4r x 1.2 m
Seed rate	:	12 buds per metre
Planting date	:	2.2.2017
Crop duration	:	12 months

### **2. Advanced Varietal Trial – I Plant**

Entries (8)	:	Co 12007, Co 12008, Co 12009, Co 12012, Co 12019, Co 12024, CoM 12085 and VSI 12121
Standards (3)	:	Co 86032, CoC 671 and CoSnk 05103
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross: 6m x 8r x 1.2 m Net : 5m x 6r x 1.2 m
Seed rate	:	12 buds per metre
Planting date	:	24.1.2017
Crop duration	:	12 months

### **3. Advanced Varietal Trial (Early) – II Plant**

Entries (5)	:	Co 11001, Co 11004, CoM 11081, CoM 11082 and CoM 11084
Standards (3)	:	Co 85004, Co 94008 and CoC 671
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross: 6m x 8r x 1.2 m Net : 5m x 6r x 1.2 m
Seed rate	:	12 buds per metre
Planting date	:	30.1.2017
Crop duration	:	10 months

#### **4. Advanced Varietal Trial (Early) – Ratoon**

Entries (5)	:	Co 11001, Co 11004, CoM 11081, CoM 11082 and CoM 11084
Standards (3)	:	Co 85004, Co 94008 and CoC 671
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross: 6m x 8r x 1.2 m Net : 5m x 6r x 1.2 m
Ratooning date	:	8.2.2017
Crop duration	:	9 months

#### **5. Advanced Varietal Trial (Midlate) – II Plant**

Entries (6)	:	Co 11005, Co 11007, Co 11012, Co 11019, CoM 11085 and CoM 11086
Standards (2)	:	Co 86032 and Co 99004
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross : 6m x 8r x 1.2 m Net : 5m x 6r x 1.2 m
Seed rate	:	12 buds per metre
Planting date	:	21.12.2016
Crop duration	:	12 months

#### **6. Advanced Varietal Trial (Midlate) – Ratoon**

Entries (6)	:	Co 11005, Co 11007, Co 11012, Co 11019, CoM 11085 and CoM 11086
Standards (2)	:	Co 86032 and Co 99004
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross : 6m x 8r x 1.2 m Net : 5m x 6r x 1.2 m
Ratooning date	:	8.2.2017
Crop duration	:	11 months

### **SEED MULTIPLICATION**

**I. (i) Multiplication of IVT (2016-17) entries at the centres:** The seed of the following entries are multiplied at the centres during 2017-18 for inclusion in AVT-I Plant in 2018-19.

Early (8)	:	Co 13002, Co 13003, Co 13004, CoN 13071, CoN 13072, CoSnk 13101, CoSnk 13102 and MS 13081
Midlate (20)	:	Co 13005, Co 13006, Co 13008, Co 13009, Co 13011, Co 13013, Co 13014, Co 13016, Co 13018, Co 13020, CoM 13082, CoN 13073, CoN 13074, CoSnk 13103, CoSnk13104 ,CoSnk 13105 , CoSnk 13106,CoT 13366, PI 13131 and PI 13132

## **II. Multiplication of pre-zonal entries for seed lifting.**

The following entries accepted in the in the Group Meeting of AICRP(S) held at the Rajendra Agricultural University, Pusa (Bihar) in 2015 are under multiplication at Central Sugarcane Research Station, Padegaon in 2017-18:

**Early (8)** : Co 14005, Co 15002, Co 15005, Co 15006, Co 15007, CoSnk 15101, CoSnk 15102 and CoVSI 15121

**Midlate (18)** : Co 15009, Co 15010, Co 15015, Co 15017, Co 15018, Co 15020, Co 15021, CoN 15071, CoN 15072, CoSnk 15103, CoSnk 15104, CoVC 15061, CoVC15062, CoVC 15063, CoVC 15064, PI 15131, PI 15132 and VSI 15122.

## **III. Seed multiplication of new entries**

The following entries were accepted in the workshop AICRP(S) held at the VSI, Pune in 2016 are under multiplication at CSRS, Padegaon in 2017-18.

**Entries (16):** Co 16006, Co 11015, Co 16009, Co 16010, Co 16017, Co 16018, CoVC 16061, CoVC 16062, CoN 16071, CoM 16081, CoM 16082, CoVSI 16121, PI 16131, CoT 16366, CoR 16141, CoR 16142

**ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE**

**Characters on which data to be recorded in Initial Varietal Trial (IVT)  
and Advance Varietal Trial (AVT)**

**Crop : Sugarcane (Early – Plant)**

1. Germination % at 30 days for tropics and 45 days for sub-tropics
2. No. of tillers (thousand/ha) at 120 days
3. No. of shoots (thousand/ha) at 240 days
4. Cane yield (t/ha) after 10 months at harvest
5. Number of millable canes (thousand/ha) after 10 months at harvest
6. Stalk length (cm) after 10 months at harvest
7. Stalk diameter (cm) after 10 months at harvest
8. Single cane weight (kg) after 10 months at harvest
9. Brix % at 8 and 10 months
10. Sucrose % in juice at 8 and 10 months
11. Purity % at 8 and 10 months
12. CCS % at 8 and 10 months
13. CCS t/ha after 10 months at harvest
14. Extraction % after 10 months at harvest
15. Fibre % after 10 months at harvest
16. Pol % cane after 10 months at harvest
17. Jaggery quality after 10 months at harvest (if facility available)
18. Jaggery yield (t/ha) after 10 months at harvest (if facility available)

**Morphological characters**

1. Lodging : Erect, lodging, snapping, heavy lodging
2. Leaf sheath spines : Absent (A), present (P), medium (M), heavy (H)
3. Flowering : Absent (A), present (P)
4. Canopy structure and colour : Green, light green, yellowish green, dark green
5. Bud size : Big (B), small (S), medium (M)
6. Pithiness : Absent (A), present (P), less (L), heavy (H)
7. Internode splits : Absent (A), present (P), low (L), moderate (M), heavy (H)
8. Natural incidence of diseases and pests

**ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE**

**Characters on which data to be recorded in ratoon crop**

**Crop : Sugarcane (Early – Ratoon)**

- Note :**
1. No gap filling should be done.
  2. Ratooning operation should be completed within 15 days after harvesting plant crop.
- 
1. Number of tillers (thousand/ha) before giving full earthing up (90 days)
  2. Number of cane formed tillers (thousand/ha) after 180 days
  3. Number of millable canes (thousand/ha) after 270 days at harvest
  4. Cane yield (t/ha) after 270 days at harvest
  5. Stalk length (cm) after 270 days at harvest
  6. Stalk diameter (cm) after 270 days at harvest
  7. Single cane weight (kg) after 270 days at harvest
  8. Brix % after 270 days at harvest
  9. Sucrose % in juice after 270 days at harvest
  10. Purity % after 270 days at harvest
  11. CCS % after 270 days at harvest
  12. CCS t/ha after 270 days at harvest
  13. Extraction % after 270 days at harvest
  14. Fibre % after 270 days at harvest
  15. Pol % cane after 270 days at harvest
  16. Jaggery quality after 270 days at harvest (if facility available)
  17. Jaggery yield (t/ha) after 270 days at harvest (if facility available)



**ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE**

**Characters on which data to be recorded in Initial Varietal Trial (IVT)**

**and Advance Varietal Trial (AVT)**

**Crop : Sugarcane (Midlate – Plant)**

1. Germination % at 30 days for tropics and 45 days for sub-tropics
2. No. of tillers (thousand/ha) at 120 days
3. No. of shoots (thousand/ha) at 240 days
4. Cane yield (t/ha) after 12 months at harvest
5. Number of millable canes (thousand/ha) after 12 months at harvest
6. Stalk length (cm) after 12 months at harvest
7. Stalk diameter (cm) after 12 months at harvest
8. Single cane weight (kg) after 12 months at harvest
9. Brix % at 10 and 12 months
10. Sucrose % in juice at 10 and 12 months
11. Purity % at 10 and 12 months
12. CCS % at 10 and 12 months
13. CCS t/ha after 12 months at harvest
14. Extraction % after 12 months at harvest
15. Fibre % after 12 months at harvest
16. Pol % cane after 12 months at harvest
17. Jaggery quality after 12 months at harvest (if facility available)
18. Jaggery yield (t/ha) after 12 months at harvest (if facility available)

**Morphological characters**

1. Lodging : Erect, lodging, snapping, heavy lodging
2. Leaf sheath spines : Absent (A), present (P), medium (M), heavy (H)
3. Flowering : Absent (A), present (P)
4. Canopy structure and colour : Green, light green, yellowish green, dark green
5. Bud size : Big (B), small (S), medium (M)
6. Pithiness : Absent (A), present (P), less (L), heavy (H)
7. Internode splits : Absent (A), present (P), low (L), moderate (M), heavy (H)
8. Natural incidence of diseases and pests

**ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE**

**Characters on which data to be recorded in ratoon crop**

**Crop : Sugarcane (Midlate – Ratoon)**

- Note :**
1. No gap filling should be done.
  2. Ratooning operation should be completed within 15 days after harvesting plant crop.
- 
1. Number of tillers (thousand/ha) before giving full earthing up (90 days)
  2. Number of cane formed tillers (thousand/ha) after 180 days
  3. Number of millable canes (thousand/ha) after 330 days at harvest
  4. Cane yield (t/ha) after 330 days at harvest
  5. Stalk length (cm) after 330 days at harvest
  6. Stalk diameter (cm) after 330 days at harvest
  7. Single cane weight (kg) after 330 days at harvest
  8. Brix % after 330 days at harvest
  9. Sucrose % in juice after 330 days at harvest
  10. Purity % after 330 days at harvest
  11. CCS % after 330 days at harvest
  12. CCS (t/ha) after 330 days at harvest
  13. Extraction % after 330 days at harvest
  14. Fibre % after 330 days at harvest
  15. Pol % cane after 330 days at harvest
  16. Jaggery quality after 330 days at harvest (if facility available)
  17. Jaggery yield (t/ha) after 330 days at harvest (if facility available)

**ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE**  
**Characters on which data to be recorded in Evaluation for drought tolerance**

**(I Plant Crop)**

**Crop : Sugarcane (I Plant)**

- i) Germination at 30 days for tropical region and 45 days for subtropical region.
- ii) Tillers count at 90 and 120 days
- iii) Shoot count at 150, 180, 240 and 360 days
- iv) Single cane weight, Cane length, Cane diameter, Number of internodes, Juice Brix %, Juice sucrose %, Extraction %, cane fibre % at 300 days
- v) Single cane weight, Cane length, Cane diameter, Number of internodes, Juice Brix %, Juice sucrose %, Extraction %, cane fibre % at 360 days
- vi) Cane yield at 360 days
- vii) Tiller mortality (Max number of shoots-NMC at harvest) X 100/ Max number of shoots
- viii) Leaf area before imposition of drought and after withdrawing the drought
- ix) Estimation of Relative Water Content (Three times – Before, during and after water stress)
- x) Leaf water potential (If facility available)
- xi) Leaf rolling at sunrise during water stress

**Soil analysis:**

- i) Field Capacity and Permanent Wilting Point of the field (before commencing the experiment)
- ii) Soil moisture content by gravimetric method once in a month at 0-15 and 15-30 cm soil depths. Three samples each in control and treatment plots should be taken.

**Weather data:**

Rainfall, Maximum and minimum temperature, RH, Wind velocity and Open Pan Evaporation

**Imposition of drought:**

Withdraw irrigation between 60 – 150 days after planting in drought treatment plot

**ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE**

**Characters on which data to be recorded in Evaluation for drought tolerance (Ratoon Crop)**

**Crop : Sugarcane (Ratoon Crop)**

- i) Tillers count at 90 and 120 days
- ii) Shoot count at 150, 180, 240 and 330 days
- iii) Single cane weight, Cane length, Cane diameter, Number of internodes, Juice Brix %, Juice sucrose %, Extraction %, cane fibre % at 330 days
- iv) Cane yield at harvest
- v) Tiller mortality  
(Max number of shoots-NMC at harvest) X 100/ Max number of shoots
- vi) Leaf area before imposition of drought and after withdrawing the drought
- vii) Estimation of Relative Water Content (Three times – Before, during and after water stress)
- viii) Leaf water potential (If facility available)
- ix) Leaf rolling at sunrise during water stress

**Soil analysis:**

- i) Field Capacity and Permanent Wilting Point of the field (before commencing the experiment)
- ii) Soil moisture content by gravimetric method once in a month at 0-15 and 15-30 cm soil depths. Three samples each in control and treatment plots should be taken.

**Weather data:**

Rainfall, Maximum and Minimum Temperature, RH, Wind velocity and Open Pan Evaporation

**Imposition of drought:**

Withdraw irrigation between 60 – 150 days after ratooning in drought treatment plot.