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

**ANNUAL REPORT  
(2015-16)**

**COMPILED  
BY**

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

# Central Sugarcane Research Station

## Padegaon- 415 521

### Tal- Phaltan, Dist- Satara

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# INTRODUCTION

Sugarcane plays an important role in the socioeconomic development of India and specially Maharashtra. Maharashtra sugar industry has been growing for the last 80 years without any impediments. The area and sugarcane production has been continuously increasing for the last 8 decades. India ranks second in area and sugarcane production, with about 50.6 Lakh ha area and 3361.5 lakh tonnes sugarcane production, next to Brazil, however the average productivity hovers around 60 to 70 t/ha pushing India ranks to 10<sup>th</sup> in the world. About 45 million farm families and a large number of dependant labourers directly and indirectly engaged in sugarcane cultivation and in sugar industry.

Sugarcane is a major commercial cash crop of Maharashtra. During 2015-16, the area under sugarcane is about 8.35 lakh ha which is next to Uttar Pradesh and sugarcane production was 741 lakh tonnes. In spite of favourable climatic conditions, for last 4-5 decades the average sugarcane productivity of Maharashtra moving around 75 to 85 t/ha. Maharashtra ranking first place in sugarcane recovery. At present in Maharashtra about 177 co-operative and private sugar factories generating employment, electricity, ethanol production, bio-compost and number of other chemicals. Hence, sugarcane and sugar industry is the backbone for economic development in Maharashtra.

Area under sugarcane crop in Maharashtra is reduced due to drought situation during 2015-16. The productivity is increased from 82 t/ha (2013-14) to 88 t/ha (2015-16). The number and crushing capacity of sugar factories was increasing year by year. In such situation, we have the only option to increase the sugarcane productivity by means of generating the improved technologies and varietal development considering the global warming and the climate change.

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 for increasing sugarcane productivity of farmers.

**Table 1. The area, production, productivity, sugar production and sugarcane recovery in Maharashtra from 2000-01 to 2015-16.**

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* (Tentative)	835	741.68	88.74	83.79	11.30

**\* Upto 6.5.2016**

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 2015-16, **81.90 ha** area was under seed production of different varieties and **61.26 Lakhs of two-eye budded setts as well as 3.33 Lakhs of single eye bud polytray plantlets** were distributed to the Sugar Factories, State Department of Agriculture, farmers and other research organizations.

# **CENTRAL SUGARCANE RESEARCH STATION, PADEGAON.**

## **SEASON & CLIMATE**

**(2014-16)**

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, 2014 to April, 2016 (21 months) was 1175.10 mm in 65 rainy days as against the normal rainfall of 929.5 mm (21 months) indicating that the rainfall received during the season was 9.87 % more than the normal. The data on climatic parameters during the crop season (June, 2014 to April, 2016 ) along with averages based on last 83 years (1932-33 to 2015-16) 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., 2014)**

The rainfall received during germination phase was 416.3 mm in 24 rainy days as against the normal of 287.4 mm. The average maximum temperature during this period was 29.9°C and minimum temperature was 21.9°C. The maximum and minimum temperature was slightly lower than average temperature. The average relative humidity (morning) during this phase was 90.7 % which was 1.45 % more than the normal.

Evenly distributed rainfall, optimum temperature and high humidity resulted in good germination of Adsali crop of sugarcane.

### **2) Tillering phase (Oct-Dec., 2014) for *Adsali* and Germination phase for Preseason crop:**

Total rainfall received during tillering phase was 184.1 mm which was 27.05 % greater than the normal of last 83 years. The average maximum and minimum temperatures during this phase were 29.9 °C and 16.1°C, respectively. The morning relative humidity was 93.7 % as against the normal 89.9 %. High humidity was not favorable for the tillering of *Adsali* sugarcane hence the productivity of *Adsali* sugarcane crushed during 2015-16 was slightly decreased. However, high humidity was also favorable for good germination of preseason sugarcane.

### **3) Early growth (*Adsali*)/Tillering (Preseason) and Germination phase (*Suru*) (Jan-Mar.2015)**

During this phase the average maximum temperature was 31.5°C and average minimum temperature was 13.5°C, which was more than the normal i.e 13.1 °C. These temperatures were favourable for *Adsali* crop growth. Due to higher humidity (90.7 %) than

the average (84.4 %), tillering of preseasonal sugarcane and germination/tillering of *Suru* sugarcane was also satisfactory.

#### **4) Desiccation phase (April to May, 2015)**

The mean maximum temperature was lower (37.9°C) than the normal (38.9°C) while the mean minimum temperature (22.2°C) was more than the normal (21.7°C). The rainfall of 23.7 mm was received during this phase. All these meteorological parameters were favorable for crop growth and sugar recovery.

#### **5) Grand growth (*Adsali*)/Early growth phase (Preseason and *Suru*) (June to Sept., 2015)**

During this phase, the average maximum and minimum temperatures were 31.2°C and 22.4°C, respectively and slightly higher than normal i.e. optimum for crop growth. The total rainfall received during this phase was 288.7 mm in 19 rainy days as against the normal rainfall of 359.0 mm. The grand growth of *Adsali*, preseasonal and *Suru* sugarcane was slightly affected due to 19.5 % less rainfall than the normal during this growth phase.

#### **6) Flowering and Maturity (*Adsali* and Preseason) Grand growth phase (*Suru*) (Oct to Dec 2015)**

During this phase, the mean maximum and minimum temperatures were 31.6°C and 22.3 °C, respectively. Total rainfall received during this phase was 176.7 mm in 5 rainy days as against 161.1 mm average of last 82 years. The high humidity and optimum temperatures favored early and profuse flowering for all season planted crop. The 9.6 % less rainfall was received than the normal.

During Jan 2016 to April 2016, the mean maximum and minimum temperatures were 35.9 °C and 11.1 °C, respectively. The optimum maximum and minimum temperatures and dry season favored maturity and sugar recovery of sugarcane crop. The overall crop growth during this year was satisfactory.

**Table 2. Average weather parameters at CSRS, Padegaon during June 2014 to April 2016.**

Sr. No.	Temperature (°C)		Humidity (%)		Sunshine (Hrs.)	Rainfall (mm)	Rainy days
	Max.	Min.	Mor.	Eve.			
June 14	34.6	23.7	84	60	7.6	32.6	2
<b>1. Germination phase for <i>Adsali</i> crop (Jul. to Sept., 2014)</b>							
July 14	29.8	22.3	85	60	2.9	79.8	6
Aug 14	29.6	21.7	95	75	3.9	310.6	14
Sept 14	30.3	21.7	92	68	5.6	025.9	4
<b>Average</b>	<b>29.9</b>	<b>21.9</b>	<b>90.7</b>	<b>67.7</b>	<b>4.1</b>	<b>138.8</b>	<b>8.0</b>
<b>Last 82 yrs avg</b>	<b>29.7</b>	<b>21.8</b>	<b>89.4</b>	<b>65.9</b>	<b>4.5</b>	<b>287.4</b>	
<b>2. Tillering phase (Oct-Dec., 2014) for <i>Adsali</i>/Germination phase for Preseason crop</b>							
Oct 14	31.2	20.0	93	60	6.9	65.8	5
Nov 14	30.3	16.7	93	49	7.6	86.7	3
Dec 14	28.1	11.7	95	48	7.5	31.6	1
<b>Average</b>	<b>29.9</b>	<b>16.1</b>	<b>93.7</b>	<b>52.3</b>	<b>7.3</b>	<b>61.4</b>	<b>3.0</b>
<b>Last 82 yrs avg</b>	<b>30.7</b>	<b>15.8</b>	<b>89.9</b>	<b>46.4</b>	<b>8.5</b>	<b>144.9</b>	
<b>3. Early growth (<i>Adsali</i>)/Tillering (Preseason) and Germination phase (<i>Suru</i>) (Jan-Mar.2015)</b>							
Jan 15	28.2	11.0	94	47	7.2	-	-
Feb 15	32.6	12.7	90	47	8.7	-	-
Mar 15	33.8	16.9	88	53	7.9	45.6	2
<b>Average</b>	<b>31.5</b>	<b>13.5</b>	<b>90.7</b>	<b>49.0</b>	<b>7.9</b>	<b>45.6</b>	<b>2.0</b>
<b>Last 82 yrs avg</b>	<b>32.0</b>	<b>13.1</b>	<b>84.4</b>	<b>47.5</b>	<b>9.7</b>	<b>56.9</b>	
<b>4. Desiccation phase (April to May, 2015)</b>							
April 15	37.4	20.7	79	39	8.8	2.2	-
May 15	38.4	23.7	87	47	8.7	21.5	2
<b>Average</b>	<b>37.9</b>	<b>22.2</b>	<b>83</b>	<b>43</b>	<b>8.8</b>	<b>11.85</b>	<b>2</b>
<b>Last 82 yrs avg</b>	<b>38.9</b>	<b>21.7</b>	<b>76.1</b>	<b>49.4</b>	<b>10.1</b>	<b>60.3</b>	
<b>5. Grand growth (<i>Adsali</i>)/Early growth phase (Preseason and <i>Suru</i>) (June to Sept., 2015)</b>							
June 15	32.6	22.8	89	63	5.8	145.6	10
July 15	31.3	23.0	63	67	5.6	7.0	1.0
Aug 15	31.1	22.1	92	78	5.2	0.0	0.0
Sept 15	31.4	21.3	91	76	5.9	136.1	8.0
<b>Average</b>	<b>31.2</b>	<b>22.4</b>	<b>89.0</b>	<b>65.8</b>	<b>5.0</b>	<b>112.2</b>	<b>6.5</b>
<b>Last 82 yrs avg</b>	<b>31.1</b>	<b>22.1</b>	<b>85.4</b>	<b>66.2</b>	<b>5.4</b>	<b>359.0</b>	
<b>6. Flowering and Maturity (<i>Adsali</i> and Preseason)/Grand growth phase (<i>Suru</i>) (Oct-Aug, 2015)</b>							
Oct 15	32.8	21.4	94	71	7.4	130.9	4.0
Nov 15	31.3	18.0	95	77	7.4	45.8	1.0
Dec 15	31.8	14.8	96	75	8.5	0.0	0.0
<b>Average</b>	<b>31.6</b>	<b>22.3</b>	<b>83.8</b>	<b>71.0</b>	<b>5.6</b>	<b>72.2</b>	<b>4.8</b>
<b>Last 82 yrs avg</b>	<b>31.8</b>	<b>16.8</b>	<b>90.6</b>	<b>57.2</b>	<b>8.7</b>	<b>161.0</b>	
Jan 16	30.4	11.3	91	54	8.4	0.0	0.0
Feb 16	34.8	15.9	84	36	7.8	3.2	1.0
Mar 16	37.5	18.8	92	45	7.9	4.2	1.0
April 16	40.9	22.3	90	44	8.5	0.0	0.0
<b>Average</b>	<b>35.9</b>	<b>17.1</b>	<b>89.3</b>	<b>44.8</b>	<b>8.2</b>	<b>1.9</b>	<b>0.5</b>
<b>Last 82 yrs avg</b>	<b>34.2</b>	<b>14.8</b>	<b>83.7</b>	<b>36.5</b>	<b>9.1</b>	<b>7.5</b>	

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

**Table 3. Incidence of insect pests on sugarcane during 2015-16**

<b>Sr. No.</b>	<b>Name of pest</b>	<b>Extent of incidence (%)</b>
1	Early shoot borer	9-38 %
2	Internodes borer	15-24 %
3	Top shoot borer	In trace to low
4	Mealy bugs	20-30 %
5	Woolly aphids	In traces to 10 %
6	Scale insect	In trace to low
7	White fly	In traces
8.	Sugarcane Pyrilla	In traces

**Table 4. Incidence of diseases on sugarcane during 2015-16**

<b>Sr.No.</b>	<b>Name of disease</b>	<b>Extent of incidence (%)</b>
1	Rust	10-40%
2	G.S.D	5-10%
3	Smut	10%
4	Brown spot	20-40%
5	Pokka Boeing	15-25%
6	Ring Spot	2-5 %
7	Yellow Leaf Disease	8-10 %



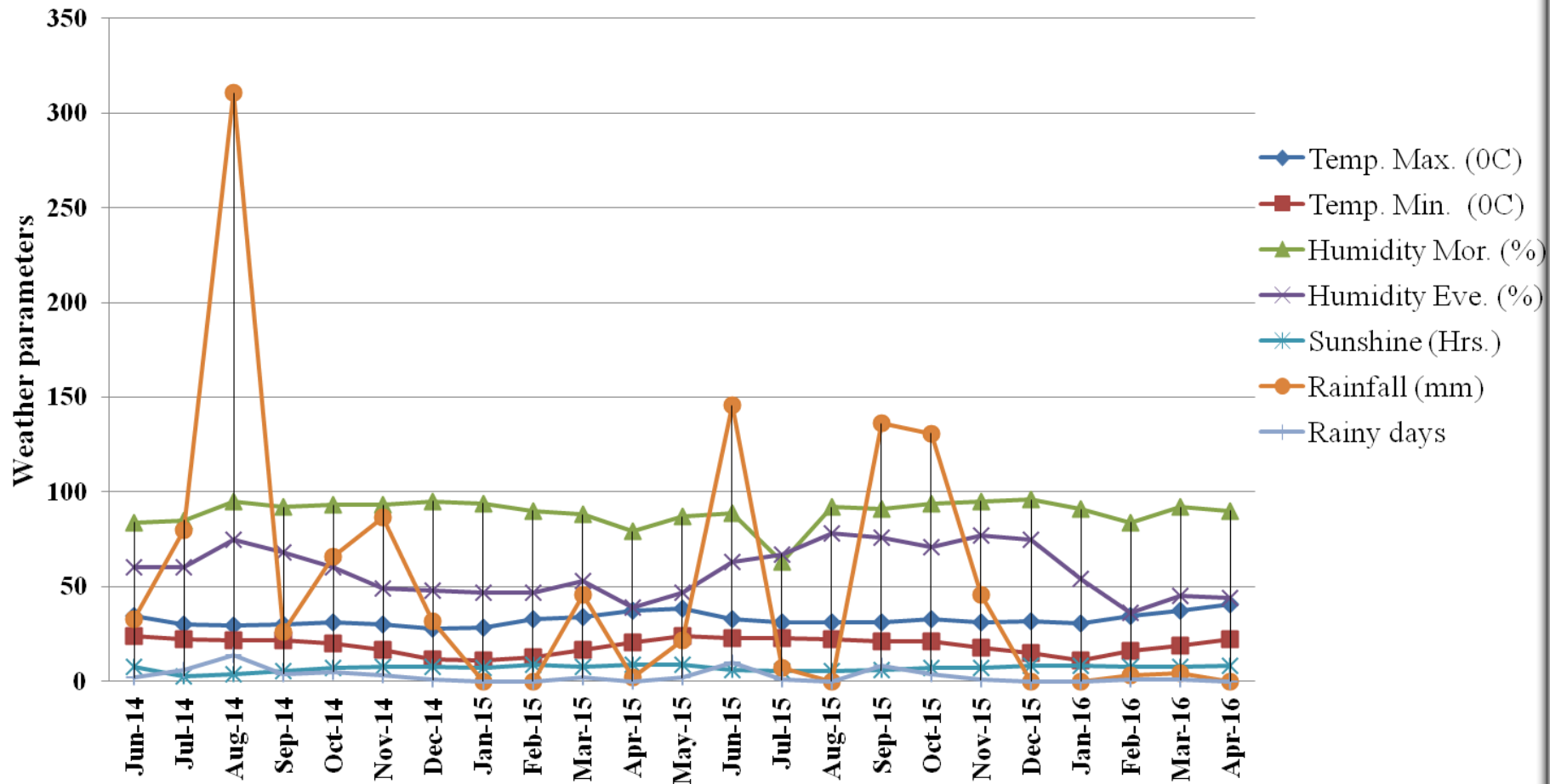


Fig. 1. Weather parameters at CSRS, Padegaon during June 2014 to April 2016.

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

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

**Staff Position: 2015-16**

**A) AICRP(S) Scheme**

<b>Sr. No.</b>	<b>Name</b>	<b>Designation</b>
<b>Sugarcane Breeder</b>		
1	Dr.S.M.Pawar	Additional charge of Sugarcane Breeder(AICRP)
<b>Sugarcane Agronomist</b>		
2.	Dr. P.M. Chaudhari	Junior Agronomist
<b>Assistant Entomologist</b>		
3	Dr. M.P. Badgujar	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	Shri. D. S. Thorave	Junior Research Assistant and additional charge of Senior Research Assistant
2	Shri B.G.Rathod	Junior Research Assistant
3	Shri. A.B.Bhosale	Agril. Assistant
4	Shri. M M. Bhuse	Agril. Assistant

**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	2011-12	4.60	--	25.52	30.12	3.35	25.31	59.23	62.83
2	2012-13	8.00	--	118.69	126.79	7.17	--	52.46	59.63
3	2013-14	8.00	--	72.72	80.72	7.00	--	61.25	68.25
4	2014-15	8.00	--	56.56	64.56	6.23	--	57.18	63.41
5	2015-16	8.00	--	35.85	43.85	5.27	--	61.58	66.85

# Central Sugarcane Research Station, Padegaon

## Decision and Action Taken Report 2015-16

Group Meeting of AICRP on Sugarcane held at Rajendra Agricultural University, Pusa, Bihar. Minutes of Technical session on varietal improvement held on 15<sup>th</sup> – 16<sup>th</sup> December 2015

Sr.No.	Decision	Action taken
1	Data on all the zonal standards must be presented when new proposals are proposed for entering into ZVT.	Care was taken while proposing new proposals.
2	The centres must depute concerned scientists for participating in workshop/ Group meeting of AICRP(S) for better discussion.	Scientists from this center are attending crossing programme, Group meeting regularly.
3	New clones proposed without the proper statistical analysis of data will not be considered for inclusion in ZVT. The centres should CD, CV for the major characters.	Care was taken in proposing the new clones for inclusion in ZVT for IVT trial during 2015-16.
4	Any variety which is released in the state or given State denomination should not be proposed for inclusion in ZVT.	Care was taken in proposing the new clones for inclusion in ZVT during 2015-16.
5	Based on cane yield, juice quality and resistance to red rot five early clones viz., Co 11001, Co 11004, CoM 11081, CoM 11082, CoM 11084 were selected for evaluation in AVT I Plant (Early) during the year 2016-17 in Peninsular zone.	As per the technical programme the trial AVT I Plant (Early) was planted on 07.01.2016.
6	Six Midlate clones Viz., Co 11005, Co 11007, Co 11012, Co 11019, CoM 11085, CoM 11086 were selected based on cane yield, juice quality and resistance to red rot for evaluation in AVT I Plant (Midlate) during the year 2016-17 in Peninsular zone.	As per the technical programme the trial AVT I Plant (Midlate) was planted on 06.01.2016.
7	Promising clones in AVT should be maintained for at least three years after completion of AVT by all the centres so that when new variety is released the same can be included as latest check.	The clones from completed AVT trial are maintained in germplasm.

8	Under the project “Evaluation and Identification of climate resilient ISH and IGH genetic stocks”, the data generated by the centres will be supplied to the Project Coordinator (Sugarcane) as per the format supplied for statistical analysis. The PC Unit may supply the analysed results to the participating centres within one month of submission.	The data of the drought trial (Climate resilient ISH and IGH genetic stick is supplied to PC unit.
9	Scientists must participate in the hybridization programme at NHG at least for three weeks for making sufficient crosses.	The scientist from this center are attending crossing programme regularly by every year.
10	Only breeders will participate in the Zonal Breeders Meet. The breeders should come with the data on yield and quality parameters as well as red rot rating.	Sugarcane breeder from this center attended Breeders meet.
11	While preparing variety Identification Proposal or variety Release Proposal, the co-entries ranking. 1 <sup>st</sup> , 2 <sup>nd</sup> and 3 <sup>rd</sup> may be considered as qualifying varieties.	Care will be taken while submitting the release proposal.

## **RESEARCH HIGHLIGHTS (2015-16)**

### **A) SUGARCANE BREEDING:**

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

The cane yield and CCS yield differences, CCS% and Sucrose % differences due to different cultures were found to be statistically significant. However, the culture CoM 12081 was recorded significantly the highest cane yield (135.05 t/ha) and CCS yield (19.86 t/ha) over all the cultures and checks except CoM 12082 (126.08 t/ha and 17.62 t/ha) respectively which was at par with it.

As far as quality is concerned the check CoC 671 was recorded significantly the highest CCS % (16.08 %) over all the cultures. The same check CoC 671 recorded significantly the highest Sucrose % (22.62 %) over all the cultures and check except culture Co 12006 (21.92 %), Co 12007 (21.38 %), Co 12008 (22.01%) and check Co 85004 (21.71 %) which were at par with it.

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

The differences due to various genotypes in respect of cane yield and CCS yield, CCS % and sucrose % were found to be statistically significant. The culture Co 10026 was recorded significantly higher cane yield (119.44 t/ha) over all the cultures and checks. The same culture Co 10026 was recorded significantly higher CSS yield (17.09 t/ha) over all the cultures and checks except the culture Co 10027 (15.52 t/ha) which was at par with it.

As far as quality is concerned the culture CoT 10367 was recorded significantly higher CCS % (15.91 %) over all the cultures and checks except the culture Co 10027 (14.98 %) which was at par with it. and also the same culture CoT 10367 was recorded significantly higher sucrose % (22.37 %) over all the cultures and checks except the culture Co 10027 (21.18 %) and check Co 85004 (20.88 %) which were at par with it.

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

The differences due to various genotypes in respect of cane yield and CCS yield, CCS % and sucrose % were found to be statistically significant. The culture Co 09004 was recorded significantly higher cane yield (129.75 t/ha) and CCS yield (20.82 t/ha) over all the cultures and checks.

As far as quality is concerned the check CoC 671 was recorded significantly higher CCS % (16.09 %) and sucrose % (22.63 %) over all the cultures and checks except the culture Co 09004 (16.05 % and 22.63 %) respectively which was at par with it.

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

The differences due to various genotypes in respect of cane yield and CCS yield, CCS % and sucrose % were found to be statistically significant. The culture Co 09004 was reported significantly superior cane yield (82.20 t/ha) over all the cultures and checks except the culture Co 09007 (79.30 t/ha) which was at par with it. The same culture Co 09004 was recorded significantly higher CSS yield (12.89 t/ha) over all the cultures and checks.

As far as quality is concerned the check CoC 671 was recorded significantly higher CCS % (15.73 %) and sucrose (22.05 %) over all the cultures and checks except the culture Co 09004 (15.67 % and 21.93 %) respectively which was at par with it.

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

The yield differences due to various genotypes in respect of cane yield, CCS yield, CCS % and sucrose % were found to be statistically significant. The genotype CoM 12085 was recorded significantly the highest cane yield (138.81 t/ha) than all other genotypes and checks except genotypes Co 12012 (133.98 t/ha), Co 12009 (119.89 t/ha), CoN 12073 (117.36 t/ha) and check Co 86032 (118.93 t/ha) which were at par with it. The same genotype CoM 12085 (20.76 t/ha) out yielded in case of CCS yield over all other cultures and checks except the culture Co 12012 (17.83 t/ha) and check Co 86032 (17.68 t/ha) which were at par with it.

As far as quality is concerned the highest CCS % (15.20%) was significantly recorded by the check Co 99004 over all other genotypes except genotypes CoM 12085 (14.95 %), VSI 12121 (14.55 %), Co 12019 (13.88 %), Co 12016 (13.71 %), Co 12024 (13.69 %) and check Co 86032 (14.86 %) which were at par with it. The same culture Co 99004 was reported significantly superior sucrose % (21.48 %) over all other genotypes except CoM 12085 (21.06 %), VSI 12121 (20.71 %), Co 12009 (20.33 %), Co 12019 (19.89 %) and check Co 86032 (20.91 %) which were at par with it.

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

The yield differences due to various genotypes in respect of cane yield, CCS yield, CCS % and sucrose % were found to be statistically significant. The genotype CoT 10369 was recorded significantly the highest cane yield (135.93 t/ha) than all other genotypes and checks except genotypes PI 10132(131.25 t/ha), Co 10033 (130.36 t/ha), Co 10017 (129.35 t/ha), CoVc 10061(125.24 t/ha) and check Co 86032 (129.02 t/ha) which were at par with it. The genotype PI 10132 (20.35 t/ha) out yielded in case of CCS yield over all other genotypes and checks except cultures CoT 10369 (19.77 t/ha), Co 10017 (18.51 t/ha), CoVc (17.80 t/ha), Co 10033 (17.63 t/ha) and check Co 86032 (18.63 t/ha) which were at par with it.

As far as quality is concerned the highest CCS % (15.51 %) was significantly recorded by the genotype PI 10132 over all genotypes and check except genotypes CoT 10369 (14.54 %), Co 10015 (14.47 %) and check Co 86032 (14.43 %) which were at par with it. The same genotype PI 10132 was reported significantly superior sucrose % (21.90 %) over all genotypes and checks except genotype CoT 10369 (20.65 %) which was at par with it.

#### **7) Advanced Varietal Trial – (Early) Pooled Results:**

The yield differences in pooled result of I Plant, II Plant and Ratoon due to various genotypes in respect of cane yield, CCS yield, CCS % and sucrose % were found to be statistically significant. The significantly highest cane yield (114.16 t/ha) and CCS yield (17.90 t/ha) was recorded by the genotype Co 09004 over all genotypes and standards.

As far as quality is concerned, the genotype Co 09004 recorded highest CCS % (15.63 %) and sucrose % (21.91 %) than all other genotypes and standards.

## **8) Name of Trial: Evaluation for drought tolerance (I Plant Crop)**

The yield differences due to various genotypes in respect of CCS yield, CCS % and sucrose % were found to be statistically significant. Considering the mean of control and drought treatment, the check CoM 0265 recorded significantly the highest cane yield (97.07 t/ha) over the genotypes AS 04-245 (67.90 t/ha), AS 04-1687 (71.91 t/ha), GU 07- 3849 (77.68 t/ha), GU 07- 3774 (48.77 t/ha), and CYM 07- 986 (59.15 t/ha) and remaining genotypes and check were at par with it. Considering the mean of control and drought treatment, the same check CoM 0265 reported significantly higher CCS yield (12.67 t/ha) than all genotypes except the genotypes SA 04-472 (12.33 t/ha), SA 04-496 (11.33 t/ha) and the check CoM 88121 (12.46 t/ha) which were at par with it.

Considering the mean of control and drought treatment, As far as quality is concerned the highest CCS % (14.08 %) was significantly recorded by the genotype SA 04-472 over all genotypes and check except check CoM 88121 (13.79 %) which was at par with it. The check CoM 88121 was reported significantly superior sucrose % (19.66 %) over all genotypes and checks except genotype SA 04-472 (19.44 %) which was at par with it.

### **B) SUGARCANE AGRONOMY:**

#### **A) On going experiment**

##### **Title 1: AS-42 Agronomic evaluation of promising sugarcane genotypes (Spring Early)**

The genotype Co 09007 was found significantly superior for cane yields and genotype Co 09004 for CCS yield than the other genotypes. The application of 125 % recommended dose of nitrogen produced significantly higher cane yield. While CCS yield was not affected by different nitrogen levels. Genotype Co 09004 recorded significantly the highest brix, sucrose %, CCS % and purity % as compared to the other genotypes. The quality parameter did not affect due to different N levels. In interaction effect genotype Co 09007 with 100% N recorded significantly the highest cane yield (175.73 t ha<sup>-1</sup>) while CCS yield (26.26 t ha<sup>-1</sup>) was significant in interaction of Co 09004 with 75% N.

##### **Title 2: AS-42 Agronomic evaluation of promising sugarcane genotypes (Spring Midlate)**

The genotype Co 10033 was found significantly superior for cane yield and genotype Co 09009 for CCS yield than the other genotypes. The application of 100 % recommended dose of nitrogen produced significantly higher Cane and CCS yields. Significantly the highest Cane yield was found in interaction of genotype Co 10033 with application of 100% RDN and CCS yield was significantly highest in genotype Co 09009 and application of 100% RDN. Significantly the highest brix(c) (28.98), sucrose% (20.19%), CCS% (14.34%) and purity% (95.40%) was recorded by genotype Co 09009 and 100% RDN.

##### **Title 3:AS-69:Use of plant growth regulators (PGRs) for enhanced yield and quality of sugarcane**

The germination (22.94%, 37.31%, and 45.72%,) was found significantly higher with planting of setts after overnight soaking in 50 ppm ethrel solution (T<sub>3</sub>) while it was found at par with treatment T<sub>7</sub>, T<sub>4</sub>, T<sub>8</sub> and T<sub>6</sub> at 30, 40, and 50 DAP. The planting of setts after overnight soaking in 50 ppm ethrel solution with GA<sub>3</sub> spray (35 ppm) at 90, 120 and 150 DAP (T<sub>7</sub>) recorded significantly the highest cane



and CCS yield (132.33 and 20.13 t ha<sup>-1</sup>). However, it was at par with planting of setts after overnight soaking in 100 ppm ethrel solution and GA<sub>3</sub> spray (35 ppm) at 90, 120 and 180 DAP (T<sub>8</sub>) (129.07 and 18.90 t ha<sup>-1</sup>), Planting of setts after overnight soaking in water with GA<sub>3</sub> spray (35 ppm) at 90, 120 and 150 DAP (T<sub>6</sub>) (126.07 and 18.57 t ha<sup>-1</sup>), planting of setts after overnight soaking in 50 ppm ethrel solution (T<sub>3</sub>) (124.53 and 18.54 t ha<sup>-1</sup>) and planting of setts after overnight soaking in 100 ppm ethrel solution (T<sub>4</sub>) (125.27 and 18.37 t ha<sup>-1</sup>). The planting of setts after overnight soaking in 50 ppm ethrel solution and GA<sub>3</sub> spray (35 ppm) at 90, 120 and 150 DAP (T<sub>7</sub>) recorded significantly the highest brix (22.52), and and CCS% (15.18 %) while it was at par with T<sub>3</sub>, T<sub>4</sub>, T<sub>6</sub> and T<sub>8</sub> and sucrose and purity were not affected by different treatments.

**Title 4: AS-68 Impact of integrated application of organics and inorganics in improving soil health and sugarcane productivity.**

Application of recommended dose fertilizers as per soil test along with 20 t ha<sup>-1</sup> FYM for preseasonal sugarcane was found beneficial in terms of yield, quality and soil health.

**C) SUGARCANE ENTOMOLOGY:**

- In **AVT Early II plant**, none of the entry showed less susceptible reaction to early shoot borer, internode borer as well as mealy bug, where as only one entry Co 09004 showed less susceptible reaction to scale insect (0%). The entry CoN 09072 showed least incidence to early shoot borer (17.28 %), as well as internode borer (23.33%), where as highest intensity of mealy bug (18.59%). The entry Co 94008 showed highest incidence of early shoot borer (34.71%), whereas least incidence of mealy bug (43.33%). The cumulative per cent infestation of early shoot borer ranged from 17.28 to 34.71 per cent. Regarding internode borer, the incidence ranged from 23.33 to 63.33 per cent. Not a single entry recorded less susceptible reaction to internode borer. It was observed that, there was no incidence of top shoot borer in all entries. The mealy bug incidence ranged from 43.33 to 86.67 per cent. All test genotypes recorded highly susceptible reaction to mealy bug. In case of scale insect, the incidence ranged from 0 to 50 per cent.
- In **AVT Early I plant trial**, no test genotypes observed less susceptible reaction to internode borer as well as mealy bug. However, all test genotypes recorded highly susceptible reaction to mealy bug. In case of early shoot borer infestation only two test genotypes i.e. Co 10005 (12.63%) as well as Co 10027 (14.34%) showed less susceptible reaction. In case of scale insect, the only one variety i.e. Co 85004 (3.33%) showed less susceptible reaction. The Co 10026 showed least incidence of mealy bug (46.67 %), where as highest incidence of internode borer (70%). The variety Co 85004 showed least incidence to internode borer (30%), where as highest incidence of mealy bug (90%). The cumulative per cent infestation of early shoot borer ranged from 12.63 to 30.23 per cent. Regarding internode borer, the incidence ranged from 30 to 70 per cent. It was observed that, there was no incidence of top shoot borer in all entries. The mealy bug incidence ranged from 46.67 to 90 per cent. In case of scale insect, the incidence ranged from 3.33 to 63.33 per cent.

- In **AVT Midlate I plant trial**, no test genotypes observed less susceptible reaction to early shoot borer, internode borer as well as mealy bug. All test genotypes observed highly susceptible reaction to mealy bug. The entry Co 09009 recorded highest incidence of early shoot borer (32.82%) as well as scale insect (43.33%), whereas least incidence to mealy bug (40%). The entry Co 10015 recorded least incidence to early shoot borer (15.19%), where as highest incidence to scale insect (43.33%). The entry Co 10033 recorded least incidence of internode borer (36.67%), as well as scale insect (no incidence). The cumulative per cent infestation of early shoot borer ranged from 15.19 to 32.82 per cent. Regarding internode borer, the incidence ranged from 36.67 to 80 per cent. It was observed that, there was no incidence of top shoot borer in all entries. The mealy bug incidence ranged from 40 to 96.67 per cent. In case of scale insect, the incidence ranged from 0 to 43.33 per cent.
  
- In **IVT Early trial**, no test genotypes showed less susceptible reaction to internode borer as well as mealy bug. All test genotypes showed highly susceptible reaction to mealy bug. The entry Co 12008 showed least incidence to early shoot borer (8.26%) as well as scale insect (no incidence). The entry CoT 12367 recorded highest incidence of internode borer (76.67%), mealy bug (cent per cent) as well as highest intensity of scale insect (5.55%). The variety Co 94008 recorded least incidence of internode borer (36.67%) as well as mealy bug (76.67%), where as highest incidence of early shoot borer (38.28 %). The cumulative per cent infestation of early shoot borer ranged from 8.26 to 38.28 per cent. Regarding internode borer, the incidence ranged from 36.67 to 76.67 per cent. It was observed that, there was no incidence of top shoot borer in all entries. The mealy bug incidence ranged from 76.67 to cent per cent. In case of scale insect, the incidence ranged from 0 to 50 per cent.
  
- In **IVT Midlate trial**, no test genotypes showed less susceptible reaction to early shoot borer, internode borer as well as mealy bug. All test genotypes recorded highly susceptible reaction to mealy bug. The entry Co 12012 showed least infestation index to internode borer (0.86%), where as highest incidence to scale insect (43.33%). The entry Co 12024 recorded highest incidence to early shoot borer (33.33%), as well as mealy bug (cent per cent). The entry CoM 12085 recorded least incidence to internode borer (36.67%), whereas of highest incidence of mealy bug (cent per cent). The cumulative per cent infestation of early shoot borer ranged from 16.02 to 33.33 per cent. Regarding internode borer, the incidence ranged from 36.67 to 73.33 per cent. It was observed that, there was no incidence of top shoot borer in all entries. The mealy bug incidence ranged from 76.67 to cent per cent. In case of scale insect, the incidence ranged from 0 to 43.33 per cent.
  
- In **AVT Early Ratoon trial**, no test genotypes showed less susceptible reaction to internode borer, mealy bug as well as scale insect, where as all test genotypes showed less susceptible reaction to early shoot borer. The entry CoN 09072 showed least incidence to scale insect (77.50%), where as highest incidence to early shoot borer (12.56%), as well as mealy bug (cent per cent). The variety Co 85004 showed least incidence to internode borer (27.50%), where as highest incidence to mealy bug as well as scale insect (cent per cent each). The cumulative per cent infestation of early shoot borer ranged from 9.51 to 12.56 per cent. Regarding internode borer, the

incidence ranged from 27.50 to 45 per cent. It was observed that, there was no incidence of top shoot borer in all entries. The mealy bug incidence ranged from 92.50 to 95 per cent. In case of scale insect, the incidence ranged from 77.50 to cent per cent.

- In the experiments, **“Survey and surveillance of sugarcane insect pests” (E.28)**, Early shoot borer is key pest of this area and per cent insect infestation was highest in *suru* planting than *adsali* and *preseasonal*. The incidence of early shoot borer ranged from 09.40 to 38.80 per cent, where as average incidence was recorded 12.60 per cent. The per cent incidence of internode borer ranged from 15.20 to 24.60 and intensity ranged from 2 to 8 per cent. The incidence of mealy bug was ranged from 20.40 to 25.80 per cent, where as intensity ranged from 2 to 5 per cent. The incidence of top shoot borer, root borer, sugarcane woolly aphid, pyrilla, whitefly, thrips, scale insects, white grub and termites were in traces to low level.
- In **“Monitoring of insect pests and bio-agents in agro ecosystem,”** the incidence of early shoot borer ranged from 0.79 to 8.87 per cent. The peak incidence of early shoot borer was observed in 20 MW (14-20 May, 2016) The incidence of pyrilla per leaf was ranged from 1 to 7. The first incidence of woolly aphid was observed in 29 MW (16 – 22 July, 2015) and it was 0.40 woolly aphid per 2.5 cm<sup>2</sup> leaf area per three leaves. However, the peak incidence was observed in 33 MW and it was 2.05 woolly aphid per 2.5 cm<sup>2</sup> leaf area per three leaves. The parasitoid, *Encarsia flavoscutellum* was ranged from 0.33 to 2.67 per leaf. The predator, *Micromus igorotus* was ranged from 0.33 to 2.67 per leaf and peak was observed in 35 MW of 2015. The mealy bug incidence was ranged from 1 to 9 per cent and peak activity was noticed in 38 MW.
- In the experiment, **“Standardization of simple, cost effective techniques for mass multiplication of sugarcane bioagents (E.34),”** the bio – agents particularly *Micromus igorotus*, *Encarsia flavoscutellum* and *Chrysoperla carnea* played a pivotal role in suppressing sugarcane woolly aphid.
- In the experiment, **“Management of borer complex of sugarcane through lures (E.36),”** the highest number of moth catches in case of early shoot borer (10 numbers/ 3 traps), internode borer (6 numbers per 3 traps) and top shoot borer (2 numbers per 3 traps) were trapped in 18, 19 and 22MW, respectively. The installation of pheromone traps @ 15 per ha reduced the incidence of 57.51 and 34.07 per cent of early shoot borer and internode borer, respectively and increased 11.11 per cent sugarcane yield over untreated control.
- In the experiment, **“Bio-efficacy of newer insecticide for the control of sugarcane early shoot borer (E.37),”** the treatment with Soil application of Chlorantraniliprole 0.4 G @ 22.5 kg / ha at the time of planting and 60 DAP (T<sub>2</sub>) was found most effective against early shoot borer, *Chilo infuscatellus* on sugarcane, which observed least cumulative incidence of early shoot borer (18.36 per cent) and recorded highest yield (128.89 t / ha) over rest of the treatments.

#### **D) SUGARCANE PATHOLOGY:**

1. In the “Evaluation of zonal varieties/genotypes for resistance to smut under artificial conditions, **ten** genotypes i.e. Co 12001, Co 12003, Co 12007, CoM 12081, CoM 12082, CoM 12083, CoN 12071, CoN 12072, CoT 12366 and CoT 12367 from IVT Early, **7 genotypes viz.**, Co 10004, Co 10005, Co 10006, Co 10024, Co 10026, CoT 10366 and CoT 10367 from AVT–Early (I Plant), **2 genotypes viz.**, Co 09004 and Co 09007 from AVT–Early (II Plant) , **09 genotypes viz.**, Co 12014, Co 12016, Co 12017, Co 12019, Co 12021, CoM 12084, CoM 12085, CoM 12086 and CoN 12073 from IVT-Midlate and **04 genotypes viz.**, Co 09009, CoM 10083, CoT 10368 and CoT 10369 from AVT-Midlate I Plant showed resistant reaction to smut disease.
2. Out of 60 genotypes, from AICRP trials under natural conditions, **43** genotypes showed **resistant** reaction to YLD disease while **15** genotypes exhibited **moderately resistant** and **two** genotypes recorded **moderately susceptible**, reaction to YLD disease under natural conditions in the field
3. During the year 2015-2016, the incidence of diseases like smut, grassy shoot, Pokka bong, rust, YLD and brown spot was observed in different areas. Smut was observed on Co 7527 ratoon crop up to 10% at Ajara, Dist. Kolhapur. Yellow leaf disease (YLD) was observed in Kasbe bavada, Radhanagri, Gadhinglaj from Kolhapur district on CoM 86032. The grassy shoot disease (GSD) was recorded in Bhuij, Bavadhan, Kikali from Wai tahsil of Satara districts on the sugarcane variety CoM 265 (ratoon). Pokka boeng was noticed on CoVSI 9805, Co 92005 in Satara and Kolhapur district. The incidence of rust disease was noticed all district from western part of Maharashtra up to 20- 40 %. Brown spot was a major problem observed predominantly in Sangli and Kolhapur districts because of frequent rains and high humidity during rainy season. The incidence of ring spot disease was noticed up to 5-15% in Gadhinglaj, Radhanagri and Karveer district Kolhapur on the sugarcane variety Co 92005, whereas trace incidence was noticed on and Co 7527.
4. In the experiment on standardization of inoculation method for screening sugarcane genotypes for resistance to brown rust, leaf whorl inoculation method, higher average no. of rust pustules (38.34 per sq. inch) and higher no. of leaves bearing rust pustules (9.4) was recorded as compared to the clip inoculation method (26.08 per sq. inch and 9.2 respectively). This indicates that the leaf whorl inoculation method is better for screening than the clip inoculation method.
5. In the chemical management of brown spot of sugarcane experimental trial is vitiated due least incidence of brown spot on experimental plot.

## SUGARCANE BREEDING

### A) State Research Scheme Programme:

#### i) Germplasm:

##### \* Maintenance of sugarcane germplasm resources for hybridization at Padegaon.

Total **550** different sugarcane genotypes including following sugarcane species are maintained in germplasm block at CSRS, Padegaon.

Sr. No.	Species	Variety
1	<i>Saccharum officinarum</i>	1. Gungera
		2. IJ 76-564
2	<i>Saccharum robustum</i>	1. NG 77-57
		2. IJ 79-436
3	<i>Saccharum sinense</i>	1. Kalkya
		2. Uba seedlings
4	<i>Saccharum barberi</i>	1. Khari
		2. Mungo 237
5	<i>Saccharum spontaneum</i>	1. SES 72
		2. SES 113B
		3. SES 114
		4. SES 147B

##### \* Maintenance of sugarcane germplasm resources for hybridization at ARS, Radhanagari.

Total **95** different sugarcane genotypes are maintained at Agricultural Research Station, Radhanagari and also used for hybridization work.

Sr.No.	Group	Total number of genotypes
1	High recovery	24
2	High cane and CCS yield	43
3	Wooly aphid resistance lines	13
4	Salinity tolerant	2
5	Jaggery quality	2
6	Raswanti quality	5
7	Drought tolerant	7
8	Smut Resistance	4
	<b>Total</b>	<b>95</b>

#### ii) Sugarcane Hybridization Programme made at SBI, Coimbatore during 2015 – 16

1	CoSnk 05103 × NCo310	High sucrose and cane yield with Resistant to red rot, Tolerant to smut, rust, Wooly Aphid, ESB and salinity
2	CoSnk 05103 × Co 62198	High sucrose and cane yield with Resistant to red rot, Tolerant to smut, rust, Wooly Aphid, ESB and salinity
3	CoN 05071 × Bo 130	High sucrose and cane yield, Resistant to smut
4	Co 8353 × Co 61298	High sucrose and cane yield, Tolerant to wilt and drought
5	CoLk 8102 × Co 61298	High sucrose and cane yield, Resistant to smut and red rot. Tolerant to salinity.
6	Co 8353 × NCo310	High sucrose, cane yield. MR to red rot, Tolerant to smut.
7	Bo 91 × Co 61298	High sucrose and cane yield, Tolerant to drought, water logging, MR smut.
8	Co 8353 × LG05493	High sucrose and cane yield, MR to red rot.

9	CoN 05071 × LG 04605	High sucrose and cane yield with MR to red rot
10	CoSnk 05103 × LG 05828	High sucrose and cane yield with MR to red rot.
11	Co 87272 × Q 65	High sucrose and cane yield with red rot resistant
12	LG 02100 × Co 62198	High sucrose and cane yield with MR to red rot.
13	CoN 05071 × Co 89029	High sucrose and cane yield, Tolerant to red rot, low temp, water stress, water logging.
14	UP 9530 × Co 62198	High sucrose and cane yield with Resistant to red rot.
15	Co 8353 × Co 89029	High sucrose and cane yield with MR to red rot, Tolerant to smut.
16	Co 0312 × Co 0209	High sucrose and cane yield with Resistant to red rot.
17	CoV 94101 × Co 97015	High sucrose and cane yield with Resistant to red rot.
18	CoM 0265 × CoC 671	High sucrose and cane yield with Resistant to red rot.
19	Co 86032 × Co 94005	High sucrose and cane yield with Resistant to red rot.
20	CoM 9217 × Co 1148	High sucrose and cane yield with Resistant to red rot.
21	Bo 91 × CoM 9217	High sucrose and cane yield with Resistant to red rot. Tolerant to drought, water logging.
22	CoH 104 × Bo 17	High sucrose and cane yield with Resistant to red rot.
23	Co 87272 × Q 65	High sucrose and cane yield with Resistant to red rot.
24	CoC 671 × CoT 8201	High sucrose and cane yield with Resistant to red rot.
25	Co 8213 × Co 62399	High sucrose and cane yield with Resistant to red rot.
26	Co 92013 × CoH 104	High sucrose and cane yield with Resistant to red rot.
27	CoM 9220 × CoH 70	High sucrose and cane yield with Resistant to red rot.
28	Bo 91 × CoPant 97222	High sucrose and cane yield with Resistant to red rot. Tolerant to drought, water logging.
29	ISH 41 × Co 94008	High sucrose and cane yield with Resistant to red rot.
30	CoM 6806 × CoH 104	High sucrose and cane yield with Resistant to red rot.
31	CoC 671 × Co 0233	High sucrose and cane yield with Resistant to red rot.
32	LG 95053 × Co 1158	High sucrose and cane yield with Resistant to red rot.
33	Co 7201 × Co 89003	High sucrose and cane yield with Resistant to red rot.
34	CoN 05071 × ISH 69	High sucrose and cane yield with Resistant to red rot.
35	CoC 671 × Co 94008	High sucrose and cane yield with MR to red rot.
36	Co 06035 × Co 975	High sucrose and cane yield with Resistant to red rot.
37	CoN 05071 × Co 6037	High sucrose and cane yield with Resistant to red rot.

**iii) Sugarcane Hybridization Programme made at CSRS, Padegaon during 2015 -16**

1	COM 8516 × CoC 671	High sucrose and cane yield with MR to red rot.
2	CoM 0265 × Co 94008	High sucrose and cane yield with Resistant to red rot, Tolerant to smut, rust and salinity
3	MS 6847 × CoC 671	High sucrose and cane yield.
4	Co 94008 × MS 10001	High sucrose and cane yield. Tolerant to wilt and drought. Resistant to Red rot.
5	MS 10001 × CoM 0265	High sucrose and cane yield, Resistant to smut and red rot. Tolerant to salinity.
6	CoM 0265 × CoC 671	High sucrose and cane yield. R to red rot, Tolerant to smut, drought and salinity.
7	CoM 0265 × MS 10001	High sucrose and cane yield, Tolerant to drought, Non lodging.
8	MS 6847 × Co 94012	High sucrose and cane yield with R to red rot.
9	Co 94008 × Co 94012	High sucrose and cane yield with R to red rot.
10	Co 10033 × CoC 671	High sucrose and cane yield with MR to red rot.

**iv) Sugarcane Hybridization Programme made at ARS, Radhanagari during 2015-16**

1	MS 6847 × Co 94012	High sucrose and cane yield with Resistant to red rot,
2	MS 6847 × CoM 0254	High sucrose and cane yield with Resistant to red rot, Tolerant to drought.
3	MS 6847 × CoM 08030	High sucrose and cane yield with Resistant to red rot
4	MS 6847 × MS 0602	High sucrose and cane yield, Tolerant to wilt and drought.
5	CoM 0238 × CoM 0254	High sucrose and cane yield, Resistant to smut and red rot. Tolerant to salinity.
6	CoM 11004 × Co 94012	High sucrose, cane yield. Tolerant to smut.
7	MS 0209 × MS 0602	High sucrose and cane yield, Tolerant to drought.
8	Co 6304 × CoM 0254	High sucrose and cane yield, MR to red rot, Tolerant to smut and drought.
9	CoM 11001 × 527/85	High sucrose and cane yield.
10	Co 8371 × Co 775	High sucrose and cane yield. Tolerant to drought.
11	CoM 88121 × Co 94012	High sucrose and cane yield with Resistant to red rot, Tolerant to smut and rust.
12	CoM 0219 × CoM 9318	High sucrose and cane yield with Resistant to red rot, Tolerant to drought.
13	CoM 09029 × 85R186	High sucrose and cane yield with Resistant to red rot.
14	Co 6304 × CoM 08030	High sucrose and cane yield with Resistant to red rot.

## Programme SB- (AICRP on Sugarcane) 2015-16

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

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	3
<b>Treatments</b>	12 + 3 = 15
<b>Plot Size:</b>	
<b>Gross</b>	6 M X 6 R
<b>Net</b>	5 M x 4 R
<b>Planting date</b>	17.01.2015
<b>Harvesting date</b>	19.01.2016
<b>Table No.</b>	6

#### Results: Table: - 6

The cane yield and CCS yield differences, CCS% and Sucrose % differences due to different cultures were found to be statistically significant. However, the culture CoM 12081 was recorded significantly the highest cane yield (135.05 t/ha) and CCS yield (19.86 t/ha) over all the cultures and checks except CoM 12082 (126.08 t/ha and 17.62 t/ha) respectively which was at par with it.

As far as quality is concerned the check CoC 671 was recorded significantly the highest CCS % (16.08 %) over all the cultures. The same check CoC 671 recorded significantly the highest Sucrose % (22.62 %) over all the cultures and check except culture Co 12006 (21.92 %), Co 12007 (21.38 %), Co 12008 (22.01%) and check Co 85004 (21.71 %) which were at par with it.



## 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>	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>	15.01.2015
<b>Harvesting date</b>	16.01.2016
<b>Table. No.</b>	7

### Results: Table. : 7

The differences due to various genotypes in respect of cane yield and CCS yield, CCS % and sucrose % were found to be statistically significant. The culture Co 10026 was recorded significantly higher cane yield (119.44 t/ha) over all the cultures and checks. The same culture Co 10026 was recorded significantly higher CSS yield (17.09 t/ha) over all the cultures and checks except the culture Co 10027 (15.52 t/ha) which was at par with it.

As far as quality is concerned the culture CoT 10367 was recorded significantly higher CCS % (15.91 %) over all the cultures and checks except the culture Co 10027 (14.98 %) which was at par with it. and also the same culture CoT 10367 was recorded significantly higher sucrose % (22.37 %) over all the cultures and checks except the culture Co 10027 (21.18 %) and check Co 85004 (20.88 %) which were at par with it.

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

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	4
<b>Treatments</b>	3 + 3 = 6
<b>Plot Size:</b>	
<b>Gross</b>	6 m x 8R
<b>Net</b>	5 m x 6R
<b>Planting date</b>	04.02.2015
<b>Harvesting date</b>	04.02.2016
<b>Table. No.</b>	8

#### Results: Table. : 8

The differences due to various genotypes in respect of cane yield and CCS yield, CCS % and sucrose % were found to be statistically significant. The culture Co 09004 was recorded significantly higher cane yield (129.75 t/ha) and CCS yield (20.82 t/ha) over all the cultures and checks.

As far as quality is concerned the check CoC 671 was recorded significantly higher CCS % (16.09 %) and sucrose % (22.63 %) over all the cultures and checks except the culture Co 09004 (16.05 % and 22.63 %) respectively which was at par with it.

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

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	4
<b>Treatments</b>	3 + 3 = 6
<b>Plot Size:</b>	
<b>Gross</b>	6 m x 8R
<b>Net</b>	5 m x 6R
<b>Ratooning date</b>	05.02.2015
<b>Harvesting date</b>	05.11.2015
<b>Table. No.</b>	9

#### Results: Table. : 9

The differences due to various genotypes in respect of cane yield and CCS yield, CCS % and sucrose % were found to be statistically significant. The culture Co 09004 was recorded significantly higher cane yield (82.20 t/ha) over all the cultures and checks except the culture Co 09007 (79.30 t/ha) which was at par with it. The same culture Co 09004 was recorded significantly higher CSS yield (12.89 t/ha) over all the cultures and checks.

As far as quality is concerned the check CoC 671 was recorded significantly higher CCS % (15.73 %) and sucrose (22.05 %) over all the cultures and checks except the culture Co 09004 (15.67 % and 21.93 %) respectively which was at par with it.

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

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	2
<b>Treatments</b>	15 + 2 = 17
<b>Plot Size:</b>	
<b>Gross</b>	6 M x 6 R
<b>Net</b>	5 M x 4 R
<b>Planting date</b>	13.01.2015
<b>Harvesting date</b>	13.01.2016
<b>Table. No.</b>	10

##### Results: Table: - 10

The yield differences due to various genotypes in respect of cane yield, CCS yield, CCS % and sucrose % were found to be statistically significant. The genotype CoM 12085 was recorded significantly the highest cane yield (138.81 t/ha) than all other genotypes and checks except genotypes Co 12012 (133.98 t/ha), Co 12009 (119.89 t/ha), CoN 12073 (117.36 t/ha) and check Co 86032 (118.93 t/ha) which were at par with it. The same genotype CoM 12085 (20.76 t/ha) out yielded in case of CCS yield over all other cultures and checks except the culture Co 12012 (17.83 t/ha) and check Co 86032 (17.68 t/ha) which were at par with it.

As far as quality is concerned the highest CCS % (15.20%) was significantly recorded by the check Co 99004 over all other genotypes except genotypes CoM 12085 (14.95 %), VSI 12121 (14.55 %), Co 12019 (13.88 %), Co 12016 (13.71 %), Co 12024 (13.69 %) and check Co 86032 (14.86 %) which were at par with it. The same culture Co 99004 was reported significantly superior sucrose % (21.48 %) over all other genotypes except CoM 12085 (21.06 %), VSI 12121 (20.71 %), Co 12009 (20.33 %), Co 12019 (19.89 %) and check Co 86032 (20.91 %) which were at par with it.

**6) Name of Trial: Advanced Varietal Trial – (Midlate I 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>	07.01.2015
<b>Harvesting date</b>	07.01.2016
<b>Table. No.</b>	11

**Results: Table: - 11**

The yield differences due to various genotypes in respect of cane yield, CCS yield, CCS % and sucrose % were found to be statistically significant. The genotype CoT 10369 was recorded significantly the highest cane yield (135.93 t/ha) than all other genotypes and checks except genotypes PI 10132(131.25 t/ha), Co 10033 (130.36 t/ha), Co 10017 (129.35 t/ha), CoVc 10061(125.24 t/ha) and check Co 86032 (129.02 t/ha) which were at par with it. The genotype PI 10132 (20.35 t/ha) out yielded in case of CCS yield over all other genotypes and checks except cultures CoT 10369 (19.77 t/ha), Co 10017 (18.51 t/ha), CoVc (17.80 t/ha), Co 10033 (17.63 t/ha) and check Co 86032 (18.63 t/ha) which were at par with it.

As far as quality is concerned the highest CCS % (15.51 %) was significantly recorded by the genotype PI 10132 over all genotypes and check except genotypes CoT 10369 (14.54 %), Co 10015 (14.47 %) and check Co 86032 (14.43 %) which were at par with it. The same genotype PI 10132 was reported significantly superior sucrose % (21.90 %) over all genotypes and checks except genotype CoT 10369 (20.65 %) which was at par with it.

**7) Name of Trial: Advanced Varietal Trial (Early) – I Plant, II Plant and Ratoon  
Pooled results.**

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	4
<b>Treatments</b>	03+3=06
<b>Plot Size:</b>	
<b>Gross</b>	6 m x 8R
<b>Net</b>	5 m x 6R
<b>Table. No.</b>	12

**Results: Table. : 12**

The yield differences in pooled data of I Plant, II Plant and Ratoon due to various genotypes in respect of cane yield, CCS yield, CCS % and sucrose % were found to be statistically significant. The significantly highest cane yield (114.16 t/ha) and CCS yield (17.90 t/ha) was recorded by the genotype Co 09004 over all genotypes and standards.

As far as quality is concerned, the genotype Co 09004 recorded highest CCS % (15.63 %) and sucrose % (21.91 %) than all other genotypes and standards.

## 8) Name of Trial: Evaluation for drought tolerance (I Plant Crop)

<b>Details</b>	Padegaon
<b>Design</b>	RBD
<b>Replications</b>	2
<b>Treatments</b>	15 + 2 = 17
<b>Plot Size: Gross</b>	6 M x 2 R
<b>Planting date</b>	20.01.2015
<b>Harvesting date</b>	20.01.2016
<b>Table. No.</b>	13

### Results: Table: - 13

The yield differences due to various genotypes in respect of CCS yield, CCS % and sucrose % were found to be statistically significant. Considering the mean of control and drought treatment, the check CoM 0265 recorded significantly the highest cane yield (97.07 t/ha) over the genotypes AS 04-245 (67.90 t/ha), AS 04-1687 (71.91 t/ha), GU 07-3849 (77.68 t/ha), GU 07- 3774 (48.77 t/ha), and CYM 07- 986 (59.15 t/ha) and remaining genotypes and check were at par with it. Considering the mean of control and drought treatment, the same check CoM 0265 reported significantly superior CCS yield (12.67 t/ha) than all genotypes except the genotypes SA 04-472 (12.33 t/ha), SA 04-496 (11.33 t/ha) and the check CoM 88121 (12.46 t/ha) which were at par with it.

Considering the mean of control and drought treatment, As far as quality is concerned the highest CCS % (14.08 %) was significantly recorded by the genotype SA 04-472 over all genotypes and check except check CoM 88121 (13.79 %) which was at par with it. The check CoM 88121 was reported significantly superior sucrose % (19.66 %) over all genotypes and checks except genotype SA 04-472 (19.44 %) which was at par with it.

## **B) All India Coordinated Research Project on Sugarcane (2016-2017)**

### **1. Initial Varietal Trial - Early**

Entries (8)	:	Co 13002, Co 13003, Co 13004, CoN 13071, CoN 13072, CoSnk 13101, CoSnk 13102 and MS 13081
Standards (3)	:	Co 85004, Co 94008 and CoC 671
Design	:	Randomized Block Design
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	:	12.01.2016
Crop duration	:	10 months

### **2. Advanced Varietal Trial (Early) – I 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	:	07.01.2016
Crop duration	:	10 months

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

Entries (8)	:	Co 10004, Co 10005, Co 10006, Co 10024, Co 10026, Co 10027, CoT 10366 and CoT 10367
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	:	14.01.2016
Crop duration	:	10 months



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

Entries (8)	:	Co 10004, Co 10005, Co 10006, Co 10024, Co 10026, Co 10027, CoT 10366 and CoT 10367
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
Ratooning date	:	29.2.2016
Crop duration	:	9 months

#### **5. Initial Varietal Trial – Midlate**

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, CoSnk 13104, CoSnk 13105 , CoSnk 13106, CoT 13366, PI 13131 and PI 13132
Standards (2)	:	Co 86032 and Co 99004
Design	:	Randomized Block Design
Replications	:	Two
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	:	31.12.2015
Crop duration	:	12 months

#### **6. Advanced Varietal Trial (Midlate) – I 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	:	Two
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	:	6.1.2016
Crop duration	:	12 months

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

Entries (11)	:	Co 09009, Co 10015, Co 10017, Co 10031, Co 10033, CoM 10083, CoT 10368, CoT 10369, CoVC 10061, PI 10131 and PI 10132.
Standards (2)	:	Co 86032 and Co 99004
Design	:	Randomized Block Design
Replications	:	Two
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	:	29.12.2015
Crop duration	:	12 months
Data to be recorded	:	As per Annexure- III

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

Entries (11)	:	Co 09009, Co 10015, Co 10017, Co 10031, Co 10033, CoM10083, CoT 10368, CoT 10369, CoVC 10061, PI10131 and PI 10132.
Standards (2)	:	Co 86032 and Co 99004
Design	:	Randomized Block Design
Replications	:	Two
Plot size	:	Gross : 6m x 8r x 1.2 m Net : 5m x 6r x 1.2 m
Ratooning date	:	29.02.2016
Crop duration	:	11 months
Data to be recorded	:	As per Annexure- IV

## **9. Evaluation for drought tolerance (I Plant Crop):**

Entries (27)	:	BM 1003143, BM 1005149, BM 1009163, BM 1010168, BM 1022173, PG 9869137, SA 98-13, SA 04-454, SA 04-4792, SA 04-458, SA 04-390, SA 04-496, SA 04-409, AS 04-1689, AS 04-245, AS 04-2097, AS 04-635, AS 04-1687, MA 5/51, MA 5/5, MA 5/37, MA 5/99, MA 5/22, GU 07-3849, GU 07-3774, GU 07-2276 and CYM 07-986
Standards (3)	:	CoM 88121, CoM 0265 and Co 86032
Design	:	Alpha design
Replications	:	Two
Plot Size	:	6m X 2r X 0.90 m
Seed rate	:	12 buds per meter
Planting date	:	10.02.2016
Crop Duration	:	12 months
Data to be recorded	:	As per Annexure- V

## 10. Evaluation for drought tolerance (Ratoon):

Entries (15)	:	AS 04-245, MA 5/5, MA 5/37, GU 07-3774, CYM 07-986, GU 07-3849, GU 07-2276, AS 04-635, AS 04-1687, AS 04-2097, SA 04-472, AS 04-1689, BM 1022173, SA 04-496, SA 04-409
Standards (2)	:	CoM 88121 and CoM 0265
Design	:	Split plot (Main plot treatments I. Drought II. Control (Recommended practices ) (Sub plot treatments – test clones)
Replications	:	Two
Plot Size	:	6m X 2r X 0.90 m
Seed rate	:	12 buds per meter
Ratooning date	:	29.2.2016
Crop Duration	:	11 months
Data to be recorded	:	As per Annexure- VI

## SEED MULTIPLICATION

### I. (i) Multiplication of IVT (2015-16) entries at the centres:

The seed of the following entries will be multiplied at the centres during 2016-17 for inclusion in AVT-I Plant in 2017-18.

Early (12)	:	Co 12001, Co 12003, Co 12006, Co 12007, Co 12008, CoM 12081, CoM 12082, CoM 12083, CoN 12071, CoN 12072, CoT 12366 and CoT 12367
Midlate (15)	:	Co 12009, Co 12012, Co 12014, Co 12016, Co 12017, Co 12019, Co 12021, Co 12024, CoM 12084, CoM 12085, CoM 12086, CoN 12073, CoN 12074, CoT 12368 and VSI 12121.

### (ii) Multiplication of latest release check variety:

Seed of CoSnk 05103 (early) and CoSnk 05104 (midlate) is supplied by Sankeshwar centre and are multiplied at the zonal centres in 2016-17 for inclusion in AVT-I Plant (2017-18) as latest release check

### II. Multiplication of pre-zonal entries for seed lifting to AICRP centers of peninsular zone II.

The following entries accepted in the Workshop of AICRP(S) held at the ICAR-Indian Institute of Sugarcane Research, Lucknow in 2014 are under multiplication for one year at ICAR-Sugarcane Breeding Institute, Coimbatore and Central Sugarcane Research Station, Padegaon in 2016-17:

Early (12)	:	Co 14002, Co 14003, Co 14004, Co 14006, CoN 14071, CoN 14072, CoSnk 14101, CoSnk 14102, CoT 14366, CoT 14367, MS 14081 and MS 14082
Midlate (25)	:	Co 13021, Co 13022, Co 14008, Co 14009, Co 14012, Co 14016, Co14022, Co 14023, Co 14025, Co 14026, Co 14027, Co 14030, Co14031, Co14032, CoN 14073, CoN 14074, CoSnk 14103, CoTI 14111, CoTI 14112, CoVC14061, CoVC 14062, PI 14131, PI 14132, VSI 14121 and VSI 14122

### **III. Seed multiplication of new entries accepted in group meeting at Pusa, Bihar.**

The following entries were accepted in the Group Meeting of AICRP(S) held at the Rajendra Agricultural University, Pusa (Bihar) in 2015. The concerned breeders are requested to supply two sets of seed material of the accepted entries; one set is to be sent to SBI, Coimbatore and the other set to CSRS, Padegaon for one year multiplication in 2016-17.

- 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, Co15021, CoN 15071, CoN 15072, CoSnk 15103, CoSnk 15104, CoVC 15061, CoVC15062, CoVC 15063, CoVC 15064, PI 15131, PI 15132 and VSI 15122

**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.

## **B) SUGARCANE AGRONOMY:**

1. AS-69: Use of plant growth regulators (PGRs) for enhanced yield and quality of sugarcane
2. AS 70: Scheduling irrigation with mulch under different sugarcane planting methods
3. AS 71: Carbon sequestration assessment in sugarcane based cropping system
4. AS 72: Agronomic performance of elite sugarcane genotypes (Early)
5. AS 72: Agronomic performance of elite sugarcane genotypes (Midlate)
6. AS 68: Impact of integrated application of organics and inorganics in improving soil health and sugarcane productivity.
- 7.

## **C) SUGARCANE ENTOMOLOGY:**

<b>Experiment No.1 (Project E 4.1) :</b>		
<b>Evaluation zonal varieties / genotypes for their reaction against major insect pests</b>		
	<b>Trials</b>	<b>Entries</b>
1	Evaluation of Initial Varietals Trial – Early [(IVT) Early] genotypes for their reaction against major insect pests.	08+03=11
2	Evaluation of Advanced Varietals Trial – Early (I Plant) genotypes for their reaction against major insect pests.	05+03=08
3	Evaluation of Advanced Varietals Trial – Early (II Plant) genotypes for their reaction against major insect pests.	08+03=11
4	Evaluation of Initial Varietal Trial – Midlate [IVT- ML] genotypes for their reaction against major insect pests.	20+02=22
5	Evaluation of Advanced Varietals Trial – Midlate (II Plant) genotypes for their reaction against major insect pests.	11+02=13
6	Evaluation of Advanced Varietals Trial – Midlate (I Plant) genotypes for their reaction against major insect pests.	06+02=08

<b>Experiment No.2 (E 28)</b>	Survey and surveillance of sugarcane insect pests.
<b>Experiment No.3 (E 30)</b>	Monitoring of insect pests and bio-agents in sugarcane agro-ecosystem.
<b>Experiment No.4 (E 34)</b>	Standardization of simple and cost effective techniques for mass multiplication of Sugarcane bio-agents.
<b>Experiment No.5 (E 36)</b>	Management of borer complex of sugarcane through pheromone lures.
<b>Experiment No.6 (E 37)</b>	Bio-efficacy of newer insecticide for the control of sugarcane early shoot borer.

## **D) SUGARCANE PATHOLOGY:**

- PP 17B** Evaluation of Zonal varieties / genotypes for resistance to smut.
- PP 17D** Evaluation of Zonal varieties / genotypes for resistance to YLD.
- PP 22** Survey of sugarcane disease naturally occurring in the area on important sugarcane varieties.
- PP-28B** Methodology for screening sugarcane genotypes for resistance to brown Rust (*Puccinia melanocephala*)
- PP 32** Management of brown spot of sugarcane.