

Crop Production

KERALA AGRICULTURAL UNIVERSITY
Agricultural Research Station, Thiruvalla
All India Coordinated Research Project on Sugarcane

Annual Report 2014 - 2015

- 1 Project No. AS 42
- 2 Title **Agronomic evaluation of promising sugarcane genotypes**
- 3 Objectives To work out agronomy of sugarcane genotypes of advanced varietal trial (AVT)
- 4 Details of the treatment/ technical programme (in bullet form)
 - 1.Varieties** : V₁ - Co 0816
 V₂ - CoSnk 08101
 V₃ - Co 07008
 - 2.Fertilizer levels:**
 - i) 75% of the recommended dose of N
 - ii) 100% of the recommended dose of N
 - iii) 125% of the recommended dose of N
- 5 Design RBD
- 6 Replications 3
- 7 Plot size 6x5.4 m²
- 8 Climatic parameters
 - Total rainfall(mm)- 2893
 - Max.temperature(⁰c)- 32.3
 - Min. temperature(⁰c)- 23.4
 - Relative Humidity(%)- 74.1

9 Observations on soil health

Parameter	Initial	After harvest
Bulk density(g cc ⁻¹)	1.49	1.46
Organic carbon (%)	0.80	0.82
Available N (kg/ha)	291.13	300.38
Available P (kg/ha)	15.42	17.94
Available K (kg/ha)	22267	230.51

10 Summary of results

The experiment was conducted with three promising cultures from AVT namely V₁ - Co 0816, V₂ - CoSnk 08101 and V₃ - Co 07008 at three nitrogen levels of 75, 100, 125% of the recommended dose. (100% Of the recommended dose = 165: 82.5: 82.5 Kg NPK/ha) .The crop was planted on 16.1.2014 and harvested on 5.1.2015.

Even though no considerable effect on germination resulting from the genotypes and nitrogen level was visible, a slight effect on tiller count was seen influenced by the genotypes where V₂ recorded higher value compared to others.

The treatment variations due to genotypes were significant for growth and yield parameters. Among the genotypes studied, the genotype V₂ recorded maximum values for cane length, cane weight, millable cane count and resulted in reasonably good yield which was significantly superior to others (79.31 t/ha) followed by V₃ with an yield of 75.58 t/ha. Brix and sugar yield also followed same trend with significantly superior yield for V₂ (10.40 t/ha).

The treatment variations due to N levels were also significant for growth and yield parameters. The growth and yield of the genotypes at 125% at the recommended dose of N was significantly superior to that at 100% (78.86 t/ha). Similarly sugar yield at 125% of recommended dose of N was significantly superior to that at 100% (10.17 t/ha). Interaction effect of the genotypes with N nutrition was not significant for the parameters under study.

There was no considerable variation in the fertility status of the soil before and after the conduct of the trial. Among the treatment combinations, the highest BC ratio of 1.38 was recorded by V₂ when 125% of the recommended dose of N was applied.

Growth, juice quality and yield as influenced by varieties and nitrogen levels

Treatments	Germination (%)		Tiller count (000/ha)		Cane length (cm)	Cane girth (cm)	Single cane wt (kg)	MCC (000/ha)	SMT Brix (%)	CCS (%)	Cane yield (t/ha)	Sugar yield (t/ha)	BC ratio
	30 DAP	45 DAP	120 DAP	150 DAP									
V ₁	50.57	54.20	76.08	68.21	217.48	8.68	1.20	65.34	19.8	13.00	71.86	9.34	
V ₂	56.12	61.08	85.42	76.44	231.69	9.02	1.34	76.86	20.2	13.10	79.39	10.40	
V ₃	52.64	56.76	80.61	72.40	220.56	8.87	1.23	70.09	19.6	11.95	75.58	9.03	
CD (0.05)	NS	NS	5.06*	4.24*	12.05*	NS	0.12*	6.92*	0.25*	NS	4.06*	0.54*	
F ₁	54.15	58.84	81.14	72.14	220.62	8.78	1.18	67.62	19.8	12.80	72.06	9.22	
F ₂	55.06	59.44	83.27	74.12	225.00	8.97	1.26	69.05	20.0	12.85	74.36	9.56	
F ₃	56.10	60.38	83.96	76.00	238.10	9.51	1.37	75.99	20.6	12.90	78.86	10.17	
CD (0.05)	NS	NS	NS	NS	12.05*	NS	0.12*	6.92*	0.25*	NS	4.06*	0.54*	
V ₁ F ₁	5.22	55.00	78.78	69.12	219.77	8.87	1.22	62.81	19.6	12.99	68.80	8.94	1.26
V ₁ F ₂	50.91	56.01	79.64	70.25	211.80	8.90	1.25	66.70	19.5	13.00	72.60	9.44	1.27
V ₁ F ₃	51.24	55.22	80.02	72.64	220.87	8.99	1.33	73.77	19.8	12.80	74.19	9.50	1.29
V ₂ F ₁	55.95	59.94	84.58	76.91	229.10	9.08	1.31	74.90	20.4	12.75	77.13	9.84	1.32
V ₂ F ₂	56.07	61.25	85.32	77.11	234.79	9.34	1.35	77.44	20.2	12.80	79.25	10.15	1.35
V ₂ F ₃	56.94	62.24	86.18	79.02	231.11	9.51	1.41	80.04	20.4	12.90	81.92	10.57	1.38
V ₃ F ₁	52.50	57.61	81.25	73.43	231.11	8.86	1.28	68.19	19.6	12.80	73.27	9.38	1.31
V ₃ F ₂	52.70	59.84	81.56	72.75	228.33	8.78	1.30	69.00	19.8	13.05	74.35	9.71	1.30
V ₃ F ₃	52.95	58.65	82.01	73.59	232.36	8.75	1.22	80.00	19.8	12.90	79.14	10.21	1.34
V_xF CD (0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

S/d

S/d

Signature of the Principal Investigator

Signature of the Head of Station

KERALA AGRICULTURAL UNIVERSITY
Agricultural Research Station, Thiruvalla
All India Coordinated Research Project on Sugarcane

Annual Report 2014 - 2015

- 1 Project No. AS 64
- 2 Title **Response of sugar cane crop to different plant nutrients in varied agro-ecological situations.**
- 3 Objectives To study differential response of sugarcane crop to different nutrients.
- 4 Details of the treatment/ technical programme (in bullet form)
1. Control (No Fertilizer)
 2. N
 - 3 NP
 4. NPK
 5. NPK+S
 6. NPK+Zn
 7. NPK+Fe
 8. NPK+Mn
 9. NPK+S+Zn
 10. NPK+S+Zn+Fe
 11. NPK+S+Zn+Fe+Mn
 12. Soil test based fertilizer application
 13. FYM @ 20 t/ha
- 5 Design RBD
- 6 Replications 3
- 7 Plot size 8x5.4m²
- 8 Climatic parameters
- Total rainfall(mm)- 2893
 Max.temperature(°c)- 32.3
 Min. temperature(°c)- 23.4
 Relative Humidity(%)- 74.1

9 Observations on soil health

Parameter	Initial	After harvest
Bulk density(g cc ⁻¹)	1.49	1.46
Organic carbon (%)	0.78	0.80
Available N (kg/ha)	301	312..38
Available P (kg/ha)	15.5	17..75
Available K (kg/ha)	213	220.5

10 Summary of results.

The trial was conducted to study the response of sugarcane crop to different plant nutrients. The crop was planted on 1.2.2014 and harvested on 25.1.2015.

Though germination percentage remained unaffected due to various treatments, tiller population was found affected considerably by them and recorded highest value for T₁₂ (soil test based nutrient application). The treatment variation due to different combination of plant nutrients were significant for growth and yield parameters. The maximum cane length (234.27 cm), cane girth (10.19 cm), cane weight (1.55 kg), MCC (94000 / ha) and ultimately cane yield (105.68 t/ha) were obtained when the crop was supplemented with nutrients based on soil test result (T₁₂). Even though there was no significant effect of various treatments on brix %, maximum sugar yield (12.26 t/ha) was also recorded by T₁₂. This was followed closely by T₁₁ (NPK+S+Zn+Fe+Mn).

Slight variation in the fertility status of the soil was noticed before and after conduct of the trial. From among the various treatments imposed, the highest BC ratio of 1.42 was also recorded by T₁₂.

Growth, juice quality and yield as influenced by different plant nutrients

Treatments		Germination (%)		Tiller count (000/ha)		Cane length (cm)	Cane girth (cm)	Single cane weight (kg)	MCC ('000/ha)	Brix (%)	CCS (%)	Cane yield (t/ha)	Sugar yield (t/ha)	BC ratio
		30 DAP	45 DAP	120 DAP	150 DAP									
T ₁	Control	59.2	63.6	82.25	74.18	205.44	8.64	1.16	42.69	17.6	12.2.	45.09	5.50	0.85
T ₂	N	60.0	64.2	95.70	85.66	207.20	9.36	1.41	74.98	17.4	12.4	77.57	9.62	1.25
T ₃	NP	60.7	64.5	114.20	102.34	215.31	9.12	1.37	80.03	17.2	12.0	85.60	10.28	1.35
T ₄	NPK	61.3	66.0	116.18	104.50	217.56	8.78	1.45	77.61	17.8	11.8	81.27	9.59	1.30
T ₅	NPK+S	59.5	64.6	89.90	80.61	220.23	9.27	1.38	81.02	17.4	11.6	87.07	10.10	1.39
T ₆	NPK+Zn	60.6	65.1	105.21	96.64	218.44	9.40	1.44	80.75	17.2	12.0	86.89	10.43	1.37
T ₇	NPK+ Fe	61.2	66.6	110.40	102.71	222.78	9.57	1.45	81.50	17.6	11.8	87.24	10.30	1.38
T ₈	NPK+ Mn	58.7	62.9	88.80	80.04	224.56	9.53	1.40	78.64	17.4	12.0	82.92	9.95	1.33
T ₉	NPK+S+Zn	59.4	63.7	89.00	80.11	220.45	9.72	1.03	74.12	17.8	12.3	73.66	9.06	
T ₁₀	NPK+S+Zn +Fe	60.8	65.2	41.41	100.35	218.78	9.26	1.17	82.06	17.2	12.0	87.76	10.54	1.39
T ₁₁	NPK+S+Zn +Fe+Mn	59.9	63.8	111.49	108.61	230.10	9.53	1.51	91.26	17.4	11.4	100.92	11.51	1.42
T ₁₂	Soil test based application	61.5	66.9	121.20	82.19	234.27	10.19	1.55	94.00	17.6	11.6	105.68	12.26	1.44
T ₁₃	FYM @20 t/ha	59.6	63.8	90.25		220.39	9.44	1.08	72.36	17.6	12.0	71.81	8.62	1.10
CD (0.05)		NS	NS	9.85*	8.97*	4.02*	0.70*	NS	3.02*	NS	NS	5.22*	0.80*	NS

S/d

Signature of the Principal Investigator

S/d

Signature of the Head of Station

KERALA AGRICULTURAL UNIVERSITY
Agricultural Research Station, Thiruvalla
All India Coordinated Research Project on Sugarcane

Annual Report 2014 - 2015

- 1 Project No. AS 66
- 2 Title **Priming of cane node for accelerating germination**
- 3 Objectives
 (i) To find out suitable cane node priming technique.
 (ii) To assess the effect of cane node on acceleration of germination.
- 4 Details of the treatment/
 technical programme (in bullet form)
 T₁ : Un-primed cane node
 T₂: Treating cane node in hot water at 50°C for 2 hours.
 T₃ : Treating cane node in hot water (50° C) with urea solution (3%) for 2 hours
 T₄ : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio.
 T₅: Conventional 3-bud sett planting.
 *T₆ : Primed and sprouted cane node (Incubated for four days after priming)
- 5 Design RBD
- 6 Replications 4
- 7 Plot size 6x5.4m²
- 8 Climatic parameters
 Total rainfall(mm)- 2893
 Max.temperature(°c)- 32.3
 Min. temperature(°c)- 23.4
 Relative Humidity(%)- 74.1

9 Observations on soil health

Parameter	Initial	After harvest
Bulk density(g cc ⁻¹)	1.49	1.46
Organic carbon (%)	0.77	0.79
Available N (kg/ha)	201	215.38
Available P (kg/ha)	14	17.9
Available K (kg/ha)	208	214.9

10. Summary of the results

The experiment was conducted to find out suitable cane node priming technique and to assess the effect of cane node on acceleration of germination. The crop was planted on 25.1.2014 and harvested on 16.1.2015.

The results revealed that the different priming techniques have significantly influenced the germination percentage and tiller count.

The highest germination percentage and tiller population were recorded in 3 bud sett planting (T_5) and the lowest value for the above parameters were obtained for the primed and sprouted cane node (T_6).

Maximum cane length (248.10 cm), MCC (78660 / ha), cane yield (85.80 t/ha) were recorded for the 3 bud sett planting (T_5). Brix and sugar yield also showed same trend and recorded significantly higher value (10.47 t/ha) for the very same treatment (T_5). This was followed closely by treating cane node in cattle dung, cows urine and water in the ratio 1:2:5 (T_4). There was no significant variation in the soil fertility parameters prior to and after the conduct of the trial. The highest BC ratio of 1.38 was recorded by T_5 (three bud sett planting).

Germination, cane yield and juice quality as influenced by cane node priming techniques

Treatments		Germination (%)		Tiller count (000/ha)		Cane length (cm)	Cane girth (cm)	Single cane weight (kg)	MCC ('000/ha)	Brix (%)	CCS (%)	Cane yield (t/ha)	Sugar yield (t/ha)	BC ratio
		30 DAP	45 DAP	120 DAP	150 DAP									
T ₁	Un primed cane node	25.84	45.76	82.16	74.25	217.11	9.51	1.32	62.05	17.6	11.8	66.60	7.86	1.01
T ₂	Cane node in hot water at 50° c for 2 hours	25.21	45.94	86.34	77.94	234.89	9.30	1.40	67.48	17.2	11.4	71.10	8.11	1.25
T ₃	Cane node in hot water (50° c) Urea solution (3%))for 2 hours	30.58	48.90	98.40	87.63	225.56	9.59	1.35	71.64	17.8	12.0	75.26	9.04	1.32
T ₄	Cane node in cattle dung, cows urine and water (1:2:5)	31.50	58.25	100.50	89.88	225.90	10.05	1.30	75.50	17.4	11.6	76.33	8.86	1.35
T ₅	3 bud sett	35.70	60.47	103.24	92.76	248.10	10.25	1.48	78.66	18.0	12.2	85.80	10.47	1.38
T ₆	Primed and sprouted cane node	22.41	37.36	87.60	78.93	226.43	9.42	1.20	66.71	17.4	11.8	69.00.	8.15	1.05
CD (0.05)		2.90*	3.22*	3.50*	3.04*	9.25*	0.25*	NS	3.25*	NS	NS	9.60*	0.52*	NS

S/d

S/d

Signature of the Principal Investigator

Signature of the Head of Station

KERALA AGRICULTURAL UNIVERSITY
Agricultural Research Station, Thiruvalla
All India Coordinated Research Project on Sugarcane

Annual Report 2014 - 2015

1	Project No.	AS 68
2	Title	Impact of integrated application of organics and in organics improving soil health and sugar cane productivity
3	Objectives	To develop nutrient management strategy for sustaining soil health and sugarcane production.
4	Details of the treatment/ technical programme (in bullet form)	Treatments (Sugarcane -plant crop) T ₁ - No organic + 50% RDF T ₂ - No organic + 100% RDF T ₃ - No organic + soil test based recommendation T ₄ - Application of FYM/Compost @ 20 tonnes / ha + 50% RDF (inorganic source) T ₅ - Application of FYM/Compost @ 20 tonnes / ha + 100% RDF (inorganic source) T ₆ - Application of FYM/Compost @ 20 tonnes / ha + in organic nutrient application based on soil test (rating chart) T ₇ - Application of FYM/Compost @ 10 tonnes / ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + 50% RDF T ₈ - Application of FYM/Compost @ 10 tonnes / ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + 100% RDF T ₉ - Application of FYM/Compost @ 10 tonnes / ha + biofertilizer (<i>Azotobacter/ Acetobacter + PSB</i>) + soil test basis
5	Design	RBD
6	Replications	3
7	Plot size	6x5.4m ²
8	Climatic parameters	Total rainfall(mm)- 2893 Max.temperature(⁰ c)- 32.3 Min. temperature(⁰ c)- 23.4 Relative Humidity(%)- 74.1

9 Observations on soil health

Parameter	Initial	After harvest
Bulk density(g cc ⁻¹)	1.49	1.46
Organic carbon (%)	0.77	0.79
Available N (kg/ha)	201	215.38
Available P (kg/ha)	14	17.9
Available K (kg/ha)	220	233.3

10 **Summary of results.**

The experiment to study the impact of integrated application of organics and inorganics in improving soil health and sugar cane productivity was planted on 21.1.2014 and harvested on 10.1.2015.

The germination percentage and tiller count remained unaffected due to the various treatments tried.

The variations due to different treatments were significant for growth and yield parameters. Among the various treatments imposed T₈ (FYM/Compost @ 10 tonnes / ha + biofertilizer (*Azotobacter/ Acetobacter* + *PSB*) + 100% RDF) recorded significantly higher value for cane length (232.90 cm), MCC (81550 /ha) and resulted in maximum yield (89.09 t/ha). Brix and sugar yield also followed same trend with significantly higher value with for sugar yield (10.87 t/ha) for the very same treatment. It was followed by T₆ (FYM/Compost @ 20 tonnes / ha + inorganic nutrient application based on soil test (rating chart)). Growth and yield parameters recorded by all other treatments except T₁, were on par.

Slight variation in the soil fertility parameters were noticed before and after the conduct of the trial especially regarding the status of major nutrients where higher values were recorded in the soil after completion of the experiment.

The nutrient composition of the farmyard manure used was 1.0:0.5:1.0 % N, P₂O₅ and K₂O. The treatment T₈ recorded the highest BC ratio (1.40).

Growth, cane yield and juice quality as influenced by different treatments.

Treatments		Germination (%)		Tiller count (000/ha)		Cane length (cm)	Cane girth (cm)	Single cane weight (kg)	MCC (*000/ha)	Brix (%)	CCS (%)	Cane yield (t/ha)	Sugar yield (t/ha)	BC ratio
		30 DAP	45 DAP	120 DAP	150 DAP									
T ₁	No organic + 50% RDF	58.55	62.70	80.64	72.15	195.00	8.91	1.18	52.27	17.6	11.2	56.04	6.28	0.75
T ₂	No organic + 100% RDF	58.75	63.40	96.10	86.29	201.32	8.99	1.20	71.46	17.2	12.4	74.79	9.28	1.28
T ₃	No organic + soil test based recommendation	59.60	63.70	98.32	87.42	210.10	9.27	1.23	73.08	17.2	11.8	75.31	8.89	1.30
T ₄	FYM/Compost @ 20 tonnes / ha + 50% RDF (inorganic source)	60.12	65.14	94.08	85.96	207.45	9.30	1.20	69.71	17.8	12.0	72.02	8.65	1.25
T ₅	FYM/Compost @ 20 tonnes / ha + 100% RDF (inorganic source)	59.43	63.80	92.25	83.77	215.56	9.47	1.27	70.94	17.2	11.6	74.38	8.63	1.28
T ₆	FYM/Compost @ 20 tonnes / ha + in organic nutrient application based on soil test (rating chart)	59.21	64.77	102.52	91.40	223.67	9.60	1.40	75.26	17.6	11.5	76.33	8.78	1.29
T ₇	FYM/Compost @ 10 tonnes / ha + biofertilizer (<i>Azotobacter/Acetobacter</i> + <i>PSB</i>) + 50% RDF	60.00	65.22	90.28	81.26	212.89	9.24	1.37	66.33	17.8	12.0	68.82	8.26	1.20
T ₈	FYM/Compost @ 10 tonnes / ha + biofertilizer (<i>Azotobacter/Acetobacter</i> + <i>PSB</i>) + 100% RDF	61.24	67.80	105.21	94.23	232.90	10.05	1.52	81.55	18.0	12.2	89.09	10.87	1.40
T ₉	FYM/Compost @ 10 tonnes / ha + biofertilizer (<i>Azotobacter/Acetobacter</i> + <i>PSB</i>) + soil test basis	60.70	66.19	95.66	85.94	228.22	9.40	1.28	70.40	17.8	11.8	72.74	8.59	1.25
CD (0.05)		NS	NS	NS	NS	9.48*	0.52*	0.18*	2.25*	NS	NS	8.83*	NS	NS

S/d

S/d

Signature of the Principal Investigator

Signature of the Head of Station

