

KERALA AGRICULTURAL UNIVERSITY



AICRP ON SUGARCANE

CROP PRODUCTION ANNUAL REPORT 2015-2016

Sugarcane Research Station, Kallunkal
Thiruvalla, Kerala-689102

KERALA AGRICULTURAL UNIVERSITY
SUGARCANE RESEARCH STATION, THIRUVALLA
AICRP on Sugarcane -Crop Production

Annual Report for 2015-16

- 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) - 2253.0
 - Max. temperature(⁰c) - 32.7
 - Min. temperature(⁰c) - 24.8
 - Relative Humidity(%) - 87.0
- 9 Observations on soil health

Parameter	Initial	After harvest
Bulk density(g cc ⁻¹)	1.43	1.40
Organic carbon (%)	1.82	1.96
Available N (kg/ha)	376.32	390.38
Available P (kg/ha)	112.72	117.94
Available K (kg/ha)	169.12	130.51
Soil pH	4.6	4.5
EC (ds m ⁻¹)	0.12	0.12

10 Summary of the 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 and 125% of the recommended dose. (100% Of the recommended dose = 165: 82.5: 82.5 Kg NPK/ha). The crop was planted on 10.01.2015 and harvested on 08.01.2016.

Even though no significant effect on germination resulting from the genotypes and nitrogen level was visible, considerable 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, V₂ recorded maximum values for cane length, cane weight, millable cane count etc and resulted in reasonably good yield which was significantly superior to others (75.70 t/ha) followed by V₃ with an yield of 61.23 t/ha. Sugar yield also followed same trend with significantly superior value for V₂ (9.59 t/ha).

The treatment variations due to varying 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%. The maximum yield of 67.63t/ha was obtained when the crop was supplemented with 125% of N. Similarly sugar yield at 125% of recommended dose of N was significantly superior to that at 100% (12.37 t/ha). Interaction effect of the genotypes with N was significant for cane length, MCC, CCS% and cane yield and the maximum values for the said parameters were recorded by V₂ when 125 % of the recommended dose of N was applied.

There was slight 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 1.40 was recorded by V₂ when 125% of the recommended dose of N was applied.

Growth, juice quality and yield as influenced by varieties and fertilizer 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	50.41	53.95	75.24	67.20	198.65	8.99	1.15	54.84	19.0	11.71	53.97	6.32	-
V ₂	55.15	60.78	84.75	85.81	230.65	9.44	1.37	76.41	20.2	12.67	75.70	9.59	-
V ₃	52.19	55.76	80.05	71.96	211.55	9.24	1.22	62.48	19.7	12.05	61.23	7.38	-
CD (0.05)	NS	NS	4.45*	5.51*	2.36*	NS	NS	1.79*	NS	0.24*	1.98*	0.12*	-
F ₁	53.80	57.96	80.85	71.94	207.88	9.15	1.20	60.97	19.3	11.95	60.05	7.17	-
F ₂	54.75	59.11	82.90	73.88	213.65	9.23	1.24	64.48	19.4	12.12	63.21	7.66	-
F ₃	56.01	60.00	84.00	77.00	219.32	9.29	1.29	68.28	19.76	12.37	67.63	8.37	-
CD (0.05)	NS	NS	NS	NS	2.36*	NS	NS	1.79*	NS	0.24*	1.98*	0.12*	-
V ₁ F ₁	55.22	56.00	78.05	70.02	195.40	8.91	1.12	53.13	19.0	11.59	52.36	6.07	1.21
V ₁ F ₂	53.91	56.01	79.54	70.66	198.81	9.00	1.15	54.73	19.0	11.70	53.71	6.28	1.23
V ₁ F ₃	52.24	55.37	80.16	73.64	201.75	9.06	1.18	56.66	19.0	11.85	55.84	6.62	1.25
V ₂ F ₁	55.87	59.98	83.58	77.77	222.67	9.38	1.32	71.16	19.8	12.28	69.85	8.58	1.35
V ₂ F ₂	56.25	61.25	85.39	77.40	230.45	9.45	1.37	76.27	20.2	12.63	74.80	9.44	1.38
V ₂ F ₃	58.00	62.75	88.38	79.20	238.33	9.51	1.43	81.80	20.6	13.11	82.45	10.81	1.40
V ₃ F ₁	52.55	57.90	80.88	74.46	205.58	9.16	1.18	58.63	19.0	11.97	57.95	6.94	1.26
V ₃ F ₂	52.96	61.00	82.15	73.50	211.69	9.24	1.21	62.42	19.1	12.03	61.12	7.35	1.28
V ₃ F ₃	54.00	59.65	82.66	73.64	217.38	9.31	1.27	66.39	19.5	12.14	64.61	7.84	1.30
VxF CD (0.05)	NS	NS	NS	NS	3.06*	NS	NS	3.10*	NS	0.40*	2.56*	NS	NS

Sd/-

Signature of the Principal Investigator

Sd/-

Signature of the Head of Station

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Annual Report for 2015-16

1	Project No.	AS 68
2	Title	Impact of integrated application of organics and inorganics in 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</i> + <i>PSB</i>) + 50% RDF T ₈ - Application of FYM/Compost @ 10 tonnes / ha + biofertilizer (<i>Azotobacter/ Acetobacter</i> + <i>PSB</i>) + 100% RDF T ₉ - Application of FYM/Compost @ 10 tonnes / ha + biofertilizer (<i>Azotobacter/ Acetobacter</i> + <i>PSB</i>) + soil test basis
5	Design	RBD
6	Replications	3
7	Plot size	6x5.4m ²
8	Climatic parameters	Total rainfall(mm) - 2253.0 Max. temperature(⁰ c) - 32.7 Min. temperature(⁰ c) - 24.8 Relative Humidity(%) - 87.0

9 Observations on soil health

Parameter	Initial	After harvest	
Bulk density(g cc ⁻¹)	1.43	1.40	
Organic carbon (%)	1.82	1.96	
Available N (kg/ha)	376.32	390.38	
Available P (kg/ha)	112.12	130.51	
Available K (kg/ha)	222.67	230.51	
Soil pH	4.6	4.5	
EC (ds m ⁻¹)	0.12	0.12	

10 Summary of the 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 15.1.2015 and harvested on 10.01.2016.

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, T₈ (FYM/Compost @ 10 t / ha + biofertilizer (*Azotobacter/ Acetobacter* + *PSB*) + 100% RDF) recorded significantly higher value for cane length (250.54 cm), MCC (89000 /ha) etc and resulted in maximum yield (107.22 t/ha). Brix% and sugar yield also followed same trend with significantly higher value with for sugar yield (12.30 t/ha) for the very same treatment. It was followed closely by T₆ (FYM/Compost @ 20 t / ha + inorganic nutrient application based on soil test (rating chart)). Growth and yield parameters recorded by all other treatments except T₁ and T₉, 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 the 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 (1.37).

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	58.50	62.56	80.13	72.00	176.33	8.13	1.21	62.79	17.33	8.52	71.98	6.13	0.80
T ₂	No organic + 100% RDF	58.70	62.96	95.94	86.09	226.16	9.25	1.49	83.56	18.00	10.18	98.97	10.07	1.25
T ₃	No organic + soil test based recommendation	59.51	63.55	98.63	87.50	222.89	9.30	1.45	84.58	17.66	10.19	99.01	10.08	1.26
T ₄	FYM/Compost @ 20 tonnes / ha + 50% RDF (inorganic source)	59.14	64.75	94.85	86.12	229.51	9.20	1.50	81.81	18.00	9.55	92.36	8.82	1.15
T ₅	FYM/Compost @ 20 tonnes / ha + 100% RDF (inorganic source)	59.08	63.71	92.04	83.65	225.94	9.28	1.47	84.19	18.67	10.32	98.26	10.14	1.26
T ₆	FYM/Compost @ 20 tonnes / ha + in organic nutrient application based on soil test (rating chart)	59.00	64.82	101.91	91.55	228.21	9.29	1.49	84.65	18.83	10.20	99.91	10.19	1.20
T ₇	FYM/Compost @ 10 tonnes / ha + biofertilizer (<i>Azotobacter/Acetobacter</i> + <i>PSB</i>) + 50% RDF	58.65	65.12	89.06	81.00	222.50	9.27	1.48	79.80	18.17	9.81	98.14	9.62	1.18
T ₈	FYM/Compost @ 10 tonnes / ha + biofertilizer (<i>Azotobacter/Acetobacter</i> + <i>PSB</i>) + 100% RDF	62.25	68.30	106.74	95.01	250.54	9.97	1.66	89.00	19.67	11.48	107.22	12.30	1.37
T ₉	FYM/Compost @ 10 tonnes / ha + biofertilizer (<i>Azotobacter/Acetobacter</i> + <i>PSB</i>) + soil test basis	60.44	65.64	94.90	86.00	221.28	9.24	1.44	83.60	18.50	10.00	72.74	9.81	1.23
CD (0.05)		NS	NS	NS	NS	8.17*	0.08*	0.17*	2.82*	NS	0.46*	4.98*	NS	NS

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Annual Report for 2015-16

- 1 Project No. AS 69
- 2 Title **Use of plant growth regulators (PGRs) for enhanced yield and quality of sugarcane**
- 3 Objectives
 (i) To accelerate rate and extent of sugarcane germination through the use of PGRs.
 (ii) To assess the effect of PGRs on sugarcane growth, yield and juice quality.
- 4 Details of the treatment/ technical programme (in bullet form)
 T₁ : Conventional planting/ Farmers' practice (3-bud setts)
 T₂ : Planting of setts after overnight soaking in water
 T₃ : Planting of setts after overnight soaking in 50 ppm ethrel solution.
 T₄ : Planting of setts after overnight soaking in 100 ppm ethrel solution.
 T₅ : T₁ + GA₃ spray (35ppm) at 90,120 and 150 DAP
 T₆ : T₂ + GA₃ spray (35ppm) at 90,120 and 150 DAP
 T₇ : T₃ + GA₃ spray (35ppm) at 90,120 and 150 DAP
 T₈ : T₄ + GA₃ spray (35ppm) at 90,120 and 150 DAP
- 5 Design RBD
- 6 Replications 3
- 7 Plot size 6x5.4m²
- 8 Climatic parameters
 Total rainfall(mm) - 2253.0
 Max. temperature(⁰c) - 32.7
 Min. temperature(⁰c) - 24.8
 Relative Humidity(%) – 87.0
- 9 Observations on soil health

Parameter	Initial	After harvest
Bulk density(g cc ⁻¹)	1.43	1.40
Organic carbon (%)	1.82	1.96
Available N (kg/ha)	376.32	390.38
Available P (kg/ha)	112.72	117.94
Available K (kg/ha)	169.12	130.51
Soil pH	4.6	4.5
EC(ds m ⁻¹)	0.12	0.12

10 Summary of the results.

The experiment was conducted to study the effect of plant growth regulators on germination, growth, yield and juice quality of sugarcane. The crop was planted on 25.01.2015 and harvested on 16.01.2016.

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

The highest germination percentage and tiller population were recorded by T₈ (T₄ +GA₃ spray (35ppm) at 90,120 and 150 DAP) and the lowest value for the above parameters were recorded by T₂ (planting of setts after overnight soaking in water).

Maximum cane length (256.00 cm), MCC (91450 / ha), cane yield (115.72 t/ha) etc were recorded T₈. Sugar yield also showed same trend and recorded significantly higher value (13.38 t/ha) for the very same treatment (T₈). This was followed closely by T₄ (planting of setts after overnight soaking in 100 ppm ethrel solution. There was some variation in the soil fertility parameters prior to and after the conduct of the trial. The highest BC ratio of 1.40 was also recorded by T₈.

Germination, cane yield and juice quality as influenced by plant growth regulators

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	Conventional planting/ Farmers' practice (3-bud setts).	55.84	61.76	92.16	86.25	227.78	9.25	1.47	63.02	17.7	9.73	95.83	9.32	1.20
T ₂	Planting of setts after overnight soaking in water.	45.21	49.94	76.34	71.94	215.87	8.89	1.38	65.75	18.0	9.03	87.65	7.91	1.12
T ₃	Planting of setts after overnight soaking in 50 ppm ethrel solution	57.58	60.90	97.40	91.63	230.39	9.30	1.46	68.09	18.0	11.07	98.45	10.90	1.19
T ₄	Planting of setts after overnight soaking in 100 ppm ethrel solution	61.50	67.25	104.50	93.88	244.03	9.60	1.60	79.84	18.5	11.40	103.67	11.82	1.32
T ₅	T ₁ + GA ₃ spray (35ppm) at 90,120 and 150 DAP	58.25	62.47	98.24	91.76	231.89	9.33	1.56	69.45	18.0	11.12	100.37	11.16	1.22
T ₆	T ₂ + GA ₃ spray (35ppm) at 90,120 and 150 DAP	59.73	63.36	96.60	92.93	235.00	9.41	1.52	73.25	18.5	11.18	101.44	11.34	1.25
T ₇	T ₃ + GA ₃ spray (35ppm) at 90,120 and 150 DAP	60.25	65.00	99.71	90.34	238.58	9.45	1.61	80.16	19.0	11.31	102.45	11.58	1.28
T ₈	T ₄ + GA ₃ spray (35ppm) at 90,120 and 150 DAP	63.00	69.21	110.06	98.75	256.00	10.20	1.75	91.45	20.0	11.57	115.72	13.38	1.40
CD (0.05)		1.90*	2.22*	3.50*	2.84*	2.56*	0.14*	0.11*	2.89*	NS	NS	4.02*	0.26*	NS

Sd/-

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