CROP IMPROVEMENT

Technical programme for the year 2021-2022

Peninsular Zone

B. II- Zonal Varietal Trial

Centres (19) : Akola, Basmathnagar, Belagavi, Coimbatore, Kolhapur, Mandya, Navsari, Padegaon, Perumalapalle, Powarkheda, Pravaranagar, Pune, Pugalur, Kawardha (Raipur), Rudrur, Sameerwadi, Sankeshwar, Sirugamani and Thiruvalla.

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1. Initial Varietal Trial

Entries(13)**:**		Co18001,Co18002,Co18003,Co18009,Co18012,Co18013, Co18024,CoVc18061,CoN18071,CoN18072,CoVSI18121, Co17009,CoT16366
Standards(3)	**:**	Co86032,CoC671andCo09004
Design	**:**	Randomised Block Design
Replications	**:**	Three
Plot size	**:**	Gross**:** 6m x 6r x 1.2m Net **:** 5m x 4r x 1.2m
Seed rate	**:**	12 buds per metre
Planting date	**:**	II fortnight of December to I fortnight of January
Crop duration	**:**	12 months
Data to be recorded	**:**	As per Annexure - I

2. Advanced Varietal Trial – I Plant

Entries(5)**:**		Co16006,Co16010,Co16018,CoVSI16121andPI16131
Standards(3)	**:**	Co86032,CoC671andCo09004
Design	**:**	Randomised Block Design
Replications	**:**	Three
Plot size	**:**	Gross**:** 6m x 8r x 1.2m Net **:** 5m x 6r x 1.2m
Seed rate	**:**	12 buds per metre
Planting date	**:**	II fortnight of December to I fortnight of January
Crop duration	**:**	12 months
Data to be recorded	**:**	As per Annexure - I

3. Advanced Varietal Trial - II Plant

Entries(12)**:**		Co11015,Co14005,Co15005,Co15006,Co15007,Co15009,Co15010, Co15017,Co15021,CoN15071,CoSnk15102andPI15131
Standards(3)	**:**	Co86032,CoC671andCo09004
Design	**:**	Randomized Block Design
Replications	**:**	Three
Plot size	**:**	Gross**:** 6m x 8r x 1.2m Net **:** 5m x 6r x 1.2m
Seed rate	**:**	12 buds per metre
Planting date	**:**	II fortnight of December to I fortnight of January
Crop duration	**:**	12 months
Data to be recorded	**:**	As per Annexure - I

4. Advanced Varietal Trial – (Ratoon)

Entries(12)**:**		Co11015,Co14005,Co15005,Co15006,Co15007,Co15009,Co15010, Co15017,Co15021,CoN15071,CoSnk15102andPI15131
Standards(3)	**:**	Co86032,CoC671andCo09004
Design	**:**	Randomised Block Design
Replications	**:**	Three
Plot size	**:**	Gross**:** 6m x 8r x 1.2m Net **:** 5m x 6r x 1.2m
Ratooning date	**:**	After harvest of AVT Plant – I
Crop duration	**:**	11 months
Data to be recorded	**:**	As Annexure-II

SEED MULTIPLICATION

1. **Multiplication of IVT (2020-21) entries at the centers :** Following 18 entries will be multiplied at the centers during 2021-22 for inclusion in AVT – I plant in 2022-23

   Entries (18): Co 17001, Co 17002, Co 17003, Co 17004, Co 17005, Co 17006, Co 17008, Co 17010, Co 17012, Co 17013, Co 17014, CoVc 17061, CoN 17071, CoN 17072, MS 17081, MS 17082, CoVSI 17121 and CoT 17366

2. **Multiplication of zonal entries accepted during 2019**

   The following entries accepted in the Workshop of AICRP(S) held at UAS, Dharward in 2019 are under multiplication at ICAR-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.

ICAR-SBI, Coimbatore (Multiplication centre):

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

CSRS, Padegaon (Multiplication centre):

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

Entries (23) : Co 19002, Co 19003, Co 19004, Co 19005, Co 19008, Co 19009, Co 19014, Co 18023, CoN 19071, MS 19081, CoVSI 19121, CoT 19366, CoT 19367, CoR 19141, CoR 19142, CoR 19143, CoR 19144, CoR 19145, CoR 19146, CoT 18366, CoT 18367, CoT 18368, CoT 18369

3. Seed multiplication of new entries

The following entries were accepted in the Group Meeting of AICRP (S) held at ICAR –IISR Lucknow through online during 19-20th October 2020. The concerned breeders are requested to supply two sets of seed materials of the accepted entries; one set to ICAR-SBI, Coimbatore and the other set to CSRS, Padegaon for one year multiplication.

Entries (17): Co 20001, Co 20002, Co 20003, Co 20005, Co 20006, Co 20007, Co 20009, Co 20010, Co 20011, Co 20012, CoN 20071, CoN 20072, CoM 20082, CoSnk 20101, CoSNk 20102, CoSnk 20103, CoT 20366.

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

B.III (a)- Evaluation and identification of climate resilient ISH and IGH genetic stocks
(i) Evaluation for drought tolerance (I Plant Crop)

Centres (4): Sankeshwar, Pune, Lucknow and Karnal

Entries(18)	:	ISH501,ISH502,ISH512,ISH519,ISH524,ISH534,ISH536,ISH548,ISH567,ISH584,ISH585, ISH587,ISH590,ISH594,IGH823,IGH829,IGH833,IGH834
Standards (3)	:	Sankeshwar:: CoM 88121, CoM 0265 and one more local check. Pune : CoA 06231, 83 R 23 and one more local check. Lucknow : CoJ 88, Co 98014 and one more local check. Karnal : CoJ 88, Co 98014 and one more local check.
Design	:	Alpha design (please refer layout plan annexed)
Replications	:	Two
Plot Size	:	6m X 2r X 1.2 m
Seed rate	:	12 buds per meter
Planting date	:	Sankeshwar, Pune : 2nd fortnight of Dec to 1st fortnight of Jan Lucknow and Karnal : 2nd fortnight of February
Crop Duration	:	12 months

Data to be recorded

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 plots

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	11	9	17	6	1	20	15
Block 2	3	5	8	16	10	14	19
Block 3	18	7	13	12	4	2	21

	Replication 2						
Block 1	20	11	14	8	17	2	5
Block 2	21	12	18	3	15	6	9
Block 3	1	10	13	4	7	19	16

Drought condition:

	Replication 1						
Block 1	13	7	10	1	4	16	19
Block 2	8	17	2	20	14	5	11
Block 3	18	15	12	21	3	9	6

	Replication 2						
Block 1	12	2	7	21	13	4	18
Block 2	5	8	19	3	10	16	14
Block 3	11	20	9	17	6	1	15

Name of the clones and serial numbers:

S. No	Clone	S. No	Clone	S. No	Clone
1	ISH 501	8	ISH 548	15	IGH 823
2	ISH 502	9	ISH 567	16	IGH 829
3	ISH 512	10	ISH 584	17	IGH 833
4	ISH 519	11	ISH 585	18	IGH 834
5	ISH 524	12	ISH 587	19	**Check 1**
6	ISH 534	13	ISH 590	20	**Check 2**
7	ISH 536	14	ISH 594	21	**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.

Seed Multiplication: The following ISH/IGH clones should be multiplied in the participating centres during 2021-22 for conducting trial in the year 2022-23.

Drought : Sankeshwar, Pune, Lucknow, Karnal,
Water logging: Motipur, Pantnagar and Pusa

Entries (12): ISH 513, ISH 516, ISH 526, ISH 528, ISH 535, ISH 542, ISH 545, ISH 554, ISH 558, ISH 564, IGH 806, IGH 816

B.III (b) Evaluation and identification of climate resilient near commercial clones
(ii) Evaluation for drought tolerance (I Plant Crop)

Centres (3): Sankeshwar, Anakapalle, Lucknow

Entries(13)	:	Co09022,Co12029,Co13034,Co14034,Co15023, Co15024,Co15026,Co15027,CoLk14203,CoLk15204,CoLk15206,CoLk15207,CoS08279
Standards (3)	:	Sankeshwar :CoM 88121, CoM 0265 and one more local check. Anakapalle :CoA 06231, 83 R 23 and one more local check. Lucknow :CoJ 88, Co 98014 and one more local check.
Design	:	Alpha design (please refer layout plan annexed)
Replications	:	Two
Plot Size	:	6m X 2r X 1.2 m
Seed rate	:	12 buds per meter
Planting date	:	Sankeshwar, Anakapalle : 2nd fortnight of Dec to 1st fortnight of Jan Lucknow : 2nd fortnight of February
Crop Duration	:	12 months

Data to be recorded

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 commercial clones for drought tolerance

Randomized Layout

Normal condition:

	Replication 1							
Block 1	3	7	15	11	13	5	9	1
Block 2	6	14	4	2	12	16	10	8

	Replication 2							
Block 1	9	5	2	12	8	13	3	16
Block 2	11	1	10	6	4	7	15	14

Drought condition:

	Replication 1							
Block 1	10	6	15	4	14	1	11	7
Block 2	5	8	12	2	3	13	9	16

	Replication 2							
Block 1	15	9	13	1	7	11	3	5
Block 2	8	14	4	6	2	12	10	16

Name of the near commercial clones and serial numbers:

S. No	Clone	S.No	Clone
1	Co 09022	9	CoLk 14203
2	Co 12029	10	CoLk 15204
3	Co 13034	11	CoLk 15206
4	Co 14034	12	CoLk 15207
5	Co 15023	13	CoS 08279
6	Co 15024	14	**Check 1**
7	Co 15026	15	**Check 2**
8	Co 15027	16	**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.

Seed Multiplication: The following near commercial clones should be multiplied in the participating centres during 2021-22 for conducting trial in the year 2022-23.

Water logging: Motipur, Pantnagar and Pusa

Water logging tolerant clones (18): Co 99006, 96 WL 1206, WL 10-20, 99 WL 1028, WL 09-965, WL 09-678, WL-10-24, WL-10-62, WL-10-85, WL-10-3, WL-10-18, WL-10-83, WL-10-105, WL 11-2263, WL 11-2534, WL 12-509, WL 12-182, WL 12-300

Annexure-I

ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE

Characters on which data to be recorded in Initial Varietal Trial (IVT) and Advanced Varietal Trial (AVT) – Plant crops

Crop: Sugarcane

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. Number of millable canes (thousand/ha) after10 months and 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 % in juice at 8, 10 and 12 months
10. Sucrose % in juice at 8, 10 and 12 months
11. Purity % at 8, 10 and 12 months
12. CCS % at 8, 10 and 12 months
13. Extraction % after 10 and 12 months at harvest
15. Fibre % in cane after 10 and 12 months at harvest
16. Pol % cane after 10 and 12 months at harvest
17 Cane yield (t/ha) after 12 months at harvest
18. CCS t/ha after 12 months at harvest
19. Jaggery quality after 10 and 12 months at harvest (if facility available)
20. Jaggery yield (t/ha) after12 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

Annexure-II

ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE

Characters on which data to be recorded in ratoon crop

Advanced Varietal Trial (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 and 330 days at harvest
4. Stalk length (cm) after 330 days at harvest
5. Stalk diameter (cm) after 330 days at harvest
6. Single cane weight (kg) after 330 days at harvest
7. Brix % in juice after 270 days and 330 days at harvest
8. Sucrose % in juice after 270 days and 330 days at harvest
9. Purity % after 270 days and 330 days at harvest
10. CCS % after 270 days and 330 days at harvest
11. Fibre % in cane after 270 days and 330 days at harvest
12. Pol % cane after 270 days and 330 days at harvest

13 Cane yield (t/ha) after 330 days at harvest

14. CCS t/ha after 330 days at harvest
15. Extraction % after 270 days and 330 days at harvest
16. Jaggery quality after 270 days and 330 days at harvest (if facility available)
17. Jaggery yield (t/ha) after 270 days and 330 days at harvest (if facility available)