CROP IMPROVEMENT

Technical programme for the year 2017-2018

North West Zone

B. II - Zonal Varietal Trial

Centres (10) : Faridkot, Karnal, Kota, Lucknow, Kapurthala, Muzaffarnagar, Pantnagar, Shahjahanpur, Sriganganagar and Uchani

1. Initial Varietal Trial (Early)

Entries (7)	:	Co 14034, CoLk 14201, CoLk 14202, CoPant 14222, CoPb 14181, CoPb 14182 and CoPb 14211
Standard (3)	:	CoJ 64, Co 0238 and Co 05009
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	:	10 months
Data to be recorded	:	As per Annexure I

2. Advanced Varietal Trial (Early) – I Plant

Entries (3)	:	Co 13034, CoPb 13181 and CoS 13231
Standard (3)	:	CoJ 64, Co 0238 and Co 05009
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	:	10 months
Data to be recorded	:	As per Annexure I

3. Advanced Varietal Trial (Early) – II Plant

Entries (4)	:	Co 12026, Co 12027, CoLk 12203 and CoPant 12221.
Standard (2)	:	CoJ 64 and Co 0238
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 (4)	:	Co 12026, Co 12027, CoLk 12203 and CoPant 12221.
Standard (2)	:	CoJ 64 and Co 0238
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
Crop duration	:	9 months
Data to be recorded	:	As per Annexure II

5. Initial Varietal Trial (Midlate)

Entries (13)	:	Co 14035, CoH 14261, CoH 14262, CoLk 14203, CoLk 14204, CoLk 14205, CoPb 14183, CoPb 14184, CoPb 14185, CoPb 14212, CoS 14231, CoS 14232 and CoS 14233
Standard (4)	:	CoS 767, CoS 8436, CoPant 97222 and Co 05011
Design	:	Randomized Block Design
Replications	:	Two
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 13035, CoH 13263, CoPant 13224, CoPb 13182 and CoLk 13204
Standard (4)	:	CoS 767, CoS 8436, CoPant 97222 and Co 05011
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)	:	Co 12029, CoH 12263, CoLk 12205, CoPant 12226, CoPb 12211 and CoS 12232
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)	:	Co 12029, CoH 12263, CoLk 12205, CoPant 12226, CoPb 12211 and CoS 12232
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

(i) Multiplication of pre-zonal entries for seed lifting

The following entries accepted during the group meeting of AICRP(S) held at the Rajendra Agricultural University, Pusa, Distt. Samastipur in 2015 are under multiplication at ICAR-SBI Regional Centre, Karnal. On prior intimation, the coordinating centres should depute their staff to the Karnal Centre and lift the seed material for one year multiplication at their centres :

Early (10) **:** Co 15023, Co 15024, Co 15027, CoLk 15201, CoLk 15202, CoLk 15203, CoLk 15204, CoLk 15205, CoPb 15211 and CoPb 15212.

Midlate (11) **:** Co 15026, CoLk 15206, CoLk 15207, CoLk 15208, CoLk 15209, CoPb 15213, CoPb 15214, CoS 15231, CoS 15232, CoS 15233 and CoS 15234.

10. Seed multiplication of new entries

The following entries were accepted during the biennial workshop of AICRP(S) held at the VSI, Pune in 2016. The concerned breeders are requested to supply seed material of their entries for one year multiplication at ICAR-SBIRC, Karnal multiplication centre.

Early (9) **:** CoLk 16201, CoLk 16202, CoPb 16211, CoPb 16181, CoPant 16221, CoPant 16222, CoS 16231, Co 15025 and Co 16029

Midlate (7) **:** CoLK 16203, CoLk 16204, CoPb 16212, CoPant 16223, CoS 16232, CoS 16233, Co 16030

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 : 1nd 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

Drought 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

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 (please refer layout plan annexed)
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

Annexure-I

ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE

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

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) after10 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 crop)

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)

Annexure-III

ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE

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

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 crop)

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)