

Information of the coordinated project on AICRP on sugarcane

1. Introduction

Sugarcane is a universal crop having sweetening agent (sucrose) and it is the primary age old source of it. It is cultivated both in tropical and sub-tropical areas of India. Sugarcane is one of the most important agro industrial crops in the country, with 4.29 million hectares under cultivation, about 300 millions tonnes productions with an average productivity of around 70 tonnes per hectare. The approximate sugarcane coverage is 2 % of the net sown area of the country. Sugarcane occupies a key position in Indian agriculture by virtue of its wide distribution in most of the states of the country. Although area under the crop remains more or less static, yet the research outcome has accelerated vertical growth in sugarcane production. India today tops among the sugar producing countries of the world both in production as well as consumption. A bumper crop of sugarcane coupled with higher recovery of sugar from cane has contributed to this all time high record production of sugar during this season. However, it is not all; we have to go a long way in meeting the projected demand of 27 million tons of sugar by 2020 AD.

There are about 435 sugar factories in the country. This industry is the second largest agro based industry. The by product of sugarcane are also of immense economic importance. The chief byproduct is Molasses, which is used as a raw material by alcohol based industries. The second byproduct, sugarcane bagasse is chief source of fuel in sugar mills. Excess bagasse is used by paper industries. Another byproduct, press mud is of immense importance from farmer point of view.

2. Historical background of the centre:-

Sugarcane research work at this station started in March, 1996 when AICRP on sugarcane-Kota came into function, the project was sanctioned in the year 1994-95 vide ICAR letter No. 10 – 17 /92 –CC(1)dated 7.8.95, fresh administrative & financial sanction was issued by the comptroller, RAU, Bikaner vide letter No. PD/Gr.II/ICAR/26/93-94/7814-24 dated 25/27.1.1996.

3. Mandate and objectives: -

The main objectives of the project are as under:

- To evolve / identify promising early and mid-late duration sugarcane varieties having better yield and sucrose than the existing standards.
- To evolve / identify promising high yield and high sucrose variety having better ratooning ability along with tolerance to moisture stress and also resistance to various diseases and pests.
- Breeder seed production to cope up the farmers demand for quality seed.
- Development of suitable crop geometry, efficient nutrient management and economic weed control to get maximum yield and sucrose both in plant and ratoon crops.
- Transfer of improved technology through frontline demonstrations and making new varieties popular among farming community.
- Survey and screening of sugarcane varieties for red-rot and smut.
- To coordinated and monitor multi location testing of germplasm
- To enhance and maintain disease free nucleus seed material distribution

4. Organization and structure:

The ARS Kota centre which is a unit of Agriculture University, Kota comes in zone Vth (Humid South Eastern Plain) which includes the district of Kota, Bundi, Baran, Jhalawar and part of sawaimadhopur, lies in the south eastern of the state of Rajasthan. Rainfall of the zone varies from 650 to 1000 mm. The main Crop of the rabi season are Wheat, Mustard, Coriander, Chickpea and Sugarcane etc.

At this station about 42 scientist including nearly 75 supporting staff with a self content sylvan complex having 105 hectare farm areas, out of which about 40 ha area is under research block and remaining farm area use for seed multiplication of different crop varieties. Besides AICRP on sugarcane, 14 ICAR project, state & non plan projects are also working at the centre. In the state sugarcane occupies nearly 10,000 ha area with the production 42, 1716 tonne & productivity 42226 kg /ha. At the centre main activity includes research work based on ICAR requirement, feed back problems of zone , extension activities, plant clinic services, medium rang whether forecast to farmers and seed production of new varieties .The centre also multiply seed of recommend varieties of the zone .

5. Staff position:-

Discipline	Post
Plant Breeding & Genetics	Dr. Pramod Kumar Sugarcane Breeder (2013 to continue)
Agronomy	Dr. B.S. Meena Sugarcane Agronomist (2013 to continue)
Technical Staff	1.Sh C.L. Gour Technical Assistant 2. Vacant

6. Budget Position:

(In Rs)

Opening balance (2015-16)	Remittance by ICAR (2015-16)	Total fund ((2015-16)	Actual expenditure for the year	ICAR share 75%	State share 25%	Closing balance end of the year (March 31 th ,2015)
1*	2	3	4	5	6	
(+) 10,48,807	18,83,000	29,31,807	43,29,618	32,47,214	10,82,404	(-) (-) 3,15,407

* Comptroller, AU/Kota/ CA/Baldi&Associate/PVT/2015-16/7 dated 19.05.2015.

ANNUAL REPORT
CROP IMPROVEMENT
(Year 2015-2016)

Expt. No. 1: Sugarcane / Breeding/ Kota / 2015-16/Spring-1

1. **Name of project** : AICRP on Sugarcane
2. **Zone/Location** : North West Zone
Agriculture Research Station Umedganj, Kota.
3. **Name of trial** : **Advance Varietal Trial – Early (II Plant)**
4. **Year of start** : Continue
5. **Objective:** : To identify a promising early duration variety having better tonnage and sucrose than the existing varieties for the zone
6. **Brief description of the experiment:**
 - (i) **No. of Entries** : 3+2=5
 - (ii) **Treatments** : **Co 10035** **Standards**
CoH 10261 **CoJ-64**
CoS 10231 **Co Pant-84211**
 - (iii) **Design** : R. B. D.
 - (iv) **Replication** : Three
 - (v) **Plot size**

Gross	: 6m x 8r x 0.75m
Net	: 5m x 6r x 0.75m
 - (vi) **Fertilizers** : 200:60:60 N P K kg/ha, respectively
 - (vii) **Weed control** : Spray of Atrazine @ 2.0 kg a. i. /ha as PE followed by one hand weeding at 60 days after planting
 - (viii) **Date of Planting** : 23.03.2015
 - (ix) **Date of Harvesting** : 14.02.2016
7. **Results:**

The advance trial comprising five early maturing test entries including two standards. The variety CoS 10231 exhibited highest cane yield (86.43 t/ha) and CCS (10.84 t/ha), closely followed by Co 10035, which exhibited higher cane yield (84.10t/ha) and CCS (10.71 t/ha). However, variety Co 10035 showed highest brix (20.97%), sucrose (18.45 %), purity (87.99%), CCS (12.70%), extraction (53.57%) and cane length (2.11m) at the time of harvest. The higher germination (46.67%), stalk diameter (2.20 cm) and single cane weight (0.94 kg) over all the varieties. The maximum number of cane tillers/ha was recorded for CoS 10231 (124.73 thousand) closely followed by standard check varieties CoPant-84211 (123.20thousand). The maximum number of malleable canes (‘000/ha) was recorded for standard check variety CoPant 84211 (92.53) closely followed by Co 10035 (92.20). **(Table-1)**
8. **Significant findings** : Research in progress
9. **Scientist attached** : Dr. P. Kumar, Sugarcane Breeder

Table 1: Advance Varietal Trial – Early (II Plant)- 2015-16.

S. No	Entry	CCS (t/ha)	Cane yield (t/ha)	CCS % (10m)	Sucrose % (10m)	Brix % (10 m)	Purity % (10m)	Pol % cane (10m)	Extraction % (10m)	Fibre % (10m)	NMC at 10m '000/ha
1	2	3	4	5	6	7	8	9	10	11	12
1	Co 10035	10.71	84.10	12.70	18.45	20.97	87.99	-	53.57	-	92.20
2	CoH 10261	9.80	82.27	11.93	17.35	19.90	87.19	-	52.57	-	86.97
3	CoS 10231	10.84	86.43	12.53	18.17	20.70	87.79	-	50.53	-	90.40
	Standards										
1	CoJ 64	9.39	76.73	12.25	17.80	20.33	87.53	-	52.90	-	86.50
2	CoPant 84211	9.92	81.43	12.17	17.67	20.23	87.25	-	53.60	-	92.53
	SE	0.172	1.189	0.089	0.123	0.117	0.085	-	0.365	-	0.649
	CD	0.493	3.404	0.254	0.352	0.334	0.243	-	1.044	-	1.859
	CV	11.77	10.02	4.99	4.75	3.96	0.67	-	4.80	-	5.01

S. No	Entry	Stalk Length (m)	Stalk Diameter (cm)	Single cane weight (kg)	CCS % (8 m)	Sucrose % (8 m)	Brix % (8 m)	Purity % (8 m)	No. of shoots ('000/ha) 240 days	No. of tillers ('000/ha) 120 days	Germi-nation % (45 days)
13	14	15	16	17	18	19	20	21	22	23	24
1	Co 10035	2.11	2.13	0.81	10.75	15.77	18.37	85.86	102.13	114.27	43.33
2	CoH 10261	2.08	2.20	0.94	10.77	15.80	18.40	85.87	86.03	122.53	46.67
3	CoS 10231	2.05	2.10	0.74	10.65	15.63	18.23	85.71	94.80	124.73	43.67
	Standards										
1	CoJ 64	2.11	2.00	0.71	10.68	15.67	18.27	85.76	97.80	119.83	40.67
2	CoPant 84211	1.90	2.17	0.80	10.04	14.81	17.43	84.93	101.03	123.20	40.33
	SE	0.019	0.024	0.011	0.068	0.078	0.076	0.073	0.782	1.051	0.521
	CD	0.054	0.069	0.032	0.195	0.224	0.217	0.209	2.241	3.011	1.491
	CV	6.37	7.88	9.70	4.44	3.48	2.89	0.59	5.63	6.02	8.40

Table 2: Advance Varietal Trial – Early (I -Plant)- 2015-16

S. No	Entry	CCS (t/ha)	Cane yield (t/ha)	CCS % (10m)	Sucrose % (10m)	Brix % (10 m)	Purity % (10m)	Pol % cane (10m)	Extra-ction % (10m)	Fibre % (10m)	NMC at 10m '000/ha
1	2	3	4	5	6	7	8	9	10	11	12
1	CoH 11262	8.93	80.21	11.10	16.04	18.63	85.76	-	52.47	-	88.57
2	CoLk 11201	10.24	81.73	12.53	18.18	20.70	87.81	-	53.90	-	93.23
3	CoLk 11202	7.96	72.53	10.98	16.08	18.67	86.14	-	52.80	-	91.53
4	CoLk 11203	9.97	84.13	11.84	17.25	19.80	87.12	-	50.47	-	103.57
	Standards										
1	CoJ 64	8.93	76.30	11.70	17.04	19.60	86.95	-	51.43	-	102.07
2	Co 0238	9.95	80.60	12.34	17.77	20.30	87.50	-	52.47	-	92.37
	SE	0.179	1.299	0.094	0.107	0.104	0.093	-	0.354	-	0.693
	CD	0.512	3.719	0.269	0.307	0.297	0.267	-	1.013	-	1.984
	CV	11.07	9.46	4.61	3.62	3.05	0.62	-	3.91	-	4.20

S. No	Entry	Stalk Length (m)	Stalk Dia-meter (cm)	Single cane weight (kg)	CCS % (8 m)	Sucrose % (8 m)	Brix % (8 m)	Purity % (8 m)	No. of shoots ('000/ha) 240 days	No. of tillers ('000/ha) 120 days	Germination % (45 days)
13	14	15	16	17	18	19	20	21	22	23	24
1	CoH 11262	2.06	2.30	0.89	9.39	13.92	16.57	83.97	106.10	129.07	46.33
2	CoLk 11201	2.03	2.00	0.65	10.96	16.05	18.63	86.10	103.97	116.17	41.67
3	CoLk 11202	2.34	2.37	1.23	9.36	13.88	16.53	83.95	110.03	132.20	43.33
4	CoLk 11203	2.46	2.37	0.96	10.65	15.63	18.23	85.74	112.87	129.17	51.33
	Standards										
1	CoJ 64	2.06	2.20	0.84	10.27	15.11	17.73	85.71	121.93	129.20	48.67
2	Co 0238	2.31	2.27	0.88	11.31	16.53	19.10	86.52	119.30	134.23	49.67
	SE	0.015	0.025	0.010	0.077	0.105	0.102	0.149	0.934	0.991	0.566
	CD	0.044	0.071	0.027	0.222	0.300	0.291	0.428	2.676	2.837	1.621
	CV	4.04	6.37	6.11	4.33	3.98	3.30	1.01	4.80	4.46	6.98

Expt. No. 3: Sugarcane / Breeding/ Kota / 2015-16/Spring-3

1. **Name of project** : AICRP on Sugarcane
2. **Zone/Location** : North West Zone
Agriculture Research Station Ummedganj, Kota.
3. **Title of Experiment** : **Initial Varietal Trial – Early**
4. **Year of start** : Continue
5. **Objective:** : To identify a promising early duration variety having better tonnage and sucrose than the existing varieties for the zone
6. **Brief description of the experiment:**
 - (i) **No. of Entries** : **7+2=9**
 - (ii) **Treatments** :

Co 12026	Standards
Co 12027	CoJ-64
CoH 12261	Co 0238
CoLk 12201	
CoLk 12202	
CoLk 12203	
CoLk 12204	
CoPant 12221	
CoPant 12222	
CoS 12231	
 - (iii) **Design** : R. B. D.
 - (iv) **Replication** : Three
 - (v) **Plot size**

Gross	: 6m x 6r x 0.75m
Net	: 5m x 4r x 0.75m
 - (vi) **Fertilizer** : 200:60:60 N P K kg/ha, respectively
 - (vii) **Weed control** : Spray of Atrazine @ 2.0 kg a. i. /ha as PE followed by one hand weeding at 60 days after planting
 - (viii) **Date of Planting** : 25.03.2015
 - (ix) **Date of Harvesting** : 06.02.2016
7. **Results:**

This early maturing initial varietal trial comprising ten test entries along with two standard checks. The variety CoPant 12221 exhibited highest cane yield (85.93 t/ha) followed by Co 12027 (83.13 t/ha), while CCS was maximum for Co 12026 (11.58 t/ha), closely followed by Co 12027 (11.30 t/ha) and Co 0238 (10.40 t/ha). The maximum number of cane tillers/ha was recorded in the standard check varieties Co 0238 (119.00 thousand) closely followed by CoLk 12201 (114.20 thousand) and CoPant 12222 (112.70 thousand), while, the maximum number of malleable canes ('000/ha) was recorded for the variety CoPant 12221 (95.13) followed by Co 12027 (93.83) and CoS 12231 (93.70). The variety Co 12026 exhibited highest Brix (22.53%), Sucrose (19.86%), Purity (89.02%) and CCS (13.90%), while extraction percentage was maximum for variety CoLk 12202 (54.63%) at the time of harvest. The highest germination of 44.67% was recorded in varieties CoLk 12201, CoLk 12202 and CoPant 12222. (**Table-3**)
8. **Significant findings** : Research in progress
9. **Scientist attached** : Dr. P. Kumar, Sugarcane Breeder

Table 3: Initial Varietal Trial – Early- 2015-16

S. No	Entry	CCS (t/ha)	Cane yield (t/ha)	CCS % (10m)	Sucrose % (10m)	Brix % (10 m)	Purity % (10m)	Pol % cane (10m)	Extraction % (10m)	Fibre % (10m)	NMC at 10m '000/ha
1	2	3	4	5	6	7	8	9	10	11	12
1	Co 12026	11.58	82.90	13.90	19.86	22.53	89.02	-	53.47	-	85.13
2	Co 12027	11.30	83.13	13.60	19.62	22.10	88.77	-	54.17	-	93.83
3	CoH 12261	7.74	65.10	11.90	17.32	19.87	87.16	-	44.70	-	72.83
4	CoLk 12201	9.84	76.60	12.85	18.62	21.13	88.12	-	51.20	-	93.20
5	CoLk 12202	9.83	76.77	12.81	18.55	21.07	88.05	-	54.63	-	92.20
6	CoLk 12203	8.70	81.20	10.29	15.15	17.77	85.25	-	46.50	-	75.77
7	CoLk 12204	8.40	77.17	10.88	15.94	18.53	86.01	-	51.10	-	91.30
8	CoPant 12221	8.20	85.93	9.55	14.15	16.80	84.22	-	50.10	-	95.13
9	CoPant 12222	8.26	81.33	10.16	14.98	17.60	85.09	-	50.27	-	93.33
10	CoS 12231	8.93	79.83	11.18	16.35	18.27	86.37	-	52.53	-	93.70
	Standards										
1	CoJ 64	8.28	75.53	10.98	16.08	18.67	86.14	-	51.53	-	91.60
2	Co 0238	10.40	81.07	12.85	18.59	20.70	88.03	-	52.60	-	92.57
	SE	0.183	1.811	0.109	0.140	0.185	0.119	-	0.735	-	1.188
	CD	0.525	5.187	0.311	0.402	0.530	0.341	-	2.104	-	3.401
	CV	5.69	6.63	2.67	2.37	2.73	0.40	-	4.15	-	3.84

S. No.	Entry	Stalk Length (m)	Stalk Diameter (cm)	Single cane weight (kg)	CCS % (8 m)	Sucrose % (8 m)	Brix % (8 m)	Purity % (8 m)	No. of shoots ('000/ha) 240 days	No. of tillers ('000/ha) 120 days	Germination % (45 days)
13	14	15	16	17	18	19	20	21	22	23	24
1	Co 12026	2.11	1.90	1.10	10.68	15.70	18.30	85.92	96.93	109.67	40.67
2	Co 12027	2.15	2.25	1.15	10.02	14.78	17.40	84.92	106.43	105.93	41.67
3	CoH 12261	1.88	2.08	1.09	9.36	13.88	16.53	83.95	90.17	100.43	34.33
4	CoLk 12201	2.23	1.88	0.92	10.22	15.29	17.90	85.41	92.03	114.20	44.67
5	CoLk 12202	1.92	2.08	1.04	10.83	15.87	18.47	85.95	108.17	106.87	44.67
6	CoLk 12203	1.93	2.25	1.16	8.61	12.85	15.53	82.72	111.20	108.67	36.67
7	CoLk 12204	2.22	2.38	1.17	9.07	13.50	16.17	83.50	113.37	99.00	43.00
8	CoPant 12221	2.34	2.12	1.22	7.81	11.78	14.50	81.26	99.67	101.93	44.33
9	CoPant 12222	2.14	2.10	1.07	8.11	12.20	14.90	81.85	102.17	112.70	44.67
10	CoS 12231	2.05	2.16	1.09	8.74	12.95	15.63	82.85	109.17	105.93	43.33
	Standards										
1	CoJ 64	1.92	2.02	1.00	9.21	13.68	16.33	83.75	103.43	108.30	43.67
2	Co 0238	2.22	2.35	1.12	10.32	15.19	17.80	85.31	112.87	119.00	43.33
	SE	0.030	0.053	0.032	0.100	0.137	0.132	0.167	1.158	1.530	0.845
	CD	0.085	0.152	0.093	0.287	0.392	0.379	0.479	3.317	4.383	2.420
	CV	4.08	7.19	8.55	3.08	2.83	2.30	0.57	3.22	4.10	5.80

Table 4: Advance Varietal Trial - Midlate (II Plant)- 2015-16

S. No	Entry	CCS (t/ha)	Cane yield (t/ha)	CCS % (10m)	Sucrose % (12m)	Brix % (12 m)	Purity % (12m)	Pol % cane (12m)	Extraction % (12m)	Fibre % (12m)	NMC at 12m '000/ha
1	2	3	4	5	6	7	8	9	10	11	12
1	Co 10036	10.14	86.13	11.77	17.15	19.70	87.03	-	47.73	-	85.07
2	CoH 10262	10.14	85.20	11.90	17.32	19.87	86.16	-	50.83	-	85.30
3	CoPant 10221	10.25	84.63	12.10	17.59	20.13	87.38	-	44.70	-	90.47
4	CoPb 10181	10.43	85.90	12.15	17.56	20.10	87.35	-	47.33	-	89.67
5	CoPb 10182	10.58	83.97	12.60	18.18	20.70	87.81	-	50.87	-	86.63
	Standards										
1	CoS 767	9.86	83.23	11.85	17.25	19.80	87.11	-	49.23	-	83.33
2	CoS 8436	9.62	82.90	11.61	16.94	19.50	86.85	-	46.77	-	85.37
3	CoPant 97222	9.48	81.50	11.64	16.99	19.53	86.89	-	45.57	-	82.80
	SE	0.215	1.560	0.129	0.202	0.157	0.238	-	0.439	-	1.034
	CD	0.616	4.468	0.370	0.578	0.450	0.682	-	1.256	-	2.961
	CV	9.25	8.03	4.68	5.00	3.42	1.18	-	3.97	-	5.20

S. No.	Entry	Stalk Length (m)	Stalk Dia-meter (cm)	Single cane weight (kg)	CCS % (10 m)	Sucrose % (10 m)	Brix % (10 m)	Purity % (10 m)	No. of shoots ('000/ha) 240 days	No. of tillers ('000/ha) 120 days	Germination % (45 days)
13	14	15	16	17	18	19	20	21	22	23	24
1	Co 10036	2.16	2.20	0.81	9.50	14.08	16.73	84.16	102.63	121.83	43.67
2	CoH 10262	2.19	2.32	1.03	10.38	15.26	17.87	85.39	109.37	124.70	43.33
3	CoPant 10221	2.35	2.40	0.80	10.68	15.67	18.27	85.76	110.13	124.53	47.33
4	CoPb 10181	1.97	1.98	1.11	10.60	15.56	18.17	85.36	113.97	125.30	45.67
5	CoPb 10182	1.99	2.13	0.80	10.91	16.11	18.70	86.16	107.10	117.33	44.67
	Standards										
1	CoS 767	2.38	2.30	0.80	10.83	15.87	18.47	85.95	112.97	118.87	42.67
2	CoS 8436	2.18	2.22	0.77	10.78	15.80	18.40	85.88	110.50	116.97	44.67
3	CoPant 97222	2.25	2.32	0.75	10.70	15.70	18.30	85.79	107.97	114.77	44.33
	SE	0.015	0.032	0.013	0.107	0.132	0.128	0.130	0.763	0.876	0.665
	CD	0.044	0.092	0.037	0.306	0.378	0.367	0.372	2.186	2.508	1.904
	CV	3.05	6.22	6.43	4.39	3.69	3.07	0.66	3.02	3.15	6.46

Expt. No. 5: Sugarcane / Breeding/ Kota / 2015-16/Spring-5

1. **Name of project** : AICRP on Sugarcane
2. **Zone/Location** : North West Zone
Agriculture Research Station Ummedganj, Kota.
3. **Title of Experiment** : **Advance Varietal Trial –Mid Late (I Plant)**
4. **Year of start** : Continue
5. **Objective:** : To identify a promising mid late duration variety having better tonnage and sucrose than the existing varieties for the zone.
6. **Brief description of the experiment:**
 - (i) **No. of Entries** : **6+3=9**
 - (ii) **Treatments** :

Co 11027	Standards
CoH 11263	CoS-767
CoLk 11204	CoS-8436
CoLk 11206	Co Pant-97222
CoPb 11214	
CoS 11232	
 - (iii) **Design** : R. B. D.
 - (iv) **Replication** : Three
 - (v) **Plot size**

Gross	: 6m x 8r x 0.75m
Net	: 5m x 6r x 0.75m
 - (vi) **Fertilizer** : 200:60:60 N P K kg/ha, respectively
 - (vii) **Weed control** : Spray of Atrazine @ 2.0 kg a. i. /ha as PE followed by one hand weeding at 60 days after planting
 - (viii) **Date of Planting** : 31.03.2015
 - (ix) **Date of Harvesting** : 28.03.2016
7. **Results** :

Among the six test entries along with three standards in this trial, the highest cane yield was recorded for the variety Co 11027 (91.30 t/ha) closely followed by CoLk 11204 (91.17 t/ha) and standard check variety CoS 767 (88.20 t/ha), while maximum CCS exhibited by CoLk 11204 (11.96 t/ha) followed by Co 11027 (11.72 t/ha) and CoS 11232 (11.29 t/ha). The maximum and minimum number of cane tillers/ha were recorded in the standard variety CoS 767 (110.67 thousands) and CoLk 11204 (104.90 thousands), respectively. But maximum number of malleable canes ('000/ha) was recorded in variety Co 11027 (94.57) followed by standard check CoS 767 (93.00). At harvest, variety CoPb 11214 exhibited highest Brix (21.90 %), Sucrose (19.41%), Purity (88.63 %), CCS (13.44%) very closely followed by CoLk 11206 [Brix (21.60 %), Sucrose (19.10 %), Purity (88.44%), CCS (13.21%)]. The maximum germination was recorded in the variety Co 11027 (45.33%) and variety CoS 11232 (45.33%). (**Table-6**)
8. **Significant findings** : Research in progress
9. **Scientist attached** : Dr. P. Kumar, Sugarcane Breeder

Table 5: Advance Varietal Trial - Midlate (I-Plant)- 2015-16

S. No	Entry	CCS (t/ha)	Cane yield (t/ha)	CCS % (12m)	Sucrose % (12m)	Brix % (12 m)	Purity % (12m)	Pol % cane (12m)	Extra-ction % (12m)	Fibre % (12m)	NMC at 12m '000/ha
1	2	3	4	5	6	7	8	9	10	11	12
1	Co 11027	11.72	91.30	12.84	18.59	21.10	88.10	-	54.57	-	94.57
2	CoH 11263	10.92	86.13	12.76	18.48	21.00	88.00	-	53.60	-	91.40
3	CoLk 11204	11.96	91.17	12.98	18.79	21.30	88.23	-	52.77	-	81.57
4	CoLk 11206	11.16	84.43	13.21	19.10	21.60	88.44	-	51.33	-	92.83
5	CoPb 11214	11.20	83.37	13.44	19.41	21.90	88.63	-	52.53	-	89.77
6	CoS 11232	11.29	86.07	13.11	18.96	21.47	88.34	-	52.50	-	92.33
	Standards										
1	CoS 767	10.49	88.20	11.90	17.32	19.87	87.16	-	52.50	-	93.00
2	CoS 8436	9.91	83.37	11.90	17.32	19.87	87.16	-	53.20	-	92.60
3	CoPant 97222	9.66	76.67	12.59	18.25	20.77	87.86	-	51.53	-	88.57
	SE	0.237	1.797	0.102	0.138	0.135	0.096	-	0.431	-	0.751
	CD	0.679	5.146	0.291	0.396	0.385	0.274	-	1.235	-	2.151
	CV	8.36	8.08	3.07	2.88	2.47	0.42	-	3.15	-	3.19

S. No	Entry	Stalk Length (m)	Stalk Dia-meter (cm)	Single cane weight (kg)	CCS % (10m)	Sucrose % (10m)	Brix % (10m)	Purity % (10m)	No. of shoots ('000/ha) 240 days	No. of tillers ('000/ha) 120 days	Germination % (45 days)
13	14	15	16	17	18	19	20	21	22	23	24
1	Co 11027	2.26	2.17	1.07	10.68	15.67	18.27	85.76	96.17	109.13	45.33
2	CoH 11263	2.08	2.07	0.74	10.65	15.63	18.23	85.74	108.73	105.50	39.67
3	CoLk 11204	2.29	2.07	0.90	11.11	16.25	18.83	86.28	113.17	104.90	41.33
4	CoLk 11206	2.13	2.03	0.76	11.14	16.29	18.87	86.46	108.37	106.27	38.67
5	CoPb 11214	2.13	2.00	0.71	11.79	17.18	19.73	87.04	119.63	110.20	40.67
6	CoS 11232	2.25	2.10	0.81	11.29	16.53	19.07	86.50	121.10	109.90	45.33
	Standards										
1	CoS 767	2.28	2.00	0.97	10.37	15.26	17.87	85.39	112.57	110.67	42.67
2	CoS 8436	2.38	1.93	0.77	10.67	15.67	18.27	85.76	115.10	109.63	43.67
3	CoPant 97222	2.19	1.87	0.75	10.88	15.94	18.53	86.02	116.43	109.27	43.00
	SE	0.012	0.027	0.012	0.107	0.145	0.141	0.136	1.059	1.164	0.801
	CD	0.034	0.077	0.034	0.307	0.416	0.404	0.390	3.033	3.332	2.293
	CV	2.05	5.12	5.47	3.77	3.48	2.91	0.61	3.63	4.13	7.29

Expt. No. 6: Sugarcane / Breeding/ Kota / 2015-16/Spring-6

1. **Name of project** : AICRP on Sugarcane
2. **Zone/Location** : North West Zone
Agriculture Research Station Ummedganj, Kota.
3. **Title of Experiment** : **Initial Varietal Trial –Mid Late**
4. **Year of start** : Continue
5. **Objective:** : To identify a promising mid late duration variety having better tonnage and sucrose than the existing varieties for the zone.
6. **Brief description of the experiment:**
 - (i) **No. of Entries** : 15+3=18
 - (ii) **Treatments** :

Co 12028	CoPant 12225	Standards
Co 12029	CoPant 12226	CoS-767
CoH 12262	CoPb 11281	CoS-8436
CoH 12263	CoPb 12182	Co Pant-97222
CoLk 12205	CoPb 12211	
CoLk 12206	CoPb 12212	
CoPant 12223	CoS 12232	
CoPant 12224		
 - (iii) **Design** : R. B. D.
 - (iv) **Replication** : Three
 - (v) **Plot size**

Gross	: 6m x 6r x 0.75m
Net	: 5m x 4r x 0.75m
 - (vi) **Fertilizer** : 200:60:60 N P K kg/ha, respectively
 - (vii) **Weed control** : Spray of Atrazine @ 2.0 kg a. i. /ha as PE followed by one hand weeding at 60 days after planting
 - (viii) **Date of Planting** : 25.03.2015
 - (ix) **Date of Harvesting** : 27.03.2016
7. **Results** :

In this initial varietal trial of midlate maturity group, the highest cane yield was recorded for the variety CoH 12263 followed by CoPant 12226 (94.77 t/ha) and CoPb 12211 (92.37 t/ha), while maximum CCS exhibited by CoH 12263 (13.17t/ha) followed by CoPb 12211 (12.70t/ha) and CoLk 12205 (12.55 t/ha). The maximum number of malleable canes (‘000/ha) were recorded in the variety CoS 767 (86.70 thousands) closely followed by CoPant 97222 (85.50 thousand) and CoPb 12182 (82.53 thousands), while the maximum number of cane tillers/ha were recorded in the variety CoLk 12205 (114.47 thousand) followed by CoLk 12206 (114.37 thousand). At harvest, the Brix (22.70%), Sucrose (20.24%), Purity (89.15%), CCS (14.05%) was highest for the variety CoPb 12182, very closely followed by CoPb 12212 [Brix (22.67%), Sucrose (20.20%), Purity (89.13%), CCS (14.03%)]. The maximum germination was recorded in the varieties CoPant 12223 (49.00 %) followed by CoPb 12212 (46.67). (**Table-6**)
8. **Significant findings** : Research in progress
9. **Scientist attached** : Dr. P. Kumar, Sugarcane Breeder

Table 6: Initial Varietal Trial -Midlate - 2015-16

S. No	Entry	CCS (t/ha)	Cane yield (t/ha)	CCS % (12m)	Sucrose % (12m)	Brix % (12m)	Purity % (12m)	Pol % cane (12m)	Extraction% (12m)	Fibre % (12m)	NMC at 12m '000/ha
1	2	3	4	5	6	7	8	9	10	11	12
1	Co 12028	10.95	82.23	13.30	19.17	21.67	88.47	-	52.10	-	79.23
2	Co 12029	11.01	90.53	12.15	17.66	20.20	87.42	-	52.57	-	82.63
3	CoH 12262	10.74	85.73	12.53	18.18	20.70	87.80	-	50.03	-	73.07
4	CoH 12263	13.17	97.47	13.53	19.38	21.97	88.28	-	46.57	-	83.37
5	CoLk 12205	12.55	90.57	13.87	19.99	22.47	88.99	-	52.63	-	72.67
6	CoLk 12206	10.17	73.03	13.93	20.06	22.53	89.04	-	52.43	-	81.83
7	CoPant 12223	11.44	82.00	13.98	20.13	22.60	89.08	-	52.43	-	80.43
8	CoPant 12224	10.28	77.47	13.27	19.17	21.67	88.48	-	48.43	-	75.07
9	CoPant 12225	9.52	74.43	12.76	18.04	20.57	87.70	-	45.60	-	73.83
10	CoPant 12226	10.72	94.77	11.23	16.39	19.00	86.43	-	45.67	-	80.27
11	CoPb 12181	10.26	76.17	13.47	19.45	21.93	88.66	-	48.77	-	82.17
12	CoPb 12182	10.38	76.30	14.05	20.24	22.70	89.15	-	44.20	-	82.53
13	CoPb 12211	12.70	92.37	13.74	19.82	22.30	88.91	-	44.93	-	72.77
14	CoPb 12212	10.61	76.60	14.03	20.20	22.67	89.13	-	46.23	-	80.33
15	CoS 12232	12.32	89.20	13.80	19.89	22.37	88.94	-	48.33	-	80.33
	Standards										
1	CoS 767	10.86	84.87	12.56	18.21	20.73	87.82	-	51.43	-	86.70
2	CoS 8436	10.39	83.67	12.43	18.04	20.57	87.84	-	52.43	-	81.00
3	CoPant 97222	10.62	84.27	12.61	18.28	20.80	87.87	-	51.70	-	85.50
	SE	0.394	2.664	0.150	0.169	0.170	0.142	-	0.613	-	1.683
	CD	1.129	7.630	0.430	0.483	0.486	0.405	-	1.756	-	4.820
	CV	6.87	6.11	2.19	1.71	1.52	0.31	-	2.40	-	4.07

S. No	Entry	Stalk Length (m)	Stalk Dia-meter (cm)	Single cane weight (kg)	CCS % (10m)	Sucrose % (10m)	Brix % (10m)	Purity % (10m)	No. of shoots ('000/ha 240 days)	No. of tillers ('000/ha 120 days)	Germination % (45 days)
13	14	15	16	17	18	19	20	21	22	23	24
1	Co 12028	2.06	2.21	0.84	11.77	17.15	19.70	87.04	91.20	109.53	42.67
2	Co 12029	2.22	2.22	0.75	10.30	15.15	17.77	85.14	95.53	107.83	44.33
3	CoH 12262	2.33	2.28	1.18	10.58	15.53	18.13	85.67	93.10	106.13	43.33
4	CoH 12263	2.29	2.18	1.19	11.74	17.11	19.67	86.99	88.37	102.30	42.00
5	CoLk 12205	2.15	2.22	0.77	11.92	17.35	19.90	87.18	92.77	114.47	46.33
6	CoLk 12206	2.01	2.04	0.71	12.69	18.38	20.90	87.93	95.50	114.37	40.00
7	CoPant 12223	2.48	2.12	0.89	11.87	17.28	19.83	87.14	78.03	105.17	49.00
8	CoPant 12224	2.00	1.92	0.82	11.18	16.35	18.93	86.39	73.53	107.60	41.33
9	CoPant 12225	1.77	1.92	0.72	10.40	15.42	17.90	85.42	82.57	111.10	43.67
10	CoPant 12226	2.05	2.12	0.90	9.55	13.67	16.33	83.77	72.50	108.80	45.33
11	CoPb 12181	1.82	1.95	0.81	11.54	16.84	19.40	86.68	88.20	111.63	42.67
12	CoPb 12182	2.03	1.94	0.90	12.74	18.80	21.23	88.01	90.73	112.90	43.00
13	CoPb 12211	2.11	2.14	1.23	12.91	18.69	21.20	88.16	91.60	110.37	39.67
14	CoPb 12212	2.00	2.13	0.71	12.10	17.59	20.13	87.37	92.67	112.10	46.67
15	CoS 12232	2.34	2.29	0.83	12.65	18.34	20.87	87.90	86.83	106.53	42.67
	Standards										
1	CoS 767	1.99	2.05	0.74	12.05	17.52	20.07	87.33	98.00	111.87	45.33
2	CoS 8436	2.15	2.22	0.77	12.56	18.21	20.73	87.83	97.93	108.63	43.00
3	CoPant 97222	2.10	2.16	0.79	12.60	18.31	20.83	87.70	87.93	108.50	45.67
	SE	0.026	0.049	0.016	0.142	0.200	0.184	0.159	1.391	1.629	1.173
	CD	0.074	0.140	0.046	0.406	0.574	0.526	0.455	3.984	4.665	3.360
	CV	2.36	4.44	3.61	2.32	2.26	1.80	0.35	3.02	2.86	5.17

Expt. No. 7: Sugarcane / Breeding/ Kota / 2015-16/Spring-7

- 1 **Name of project** : AICRP on Sugarcane
2 **Zone/Location** : North West Zone
Agriculture Research Station Ummedganj, Kota.
3 **Title of Experiment** : **Zonal Varietal Trial-Early**
4 **Year of start** : Continue
5 **Objective:** : To identify a promising early duration variety having better tonnage and sucrose than the existing varieties for the zone
- 6 **Brief description of the experiment:**
(i) **No. of Entries** : 9+2=11
(ii) **Treatments** : Co-13033 Standards
Co-13034 CoJ-64
CoLk 13201 Co-238
CoLk 13202
CoLk 13203
CoPant13221
CoPant13222
CoS- 13231
CoS- 13232
(iii) **Design** : Augmented.
(iv) **Replication** : One with three blocks
(v) **Plot size**
Gross : 6m x 6r x 0.75m
Net : 5m x 4r x 0.75m
(vi) **Fertilizer** : 200:60:60 N P K kg/ha, respectively
(vii) **Weed control** : Spray of Atrazine @ 2.0 kg a. i. /ha as PE followed by one hand weeding at 60 days after planting
(viii) **Date of Planting** : 20.03.2015
(ix) **Date of Harvesting** : 19.03.2016
6. **Results:**
Among eleven test entries in this early maturing trial, variety CoLk 13201 exhibited highest cane yield (82.7t/ha) along with highest CCS (10.12t/ha) followed by CoS13232 cane yield (78.4 t/ha) and CCS (9.11 t/ha).The maximum number of cane tillers/ha was recorded in variety CoPant 13222 (117.4) followed by standard check variety Co 0238 (116.6), while the maximum number of malleable canes ('000/ha) was recorded for variety CoLk 13202 (95.1 thousand) followed CoLk 13201 (89.1 thousand). The Brix (19.6%), Sucrose (17.57%), Purity (89.63%), CCS (12.23%) were highest for the variety CoLk 13201 followed by CoS13232 (19.5%), (16.94%) (86.86%) and (11.62%), respectively, while extraction percentage was maximum for variety Co 0238 (52.8%) at the time of harvest. The maximum germination was recorded in the variety CoPant 13222 (47.00%) followed by CoLk 13202 (46.00%) and CoJ 64 (46.00%). (**Table-7**)
- 7 **Significant findings** : Research in progress
8 **Scientist attached** : Dr. P. Kumar, Sugarcane Breeder

Table 7: Zonal Varietal Trial-Early –2015-16

S. No	Entry	CCS (t/ha)	Cane yield (t/ha)	Sucrose % (10m)	Brix % (10 m)	Purity % (10m)	CCS % (10m)	Pol % cane (10m)	Extra-ction% (10m)	Fibre % (10m)	NMC at 10 m '000/ha
1	2	3	4	5	6	7	8	9	10	11	12
1	Co-13033	8.25	75.5	16.01	18.6	86.08	10.93	-	45.8	-	82.6
2	Co-13034	8.51	73.7	16.84	19.4	86.80	11.55	-	51.2	-	79.8
3	CoLk 13201	10.12	82.7	17.57	19.6	89.63	12.23	-	52.3	-	89.1
4	CoLk 13202	6.83	78.3	13.02	15.7	82.93	8.72	-	49.6	-	95.1
5	CoLk 13203	6.74	75.9	13.23	15.9	83.19	8.88	-	46.2	-	78.6
6	CoPant13221	7.60	76.4	14.67	17.3	84.80	9.94	-	48.3	-	84.8
7	CoPant 13222	8.38	77.8	15.80	18.4	85.89	10.77	-	49.5	-	87.6
8.	CoS13231	8.05	75.7	15.60	18.2	85.70	10.63	-	52.1	-	83.7
9.	CoS13232	9.11	78.4	16.94	19.5	86.86	11.62	-	48.6	-	81.3
	Standards										
1	CoJ 64	8.36	74.9	16.32	18.9	86.35	11.16	-	51.2	-	79.5
2	Co 0238	8.37	73.5	16.63	19.2	86.61	11.39	-	50.4	-	83.1

S. No	Entry	Stalk Length (m)	Stalk Dia-meter (cm)	Single cane weight (kg)	Brix % (8m)	Sucros e % (8m)	CCS % (8m)	Purity % (8m)	No. of shoots '000/ha 240 days	No. of tillers ('000/ha) 120 days	Germinat ion % (45days)
13	14	15	16	17	18	19	20	21	22	23	24
1	Co-13033	2.12	2.11	0.85	15.8	13.12	8.80	83.06	95.2	109.9	44.00
2	Co-13034	2.05	2.10	0.79	16.5	13.85	9.34	83.91	97.5	115.7	43.00
3	CoLk 13201	1.99	1.93	0.78	16.9	14.26	10.66	84.37	84.9	110.5	45.00
4	CoLk 13202	2.14	1.92	0.89	14.8	12.09	8.03	81.71	85.6	108.6	46.00
5	CoLk 13203	1.95	2.00	0.78	14.6	11.89	7.89	81.42	86.1	102.3	45.00
6	CoPant13221	1.97	2.07	0.92	15.2	12.51	8.35	82.27	84.3	112.5	42.00
7	CoPant 13222	1.89	1.93	0.85	15.4	12.71	8.49	82.54	85.4	117.4	47.00
8.	CoS13231	1.95	1.96	0.87	14.6	11.89	7.89	81.42	81.9	113.6	39.00
9.	CoS13232	2.14	2.01	0.86	14.9	12.20	8.12	81.85	86.4	112.8	45.00
	Standards										
1	CoJ 64	2.13	2.17	0.88	15.3	12.61	8.42	82.41	89.4	115.2	46.00
2	Co 0238	2.26	2.19	0.92	15.8	13.12	8.80	83.06	87.3	116.6	44.00

Expt. No. 8: Sugarcane / Breeding/ Kota / 2015-16/Spring-8

- 1 **Name of project** : AICRP on Sugarcane
- 2 **Zone/Location** : North West Zone
Agriculture Research Station Ummedganj, Kota.
- 3 **Title of Experiment** : **Zonal Varietal Trial-Midlate**
- 4 **Year of start** : Continue
- 5 **Objective:** : To identify a promising medium duration variety having better tonnage and sucrose than the existing varieties for the zone
- 6 **Brief description of the experiment:**
- (i) **No. of Entries** : **13+3=16**
- (ii) **Treatments** : Co 13035 CoPant 13223 Standards
Co 13036 CoPant 13224 CoS-767
CoH 13261 CoPb 13182 CoS-8436
CoH 13262 CoPb 13183 Co Pant-97222
CoH 13263 CoS 13232
CoLk 13204 CoS 13233
CoLk 13205
- (iii) **Design** : Augmented.
- (iv) **Replication** : One with three blocks
- (v) **Plot size**
- Gross** : 6m x 6r x 0.75m
Net : 5m x 4r x 0.75m
- (vi) **Fertilizer** : 200:60:60 N P K kg/ha, respectively
- (vii) **Weed control** : Spray of Atrazine @ 2.0 kg a. i. /ha as PE followed by one hand weeding at 60 days after planting
- (viii) **Date of Planting** : 20.03.2015
- (ix) **Date of Harvesting** : 28.02.2016
6. **Results:**
In this midlate trial, the variety CoS 13232 exhibited highest cane yield (84.5 t/ha) followed by standard CoS 767 (84.2 t/ha), the CCS was highest for CoS 8436 (9.24 t/ha) closely followed by standard CoS 767 (9.21 t/ha). The maximum number of cane tillers/ha was recorded in variety CoPb 13183 (119.6 thousand) followed by CoS 13232 (118.2 thousand), while the maximum number of malleable canes ('000/ha) was recorded for variety CoPant 97222 (84.4) followed by CoS 13232 (84.2) and CoS 8436 (83.7). At the time of harvest Brix (19.4%) and Sucrose (16.84%) were highest for variety CoH 13261, followed by CoPant 13224 (19.2%) and (16.63%), respectively, while extraction percentage was maximum for variety Co 13036 (47.3%) and CoPant 13224(47.3%) at harvest. The maximum germination was recorded in the variety CoH 13262 (48.00 %). The variety CoS 8436 possessed longest canes (2.23 m), while variety CoS 767 (2.29 cm) had thickest canes. (**Table-8**)
- 7 **Significant findings** : Research in progress
- 8 **Scientist attached** : Dr. P. Kumar, Sugarcane Breeder

Table 8: Zonal Varietal Trial-Midlate –2015-16

S. No	Clone	CCS (t/ha)	Cane yield (t/ha)	Brix % (12m)	Sucrose % (12m)	Purity % (12 m)	CCS % (12m)	Pol % cane	Extra-ction % (12 m)	Fibre % (12m)	NMC at 12 m ('000/ha)
1	2	3	4	5	6	7	8	9	10	11	12
1	Co 13035	7.86	79.6	17.2	14.57	84.69	9.87	-	46.3	-	83.5
2	Co 13036	7.94	74.2	18.3	15.70	85.80	10.70	-	47.3	-	81.7
3	CoH 13261	8.84	76.6	19.4	16.84	86.78	11.55	-	46.3	-	78.8
4	CoH 13262	8.94	81.8	18.6	16.01	86.08	10.93	-	42.4	-	76.9
5	CoH 13263	8.09	79.5	17.6	14.98	85.11	10.17	-	42.6	-	79.8
6	CoLk 13204	9.06	84.1	18.4	15.80	85.89	10.77	-	43.3	-	82.2
7	CoLk 13205	9.20	82.4	18.9	16.32	86.35	11.16	-	45.4	-	83.6
8	CoPant 13223	7.96	76.5	17.9	15.29	85.41	10.40	-	43.9	-	79.6
9	CoPant 13224	8.41	73.8	19.2	16.63	86.61	11.39	-	47.3	-	79.34
10	CoPb 13182	7.81	76.8	17.6	14.98	85.11	10.17	-	42.8	-	76.8
11	CoPb 13183	8.94	82.3	18.5	15.91	85.98	10.86	-	43.9	-	82.9
12	CoS 13232	8.65	84.5	17.7	15.08	87.85	10.24	-	44.4	-	84.2
13	CoS 13233	8.93	83.5	18.3	15.70	85.80	10.70	-	45.5	-	76.7
	Standards										
1	CoS 767	9.21	84.2	18.6	16.01	86.08	10.93	-	45.3	-	81.7
2	CoS 8436	9.24	82.8	18.9	16.32	86.35	11.16	-	43.6	-	83.7
3	CoPant 97222	8.48	82.1	17.8	15.19	85.31	10.32	-	45.8	-	84.4

S. No	Clone	Stalk Length (cm)	Stalk Diameter (cm)	Single cane weight (kg)	Brix % (10m)	Sucrose % (10 m)	Purity % (10m)	CCS % (10m)	No. of tillers ('000/ha) 120 days	Germination % (45days)
13	14	15	16	17	18	19	20	21	22	23
1	Co 13035	1.96	2.16	0.89	15.2	12.51	82.27	8.35	102.3	43.00
2	Co 13036	1.89	2.27	0.83	16.4	13.74	83.79	9.25	103.5	39.00
3	CoH 13261	2.00	2.15	0.86	16.9	14.26	84.37	9.64	104.7	46.00
4	CoH 13262	2.07	2.18	0.72	17.1	14.46	84.58	9.78	110.3	48.00
5	CoH 13263	2.11	2.21	0.79	16.2	13.54	83.56	9.11	111.5	44.00
6	CoLk 13204	2.13	2.18	0.74	15.6	12.92	82.80	8.65	110.3	47.00
7	CoLk 13205	2.15	2.21	0.82	14.9	12.20	81.85	8.12	115.6	43.00
8	CoPant 13223	2.13	2.23	0.81	17.5	14.88	85.01	10.10	115.5	42.00
9	CoPant 13224	2.12	2.11	0.78	14.9	12.20	82.85	8.12	112.4	46.00
10	CoPb 13182	2.21	1.93	0.84	15.7	13.02	82.93	8.72	111.6	43.00
11	CoPb 13183	2.22	1.96	0.79	15.2	12.51	82.27	8.35	119.6	46.00
12	CoS 13232	2.14	2.11	0.81	16.1	13.43	83.43	9.02	118.2	47.00
13	CoS 13233	2.15	2.16	0.83	16.2	13.54	83.56	9.11	107.3	39.00
	Standards									
1	CoS 767	2.18	2.29	0.87	16.6	13.95	84.03	9.61	108.6	46.00
2	CoS 8436	2.23	2.21	0.86	15.9	13.23	83.19	8.88	107.5	43.00
3	CoPant 97222	2.21	2.22	0.84	15.6	12.92	82.80	8.65	109.6	44.00

