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**ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE**  
**(Indian Council of Agricultural Research)**

**CONSOLIDATED TECHNICAL PROGRAMME**  
**(2013 – 2014)**



**INDIAN INSTITUTE OF SUGARCANE RESEARCH**  
**LUCKNOW - 226 002**

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## **CROP IMPROVEMENT**

### **Tentative Technical programme for the year 2013-2014**

#### **North West Zone**

##### **Zonal Varietal Trial**

**Centres (11) :** Faridkot, Karnal, Kota, Lucknow, Ludhiana, Modipuram, Muzaffarnagar, Pantnagar, Shahjahanpur, Sriganaganagar and Uchani

##### **1. Initial Varietal Trial (Early)**

Entries (3) : Co 10035, CoH 10261 and CoS 10231.  
Standard (2) : CoJ 64 and CoPant 84211  
Design : Randomized Block Design  
Replications : Four  
Plot size : Gross : 6m x 6r x 0.75m  
Net : 5m x 4r x 0.75m  
Seed rate : 12 buds per meter  
Date of planting : February- March  
Crop duration : 10 months  
Data to be recorded : As per Annexure I

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

Entries (5) : CoH 09262, CoH 09263, CoLk 09202, CoPb 09181 and CoS 09246  
Standard (2) : CoJ 64 and CoPant 84211  
Design : Randomized Block Design  
Replications : Three  
Plot size : Gross : 6m x 8r x 0.75m  
Net : 5m x 6r x 0.75m  
Seed rate : 12 buds per meter  
Date of planting : February- March  
Crop duration : 10 months  
Data to be recorded : As per Annexure I

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

Entries (3)	:	CoPb 08211, CoPb 08212 and CoS 08233
Standard (2)	:	CoJ 64 and CoPant 84211
Design	:	Randomized Block Design
Replications	:	Four
Plot size	:	Gross : 6m x 8r x 0.75m Net : 5m x 6r x 0.75m
Seed rate	:	12 buds per meter
Date of planting	:	February- March
Crop duration	:	10 months
Data to be recorded	:	As per Annexure I

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

Entries (3)	:	CoPb 08211, CoPb 08212 and CoS 08233
Standard (2)	:	CoJ 64 and CoPant 84211
Design	:	Randomized Block Design
Replications	:	Four
Plot size	:	Gross : 6m x 8r x 0.75m Net : 5m x 6r x 0.75m
Date of ratooning	:	After harvest of plant crop
Date of ratooning	:	After harvest of plant crop
Crop duration	:	9 months
Data to be recorded	:	As per Annexure II

## **5. Initial Varietal Trial (Midlate)**

Entries (10)	:	Co 10036, Co 10037, Co 10039, CoH 10262, CoH 10263, CoPant 10221, CoPb 10181, CoPb 10182, CoPb 10183 and CoPb 10211.
Standard (3)	:	CoS 767, CoS 8436 and CoPant 97222
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross : 6m x 6r x 0.90m Net : 5m x 4r x 0.90m
Seed rate	:	12 buds per meter
Date of planting	:	February- March
Crop duration	:	12 months
Data to be recorded	:	As per Annexure III

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

Entries (5)	:	Co 09022, CoH 09264, CoLk 09204, CoPb 09214 and CoS 09232.
Standard (3)	:	CoS 767, CoS 8436 and CoPant 97222
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross : 6m x 8r x 0.90m Net : 5m x 6r x 0.90m
Seed rate	:	12 buds per meter
Date of planting	:	February- March
Crop duration	:	12 months
Data to be recorded	:	As per Annexure III

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

Entries (6)	:	CoH 08262, CoH 08263, CoH 08264, CoPb 08217, CoS 08234 and CoS 08235
Standard (3)	:	CoS 767, CoS 8436 and CoPant 97222
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross : 6m x 8r x 0.90m Net : 5m x 6r x 0.90m
Seed rate	:	12 buds per meter
Date of planting	:	February- March
Crop duration	:	12 months
Data to be recorded	:	As per Annexure III

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

Entries (6)	:	CoH 08262, CoH 08263, CoH 08264, CoPb 08217, CoS 08234 and CoS 08235
Standard (3)	:	CoS 767, CoS 8436 and CoPant 97222
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross : 6m x 8r x 0.90m Net : 5m x 6r x 0.90m
Date of ratooning	:	After harvest of plant crop
Crop duration	:	11 months
Data to be recorded	:	As per Annexure IV

## 9. Seed Multiplication for ZVT

The following entries accepted during the Group Meeting of AICRP(S) held at OUAT, Bhubaneswar in 2011 are under multiplication at SBI Regional Centre, Karnal. On prior intimation, the coordinating centres should depute their staff to SBI Regional Centre, Karnal and lift the seed material for one year multiplication at their centres :

**Early (7)** : CoH 11261, CoH 11262, CoLk 11201, CoLk 11202, CoLk 11203, CoPb 11211 and CoPb 11212

**Midlate (13)** : Co 11026, Co 11027, CoH 11263, CoH 11264, CoLk 11204, CoLk 11205, CoLk 11206, CoPb 11181, CoPb 11182, CoPb 11213, CoPb 11214, CoS 11231 and CoS 11232

## 10. New entries accepted

The following entries were accepted during the Workshop of AICRP(S) held at TNAU, Coimbatore in 2012. The concerned breeders are requested to supply seed material of their entries for one year multiplication at Karnal multiplication centre.

**Early (10)** : Co 12026, Co 12027, CoH 12261, CoLk 12201, CoLk 12202, CoLk 12203, CoLk 12204, CoPant 12221, CoPant 12222 and CoS 12231

**Midlate (15)** : Co 12028, Co 12029, CoH 12262, CoH 12263, CoLk 12205, CoLk 12206, CoPant 12223, CoPant 12224, CoPant 12225, CoPant 12226, CoPb 12181, CoPb 12182, CoPb 12211, CoPb 12212 and CoS 12232.

**Note:** As per decision of the Workshop-2012, variety Co 0238 will replace CoPant 84211 as standard in IVT Early w.e.f. crop season 2014-15. Therefore, Co 0238 may be multiplied at the centres during 2013-14 for availability of seed material.

## **CROP IMPROVEMENT**

**Technical programme for the year 2013-2014**

**North Central and North Eastern Zone**

### **Zonal Varietal Trial**

**Centres (6):** Bethuadahari, Buralikson, Gorakhpur, Motipur, Pusa and Seorahi

#### **1. Advanced Varietal Trial (Early) – I Plant**

Entries (4)	:	BO 153, CoP 08436, CoSe 09452 and UP 09453
Standard (2)	:	BO 130 and CoSe 95422
Design	:	Randomized Block Design
Replications	:	Four
Plot size	:	Gross : 6m x 8r x 0.75m Net : 5m x 6r x 0.75m
Seed rate	:	12 buds per meter
Date of planting	:	February- March
Crop duration	:	10 months
Data to be recorded	:	As per Annexure I

#### **2. Initial Varietal Trial (Midlate)**

Entries (3)	:	CoSe 10451, CoSe 10452 and CoSe 10453
Standard (3)	:	BO 91, CoP 9301 and CoSe 92423
Design	:	Randomized Block Design
Replications	:	Four
Plot size	:	Gross : 6m x 6r x 0.90m Net : 5m x 4r x 0.90m
Seed rate	:	12 buds per meter
Date of planting	:	February- March
Crop duration	:	12 months
Data to be recorded	:	As per Annexure III



### **3. Advanced Varietal Trial (Midlate) – I Plant**

Entries (2)	:	BO 154 and CoP 09437.
Standard (3)	:	BO 91, CoP 9301 and CoSe 92423
Design	:	Randomized Block Design
Replications	:	Four
Plot size	:	Gross : 6m x 8r x 0.90m Net : 5m x 6r x 0.90m
Seed rate	:	12 buds per meter
Date of planting	:	February- March
Crop duration	:	12 months
Data to be recorded	:	As per Annexure III

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

Entries (3)	:	CoP 08437, CoSe 08451 and CoSe 08452
Standard (3)	:	BO 91, CoP 9301 and CoSe 92423
Design	:	Randomized Block Design
Replications	:	Four
Plot size	:	Gross : 6m x 8r x 0.90m Net : 5m x 6r x 0.90m
Seed rate	:	12 buds per meter
Date of planting	:	February- March
Crop duration	:	12 months
Data to be recorded	:	As per Annexure III

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

Entries (3)	:	CoP 08437, CoSe 08451 and CoSe 08452
Standard (3)	:	BO 91, CoP 9301 and CoSe 92423
Design	:	Randomized Block Design
Replications	:	Four
Plot size	:	Gross : 6m x 8r x 0.90m Net : 5m x 6r x 0.90m
Date of ratooning	:	After harvest of plant crop
Crop duration	:	11 months
Data to be recorded	:	As per Annexure IV

## **6. Seed Multiplication for ZVT:**

The following entries accepted at the Group Meeting held at OUAT, Bhubaneswar in 2011 are to be multiplied at coordinating centres for one year (2013-2014). On prior intimation, the centres of the zone are requested to depute their staff at S.R.I., Pusa centre and lift the material for one year multiplication at their centre as detailed below:

**Early (5)** : CoP 11436, CoP 11437, CoP 11438, CoSe 11451 and CoSe 11452

**Midlate (7)** : BO 155, CoP 11439, CoP 11440, CoSe 11453, CoSe 11454, CoSe 11455 and CoSe 11456

## **7. New entries accepted:**

The following entries were accepted during Workshop of AICRP(S) held at TNAU, Coimbatore in 2012. The concerned breeders are requested to supply seed material of their entries for one year multiplication at S.R.I., Pusa multiplication centre.

**Early (5)** : CoLk 12207, CoLk 12208, CoP 12436, CoP 12437 and CoSe 12451

**Midlate (6)** : CoLk 09204, CoLk 12209, CoP 12438, CoP 12439, CoSe 12452 and CoSe 12453

## **CROP IMPROVEMENT**

### **Technical programme for the year 2013-2014**

#### **Peninsular Zone**

##### **Zonal Varietal Trial**

**Centres (18) :** Akola, Basmathnagar, Coimbatore, Kolhapur, Mandya, Navsari, Padegaon, Perumalapalle, Powarkheda, Pravaranagar, Pune, Pugalur, Raipur, Rudrur, Sameerwadi, Sankeshwar, Sirugamani and Thiruvalla.

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

<b>Early (12)</b>	:	Co 10004, Co 10005, Co 10006, Co 10024, Co 10026, Co 10027, CoM 10081, CoM 10082, CoN 10071, CoN 10072, CoT 10366 and CoT 10367
Standards (3)	:	Co 85004, Co 94008 and CoC 671
Design	:	Randomised 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	:	1 <sup>st</sup> fortnight of February
Crop duration	:	10 months
Data to be recorded	:	As per Annexure - I

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

Early (2)	:	Co 08001 and VSI 08121
Standards (3)	:	Co 85004, Co 94008 and CoC 671
Design	:	Randomised Block Design
Replications	:	Four
Plot size	:	Gross: 6m x 8r x 0.9 m Net : 5m x 6r x 0.9 m
Seed rate	:	12 buds per metre
Planting date	:	1 <sup>st</sup> fortnight of February
Crop duration	:	10 months
Data to be recorded	:	As per Annexure - I

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

Early (2)	:	Co 08001 and VSI 08121
Standards (3)	:	Co 85004, Co 94008 and CoC 671
Design	:	Randomised Block Design
Replications	:	Four
Plot size	:	Gross: 6m x 8r x 0.9 m Net : 5m x 6r x 0.9 m
Ratooning date	:	After harvest of AVT Plant – I
Crop duration	:	9 months
Data to be recorded	:	As Annexure-II

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

<b>Midlate (14)</b>	:	Co 10015, Co 10017, Co 10031, Co 10033, CoM 10083, CoM 10084, CoN 10073, CoT 10368, CoT 10369, CoVC 10061, CoVSI 10121, CoVSI 10122, PI 10131 and PI 10132
Standards (2)	:	Co 86032 and Co 99004
Design	:	Randomised 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	:	December to January
Crop duration	:	12 months
Data to be recorded	:	As per Annexure III

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

Midlate (5)	:	Co 08008, Co 08009, Co 08016, Co 08020 and CoSnk 08101
Standards (2)	:	Co 86032 and Co 99004
Design	:	Randomised Block Design
Replications	:	Three
Plot size	:	Gross : 6m x 8r x 0.9m Net : 5m x 6r x 0.9m
Seed rate	:	12 buds per metre
Planting date	:	December to January
Crop duration	:	12 months
Data to be recorded	:	As per Annexure III

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

Midlate (5)	:	Co 08008, Co 08009, Co 08016, Co 08020 and CoSnk 08101
Standards (2)	:	Co 86032 and Co 99004
Design	:	Randomised Block Design
Replications	:	Three
Plot size	:	Gross: 6m x 8r x 0.9m Net : 5m x 6r x 0.9m
Ratooning date	:	After harvest of AVT Plant I
Crop duration	:	11 months
Data to be recorded	:	As per Annexure IV

## **SEED MULTIPLICATION**

**Multiplication of IVT (2012-13) entries at the centres:** The following entries will be multiplied at the centres during 2013-14:

<b>Early (8)</b>	:	Co 09002, Co 09003, Co 09004, Co 09005, Co 09006, Co 09007, CoN 09071 and CoN 09072
<b>Midlate (10)</b>	:	Co 09009, Co 09010, Co 09012, Co 09013, Co 09014, Co 02040, CoN 09073, CoN 09074, CoSnk 05102 and CoVSI 09121

The following entries accepted in the Group Meeting held in Bhubneswar in 2011 are under multiplication at Sugarcane Breeding Institute, Coimbatore and Central Sugarcane Research Station, Padegaon. On prior intimation the centers should depute their staff and lift the material for one year multiplication.

**S.B.I, Coimbatore (Multiplication centre):**

Mandya, Perumalapalle, Powarkheda, Pugalur, Rudrur, Sameerwadi, Sirugamani and Thiruvalla.

**C S R S, Padegaon (Multiplication centre):**

Akola, Basmathnagar, Kolhapur, Navsari, Pravaranagar, Pune, Raipur and Sankeshwar.

**Early (13) :** Co 11001, Co 11004, Co 11016, Co 11017, Co 11018, CoM 11081, CoM 11082, CoM 11083, CoM 11084, CoN 11071, CoN 11072, CoT 11366 and PI 11131

**Midlate (14) :** Co 11005, Co 11007, Co 11012, Co 11019, Co 11020, Co 11021, Co 11022, Co 11023, Co 11024, CoM 11085, CoM 11086, CoM 11087, CoN 11073 and CoN 11074

**New Entries accepted**

The following entries were accepted in the Workshop of AICRP(S) held at the TNAU, Coimbatore in 2012. 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.

**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.

## **CROP IMPROVEMENT**

### **Technical programme for the year 2013-2014**

#### **East Coast Zone**

#### **ZONAL VARIETAL TRIAL**

**Centres (5):** Anakapalle, Cuddalore, Nayagarh, Nellikuppam and Vuyyuru

##### **1. Initial Varietal Trial (Early)**

Early (5)	:	CoA 11321, CoA 11322, CoA 11323, CoC 10336 and CoC 11336
Standards (3)	:	Co 6907, CoC 01061 and CoA 92081
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross : 6.0 m x 6r x 1.2 m Net : 5.0 m x 4r x 1.2 m
Seed rate	:	12 buds per meter
Date of planting	:	1 <sup>st</sup> fortnight of February
Crop duration	:	10 months
Data to be recorded	:	As per Annexure-I

##### **2. Initial Varietal Trial - Midlate**

Midlate (4)	:	CoA 11324, CoA 11325, CoA 11326 and CoOr 11346
Standards (3)	:	CoV 92102, Co 7219 and Co 86249
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross : 6.0 m x 6r x 1.2 m Net : 5.0 m x 4r x 1.2 m
Seed rate	:	12 buds per meter
Date of planting	:	December 20 to January, 20
Crop duration	:	12 months
Data to be recorded	:	As per Annexure-III

### **3. Advanced Varietal Trial (Midlate) - I Plant**

Entries (3)	:	CoA 10321, CoC 10337 and CoOr 10346
Standards (3)	:	CoV 92102, Co 7219 and Co 86249
Design	:	Randomized Block Design
Replications	:	Four
Plot size	:	Gross : 6.0 m x 8r x 0.8 m Net : 5.0 m x 6r x 0.8m
Seed rate	:	12 buds per meter
Date of planting	:	December 20 to January, 20
Crop duration	:	12 months
Data to be recorded	:	As per Annexure-III

### **4. New entries accepted and seed multiplication :**

The following entries were accepted during the Workshop of AICRP(S) held at the TNAU, Coimbatore in 2012. The concerned breeders are requested to supply seed material to all the centres of the zone for one-year multiplication. Breeders of all the centres of the zone may please ensure that seed material of new entries is received well in time for planting.

**Early (5)** : CoA 12321, CoA 12322, CoA 12323, CoOr 12346 and CoV 12356.

**Midlate (2)** : CoA 12324 and CoV 12357.



## **CROP PRODUCTION**

### **Technical Programme - 2013-2014**

<b>AS-42</b>	<b>:</b>	<b>Agronomic evaluation of promising sugarcane genotypes</b>
<b>Objective</b>	<b>:</b>	To work out agronomy of sugarcane genotypes of advanced varietal trial (AVT)
<b>Year of start</b>	<b>:</b>	2007-2008 (with new set of genotypes of AVT)
<b>Year of completion</b>	<b>:</b>	Continuing
<b>Locations</b>	<b>:</b>	All centres
<b>Planting season</b>	<b>:</b>	Autumn or Spring (Experiment will be conducted only in one crop season either in autumn or spring followed by ratoon, i.e. 2 plant + 1 ratoon)
<b>Treatments</b>	<b>:</b>	
<b>1. Varieties</b>	<b>:</b>	Minimum of three promising genotypes (from AVT).
<b>2. Fertilizer levels:</b>		i) 75% of the recommended dose of N ii) 100% of the recommended dose of N iii) 125% of the recommended dose of N
<b>Design</b>	<b>:</b>	RBD
<b>Replication</b>	<b>:</b>	3-4
<b>Plot size</b>	<b>:</b>	In the first year, the plot size will depend on the availability of seed, but in the second year, it will be 6 rows of at least 6 m length
<b>Row spacing</b>	<b>:</b>	Recommended row spacing for a particular season in the concerned zone
<b>Note:</b> 1. Seed material of the test varieties may be obtained from concerned breeder of the center. 2. Separate trials may be laid out for early and mid-late groups.		
<b>Observations to be recorded</b>	<b>:</b>	i) Initial soil fertility status for available NPK, soil texture, physico-chemical properties of the soil. ii) Data on germination, tillers, millable canes, cane yield, juice quality, CCS%, CCS yield of plant/ratoon crop. iii) Other specific characteristics of the genotypes. iv) Planting and harvesting dates, name of variety, fertilizers applied, irrigations, plant protection measures, etc.

<b>AS-63</b>	<b>: Plant geometry in relation to mechanization in sugarcane</b>
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- Objective** : 1. To work out optimum plant geometry for use of farm machinery.  
2. To study varietal response to different planting geometry.
- Year of Start** : 2011-2012
- Year of completion** : 2013-2014
- Locations** : Lucknow, Pantnagar, Pune, Navsari, Thiruvalla, Faridkot, Pusa, Padegaon, Ludhiana, Modipuram and Kolhapur
- Treatments** : **A. Plant geometry**  
(i) 120 cm row distance  
(ii) 150 cm row distance  
(iii) 30 : 120 cm for subtropical region (Paired)  
30 : 150 cm for tropical region (Paired)
- B. Genotype: Four genotypes with distinct plant morphological traits**
- Design** : Split plot
- Replications** : Four
- Plot size** : 6.0 m x 8.0 m
- Date of planting** : Subtropical : February - March  
Tropical : December - January
- Observations** : 1. Germination count at 35 DAP  
2. Tiller population at 90,120 and 180 DAP  
3. Plant height at 120 & 180DAP.  
4. Juice sucrose at one month prior to harvest and at harvest.  
5. Number of millable canes, length and girth of the cane at harvest.  
6. Cane and sugar yield.

<b>AS-64 : Response of sugarcane crop to different plant nutrients in varied agro-ecological situations</b>
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Objective : To study differential response of sugarcane crop to different nutrients.

Year of Start : 2011-2012

Year of completion : 2013-2014

Locations : All participating centres

Treatments :

1. Control (No Fertilizer)
2. N
3. NP
4. NPK
5. NPK+S
6. NPK+Zn
7. NPK+Fe
8. NPK+Mn
9. NPK+S+Zn
10. NPK+S+Zn+Fe
11. NPK+S+Zn+Fe+Mn
12. Soil test based fertilizer application
13. FYM @ 20 t/ha

**Note :**

S : 40/60 kg/ha-elemental sulphur (Subtropical / Tropical)

Zn : 25/50 kg ZnSO<sub>4</sub>/ha (Subtropical / Tropical)

Fe : Foliar spray of 1% FeSO<sub>4</sub> thrice in weekly interval at vegetative stage

Mn : 5/10 kg MnSO<sub>4</sub>/ha (Subtropical / Tropical)

N P K as per recommendations

Design : RBD

Replications : Three

Plot size : 6 rows ; 8 m length

Date of planting : Sub-tropical : February – March  
Tropical : December - January

Observations to be recorded :

1. Germination count at 35 DAP
2. Tiller population at 90,120 and 180 DAP
3. Plant height at 120 & 180DAP.
4. Juice sucrose at one month prior to harvest and at harvest.
5. Number of millable canes, length and girth of the cane at harvest
6. Cane and sugar yield.
7. Soil analysis : Initial and final Soil O.C, Soil pH, EC, N,P,K, Fe, Mn, Zn, S
8. Analysis of FYM for chemical properties.

<b>AS-65</b>	<b>: Enhancing sugarcane productivity and profitability under wheat – sugarcane cropping system</b>
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- Objective : To enhance the productivity of sugarcane under wheat-sugarcane cropping system.
- Year of Start : 2012-2013
- Year of completion : Three crop cycles
- Locations : Subtropical centres (Faridkot, Ludhiana, Sriganaganagar, Uchani, Lucknow, Pantnagar, Modipuram, Pusa and Bethuadahari)
- Treatments :
- T<sub>1</sub> : Autumn planted sugarcane
  - T<sub>2</sub> : T<sub>1</sub> + Wheat (1:2)
  - T<sub>3</sub> : T<sub>1</sub> + Wheat (1:3)
  - T<sub>4</sub> : Wheat sown on 15<sup>th</sup> Nov. – late sugarcane
  - T<sub>5</sub> : Wheat sown on 15<sup>th</sup> Dec- late sugarcane
  - T<sub>6</sub> : FIRB sowing of wheat 15<sup>th</sup> Nov. (75 cm with 3 rows of wheat) + sugarcane in furrow in 3<sup>rd</sup> week of February.
  - T<sub>7</sub> : FIRB sowing of wheat 15<sup>th</sup> Nov. (75 cm with 3 rows of wheat) + sugarcane in furrow in 3<sup>rd</sup> week of March.
  - T<sub>8</sub> : T<sub>6</sub> with 15<sup>th</sup> December sowing of wheat
  - T<sub>9</sub> : T<sub>7</sub> with 15<sup>th</sup> December sowing of wheat
- Design : RBD
- Replication : Three
- Plot size : 6 rows ; 8 m length
- Date of sowing : As per treatments
- Observations to be recorded :
- Wheat :**
1. Germination count
  2. Number of tillers at 30,60 and 90 DAS
  3. Days to maturity
  4. Straw and grain yield
- Sugarcane :**
1. Germination count at 45 DAP
  2. Tiller population at 90,120 and 180 DAP
  3. Plant height at 120 & 180 DAP.
  4. Juice sucrose at harvest.
  5. Number of millable canes, length, diameter and weight of cane at harvest
  6. Cane and sugar yield.
  7. B:C ratio

<b>AS-66</b>	<b>: Priming of cane node for accelerating germination</b>
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- Objectives : (i) To find out suitable cane node priming technique.  
(ii) To assess the effect of cane node on acceleration of germination.
- Year of Start : 2012-2013
- Centres : All participating centres
- Treatments : : T<sub>1</sub> : Un-primed cane node  
T<sub>2</sub> : Treating cane node in hot water at 50°C for 2 hours.  
T<sub>3</sub> : Treating cane node in hot water (50° C) urea solution (3%) for 2 hours  
T<sub>4</sub> : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio.  
T<sub>5</sub> : Conventional 3-bud sett planting.  
\*T<sub>6</sub> : Primed and sprouted cane node (Incubated for four days after priming)  
(\*Put the single cane node in the slurry of cattle dung, cattle urine and water for 15 minutes. Take out the buds and put in decomposed FYM and cover it with sugarcane trash for 4-5 days for sprouting.)
- Design : RBD
- Replication : Four
- Observations to be recorded : 1. Germination at 10, 20, 30 and 40 DAP  
2. Shoot counting at 60, 90, 120 and 150 DAP  
3. Per clump shoot counting at 60, 90, 120 and 150 DAP  
4. Number of millable canes, cane length, diameter and weight of cane  
5. Juice quality (brix, pol % juice and purity)  
6. Cane and sugar yields

Note :

1. Cane nodes having bud and root bands with 4-5 cm length and 10-15 in weight will be taken up for planting.
2. Normal package of practices will be followed.
3. After planting cane nodes in furrows, these will be covered with 2-3 cm soil layer.
4. At the time of planting, there should be 60% available moisture in the soil.
5. Depth of planting at 10 cm with soil coverage of 2.5 cm. Plant to plant spacing at 30 cm.

<b>AS-67</b>	<b>: Optimization of fertigation schedule for sugarcane through micro irrigation technique under different agro-climatic conditions</b>
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- Objective : To economize water use in cultivation and improve sugarcane productivity.
- Year of start : 2011-12
- Centres : Cuddalore, Mandya, Lucknow and Faridkot
- Treatments : **A. Irrigation water/ method applied:**
- I<sub>1</sub> : Sub-surface drip irrigation at 75% Pan Evaporation (PE)-irrigation once in two days.
  - I<sub>2</sub> : Sub-surface drip irrigation at 100% PE- irrigation once in two days.
  - I<sub>3</sub> : Sub-surface drip irrigation at 125% PE- irrigation once in two days.
  - I<sub>4</sub> : Farmer's practice – surface irrigation
- B. Nitrogen levels :**
- N<sub>1</sub> : 100% recommended dose of nitrogen (RDN)
  - N<sub>2</sub> : 75% (RDN)
  - N<sub>3</sub> : 50% (RDN)

**Details of Methodology :**

Recommended variety of sugarcane will be planted in paired rows at recommended spacing for the region. Drip treatments will be placed between sugarcane rows at a depth of 20-25 cm. Entire dose of P and K fertilizers as per recommendation of the region will be applied. Entire dose of nitrogen after deducting the amount of N supplied through DAP will be applied through urea in different installments at 10-12 days interval before onset of monsoon as per the recommendation.

- Treatments : 12
- Design : Strip Plot
- Replication : 3
- Plot size : 10 rows of 10 meter length
- Observations to be recorded : **A. Soil parameters**
- 1. Physical parameters (bulk density and infiltration rate)
  - 2. Quantity of water applied
  - 3. Water use efficiency
- B. Sugarcane:**
- 1. Germination
  - 2. Periodic tiller population and millable cane count
  - 3. Growth parameters i.e., cane length, diameter and weight
  - 4. Juice quality (brix, pol and purity)
  - 5. Cane and sugar yields

## PLANT PATHOLOGY

### Technical Programme – 2013-2014

**PP 14 & : Identification of pathotypes of red rot pathogen**

**PP 14 (a) : Maintenance of isolates of red rot pathogen**

**Objective :** To gather information on the major pathotypes of red rot from the different areas/zones.

**Year of start :** 1983-84 (Continuing project)

**Location :**

North West Zone	:	Lucknow, Shahjahanpur, Ludhiana, Uchani and Karnal (SBI)
North Central Zone	:	Pusa and Seorahi
East Coast Zone	:	Anakapalle and Cuddalore
Peninsular Zone	:	Navsari, Coimbatore and Thiruvalla

Working isolates showing pathogenic variability from the previously reported pathotypes at different centers will be confirmed at the following centers : Lucknow and Uchani (North-West zone) and S.B.I., Coimbatore (Peninsular and East Coast zones). The participating centers will deposit such working isolates at the above mentioned centers latest by June 15 of each year. The zonal centers will also maintain the type cultures.

**Sugarcane Differentials (14 Nos.) :** 1. *Baragua* (*S. officinarum*); 2. *Khakai* (*S. sinense*); 3. SES 594 (*S. spontaneum*); 4. CoS 767; 5. BO 91; 6. CoC 671; 7. Co 7717; 8. Co 997; 9. CoJ 64; 10. Co 1148; 11. Co 419; 12. Co 62399; 13. Co 975; 14. CoS 8436

**Note:** In order to replace some of the current differentials with new ones, additional varieties viz., Co 7805, Co 86002, Co 86032, CoV 92102 and CoSe 95422 are to be multiplied at SBI, Coimbatore and SBI Research centre, Karnal during 2013-14 for supply of seed to AICRP centres for inclusion in this project.

**No. of isolates :** Virulent isolates collected from red rot affected canes of commercially cultivated varieties in the zone.

**Method of inoculation :** Plug method of inoculation is to be used (Details vide PP.17). Inoculations with each isolate to be done on all the differentials with freshly prepared spore suspension. All inoculations to be completed in 2 days by last week of August.

**Observation :** One observation at 60<sup>th</sup> day of inoculation.

**Evaluation** : The canes are to be split open longitudinally. Inoculated canes free from borer infestation and other damages are taken for evaluation. Based on parameters viz., nodal transgression, lesion width, white spots, top yellowing/drying, rind infection and sporulation over the rind, the host reaction is categorized into three groups viz., Resistant (R), Susceptible (S) and Intermediate (X) as follows –

- R : Lesion width laterally restricted; nodal transgression up to 2 nodes; white spots, rind infection, sporulation over the rind and yellowing/drying of tops absent.
- S : Lesion width laterally spreading, nodal transgression more than 2 nodes; white spots progressive or restricted; in case of progressive white spots, rind infection, sporulation over the rind and yellowing/drying of tops absent or present.
- X : Lesion width laterally restricted or spreading; nodal transgression more than 2 nodes; white spots absent or present (restricted type), rind infection, sporulation over the rind and yellowing/drying of tops absent.

<b>PP 17 : Evaluation of zonal varieties for resistance to red rot, smut and wilt</b>
---

**Objective** : To gather information on the relative resistance to red rot, smut and wilt of the entries in zonal varietal trial of the respective zones.

**A. RED ROT**

**Locations** :

- North West Zone : Lucknow, Ludhiana, Uchani, Shahjahanpur, Pantnagar and Karnal (SBI)
- North Central Zone : Pusa, Motipur, Seorahi and Bethuadahari
- North East Zone : Buralikson
- East Coast Zone : Anakapalle and Cuddalore
- Peninsular Zone : Thiruvalla, Navsari and Coimbatore

**Year of Start** : 1986-87 (Continuing project)

**Varieties** : All the centres will test all the entries of early and midlate groups under IVT and AVT of the respective zones. The seed material for this programme is to be obtained from the respective breeders of the centres. One six-metre row of at least 20 clumps may be kept for inoculation with each pathotype by plug/nodal cotton swab method. Any red rot susceptible variety of the same maturity group may be used as standard (check).



### Inoculum (Pathotypes to be used) :

- North West Zone : CF 08 & CF 09 (To be inoculated separately)  
North Central Zone : CF 07 & CF 08 (To be inoculated separately)  
East Coast Zone : CF 04 & CF 06 (To be inoculated separately)  
Other zones : Two widely occurring isolates on commercial varieties in the area

(Note: If pathotypes are not available, CF 07, CF 08 and CF 09 may be obtained from IISR, Lucknow and CF 04 & CF 06 from RARS, Anakapalle.)

Freshly sporulating, 7-day-old, culture, in Petri-dishes will be taken. The spore mass will be washed with 100 ml of sterile water and collected in a flask. Conidial suspension at a spore concentration of one million spores per ml will be prepared for inoculation. Fresh inoculum should always be used for inoculation. To maintain the virulence of pathotype, it should be inoculated in susceptible variety and re-isolated and purified.

### Method of inoculation

**1. Plug Method :** Two canes in each of the 20 clumps to be inoculated. Inoculation is to be done in the middle of the 3<sup>rd</sup> exposed internode from bottom and two drops of the spore suspension is to be injected with a large syringe in each cane and sealed with plastic clay (plasticine) or modeling clay.

**2. Nodal Cotton Swab Method :** Two canes in each of 20 clumps will be inoculated by removing leaf sheath (lower most green leaf sheath) and immediately placing cotton swab (dipped in freshly prepared inoculum suspension) around the cane covering nodal region. The cotton swab should be held in place by wrapping parafilm over the swab.

### Evaluation

**1. Plug Method :** The canes to be split open longitudinally sixty days after inoculation along the point of inoculation. Inoculated canes free from borer infestation and other damages are taken for evaluation. This is graded on the international scale of 0-9 as follows :

Variety (genotype): ----- Method of inoculation: -----

No. of canes evaluated	Condition of tops*	Lesion width ** (LW)	White spot < (WS)	Nodal transgression ※ (NT)	Total Score	Remarks
1.						
2. to						
15.						

\* 1.Condition of top : Green (G)-0; Yellow (Y)/Dry (D)-1.

\*\*2. Lesion width above to inoculated internode is assigned the score 1, 2 or 3

< 3. White spot is assigned score of 1 or 2 according to whether it is restricted or progressive.

※4. N.T. No. of nodes crossed above the inoculated internode and given the score as :

1- if one node crossed; 2-if two nodes crossed; 3. if three nodes are crossed (maximum)

Average Score = Total Score/No. of canes evaluated

**Disease reaction : 0-9 scale**

0.0 to 2 - R  
2.1 to 4 – MR  
4.1 to 6 – MS  
6.1 to 8 – S  
Above 8 – HS

**Note :** Average score is taken into account for assigning the disease reaction.

**2. Nodal Cotton Swab Method :** Remove cotton swab and scrap the node with a knife. Record presence/absence of lesions. In case lesions are progressing into stalk, the reaction is to be recorded as S (susceptible) and if no lesion development, then R (resistant).

**B. SMUT**

**Locations :**

North West Zone : Lucknow, Ludhiana, Uchani, Shahjahanpur and Pantnagar  
North Central Zone : Pusa, Motipur and Seorahi  
East Coast Zone : Anakapalle and Cuddalore  
Peninsular Zone : Coimbatore, Powarkheda, Thiruvalla, Padegaon, Navsari, Kolhapur, Sankeshwar and Pune

**Year of Start :** 1994-1995

**Varieties :** All the entries of early and midlate group under IVT and AVT of the respective zones. The seed material is to be obtained from the respective breeders of the centre.

**Inoculum :** *Sporisorium scitamineum* (Syn. *Ustilago scitaminea*) teliospores freshly collected from smut susceptible sugarcane varieties will serve as source of inoculum.

**Storage :** Freshly collected whips are air dried by keeping under shade and teliospores are collected in butter paper bags and are stored in desiccator under anhydrous calcium chloride. Spore viability is to be ensured before inoculation.

**Inoculation :** The method of inoculation consists of steeping of setts (three bud) for 30 minutes in a spore suspension of over 90% viability and with a spore load of one million spores per milliliter.

**Plot size & Planting :** The plot size is one, 3-metre row planted with 10, three-bud setts with a minimum of two replications.

**Standards :** Any smut susceptible and resistant variety of same maturity group may be used as standard (check).

**Observations :** Number of smut affected clumps per row are to be recorded. Smut incidence at fortnightly intervals has to be recorded up to harvest of the crop.

**Evaluation :** Evaluation is based on percentage of total clumps infected (No. of affected clumps/total clumps x100). It is required to maintain at least 15 to 20 clumps in each genotype before arriving at the percentage of infection. The following grading is to be followed for disease reaction:

0 %	:	Resistant
>0 to 10 %	:	Moderately resistant
>10 to 20 %	:	Moderately susceptible
>20 to 30 %	:	Susceptible
Above 30 %	:	Highly susceptible

### C. WILT

**Location :** Ludhiana, Lucknow, Pusa, Navsari, Sankeshwar and Anakapalle

**Year of Start :** 2000-2001

**Varieties :** Entries of AVT of the respective zones.

**Plot size & Planting :** Two rows of 5 m length, planted under wilt sick soils.

**Standards :** Any wilt susceptible and resistant variety of the zone.

**Observations :**

1. Germination count at 45 days after planting
2. Appearance of wilt symptoms on the standing canes (on clumps)
3. At the end of 10 months, 10 clumps are to be uprooted with roots. All the canes from the clumps will be split open longitudinally and the wilt severity index scored on a 0-4 scale.

**Evaluation :** 0-4 Scale of wilt severity index

#### Grade Symptoms

- 0 Healthy canes and roots with no external or internal symptoms of wilt.
- 1 No wilting or drying of leaves, no stunting or shrinking of the stalk or rind, slight pith formation with yellow discolouration of the internal tissues in one or two lower internodes only. No cavity formation or fungal growth seen. Apparently normal and healthy roots.
- 2 Mild yellowing of top leaves and drying of lower leaves, mild stunting and shrinking of the stalk and rind. Yellowish discolouration of the internal tissues extending to three or four bottom internodes. Slight cavity formation of the pith, no fungal growth seen, slightly discoloured roots.
- 3 Mild yellowing of top leaves and drying of lower leaves, mild stunting and shrinking of the stalk and rind. Light brown discolouration of the internal tissues throughout the entire length of the cane except the top. Severe pith and cavity formation. Sparse fungal growth observed in the pith cavities.

- 4 Complete yellowing and death of the leaves, marked stunting, shrinking and drying of the stalk and rind, dark brown discolouration of the internal tissues extending throughout the entire length of the cane. Large pith cavities with profuse overgrowth of the associated fungi. Most of the roots necrotic with dark discolouration dislodge easily from the stalks. Roots mildly discoloured and slightly necrotic.

The mean wilt severity index is worked out based on the number of canes samples.

$$\text{Mean wilt severity index} : \frac{\text{Sum of wilt indices of individual stalks}}{\text{Number of stalks samples}}$$

**PP 22 : Survey of sugarcane diseases naturally occurring in the area on important sugarcane varieties**

- Objective** : To gather information on the diseases naturally occurring in the area on varieties for compiling an all India disease status report yearly
- Locations** : Lucknow, Ludhiana, Uchani, Shahjahanpur, Pantnagar, Karnal (SBI), Modipuram, Pusa, Seorahi, Buralikson, Anakapalle, Cuddalore, Coimbatore, Mandya, Sankeshwar, Powarkheda, Thiruvalla, Padegaon, Kolhapur, Navsari and Pune.
- Year of Start** : 1989-1990
- Observations** : Periodic observations in June, September and December in all locations to gather information on the **per cent incidence of diseases** on all varieties of the area (General survey)

**PP 23 : Assessment of elite and ISH genotypes for resistance to red rot**

- Objective** : To gather information on *Saccharum* sp. and elite genotypes for resistance to red rot, so that the resistant genotypes could be used in breeding programme as possible donor for resistance
- Locations** : Ludhiana, Uchani, Karnal, Shahjahanpur, Lucknow, Pusa, Seorahi, Anakapalle, Cuddalore and Navsari.
- No. of genotypes** : Director, SBI, Coimbatore may be requested in advance for supply of seed material of the genotypes.
- Plot size** : One, six metre row of at least 10 clumps
- No. of isolates** : As indicated in PP 17 experiment.
- Method of inoculation** : Plug method only.
- Inoculum** : As per details given under PP 17 (Pathotypes to be inoculated individually only)
- Method of evaluation** : As per details in PP 17

<b>PP 28 (a) : Management of rust of sugarcane</b>
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**Objective** : To find out effective method of rust management through chemicals.

**Locations** : Pune, Padegaon, Kolhapur, Sankeshwar and Anakapalle

**Year of Start** : 2012-13

**Treatment :**

**I. Variety** : Rust susceptible variety of the area (Date of planting : July/August)

**II. Fungicides**

T.1	- Chlorothalonil	-	0.25 %
T.2	- Propineb	-	0.20 %
T.3	- Triadimefon	-	0.10 %
T.4	- Mancozeb	-	0.30 %
T.5	- Control (Untreated)	-	-

**III. Time of application of fungicides :** To be applied just after appearance of rust pustules followed by two sprays at 15 days interval.

**Plot size** : 6 x 7 sq. m

**Design** : RBD

**Replications** : Three

**Observations :**

1. Germination %
2. Disease severity (% leaf area covered with rust pustules based on observations of 10 leaves per clump; total no. of clumps to be observed at least 10 )
3. Cane yield per plot and per hectare
4. Brix, Pol %, Purity and CCS %
5. Cost-benefit ratio

**PP 28 (b) : Methodology for screening sugarcane genotypes for resistance to brown rust (*Puccinia melanocephala*)**

**Objective :** To standardize methodology for inoculation of urediniospores of brown rust and rating of resistance.

**Year of start :** 2013-14

**Locations :** Pune, Padegaon, Kolhapur, Sankeshwar and Anakapalle

**i. Inoculation methodology :**

**(i) Clip inoculation in leaf whorl**

As soon as brown rust appears in field, select rust affected leaves. Cut leaf bits (clips) measuring 8-10 cm. Select ten rust-free plants of the same susceptible variety in different location. In three shoots of each plant (clump), insert 2-3 clips in the leaf whorl of each shoot.

**(ii) Leaf whorl inoculation**

As soon as brown rust appears in field, collect rust affected leaves. Make a suspension of urediniospores in sterilized distilled water ( $10^4$ – $10^5$  spores/ml). Pour 1 ml freshly prepared urediniospore suspension in each leaf whorl. Inoculate in 10 clumps (three shoots per clump) of same susceptible variety.

In the aforementioned two methods, plants to be inoculated may be marked by cutting one-third of the tips of the uppermost leaves so that they can easily be identified during recording observations.

**Observations :** After 4 weeks, record symptoms on leaves by counting- (i) average number of rust pustules per square inch, and (ii) number of leaves bearing rust pustules.

**ii. Rating of resistance:** To be taken up after standardization of inoculation method.

**Note:** The inoculation methods have been amended in consultation with the PI (Plant Pathology (Refer proceedings of technical session of Plant Pathology during the Workshop – 2012).

<b>PP 30:      Assessment of field resistance in sugarcane to red rot</b>
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**Objective** : Identification sugarcane varieties exhibiting field resistance to red rot.

**Year of Start** : 2010-11

**Duration** : 3 years

**Location** : North West Zone : Pantnagar  
North Central Zone : Pusa  
East Coast Zone : Cuddalore, Anakapalle  
Peninsular Zone : Navsari and Coimbatore

**Methodology** :

**Isolates/pathotypes:** North West Zone - CF 08 & CF 09

North Central Zone - CF 07 & CF 08

East Coast Zone - CF 04 & CF 06

Peninsular Zone - prevailing isolates/pathotype

**Varieties** : Two released & notified moderately resistant (by plug method) checks, two known susceptible checks of the zone and 10-15 entries in IVT/AVT which are susceptible under nodal cotton swab method of inoculation

**Inoculum preparation:** One kg of sorghum grain (partially broken grains without powdering) and sand mixture (1:3 ratio) mixed with 100 ml of distilled water. The thoroughly mixed medium is to be distributed in container either in glass bottle or 500 ml conical flask and sterilized at 15 lb pressure for 2 hr. After 2 days, each container is inoculated with mycelia/spore suspension. After 15 days, the inoculum will be ready for application.

**Method of application:** 150 g of grain inoculum/ 20 ft row is applied at the time of planting. The inoculum is to be applied on the setts in the furrows and covered with soil before irrigation and it has to be mixed with equal quantity of sand to have uniform distribution.

**Observations:** Disease development is to be recorded at pre-emergence as well as post-emergence stages at monthly intervals till maturity of crop. Disease development is indicated by death of settlings, yellowing and drying of leaves, mid rib lesions in the whorl and production of dead hearts, which can not be pulled out easily as in early shoot borer. From affected settling/plant part, the pathogen should be re-isolated for confirming the presence of *C. falcatum*. The information generated should be presented in tabular form giving details of symptoms observed after planting date as exemplified below:

**Table : Assessment of field resistance of sugarcane varieties to red rot**

S.No.	Variety	Resistance Level (MR / S)	Symptoms observed followed by no. of days after planting	<i>C. falcatum</i> recovered (Yes / No)	Any other information
1.	CoJ 64 (For example)	Field S	SY (65), SM (90), CR (150), LY (160), CD (180)	Yes	In all five clumps were affected
2.					
3.					
4.					
5.					
6.					

**Symptom code:** Yellowing of leaves in settling (SY); Drying of leaves in settling (SD); Settling mortality (SM); Rotting in intermodal tissue of cane (CR); Yellowing of spindle leaves (LY); Drying of spindle leaves (LD); Whole clump drying (CD).

<b>PP 31: Screening, epidemiology and management of pokkah boeng in sugarcane</b>
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**Objectives :** To study the development of pokkah boeng disease in relation to weather parameters and its management in sugarcane crop.

**Location :** Uchani, Shahjahanpur, Seorahi, Kolhapur, Pune, Akola and Anakapalle

**Year of start :** 2011-2012

**Observations to be recorded :** Screening the desirable varieties for the incidence of pokkah boeng, correlation of climatic factors in relation to disease development and management of pokkah boeng under field conditions if the disease reaches acute phase.



**(i) Screening:**

**Symptoms to be observed**

**Mild** - Green plants with pokkah boeng (curling/ twisting of spindle leaves, tearing of leaves, whitish/chlorotic streaks on the leaves) at varying intensities.

**Moderate** - Yellowing of 3<sup>rd</sup>/ 4<sup>th</sup> leaf followed by complete yellowing of foliage and expression of top rot symptom

**Severe** - Yellowing of leaves + Discolouration (Light coloured) of stalks + Wilting symptom in opened stalks

Observe for the presence of above symptoms and grade it as given below:

Varieties*	Per cent infected plants				Disease reaction
	Mild	Moderate	Severe	Total incidence	
V1					
V2					
V3					

\*: No restriction on number of varieties to be studied

**Disease Reaction:**

0-5% - Resistant; >5-10% - Mod. Susceptible; >10-20% - Susceptible; > 20% - Highly Susceptible

**(ii) Epidemiology**

Record temperature, relative humidity and rainfall from May to September and establish correlation with disease incidence

**(iii) Management-** (To be taken up after decision is taken in Workshop / Group Meeting of AICRP)

**Varieties :** Two susceptible varieties

**Treatments:**

T-1. Sett treatment - Overnight soaking with Carbendazim – 0.1% a.i.

T-2. Foliar spray - Carbendazim – 0.05% a.i. (3 sprays at 15 days interval from May15th)

T-3. Sett treatment (T1) + Foliar spray with carbendazim (T2)

T-4. Control

**Replications: 4**

**Observations:** Record disease incidence of pokkah boeng displaying symptoms of top rot or wilt or both and present, the data in tabular form

## For North West Zone

### PP 14: Pathogenic behaviour of isolates of *C. falcatum* on a set of differentials

Sl. No	Pathotype /Isolate	Source	Reaction of host differentials													
			Co 419	Co 975	Co 997	Co 1148	Co 7717	Co 62399	CoC 671	CoJ 64	CoS 767	CoS 8436	BO 91	Bara-gua	Kakhai	SES 594
1.	CF 01	Co 1148														
2.	CF 02	Co 7717														
3.	CF 03	CoJ 64														
4.	CF 07	CoJ 64														
5.	CF 08	CoJ 64														
6.	CF 09	CoS 767														
7.	CF 11	CoJ 64														
8.	New isolate/s															

The order of the differentials to be maintained and if additional differentials are added they may be given at the end.

## For North Central Zone

### PP 14: Pathogenic behaviour of isolates of *C. falcatum* on a set of differentials

Sl. No	Pathotype /Isolate	Source	Reaction of host differentials													
			Co 419	Co 975	Co 997	Co 1148	Co 7717	Co 62399	CoC 671	CoJ 64	CoS 767	CoS 8436	BO 91	Bara-gua	Kakhai	SES 594
1.	CF 07	Co J 64														
2.	CF 08	CoJ 64														
3.	New isolate/s															

The order of the differentials to be maintained and if additional differentials are added they may be given at the end.

**For East Coast Zone**

**PP 14: Pathogenic behaviour of isolates of *C. falcatum* on a set of differentials**

Sl. No	Pathotype /Isolate	Source	Reaction of host differentials													
			Co 419	Co 975	Co 997	Co 1148	Co 7717	Co 62399	CoC 671	CoJ 64	CoS 767	CoS 8436	BO 91	Baragua	Kakhai	SES 594
1.	CF 04	Co 419														
2.	CF 05	Co 997														
3.	CF 06	CoC 671														
4.	CF 10															
5.	New isolate/s															

The order of the differentials to be maintained and if additional differentials are added they may be given at the end.

**For Peninsular Zone**

**PP 14: Pathogenic behaviour of isolates of *C. falcatum* on a set of differentials**

Sl. No	Pathotype /Isolate	Source	Reaction of host differentials													
			Co 419	Co 975	Co 997	Co 1148	Co 7717	Co 62399	CoC 671	CoJ 64	CoS 767	CoS 8436	BO 91	Baragua	Kakhai	SES 594
1.	CF 06	CoC 671														
2.	New isolate/s															

The order of the differentials to be maintained and if additional differentials are added they may be given at the end.

**PP 22: Survey of naturally occurring sugarcane diseases**

Sl.No.	Disease	Name of area* surveyed	% Disease incidence (clump basis)	Varieties affected	Crop stage when observed	Any other information
1	Red rot					
2	Smut					
3	Wilt					
4	RSD					
5	YLD					
6	GSD					
7	Foliar Diseases (Specify)					
8	Other disease problems specific to the location					

\* Mention name of district also; RSD= Ratoon stunting disease; YLD= Yellow leaf disease; GSD= Grassy shoot disease

## ENTOMOLOGY

### Technical Programme – 2013-2014

<b>Project E.4.1</b>	<b>:</b>	<b>Evaluation of zonal varieties/genotypes for their reaction against major insect pests</b>
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**Objective** : To grade the entries in the zonal varietal trials for their behaviour towards damage by key pests in the area.

**Year of Start** : 1985-86 (continuing)

**Locations** : Ludhiana, Uchani, Karnal (SBI), Lucknow, Shahjahanpur, Pusa, Seorahi, Bethuadahari, Buralikson, Anakapalle, Navsari, Padegaon, Pune, Powarkheda, Kolhapur, Mandya, and Akola.

**No. of replications** : Three

**Plot size** : A minimum of 3, six metre, rows/variety per replication

**Methodology** : The experiment should be conducted separately without insecticidal application. The seed material is to be obtained from the breeders of the respective centres. The susceptible check variety for each major insect pest is to be included.

#### Observations to be recorded:

For shoot borer : i) Per cent incidence (based on dead-hearts)  
ii) No. of bored plants/ha

Observations to be recorded in post-germination phase at 30 days interval up to 120 days

For top borer : Per cent incidence during the 3rd and 4th broods (July, August and September) in North West, North Central and North East Zones and during 5<sup>th</sup> & 7<sup>th</sup> months and at harvest in Peninsular and East Coast Zones

For stalk and internode borers : (i) At harvest both per cent incidence and per cent intensity (25 canes per replication) may be recorded. The infestation index may also be computed as follows:

$$\text{Infestation index} = \frac{\text{Per cent incidence} \times \text{per cent intensity}}{100}$$

(ii) The yield and quality parameters are also to be recorded in both healthy and bored canes and CCS/plot calculated separately.

- For pyrilla : Population of nymph, adult and egg masses be recorded from a unit of 10 canes (20 leaves) and average per leaf sheath be reported.
- For white fly : Population of nymph and puparia be recorded from a unit of 10 canes (20 leaves), from proximal, middle and distal region. Average population cm<sup>2</sup> be reported.
- For white grub : Grub as well as adult population be recorded by digging 1 square meter area at 5 sites in the field. Population per ha be calculated and reported.
- Observations also to be recorded on termites, thrips and mite infestation and broad categorisation be made as less susceptible, susceptible and highly susceptible.

**Note :**

1. In the first year, the entomologists will record observations in the breeder's trial (IVT) and from second year onwards they should take separate experiment with entries of AVT (plant and ratoon). A susceptible check be included in the trial.
2. A minimum of three years data are needed to grade the variety. (The maximum pest incidence should be considered instead of mean data of three years for grading the variety).
3. Grading of infestation level should be done as per following table:

*Grades of insect pests infestation*

<b>Pest</b>	<b>LS</b>	<b>MS</b>	<b>HS</b>
Early shoot borer (%)	Below 15.0	15.1-30.0	Above 30.0
Internode borer (%)	Below 20.0	20.1-40.0	Above 40.0
Scale insect	Below 10.0	10.1-35.0	Above 35.0
Mealy bug/spittle bug	Below 5.0	5.1-30.0	Above 30.0
Root borer	Below 15.0	15.1-30.0	Above 30.0
Top borer (%)	Below 10.0	10.1-20.0	Above 20.0
Stalk borer (infestation index)	Below 2.0	2.1-5.0	Above 5.0
Pyrilla (Nymph + Adult per leaf)	Below 5.0	5.1-20.0	Above 20.0
White fly (per square inch)	Below 2.0	2.1-5.0	Above 5.0
Woolly aphid	0 (Resistant) –Free 1 (Moderately resistant)– Less than 25% leaf area covered 2 (Moderately susceptible)– 25% leaf area covered 3 (Susceptible)– 25-50% leaf area covered 4 (Highly susceptible)– More than 50% leaf area covered		

<b>Project E. 28</b>	<b>:</b>	<b>Survey and surveillance of sugarcane insect pests</b>
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**Objective** : To identify key insect pests of sugarcane in the area  
**Duration** : Long term  
**Year of start** : 2003-2004  
**Locations** : All Centres where entomologists are available

**Methodology & observations to be recorded :**

- i) Roving survey of sugarcane fields at 5-8 Km distance be recorded.
- ii) Report containing information on location, variety, date of planting, spacing, fertilizer doses and inter crops, if any
- iii) Observations on incidence of borers be recorded by examining 100 canes at five places (four corners and in the middle), sucking pests by examining 20 canes and others as mentioned in technical programme of E 4.1.

<b>Project E. 30</b>	<b>:</b>	<b>Monitoring of insect pests and bioagents in sugarcane agro-ecosystem</b>
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**Objective** : To monitor the key insect pests and natural enemies in the area  
**Locations** : Ludhiana, Uchani, Karnal (SBI), Lucknow, Shahjahanpur, Modipuram, Pusa, Seorahi, Anakapalle, Navsari, Padegaon, Pune, Powarkheda, Kolhapur, Mandya and Akola.  
**Year of start** : 2006-2007  
**Duration** : Long term  
**Methodology** :  
1. Planting of sugarcane variety recommended for the region in 0.2 ha area.  
2. All recommended practices to be followed except application of insecticide.  
**Observations to be recorded** :  
1. Observations on incidence of borers be recorded by examining 100 canes at five places (four corners and in the middle), sucking pests by examining 20 canes and others as mentioned in technical programme of E 4.1.  
2. Meteorological data (weekly average) to be recorded on: temperature (max & min), relative humidity, no. of rainy days and total rainfall.

## Project E.33 : Bioefficacy of insecticides against mealy bugs in sugarcane

**Objective** : To evaluate efficacy of insecticides against mealy bugs in sugarcane.

**Year of Start** : 2011-12

**Locations** : Padegaon, Akola, Pune, Navsari, Anakapalle

**Design** : RBD (Randomized Block Design)

**Replications** : Three

**No. of treatments** : 9

**List of treatments:**

Treatment No.	Name of the treatment
1	Sett treatment of Imidacloprid 70 WG /SP 25 g a.i./ha + spraying of Imidacloprid 17.8 SL 0.005%
2	Sett treatment of Imidacloprid 70 % WG /SP 25 g a.i./ha + spraying of Thiamethoxam 25 WG 0.004%
3	Sett treatment of Imidacloprid 70 % WG /SP 25 g a.i./ha + spraying of Clothianidin 50 WSG 0.004%
4	Sett treatment of Imidacloprid 70 % WG /SP 25 g a.i./ha + spraying of Acetamaprid 20 SP 0.004%
5	Sett treatment of Thiamethoxam 70 WG /SP 10 g a.i./ha + spraying of Imidacloprid 17.8 SL 0.005%
6	Sett treatment of Thiamethoxam 70 WG /SP 10 g a.i./ha + spraying of Thiamethoxam 25 WG 0.004%
7	Sett treatment of Thiamethoxam 70 WG /SP 10 g a.i./ha + spraying of Clothianidin 50 WSG 0.004%
8	Sett treatment of Thiamethoxam 70 WG /SP 10 g a.i./ha + spraying of Acetamaprid 20 SP 0.004%
9	Untreated Control

**Plot size:** 6.0 m x 5.4 m

**Method of application:**

Dose of a.i. is based on 35000 three eye bud setts. Spraying will be done at the time of cane formation (Approximately 4 - 5 months after planting).

**Method of observation:**

Germination percentage at 30 and 45 DAP

**Randomly select 10 canes from 3 meter row length and count number of infested internodes out of total number of internodes**

1. Before spraying and 7, 15 and 30 DAS and at harvest.
2. Yield and quality parameters.

**Variety:** Most susceptible variety of respective centre.



<b>Project E.34</b>	<b>:</b>	<b>Standardization of simple and cost effective techniques for mass multiplication of sugarcane bio-agents</b>
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**Objective** : To develop simple and cost effective mass-multiplication techniques of promising bio-agents of the area.

**Duration** : Three years

**Year of start** : 2012-2013

**Location and bio-agents to be multiplied :**

Sr. No.	Locations	Target bio agents
1.	Anakapalle	<i>Beauveria bassiana</i>
2.	Uchani	<i>Encarsia</i> spp.
3.	Lucknow	<i>Metarhizium anisopliae</i> , <i>Beauveria bassiana</i> , <i>Chrysoperla carnae</i>
4.	Padegaon	<i>Chrysoperla carnae</i>

**Methodology** : Simple and cost effective host insect/media for multiplication of parasitoid/predator and insect pathogen/parasite.

- Note:**
1. For mass multiplication of entomopathogenic fungi, plant pathologist at the centre may be requested to jointly work.
  2. Uchani centre will provide *Beauveria bassiana* culture and Mandya centre may provide *Encarsia* culture.

## **Project E.35 : Bioefficacy of insecticides against white grub in sugarcane**

**Objective** : To evaluate bioefficacy of different insecticides against white grub in sugarcane.

**Year of Start** : 2012-2013

**Locations** : Uchani and Shahjahanpur

**Design** : RBD (Randomized block design)

**Replications** : Three

**No. of treatments:** 10

**List of treatments:**

**Soil application 15 days before onset of monsoon**

<b>Treatment No.</b>	<b>Name of the treatment</b>
1.	Chlorpyriphos 20 EC 1 kg a.i./ha
2.	Fipronil 0.3% G 60 g a.i./ha
3.	Deltamethrin 2.8 EC 25 g a.i./ha
4.	Imidacloprid 17.8 SL 100 g a.i./ha
5.	Thiamethoxam 20% SG 50 g a.i./ha
6.	Carbofuran 3% G 1.5 kg a.i./ha
7.	Clothianidin 50% WDG 100 g a.i./ha
8.	Control

**Plot size:** 6 x 6 m Gross; 6 x 5 m net

**Method of application:**

**Soil application before onset of monsoon**

**Method of observation:**

1. Larval population count per metre row length starting from 15 days after application of insecticide and succeeding 3 observations at monthly interval and final observation at harvest (per cent incidence).
2. Yield and quality parameters.

<b>Project E.36</b>	<b>:</b>	<b>Management of borer complex of sugarcane through lures</b>
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- Objective** : To manage sugarcane borers (early shoot borer, top borer, internode borer and stalk borer) through pheromone traps.
- Year of Start** : 2012-2013
- Variety** : Recommended variety of the location
- Location** :
- Peninsular Zone** : Mandya, Akola, Pune, Navsari, Powarkheda and Padegaon
  - East Coast Zone** : Anakapalle
  - North West Zone** : Ludhiana, Uchani, Shahjahanpur and Lucknow
  - North Central Zone** : Seorahi and Pusa
- Treatments** : Pheromone lures of sugarcane early shoot borer, top borer and stalk borer
- Plot size** : Two blocks, each of minimum half acre. In first block, trap should be installed and the second be kept as such (control). In between both blocks, at least one acre sugarcane crop should be taken to avoid the pheromone trap effect.
- Methodology** : In Peninsular and East Coast Zone, the test insect-pests will be early shoot borer, top borer and internode borer, while in north west and north central zones, early shoot borer, top borer and stalk borer. Three pheromone traps for each pest will be installed in the second fortnight of February till harvest of crop in one acre of sugarcane crop. The pheromone lure will be changed after 2 months.
- Observations to be recorded** :
1. Observations on number of moths trapped will be recorded at weekly interval. The mean number of moth capture will be worked out. The correlation and regression of moth captures will be worked out with weekly meteorological parameters.
  2. Infestation of each borer will be recorded in both blocks.
- Source of lure** : Pest Control (India) Private Limited, Division : Bio-Control Research Laboratories, PO Box 6426, Yelahanka Post Office, Bangalore – 560 064, Karnataka.

<b>Project E.37</b> : <b>Bioefficacy of new insecticides for the control of sugarcane early shoot borer</b>
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**Objective :** To find out effective strategy for the management of sugarcane early shoot borer

**Year of Start :** 2013-14

**Variety :** Recommended variety of the location

**Location :** Powarkheda, Mandya, Anakapalle, Padegaon, VSI, Pune, Navsari and Ludhiana

**Design :** RBD

**Number of treatments :** 9 (Nine)

**Number of replication :** 3 (Three)

**Plot size :** Gross: 6 m x 5.4 m  
Net: 6 m x 6.3 m

**Spacing :** Between two rows; 0.9 m (R-R)

**Seed rate :** As per the recommendation

**Fertilizer application :** As per the recommendation

**Treatments details:**

1. Soil application of fipronil 0.3 G @ 25 kg a.i./ha at the time of planting and 60 DAP
2. Soil application of Chlorantraniliprole 0.4 G @ 22.5 kg /ha at the time of planting and 60 DAP
3. Spraying of Chlorantraniliprole 18.5 SC 375 ml/ha at 30 and 60 DAP
4. Spraying of spinosad 45 SC @ 90 ml/ha at 30 and 60 DAP
5. Spraying of flubendiamide @ 250 ml/ha at 30 and 60 DAP
6. Spraying of flubendiamide 10 EC @ 1 lit/ha at 30 and 60 DAP
7. Soil application of phorate 10 G @ 15 kg/ha at the time of planting and 60 DAP
8. Soil application of carbofuran 3 G @ 33 kg/ha at the time of planting and 60 DAP
9. Untreated control

**Observations to be recorded:**

**(A) Early Shoot borer:**

- ESB infestation will be recorded by counting number of dead hearts easily pulled out and emitting offensive odour as well as the total number of shoots/plant in each net plot on 45, 60, 90 and 120 DAP.

- The per cent incidence of shoot borer will be worked out by following formula:

$$\text{Per cent incidence} = \frac{\text{Number of dead hearts}}{\text{Total number of shoots}} \times 100$$

- The cumulative per cent infestation will be worked out by taking progressive total of infested shoots in proportion to total shoot formed.

**Yield, growth and quality parameters:**

- (a) Germination (%)
- (b) Tillering per cent at 120 DAP
- (c) Number of millable cane
- (d) Cane yield (kg/ha)
- (e) Growth parameters [total cane height (cm), millable cane height (cm), number of internodes (10 canes/treatment/replication) and girth of cane (10 canes/ treatment/replication)].
- (f) Quality parameters.

**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)

**Centre-wise slot numbers allotted to sugarcane entries proposed for evaluation in AICRP(S)**

S.No	Centre	Slot number	Centre Code
<b>Peninsular Zone</b>			
1	Coimbatore (including Karnal)	001 - 060	Co
2	Mandya	061 – 070	CoVC
3	Navsari	071 - 080	CoN
4	Padegaon	081 - 090	CoM
5	PowarKheda	091- 100	CoJN
6	Sankeshwar	101 - 110	CoSnk
7	Thiruvalla	111 - 120	CoTl
8	VSI, Pune	121 - 130	CoVSI
9	EID Parry, Pugalur	131 - 140	PI
10	Sirugamani	141 - 145	CoSi
<b>North West Zone</b>			
11	Faridkot	181 - 190	CoPb
12	Kota	191 - 200	CoPK
13	Lucknow	201 - 210	CoLk
14	Ludhiana	211 - 220	CoPb
15	Pantnagar	221 - 230	CoPant
16	Shahjahanpur	231 - 250	CoS
17	Sriganganagar	251 - 260	CoSg
18	Uchani	261 - 270	CoH
<b>East Coast Zone</b>			
19	Anakapalle	321 - 335	CoA
20	Cuddalore	336 –345	CoC
21	Nayagarh	346 - 355	CoOr
22	Vuyyuru	356 –365	CoV
23	Perumallapalle	366- 375	CoT
24	Nellikuppam	376 –385	PI
<b>North Central Zone</b>			
25	Bethuadahari	426 - 435	CoB
26	Pusa	436 - 450	CoP
27	Seorahi	451 - 465	CoSe
<b>North East Zone</b>			
28	Buralikson	501 - 510	CoBln

**Note:** In each agro-climatic zone sufficient slot numbers are kept reserved for accommodating entries of centers identified in future under AICRP (S). The 3-digit slot numbers are to be prefixed by 2-digit number of the year in which entries are accepted for evaluation at AICRP (S) workshop/group meeting. Finally, a 5-digit number of a variety is to be preceded by the centre's code.

**List of entries for screening against major insect pests and diseases of sugarcane during 2013-2014**

**North West Zone**

**1. Initial Varietal Trial (Early)**

Early (3) : Co 10035, CoH 10261 and CoS 10231

**2. Advanced Varietal Trial (Early) – I Plant**

Entries (5) : CoH 09262, CoH 09263, CoLk 09202, CoPb 09181 and CoS 09246

**2. Advanced Varietal Trial (Early) – II Plant**

Entries (3) : CoPb 08211, CoPb 08212 and CoS 08233

**4. Initial Varietal Trial (Midlate)**

Entries (10) : Co 10036, Co 10037, Co 10039, CoH 10262, CoH 10263, CoPant 10221, CoPb 10181, CoPb 10182, CoPb 10183 and CoPb 10211

**5. Advanced Varietal Trial (Midlate) - I Plant**

Entries (5) : Co 09022, CoH 09264, CoLk 09204, CoPb 09214 and CoS 09232

**6. Advanced Varietal Trial (Midlate) - II Plant**

Entries (6) : CoH 08262, CoH 08263, CoH 08264, CoPb 08217, CoS 08234 and CoS 08235

## **NORTH CENTRAL AND EASTERN ZONE**

### **1. Advanced Varietal Trial (Early) – I Plant**

Early (4) : BO 153, CoP 08436, CoSe 09452 and UP 09453

### **2. Initial Varietal Trial (Midlate)**

Entries (3) : CoSe 10451, CoSe 10452 and CoSe 10453

### **2. Advance Varietal Trial (Midlate) – I Plant**

Entries (2) : BO 154 and CoP 09437

### **3. Advance Varietal Trial (Midlate) – II Plant**

Entries (3) : CoP 08437, CoSe 08451 and CoSe 08452

## **PENINSULAR ZONE**

### **1. Initial Varietal Trial (Early)**

Early (12) : Co 10004, Co 10005, Co 10006, Co 10024, Co 10026,  
Co 10027, CoM 10081, CoM 10082, CoN 10071, CoN 10072,  
CoT 10366 and CoT 10367

### **2. Advanced Varietal Trial (Early) - II Plant**

Entries (2) : Co 08001 and VSI 08121

### **3. Initial Varietal Trial (Midlate)**

Midlate (14) : Co 10015, Co 10017, Co 10031, Co 10033, CoM 10083,  
CoM 10084, CoN 10073, CoT 10368, CoT 10369,  
CoVC 10061, CoVSI 10121, CoVSI 10122, PI 10131  
and PI 10132

### **4. Advanced Varietal Trial (Midlate) - II Plant**

Entries (5) : Co 08008, Co 08009, Co 08016, Co 08020 and CoSnk 08101

## **EAST COAST ZONE**

### **1. Initial Varietal Trial (Early)**

Entries (5) : CoC 10336, CoA 11321, CoA 11322, CoA 11323 and CoC 113362

### **2. Initial Varietal Trial (Midlate)**

Entries (4) : CoA 11324, CoA 11325, CoA 11326 and CoOr 11346

### **3. Advanced Varietal Trial (Midlate) - I Plant**

Entries (3) : CoA 10321, CoC 10337 and CoOr 10346