

AS 42:	Agronomic evaluation of promising sugarcane genotypes
Year of initiation	2012-13
Design	FRBD
Treatments	4 varieties from AVT V ₁ : Co C 07336; V ₂ : Co A 08324; V ₃ : Co OR 08346; V ₄ : Co 6907 3 fertilizer levels : 75, 100 and 125 % RDN
Replication	3
Recommended fertilizer dose	250:100:60 N :P ₂ O ₅ : K ₂ O kg /ha
Plot size	6 x 4.8 m ²
Date of planting	27.12.12
Date of harvest	15.11.13

AS 42.1 Effect of genotypes and fertility levels on germination, tiller count, yield and juice quality of sugarcane

Treatments	Germination % at 45 DAP	No of tillers (000/ha) at 90 DAP	No of tillers (000/ha) at 120 DAP	NMC (000/ha)	Cane yield (t/ha)	Juice Brix %	Juice Sucrose%	CCS %	CCS yield (t/ha)
Genotypes									
CoC 07336	44.17	64.97	62.43	60.61	72.34	18.11	15.32	10.37	7.51
CoA 08324	51.79	75.00	72.46	68.44	80.82	18.59	15.64	10.55	8.54
Co Or 8346	60.31	81.83	79.29	73.76	83.91	18.86	15.90	10.75	9.06
Co 6907	50.83	79.90	77.36	72.26	82.59	18.77	15.41	10.27	8.50
SEm ±	2.346	3.479	3.512	2.713	2.221	0.141	0.145	0.136	0.279
CD at 5 %	6.881	10.202	9.202	7.958	6.514	0.413	0.425	NS	0.818
N levels									
75 %	51.00	79.40	76.86	71.87	80.56	18.68	15.83	10.73	8.69
100 %	52.98	77.98	75.44	70.76	84.05	18.80	15.62	10.47	8.81
125 %	51.36	68.89	66.35	63.68	75.03	18.27	15.25	10.25	7.70
SEm ±	2.032	3.013	3.113	2.350	1.924	0.122	0.126	0.118	0.242
CD at 5 %	NS	8.83	8.840	6.891	5.642	0.357	0.368	0.346	0.708

AS 42.1 Interaction effect of different genotypes at various fertility level on cane yield

Genotypes	Mean table			Mean
	N1	N2	N3	
CoC 07336	61.03	83.52	72.47	72.34
CoA 08324	84.73	77.41	80.34	80.82
Co Or 8346	91.70	89.24	70.80	83.91
Co 6907	84.79	86.45	76.52	82.59
Mean	80.56	84.15	75.03	79.92
	V	N	V x N	
Sem	2.221	1.924	3.848	
CD 5%	6.514	5.642	11.283	
CV %	8.34			

The experiment was laid out in factorial randomized block design with three genotypes from AVT namely CoC 07336, Co A 08324 and Co Or 8346 along with one standard check *i.e.* Co 6907 on red laterite soil of the experimental farm of Sugarcane Research Station, Nayagarh. The soil was acidic (pH 5.12) in reaction with electrical conductivity of 0.178 dsm⁻¹. Available N content was in lower range

(159 kg/ha), but the soil was medium in available P (19.8 kg/ha) and (K 148 kg/ha) content. The genotype Co Or 8346 produced the highest average cane yield of 83.91 t/ha with application of 100 % RDN and was closely followed by Co 6907 (82.59 t/ha) and Co A 08324 (80.82 t/ha). All the three varieties were statistically superior to CoC 07336 which produced an average cane yield of 72.34 t/ha. All the sugarcane varieties exhibited higher response to either 75 or 100 % RDN which declined at 125 % RDN level except CoA 08324 which exhibited higher response to 125 % RDN. Among the four genotypes tried in the said experiment CoC 07336 produced the lowest average cane and CCS (7.51 t/ ha) yield. Moreover this variety flowers profusely during 6th month of October – November, hence found unsuitable for local situation.

AS 64:	Response of sugarcane crop to different plant nutrients in varied agro- climatic situations
Year of initiation	2012-13
Design	RBD
Treatments	13
Replication	3
Variety	Co Or 03151 (Sabita)
Recommended fertilizer dose	250:100:60 N: P ₂ O ₅ : K ₂ O kg /ha
Plot size	8x 4.8 m ²
Date of planting	29.12.12
Date of harvest	18.11.13

Treatment details:

T ₁	Control (no fertilizers or manures)
T ₂	N
T ₃	NP
T ₄	NPK
T ₅	NPK+S (60 kg elemental S/ha)
T ₆	NPK+ Zn (50 kg ZnSO ₄ /ha)
T ₇	NPK+ Fe (1 % FeSO ₄ foliar spray thrice in 1 week interval i.e. at 120, 127 and 135 DAP)
T ₈	NPK+ Mn (10 kg MnSO ₄ /ha)
T ₉	NPK+ S+ Zn
T ₁₀	NPK+ S+ Zn+ Fe
T ₁₁	NPK+ S+ Zn+ Fe+ Mn
T ₁₂	Soil test based fertilizer application (315:100:60 kg N: P ₂ O ₅ : K ₂ O + 60 kg elemental S/ha)
T ₁₃	FYM @ 20 t/ha

AS 64.1 Effect of different plant nutrients on yield parameters of sugarcane crop

Treatments		Germination% at 35 DAP	No of tillers (000/ha)			Length of cane (cm)			Girth of cane at harvest (cm)
			90 DAP	120 DAP	180 DAP	120 DAP	180 DAP	Harvest	
T ₁	Control	29.03	53.65	62.76	51.74	89.0	162.0	174.3	1.97
T ₂	N	46.78	63.98	74.22	63.54	124.0	208.3	228.5	2.33
T ₃	NP	54.21	65.10	78.47	68.58	128.0	229.3	238.8	2.43
T ₄	NPK	57.87	82.55	85.50	81.94	142.3	252.3	261.5	2.57
T ₅	NPK+S	56.23	85.42	88.02	84.38	142.7	261.0	264.3	2.60
T ₆	NPK+ Zn	57.39	83.07	88.89	86.20	139.3	279.7	289.5	2.50
T ₇	NPK+ Fe	57.68	86.98	89.50	85.85	146.7	282.7	294.3	2.43
T ₈	NPK+ Mn	54.49	80.47	86.89	81.08	136.3	274.0	288.6	2.40
T ₉	NPK+ S+ Zn	56.33	85.42	91.49	84.64	157.3	279.7	284.3	2.73
T ₁₀	NPK+ S+ Zn+ Fe	57.10	86.28	92.19	86.95	173.3	286.7	298.2	2.97
T ₁₁	NPK+ S+ Zn+ Fe+ Mn	53.82	79.95	92.01	84.14	163.7	268.3	277.3	2.57
T ₁₂	Soil test based fert appln	59.80	87.15	92.71	88.37	177.3	275.0	301.2	2.93
T ₁₃	FYM @ 20 t/ha	50.54	60.85	70.57	63.80	128.3	228.0	239.5	2.43
SEm ±		4.19	3.47	4.58	4.88	10.58	10.74	11.72	0.16
CD at 5 %		12.22	10.14	13.37	14.23	30.87	31.33	33.51	0.47
CV%		12.59	7.21	8.71	10.01	11.89	6.79	9.56	10.27

AS 64.2 Effect of different plant nutrients on juice quality and yield of sugarcane

Treatments		Brix % 1 month prior to harvest	Brix % at harvest	CCS % at harvest	NMC (000/ha)	Cane yield (t/ha)	CCS (t/ha)
T ₁	Control	15.47	18.73	10.42	48.24	43.42	4.52
T ₂	N	16.13	18.91	10.27	60.04	67.00	6.90
T ₃	NP	15.73	18.81	9.89	64.78	73.65	7.33
T ₄	NPK	15.77	19.16	10.80	78.14	75.53	8.15
T ₅	NPK+S	16.23	19.58	11.04	79.06	76.82	8.50
T ₆	NPK+ Zn	15.53	18.63	9.38	78.88	78.34	7.34
T ₇	NPK+ Fe	15.67	19.07	10.94	81.95	82.36	9.01
T ₈	NPK+ Mn	16.13	19.28	11.04	77.18	76.10	8.40
T ₉	NPK+ S+ Zn	15.37	18.72	9.95	83.22	84.02	8.35
T ₁₀	NPK+ S+ Zn+ Fe	15.90	19.14	10.18	84.24	85.36	8.68
T ₁₁	NPK+ S+ Zn+ Fe+ Mn	15.80	19.16	10.34	83.08	83.83	8.66
T ₁₂	Soil test based fert appln	16.03	19.26	10.33	84.47	85.65	8.84
T ₁₃	FYM @ 20 t/ha	15.37	18.79	10.42	59.90	57.23	6.00
SEm ±		0.35	0.19	0.04	4.26	7.17	0.06
CD at 5 %		NS	0.55	0.12	12.43	8.92	0.11
CV%		3.54	1.58	0.63	9.19	10.47	5.67

Application of soil test based fertilizer dose *i.e.* 315:100:60 kg N: P₂O₅: K₂O + 60 kg elemental S/ha resulted in higher number of tillers at different growth stages of sugarcane genotype “Sabita” leading to higher cane (85.65 t/ha) and CCS yield (8.84 t/ha). The length (301.2 cm) and girth (2.93 cm) of the canes at harvest were also the higher as compared to all other treatment combinations. This was closely followed by T₁₀ *i.e.* RDF 250:100:60 N: P₂O₅: K₂O kg /ha along with sulphur (60 kg elemental S/ha),

zinc (50 kg ZnSO₄/ha) and iron (1 % FeSO₄ foliar spray thrice in 1 week interval i.e. at 120, 127 and 135 DAP) with cane and CCS yield of 85.36 & 8.68 t/ha, respectively. Application of NPK+ S+ Zn (cane yield of 84.02 and CCS yield of 8.35 t/ha) and combined use of NPK+ S+ Zn+ Fe+ Mn (cane yield of 83.83 and CCS yield of 8.66 t/ha) were next in order. NPK+ Fe recorded cane yield of 82.36 and CCS yield of 9.01 t/ha. All the above treatments were at par with the best treatment indicating the obvious influence of micronutrient application on cane and CCS yield.

AS 64.3 Effect of different plant nutrients on soil fertility status after harvest of sugarcane crop

Treatments		pH	EC (dsm ⁻¹)	OC (%)	Available (Kg/ha)				Available(ppm)		
					N	P	K	S	Fe	Mn	Zn
T ₁	Control	5.20	0.241	0.463	116.3	16.5	135.4	2.1	23.27	55.36	0.61
T ₂	N	5.31	0.225	0.501	146.6	22.6	143.6	2.5	22.00	58.21	0.55
T ₃	NP	5.32	0.251	0.472	140.3	26.4	148.4	2.0	23.20	69.85	0.52
T ₄	NPK	5.24	0.209	0.436	141.7	25.4	137.2	2.2	26.60	75.69	0.69
T ₅	NPK+S	5.12	0.201	0.448	153.0	23.6	149.2	2.9	22.25	57.30	0.76
T ₆	NPK+ Zn	5.16	0.189	0.511	145.0	24.3	165.9	2.3	25.01	55.61	0.84
T ₇	NPK+ Fe	5.20	0.212	0.466	150.6	28.6	158.3	1.6	24.80	61.23	0.76
T ₈	NPK+ Mn	5.28	0.186	0.501	149.3	27.6	153.8	1.9	24.11	67.56	0.81
T ₉	NPK+ S+ Zn	5.17	0.194	0.523	139.0	26.5	154.6	2.8	22.40	56.56	0.92
T ₁₀	NPK+ S+ Zn+ Fe	5.25	0.208	0.466	141.6	18.6	156.8	2.7	23.75	56.33	0.91
T ₁₁	NPK+ S+ Zn+ Fe+ Mn	5.21	0.183	0.420	145.5	22.6	166.2	2.5	25.30	60.38	0.88
T ₁₂	Soil test based fert appln	5.23	0.197	0.429	185.5	25.6	177.5	2.8	26.75	56.33	0.72
T ₁₃	FYM @ 20 t/ha	5.28	0.208	0.431	130.7	18.8	139.6	2.0	24.61	50.33	0.68
Initial		5.26	0.226	0.451	190.7	29	239.3	3.6	28.03	67.59	0.59

The experimental soil was acidic in reaction with the soil pH ranging from 5.12 to 5.32 with the initial value of 5.26. The soil was low in organic carbon (0.420 to 0.523%), available N (116.3 kg/ha in control plot to 185.5 kg/ha with soil test based fertilizer application), S (1.6 to 2.9 kg/ha) and Zn (0.52 to 0.92 ppm). Available P and K were in medium range of soil fertility, whereas available Fe and Mn content of the soil were in higher range.

AS 66:	Priming of cane nodes for accelerating germination
Year of initiation	2012-13
Design	RBD
Treatments	6
Replication	4
Variety	Co Or 04152 (Raghunath)
Recommended fertilizer dose	250-100-60 kg N P ₂ O ₅ K ₂ O/ha
Plot size	6 x 4.8 m ²
Date of sowing	30.12.12
Date of harvest	28.11.13

AS 66.1 Effect of priming of cane nodes on germination and shoot count at various stages of cane growth

Treatments		(Germination%)			No of shoots (000/ha)			
		20 DAP	30 DAP	40 DAP	60 DAP	90 DAP	120 DAP	150 DAP
T ₁	Unprimed cane node	8.19	27.25	37.50	24.84	48.75	52.52	49.52
T ₂	Treating cane nodes in 50°C hot water for 2 hrs	8.31	31.25	46.75	26.49	54.84	61.50	52.48
T ₃	Treating cane nodes in (50°C) hot water urea solution(3%) for 2 hrs	8.65	31.20	47.07	34.83	60.87	65.25	59.75
T ₄	Priming of nodes in cattle dung (1): cattle urine (2) : water(5) ratio	8.45	36.15	47.13	36.39	61.48	66.25	59.75
T ₅	Conventional 3 bud sett planting	10.18	38.83	53.50	49.43	66.73	75.00	69.00
T ₆	Primed and sprouted cane nodes	9.90	37.45	51.25	46.02	59.90	72.67	66.25
SEm ±		0.464	1.407	2.575	3.949	2.962	2.413	2.796
CD at 5 %		1.400	4.239	7.758	11.899	8.924	7.271	8.426
CV%		10.38	8.35	10.91	11.74	10.08	7.36	9.41

AS 66.2 Effect of priming of cane nodes on yield parameters of cane

Treatments		No of shoots/clump				Length of cane (cm)	Girth of cane (cm)	Weight of cane (kg)
		60 DAP	90 DAP	120 DAP	150 DAP			
T ₁	Unprimed cane node	1.00	2.00	4.50	3.25	2.3	2.2	1.67
T ₂	Treating cane nodes in 50°C hot water for 2 hrs	1.00	2.00	5.50	3.75	2.3	2.3	1.80
T ₃	Treating cane nodes in (50°C) hot water urea solution(3%) for 2 hrs	1.00	3.00	5.75	4.00	2.3	2.4	1.79
T ₄	Priming of nodes in cattle dung (1): cattle urine (2) : water(5) ratio	1.75	3.00	5.75	3.75	2.5	2.6	1.82
T ₅	Conventional 3 bud sett planting	2.00	4.25	6.50	5.25	2.6	2.9	1.83
T ₆	Primed and sprouted cane nodes	2.00	4.00	6.00	4.50	2.5	2.8	1.85
SEm ±		0.102	0.195	0.321	0.230	0.078	0.124	0.079
CD at 5 %		0.308	0.589	0.966	0.692	0.235	0.375	NS
CV%		14.00	12.85	11.31	11.25	6.67	9.98	8.88

AS 66.3 Effect of priming of cane nodes on juice quality and yield of cane

Treatments		Brix %	Pol %	Purity %	NMC (000/ha)	Cane yield (t/ha)	CCS (t/ha)
T ₁	Unprimed cane node	18.51	15.25	82.39	38.00	45.05	9.09
T ₂	Treating cane nodes in 50°C hot water for 2 hrs	17.11	13.78	80.54	49.81	58.03	9.75
T ₃	Treating cane nodes in (50°C) hot water urea solution(3%) for 2 hrs	18.55	15.52	83.67	50.25	63.75	10.44
T ₄	Priming of nodes in cattle dung (1): cattle urine (2) : water(5) ratio	19.01	15.98	84.06	64.00	76.75	10.78
T ₅	Conventional 3 bud sett planting	18.67	14.87	79.65	67.50	81.28	10.18
T ₆	Primed and sprouted cane nodes	19.17	15.79	82.37	65.50	77.00	10.54
SEm ±		0.105	0.429	2.110	1.953	2.873	0.330
CD at 5 %		0.317	NS	NS	5.886	8.656	NS
CV%		1.14	5.20	4.118	6.93	10.61	8.112

Out of the six treatments, conventional method of planting three budded sugarcane setts proved to be the best with highest number of net millable canes (67.50 th/ha), cane (81.28 t/ha) and CCS yield

(10.18 t/ha). The treatment next in order was T₆ where primed and sprouted cane nodes were planted which could produce NMC of 65.50 ('000 /ha) with cane and CCS yield of 77.00 and 10.54 t/ha, respectively. Planting of primed cane nodes in cattle dung (1): cattle urine (2): water (5) ratio could produce NMC of 64.00 ('000 /ha) cane and CCS yield of 76.75 and 10.78 t/ha, respectively. These three treatments were at par and significantly superior to other treatment combinations. The higher yield parameters i.e. number of shoots/ha, number of shoots per clump, length and girth of cane in the above mentioned treatments were the factors of higher cane and CCS yield. However, the juice quality was not affected by various priming effects. Planting of unprimed cane nodes (T₁) was the lowest yielder (cane and CCS yield of 45.05 and 9.09 t/ha, respectively).

