

CROP IMPROVEMENT

Technical programme for the year 2017-2018

East Coast Zone

B II - ZONAL VARIETAL TRIALS

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

1. Initial Varietal Trial (Early)

Entries (4)	:	CoC 15336, CoC 15337, CoC 15338 and CoV 15356
Standards (3)	:	CoA 92081, CoC 01061 and CoOr 03151
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross : 6.0 m x 6r x 0.90 m Net : 5.0 m x 4r x 0.90 m
Seed rate	:	12 buds per meter
Date of planting	:	1 st fortnight of January
Crop duration	:	10 months
Data to be recorded	:	As per Annexure - I

2. Advanced Varietal Trial (Early) I Plant

Entries (3)	:	Co 13023, CoA 14321 and CoC 14336
Standards (3)	:	CoA 92081, CoC 01061 and CoOr 03151
Design	:	Randomized Block Design
Replications	:	Four
Plot size	:	Gross : 6.0 m x 8r x 0.9 m Net : 5.0 m x 6r x 0.9 m
Seed rate	:	12 buds per meter
Date of planting	:	1 st fortnight of January
Crop duration	:	10 months
Data to be recorded	:	As per Annexure - I

3. Advanced Varietal Trial (Early) – II Plant

Entries (5)	:	CoA 13322, CoA 13323, CoC 13336, CoC 13337 and CoV 13356
Standards (2)	:	CoC 01061 and CoA 92081
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross : 6.0 m x 8r x 0.9 m Net : 5.0 m x 6r x 0.9 m
Seed rate	:	12 buds per meter
Date of planting	:	1st fortnight of January
Crop duration	:	10 months
Data to be recorded	:	As per Annexure - I

4. Advanced Varietal Trial (Early) – Ratoon

Entries (5)	:	CoA 13322, CoA 13323, CoC 13336, CoC 13337 and CoV 13356
Standards (2)	:	CoC 01061 and CoA 92081
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross : 6.0 m x 8r x 0.9 m Net : 5.0 m x 6r x 0.9m
Date of ratooning	:	After harvest of the crop
Crop duration	:	9 months
Data to be recorded	:	As per Annexure - II

5. Initial Varietal Trial (Midlate)

Entries (5)	:	CoC 15339, CoC 15340, CoOr 15346, PI 15376 and PI 15377
Standards (3)	:	CoV 92102 ,Co 86249and Co 06030
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross : 6.0 m x 6r x 0.9 m Net : 5.0 m x 4r x 0.9 m
Seed rate	:	12 buds per meter
Date of planting	:	2 nd fortnight of November to end of December
Crop Duration	:	12 months
Data to be recorded	:	As per Annexure - III

6. Advanced Varietal Trial (Mid late) – I Plant

Entries (6)	:	Co 13028, Co 13029, Co 13031, CoA 14323, CoC 14337 and PI 14377
Standards (3)	:	CoV 92102, Co 86249 and Co 06030
Design	:	Randomized Block Design
Replications	:	Three
Plot size	:	Gross : 6.0 m x 8r x 0.9 m Net :5.0 m x 6r x 0.9 m
Seed rate	:	12 buds/meter
Date of Planting	:	2 nd fortnight of November to end of December
Crop duration	:	12 months
Data to be recorded	:	As per Annexure - III

7. Advanced Varietal Trial (Midlate) – II Plant

Entries (4)	:	CoA 11326, CoA 12324, CoC 13339 and CoOr 13346
Standards (2)	:	Co 86249 and CoV 92102
Design	:	Randomized Block Design
Replications	:	Four
Plot size	:	Gross : 6.0 m x 8r x 0.9 m Net : 5.0 m x 6r x 0.9 m
Seed rate	:	12 buds per meter
Date of planting	:	2 nd fortnight of November to end of December
Crop duration	:	12 months
Data to be recorded	:	As per Annexure - III

8. Advanced Varietal Trial (Midlate) – Ratoon

Entries (4)	:	CoA 11326, CoA 12324, CoC 13339 and CoOr 13346
Standards (2)	:	Co 86249 and CoV 92102
Design	:	Randomized Block Design
Replications	:	Four
Plot size	:	Gross : 6.0 m x 8r x 0.9 m Net : 5.0 m x 6r x 0.9 m
Seed rate	:	12 buds per meter
Date of ratooning	:	After harvest of the crop
Crop duration	:	11 months
Data to be recorded	:	As per Annexure - IV

9. Seed multiplication of new entries

The following entries were accepted during the 31st Biennial Workshop of AICRP(S) held at VSI, Pune in 2016. 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 (4) : CoA 16321, CoC 16336, CoC 16337 and CoV 16356

Midlate (5): CoA 16322, CoC 16338, CoC 16339, CoV 16357 and PI 16376

B.III - Evaluation and identification of climate resilient ISH and IGH genetic stocks

(i) Evaluation for drought tolerance (II Plant Crop)

Centres (4): Padegaon, Anakapalle, Faridkot and Karnal

- 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) : Padegaon : CoM 88121, CoM 0265 and one more check.
Anakapalle : CoA 06231, 83 R 23 and one more check.
Faridkot : CoJ 88, Co 98014 and one more check.
Karnal : CoJ 88, Co 98014. and one more check.
- Design : Alpha design (please refer layout plan annexed)
- Replications : Two
- Plot Size : 6m X 2r X 0.90 m
- Seed rate : 12 buds per meter
- Planting date : Padegaon and Anakapalle : 1st fortnight of February
Faridkot and Karnal : 2nd fortnight of February
- Crop Duration : 12 months
- Data to be recorded : As detailed below:
- 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

Layout plan for Evaluation and identification of climate resilient ISH and IGH genetic stocks for drought tolerance

Randomized Layout

Normal condition :

REPLICATION 1										
Block 1	24	27	1	30	17	13	5	11	8	21
Block 2	4	16	10	20	7	29	15	3	23	26
Block 3	6	19	14	12	22	18	25	28	9	2

REPLICATION 2										
Block 1	30	9	21	24	15	3	18	6	12	27
Block 2	26	23	14	8	29	11	2	17	20	5
Block 3	10	25	19	28	22	7	13	16	4	1

Droughtcondition :

REPLICATION 1										
Block 1	22	6	9	25	18	12	14	28	2	19
Block 2	20	4	3	7	16	29	10	26	23	15
Block 3	24	1	8	11	5	30	27	13	21	17

REPLICATION 2										
Block 1	7	25	16	22	1	10	13	4	19	28
Block 2	24	12	6	18	15	3	30	9	21	27
Block 3	2	8	14	29	23	26	11	17	20	5

Name of the clone and serial number :

S. No	Clone	S. No	Clone	S. No	Clone
1	BM 1003143	11	SA 04-390	21	MA 5/37
2	BM 1005149	12	SA 04-496	22	MA 5/99
3	BM 1009163	13	SA 04-409	23	MA 5/22
4	BM 1010168	14	AS 04-1689	24	GU 07-3849
5	BM 1022173	15	AS 04-245	25	GU 07-3774
6	PG 9869137	16	AS 04-2097	26	GU 07-2276
7	SA 98-13	17	AS 04-635	27	CYM 07-986
8	SA 04-454	18	AS 04-1687	28	Check 1
9	SA 04-472	19	MA 5/51	29	Check 2
10	SA 04-458	20	MA 5/5	30	Check 3

Note : In case one or two entries are missing due to unavailability of seed material, additional checks (other than Check 1,2,3) may be taken.

(ii) Evaluation for drought tolerance (Ratoon Crop)

Centres (4):Padegaon, Anakapalle, Faridkot and Karnal

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) : Padegaon : CoM 88121, CoM 0265 and one more check.
Anakapalle :CoA 06231, 83 R 23 and one more check.
Faridkot : CoJ 88, Co 98014 and one more check.
Karnal : CoJ 88, Co 98014. and one more check.

Design : Alpha design

Replications : Two

Plot Size : 6m X 2r X 0.90 m

Ratooning date : Immediately after harvest of I Plant crop

Crop Duration : 11 months

Data to be recorded : As detailed below:

- 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.III - Evaluation and identification of climate resilient ISH and IGH genetic stocks

iii) Evaluation for water logging tolerance (II Plant Crop)

Centres (4): Kolhapur, Vuyyuru, Motipur and Pusa

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)	:	Three standards (At least one sensitive and one tolerant checks) may be decided by the centres.
Design	:	Alpha design (please refer layout plan annexed)
Replications	:	Two
Plot Size	:	6m X 2r X 0.90 m
Seed rate	:	12 buds per meter
Planting date	:	Kolhapur and Vuyyuru : 1 st fortnight of February Motipur and Pusa : 2 nd fortnight of February
Crop Duration	:	12 months
Data to be recorded	:	As detailed below:

- i) Germination at 30 days for tropical region and 45 days for sub-tropical region and tillering at 90 days.
- ii) Shoot count, Single cane weight, Cane length, Cane diameter, Internode length (average of three middle internodes), number of fully emerged leaves and leaf area/plant just before of water logging, 30 and 60 days after water logging
- iii) Juice Brix %, Juice sucrose %, Juice purity %, Extraction %, Cane fibre %, NMC, cane diameter, cane length, single cane weight at 300 and 360 days
- iv) Cane and CCS yields at 360 days
- v) Aerial rooting: Number of nodes with aerial roots and intensity of aerial roots (Rated as absent, low, medium and high)
- vi) Foliage colour (green, light green, pale yellow) at 30 and 60 days after water logging

Weather data:

Rainfall (weekly rainfall), Maximum and Minimum temperature, RH

Imposition of water logging treatment:

1. In case natural water logging fails due to insufficient rains, water stagnation may be ensured (minimum 15 cm) during the grand growth phase (150 – 210 days after planting) / monsoon season.
2. Control plots must be well drained to avoid stagnation of water though out the cropping period.
3. Water level (in cm) above ground level in water logged blocks at 15 days interval after initiation of monsoon.
4. Duration of water logging.

**Layout plan for Evaluation and identification of climate resilient ISH and IGH genetic stocks
for water logging
Randomized Layout**

Water logging condition :

REPLICATION 1										
Block 1	22	6	9	25	18	12	14	28	2	19
Block 2	20	4	3	7	16	29	10	26	23	15
Block 3	24	1	8	11	5	30	27	13	21	17

REPLICATION 2										
Block 1	7	25	16	22	1	10	13	4	19	28
Block 2	24	12	6	18	15	3	30	9	21	27
Block 3	2	8	14	29	23	26	11	17	20	5

Normal condition (Experiment should not be conducted in low lying area):

REPLICATION 1										
Block 1	24	27	1	30	17	13	5	11	8	21
Block 2	4	16	10	20	7	29	15	3	23	26
Block 3	6	19	14	12	22	18	25	28	9	2

REPLICATION 2										
Block 1	30	9	21	24	15	3	18	6	12	27
Block 2	26	23	14	8	29	11	2	17	20	5
Block 3	10	25	19	28	22	7	13	16	4	1

Name of the clone and serial number:

S. No	Clone	S.No	Clone	S. No	Clone
1	BM 1003143	11	SA 04-390	21	MA 5/37
2	BM 1005149	12	SA 04-496	22	MA 5/99
3	BM 1009163	13	SA 04-409	23	MA 5/22
4	BM 1010168	14	AS 04-1689	24	GU 07-3849
5	BM 1022173	15	AS 04-245	25	GU 07-3774
6	PG 9869137	16	AS 04-2097	26	GU 07-2276
7	SA 98-13	17	AS 04-635	27	CYM 07-986
8	SA 04-454	18	AS 04-1687	28	Check 1
9	SA 04-472	19	MA 5/51	29	Check 2
10	SA 04-458	20	MA 5/5	30	Check 3

Note : In case one or two entries are missing due to unavailability of seed material, additional checks (other than Check 1,2,3) may be taken.

iv) Evaluation for water logging tolerance (Ratoon Crop)

Centres (4): Kolhapur, Vuyyuru, Motipur and Pusa

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)	:	Three standards (At least one sensitive and one tolerant checks) may be decided by the centres.
Design	:	Alpha design
Replications	:	Two
Plot Size	:	6m X 2r X 0.90 m
Ratooning date	:	Immediately after harvest of I Plant crop
Crop Duration	:	11 months
Data to be recorded	:	As detailed below:

- i) Shoot count, Single cane weight, Cane length, Cane diameter, Internode length (average of three middle internodes), number of fully emerged leaves and leaf area/plant just before of water logging, 30 and 60 days after water logging.
- ii) Juice Brix %, Juice sucrose %, Juice purity %, Extraction %, Cane fibre %, NMC, cane diameter, cane length, single cane weight at 270 and 330 days.
- iii) Cane and CCS yields at 330 days.
- iv) Aerial rooting: Number of nodes with aerial roots and intensity of aerial roots (Rated as absent, low, medium and high).
- v) Foliage colour (green, light green, pale yellow) at 30 and 60 days after water logging.

Weather data:

Rainfall (weekly rainfall), Maximum and Minimum temperature, RH

Imposition of water logging treatment:

- a. In case natural water logging fails due to insufficient rains, water stagnation may be ensured (minimum 15 cm) during the grand growth phase (150 – 210 days after ratooning) / monsoon season.
- b. Control plots must be well drained to avoid stagnation of water through out the cropping period.
- c. Water level (in cm) above ground level in water logged blocks at 15 days interval after initiation of monsoon.
- d. Duration of water logging.

ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE

Characters on which data to be recorded in IVT and AVT (Plant crops)

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 AVT (Early – Ratoon)

- Note :**
1. No gap filling should be done.
 2. Ratooning operation should be completed within 15 days after harvesting plant crop.
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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 IVT and AVT (Midlate –Plant crops)

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 AVT (Midlate – Ratoon)

- Note :**
1. No gap filling should be done.
 2. Ratooning operation should be completed within 15 days after harvesting plant crop.
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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)