

**Annual Report of All India Coordinated Research Project on Sugarcane
(Agronomy & Soil Science) for the year 2015-16
Centre- Uchani (Karnal)**

AS 42 : **Agronomic evaluation of promising new sugarcane genotypes.**

Objectives : To work out agronomy of sugarcane varieties from advanced varietal trial

Year of start : 2014-15 (Continued with new genotypes)

Treatments :

A. Genotypes – 6(Three in early and three in mid-late groups in separate trials)

i) Early : CoLk 9202, CoS 92046 and CoH 9262

ii) Mid-late : Co 10036, CoP10221 and Co10231

B. Fertility levels - 3

i) 75% of recommended doses of N (112.5 kg/ha)

ii) 100% of recommended doses of N (150 kg/ha)

iii) 125% of recommended doses of N (187.5 kg/ha)

Two separate experiments were conducted on early and mid late sugarcane varieties as mentioned above in Factorial RBD with three replications. Crop was planted at 75 cm row spacing on March 31, 2015. The soil of the experimental field was clay loam in texture having pH 7.8, EC 0.4 dsm⁻¹, organic carbon 0.31%, available P 11.1 kg/ha and available K 150 kg/ha. Recommended doses of phosphorus (50 kg P₂O₅/ha) and potash (50 kg K₂O/ha) were applied at the time of planting whereas nitrogen as per treatments was applied in three equal splits. Recommended dose of Nitrogen is 150 kg/ha. The crop was irrigated at 8-10 days intervals during pre-monsoon period and 20 days interval during post monsoon period. The harvesting of the experiment was done on February 15, 2016.

In early group, variety CoLk 9202 produced highest cane and sugar yield (75.1, 8.58 t/ha) followed by CoH 09262 (66.3, 8.02 t/ha) and lowest in case of CoS 92046 (63.1, 7.28 t/ha) CoH 9262 recorded significantly highest CCS % (12.09). All the varieties responded upto 25 % higher than recommended dose of nitrogen (187.5 kg/ha).

In mid late group, varieties CoP10221 and Co 10036 being at par were significantly higher in terms of germination, tillers, millable cane, cane yield and sugar yield as compared to variety Co 10231. No significant differences were observed among varieties in terms of CCS per cent. All the varieties responded upto 25 % higher than recommended dose of nitrogen (187 kg/ha)

Summary: In early group, variety CoLk 9202 produced significantly highest cane (75.1 t/ha) and sugar yield (8.58 t/ha). CoH 9262 recorded significantly higher CCS % (12.09). In mid late group, varieties CoP10231(77.4, 9.19 t/ha) and Co 10036 (78.8, 9.38 t/ha) being at par produced significantly higher cane yield and sugar yield as compared to variety Co 10031 (71.9, 8.53 t/ha). All the varieties responded upto 25 % higher than recommended dose of nitrogen (187.5 kg/ha) irrespective of maturity group.

Table 1: Effect of different fertility levels on growth, yield and quality of early group varieties

Treatments	Germination (%)	No. of tillers (000/ha)	No. of millable canes (000/ha)	Single cane weight (g)	Cane yield (t/ha)	CCS (%)	Sugar yield (t/ha)
Genotypes							
CoLk 9202	42.2	120.2	95.3	796	75.1	11.42	8.58
CoS 92046	42.4	115.2	90.9	703	63.1	11.53	7.28
CoH 9262	44.8	120.1	95.1	705	66.3	12.09	8.02
CD at 5%	2.0	NS	NS	18	3.0	0.16	0.37
Nitrogen dose							
75% of recom.	42.9	112.5	88.7	710	62.2	11.57	7.19
Recommended	43.6	119.3	94.3	740	69.0	11.71	8.08
125% of recom.	42.9	123.7	98.3	754	73.3	11.77	8.62
CD at 5%	NS	4.1	3.9	12	2.9	0.19	0.15

* Recommended Nitrogen - 150 kg /ha

Table 2: Effect of different fertility levels on growth, yield and quality of mid- late varieties

Treatments	Germination (%)	No. of tillers (000/ha)	No. of millable canes (000/ha)	Single cane weight (g)	Cane yield (t/ha)	CCS (%)	Sugar yield (t/ha)
Genotypes							
Co 10036	39.5	111.5	87.5	830	71.9	11.86	8.53
CoP10221	44.1	120.7	93.6	850	78.8	11.90	9.38
Co10231	43.5	119.3	92.6	844	77.4	11.87	9.19
CD at 5%	2.4	5.2	4.3	16	3.0	NS	0.41
Nitrogen dose							
75% of recom.	41.9	110.6	85.8	815	69.2	11.83	8.19
Recommended	42.5	117.9	91.9	848	77.1	11.89	9.18
125% of recom.	42.7	123.0	95.9	861	81.8	11.90	9.73
CD at 5%	NS	4.0	3.8	12	2.8	NS	0.34

AS 68: Impact of integrated application of organics and inorganics in improving soil health and sugarcane productivity

Objective: To develop nutrient management strategy for sustaining soil health and sugarcane production

Cropping system : Sugarcane – Ratoon-I – Ratoon-II

Year of start: 2014 – 2015 (Plant crop)

Treatment:

Tr.	Sugarcane (plant crop)	Ratoon-I	Ratoon- II
T1	No organic + 50% RDF	Application of trash at 10 t/ ha + 50% RDF	Application of trash at 10 t/ ha + 50% RDF
T2	No organic + 100% RDF	Application of trash at 10 t/ ha + 100% RDF	Application of trash at 10 t/ ha + 100% RDF
T3	No organic + soil test based recommendation	Application of trash at 10 t/ ha + soil test basis (NPK application)	Application of trash at 10 t/ ha + soil test basis (NPK application)
T4	Application of FYM/Compost @ 20 t/ ha + 50% RDF (inorganic source)	Application of FYM/Compost @ 20 t/ ha + 50% RDF (inorganic source)	Application of FYM/Compost @ 20 t / ha + 50% RDF (inorganic source)
T5	Application of FYM/Compost @ 20 t/ ha + 100% RDF (inorganic source)	Application of FYM/Compost @ 20 t/ ha + 100% RDF (inorganic source)	Application of FYM/Compost @ 20 t/ ha + 100% RDF (inorganic source)
T6	Application of FYM/Compost @ 20 t / ha + in organic nutrient application based on soil test (rating chart)	Application of FYM/Compost @ 20 t/ ha + in organic nutrient application based on soil test (NPK application)	Application of FYM/Compost @ 20 t/ ha + in organic nutrient application based on soil test (NPK application)
T7	Application of FYM/Compost @ 10 t/ ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + 50% RDF	Application of FYM/Compost @ 10 t/ ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + 50% RDF	Application of FYM/Compost @ 10 t/ ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + 50% RDF
T8	Application of FYM/Compost @ 10 t/ ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + 100% RDF	Application of FYM/Compost @ 10 t / ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + 100% RDF	Application of FYM/Compost @ 10 t/ ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + 100% RDF
T9	Application of FYM/Compost @ 10 t/ ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + soil test basis	Application of FYM/Compost @ 10 t/ ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + soil test basis (NPK application)	Application of FYM/Compost @ 10 t/ ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + soil test basis (NPK application)

The experiment was conducted on early maturing and good ratooner variety CoH 160 randomized block design with three replications. The first ratoon crop was initiated during last week of February. Recommended doses of phosphorus (50 kg/ha), potash (50 kg/ha) were applied at the time of preparing field for ratoon initiation, whereas doses of nitrogen was applied in four equal splits as top dressing (At ratoon initiation, April, May & June). The values for Nitrogen, phosphorus and potash on soil test basis were 172, 56 and 60 NPK kg/ha, respectively. The crop was irrigated at 8-10 days intervals during pre-monsoon period and 20 days interval during post monsoon period. The plant crop was harvested on February 26, 2016.

The treatments with 100 % RDF and soil test based fertilizer with FYM application being at par produced significantly higher number of tillers, millable canes and cane yield as compared to the treatments of 50 % RDF with FYM and trash mulching (Table 3). Application of 20 t/ha FYM with 50 % RDF or 100% RDF or Soil test based fertilizers application produced similar number of tillers, millable canes, cane yield in comparison to the treatments of 10 t/ha FYM + Biofertilizer application with 50 % RDF or 100% RDF or Soil test based fertilizers application. Treatment T6, T5, T9 and T 8 were found best and at par treatments in terms of number of tillers, millable canes and cane and sugar yield as compared to rest of the treatments. So FYM 10t /ha can be saved with application of biofertilizer in sugarcane crop in addition in increasing the population of soil micro organism if applied in both plant and ratoon crop. Treatment T5 and T6 being at par produced significantly highest sugar yield among all the treatments.

Summary: FYM @ 20 t / ha + in organic nutrient application based on soil test in plant crop and ratoon crop (T6) and application of FYM/Compost @ 20 t/ ha + 100% RDF in plant and ratoon crop (T5) recorded highest number of tillers, millable canes and cane yield in sugarcane plant-ratoon cropping system. Whereas, treatments Treatment T5 and T6 being at par produced significantly highest sugar yield among all the treatments.

Table 3: Effect of different treatments on sugarcane plant crop

Tr.	Sugarcane (plant crop)	Ratoon-I	Tillers (000/ha)	NMC (000/ha)	Cane weight (g)	Cane yield (t/ha)	CCS (%)	Sugar yield (t/ha)
T1	No organic + 50% RDF	Application of trash at 10 t/ ha + 50% RDF	92.3	68.0	652	43	11.80	5.07
T2	No organic + 100% RDF	Application of trash at 10 t/ ha + 100% RDF	132.1	107.8	841	87.8	12.00	10.53
T3	No organic + soil test based recommendation	Application of trash at 10 t/ ha + soil test basis (NPK)	135.6	110.6	840	89.8	12.10	10.87
T4	Application of FYM @ 20 t/ ha + 50% RDF	Application of FYM/Compost @ 20 t/ ha + 50% RDF (inorganic)	105.0	78.1	702	53.1	11.97	6.36
T5	Application of FYM @ 20 t/ ha + 100% RDF	Application of FYM/Compost @ 20 t/ ha + 100% RDF (inorganic)	141.9	116.6	875	98.9	12.01	11.88
T6	Application of FYM @ 20 t / ha + inorganic nutrient based on soil test	Application of FYM/Compost @ 20 t/ ha + inorganic nutrient based on soil test (NPK application)	145.0	118.2	873	100.5	12.00	12.06
T7	Application of FYM @ 10 t/ ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + 50% RDF	Application of FYM/Compost @ 10 t/ ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + 50% RDF	101.4	72.4	694	48.6	11.83	5.76
T8	Application of FYM @ 10 t/ ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + 100% RDF	Application of FYM/Compost @ 10 t / ha + biofert. (<i>Azotobacter/ Acetobacter + PSB</i>) + 100% RDF	138.6	109.7	870	94.5	12.03	11.00
T9	Application of FYM @ 10 t/ ha + biofert. (<i>Azotobacter/ Acetobacter + PSB</i>) + soil test basis(NPK application)	Application of FYM/Compost @ 10 t/ ha + biofert. (<i>Azotobacter/ Acetobacter + PSB</i>) + soil test basis(NPK application)	141.4	112.9	870	95.1	12.00	11.41
	CD at 5%		9.2	8.1	20	5.7	NS	0.42

AS 69 : **Use of plant growth regulators (PGRs) for enhanced yield and quality of sugarcane**

Objective : 1. To accelerate rate and extent of sugarcane germination through the use of PGRs
2. To assess the effect of PGRs on sugarcane growth, yield and juice quality

Year of start : 2015 – 2016

Treatments

1. Conventional planting/ Farmers' practice (3-bud setts)
2. Planting of setts after overnight soaking in water
3. Planting of setts after overnight soaking in 50 ppm ethrel solution
4. Planting of setts after overnight soaking in 100 ppm ethrel solution
5. T1+GA₃ spray (35 ppm) at 90, 120 and 150 DAP
6. T2+ GA₃ spray (35 ppm) at 90, 120 and 150 DAP
7. T3 + GA₃ (35 ppm) spray at 90, 120 and 150 DAP
8. T4 + GA₃ (35 ppm) spray at 90, 120 and 150 DAP

Table: Effect of different treatments on growth and yield of sugarcane

Treatments		Germination (%)	Tillers (000/ha)	NMC (000/ha)	Single cane weight (g)	Cane yield (t/ha)	CCS (%)	Sugar yield (t/ha)
1	Conventional planting/ (3-bud setts)	38.3	122.0	100.3	828	80.4	11.93	9.59
2	Planting of setts after overnight soaking in water	42.6	136.4	111.6	825	89.2	12.22	10.90
3	Planting of setts after overnight soaking in 50 ppm ethrel solution	46.6	147.6	119.1	822	94.9	12.35	11.72
4	Planting of setts after overnight soaking in 100 ppm ethrel solution	47.3	149.0	119.8	820	95.0	12.31	11.69
5	T1+GA ₃ spray (35 ppm) at 90, 120 and 150 DAP	38.1	128.7	105.6	827	84.7	11.95	10.12
6	T2+ GA ₃ spray (35 ppm) at 90, 120 and 150 DAP	42.5	142.1	115.9	823	92.3	12.25	11.31
7	T3 + GA ₃ (35 ppm) spray at 90, 120 and 150 DAP	46	154.6	124.3	821	98.8	12.3	12.15
8	T4 + GA ₃ (35 ppm) spray at 90, 120 and 150 DAP	47.2	156.9	125.6	817	99.3	12.31	12.22
CD at 5%		3.2	7.1	5.0	NS	3.2	NS	0.34

The experiment was conducted on variety CoH 167 (Mid maturing) in RBD with three replications in spring season. Crop was planted at 75 cm row spacing on March 15, 2015. The soil

of the experimental field was clay loam in texture having pH 7.6, EC 0.4 dsm⁻¹, organic carbon 0.39%, available P 12.6kg/ha and available K 166 kg/ha. Recommended doses of phosphorus (50 kg P₂O₅/ha) and potash (50 kg K₂O/ha) and 1/3rd nitrogen were applied at the time of planting. Rest of the nitrogen was applied in three equal splits. Recommended dose of Nitrogen is 150 kg/ha. The crop was irrigated at 8-10 days intervals during pre-monsoon period and 20 days interval during post monsoon period. The harvesting of the experiment was done on March 10, 2016.

Soaking of sugarcane setts in water or 50 ppm or 100 ppm ethrel solutions resulted in significant increase in sugarcane germination, tillers, millable canes and cane and sugar yield over conventional practice. Spraying of GA3 (35 ppm) resulted in significant increase in number of millable canes, cane and sugar yield in comparison to their untreated treatments. Treatments T 7 and T8 being at par produced significantly higher number of tillers, NMC, cane yield and sugar yield.

**Summary of experiments conducted by Crop Production group (Agronomy & Soil Science) at
CCSHAU, RRS, UCHANI, KARNAL**

(2015-16)

Following experiments were allotted during 2015-16 and all the allotted experiments were conducted

AS 42: Agronomic evaluation of promising new sugarcane genotypes

In early group, variety CoLk 9202 produced significantly highest cane (75.1 t/ha) and sugar yield (8.58 t/ha). CoH 9262 recorded significantly higher CCS % (12.09). In mid late group, varieties CoP10231(77.4, 9.19 t/ha) and Co 10036 (78.8, 9.38 t/ha) being at par produced significantly higher cane yield and sugar yield as compared to variety Co 10031 (71.9, 8.53 t/ha). All the varieties responded upto 25 % higher than recommended dose of nitrogen (187.5 kg/ha) irrespective of maturity group.

AS-68: Impact of integrated application of organics and inorganics in improving soil health and sugarcane productivity

FYM @ 20 t / ha + in organic nutrient application based on soil test in plant crop and ratoon crop (T6), Application of FYM/Compost @ 20 t/ ha + 100% RDF in plant and ratoon crop (T5) recorded highest number of tillers, millable canes and cane yield in sugarcane plant- ratoon cropping system.

AS 69: Use of plant growth regulators (PGRs) for enhanced yield and quality of sugarcane

Soaking of sugarcane setts in water or 50 ppm or 100 ppm ethrel solutions resulted in significant increase in sugarcane germination, tillers, millable canes and cane and sugar yield over conventional practice. Spraying of GA3 (35 ppm) resulted in significant increase in number of millable canes, cane and sugar yield in comparison to their untreated treatments. Treatments T 7 and T8 being at par produced significantly higher number of tillers, NMC, cane yield and sugar yield.