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All India Coordinated Research Project on Sugarcane

Indian Institute of Sugarcane Research, Lucknow

AS 42:Agronomic evaluation of promising genotypes of sugarcane

An experiment was conducted to evaluate three sugarcane genotypes (CoH 06265, CoS 06247 and CoH 06266) under three NPK levels (112.5, 45, 45; 150, 60, 60 and 187.5,75,75 kg/ha) with a view to identifying suitable genotype under various fertilizer schedules in spring season. Initial soil chemical analysis indicated that soil was low in organic carbon (0.46%) and available nitrogen (262 kg/ha); medium in phosphorus (39.5 kg P_2O_5/ha) and potassium (284 kg K_2O /ha) contents. Sugarcane planting was done in the month of February 2013.

Sugarcane genotype, CoH 06265 produced the highest number of millable cane (102350/ha) followed by CoS 06247 (90840/ha) and CoH 06266 (76830/ha -Table 1). The highest cane length (213.9 cm) was recorded with genotype CoS 06247 but thicker canes (2.477 cm diameter) were harvested with the genotype CoH 06265. Thus both the genotypes could not yield significant difference in individual cane weight. Genotype, CoH 06266 recorded the lowest mean cane weight (924 g). There were no significant differences in sucrose content of different genotypes. The highest cane and sugar yields (88.5 and 11.1 t/ha, respectively) was observed with genotype CoH 06265. It was followed by CoS 06247 (79.4 and 9.96 tonnes cane and sugar yields/ha, respectively).

Mean number of millable canes, cane length, diameter, weight and cane and sugar yields significantly increased up to application of 150, 60, 60 kg NPK/ha. Recommended level of NPK i.e., 150, 60 and 60 kg /ha fetched significantly higher cane (80.12 t/ha) and sugar yields (9.99 t/ha) which was at par with 125% NPK levels. Different fertility levels could not influence the juice quality parameters significantly. The interaction between genotypes and fertility levels were not significant.

Table 1: Influence of different treatments on growth, quality and yield of sugarcane crop

Treatment	NMC (000/ha)	Cane length (cm)	Came diameter (cm)	Cane weight (g)	°Brix	Pol % Juice	Purity %	Cane yield (t/ha)	Sugar yield (t/ha)
Genotypes									

CoH 06265	102.35	203.4	2.477	1059	20.59	18.15	87.99	88.5	11.10
CoS 06247	90.84	213.9	2.339	1186	20.46	18.12	88.15	79.4	9.96
CoH 06266	76.83	197.06	2.291	924	20.52	17.95	87.50	63.6	7.86
SE m±	2.84	4.22	0.048	43.20	0.058	0.067	0.19	3.50	0.26
CD (P=0.05)	8.51	12.65	0.14	129.50	NS	NS	NS	10.49	0.81
Fertility levels (NPK kg/ha)									
112.5,45,45	79.80	198.3	2.187	963	20.52	18.06	87.71	69.82	8.70
150,60,60	93.49	211.3	2.406	1118	20.53	18.07	87.97	80.12	9.99
187.5,75,75	96.74	204.8	2.514	1088	20.52	18.10	87.96	81.46	10.19
SE m±	4.84	6.22	0.048	0.073	0.058	0.067	0.19	8.03	0.26
CD (P=0.05)	8.51	12.65	0.14	129.50	NS	NS	NS	10.49	0.81

AS 63: Plant Geometry in relation to mechanization in sugarcane

Field experiment was conducted to workout optimum plant geometry of different varieties for use of farm machinery. The experiment consisted of 12 treatment combinations with 3 planting geometries viz., 120, 150 and 30x120 cm row spacings and 4 varieties viz., CoS 96275, CoSe 92423, CoS 94257 and CoLk 94184. The experiment was laid out in split plot design allocating plant geometry in main plot and varieties in sub plots. The treatments were replicated thrice in the experiment.

The data on ratoon sugarcane growth, yield attributes and yield indicate that significant highest shoot population (166.71 thousands/ha), number of millable canes (141.44 thousand/ha) and cane yield (73.56 t/ha) was observed at 30x120 cm row spacing (Table 1). Variety CoSe 92423 recorded significantly highest yield (66.59 t/ha) to CoS 96275 and CoS 94257, however it was found similar to CoLk 94184 (63.59 t/ha). The quality parameters were not affected by plant geometry but significantly highest sugar yield was obtained at

30x120 cm spacing. Different genotypes showed significant variation for different quality observations. Significantly highest brix (22.11), pol % (19.84) with purity of 89.71% and CCS % (13.82) was harnessed by CoLk 94184. This genotype also fetched significantly highest sugar yield (8.79 t/ha), which was closely followed by CoSe 92423.

Table 1: Ratoon cane growth, yield attributes and yield under different planting geometries and genotypic variations

Treatment	Shoot count 180 DAP	NMC (000/ha)	Cane length (cm)	Cane girth (cm)	Av. Cane weight (g)	Cane yield (t/ha)
Row spacing						
120 cm	138.72	107.32	181.98	2.35	0.79	61.58
150 cm	116.33	90.14	179.36	2.48	0.93	52.68
30x120	166.71	141.44	182.28	2.39	0.82	73.56
CD (P = 0.05)	17.60	14.35	NS	NS	NS	8.65
Genotypes						
CoS 96275	132.67	104.89	173.03	2.30	0.71	59.48
CoSe 92423	144.47	119.56	185.73	2.61	0.92	66.59
CoS 94257	144.76	104.16	178.23	2.54	0.92	60.77
CoLk 94184	140.43	123.25	187.81	2.58	0.83	63.59
CD (P = 0.05)	6.73	8.73	6.27	0.16	0.18	4.59

Table 2: Effect of planting geometries and genotypes on quality attributes and sugar yield

Treatment	^{0}Brix	Pol (%)	Purity (%)	CCS (%)	CCS (t/ha)
Planting Geometries					
Row spacing					
120 cm	20.45	17.98	87.85	12.40	7.63
150 cm	20.55	18.10	87.92	12.49	6.59
30x120	20.59	18.00	87.33	12.38	9.09
CD (P = 0.05)	NS	NS	NS	NS	0.97
Genotypes					
CoS 96275	21.15	18.69	88.33	12.93	7.64

CoSe 92423	19.17	16.51	86.12	11.28	7.55
CoS 94257	19.68	17.05	86.58	11.68	7.10
CoLk 94184	22.11	19.84	89.71	13.82	8.79
CD (P = 0.05)	1.23	1.33	1.10	1.16	0.79

AS 64: Response of sugarcane crop to different plant nutrients in varied agro- ecological situations

A field experiment was initiated during first week of April, 2013, to study the response of sugarcane to different nutrients. Twelve nutrient treatments in RBD having three replications with sugarcane (Cv. CoSe 92423) was planted. The recommended fertilizer dose was 150 kg N, 60 kg P_2O_5 and 60 kg K_2O ha^{-1}. The other nutrient 40 kg S, 25 kg $ZnSO_4$, 10 kg $FeSO_4$ and 5 kg $MnSO_4$ ha^{-1} were applied as per the treatment. Twelve nutrient treatments in RBD having three replications with sugarcane (Cv. CoSe 92423) was studied for response of sugarcane to different nutrients.

Initially soil was low in organic carbon (0.31%), available nitrogen (208.5 kg ha^{-1}), phosphorus (11.88 kg P_2O_5 ha^{-1}) and medium in potassium (202.87 kg K_2O ha^{-1}) contents. Growth parameter on tiller population at 90 and 120 days after planting, NMC, yield attributes, cane yield and cane juice quality were recorded.

Cane yield (t/ha) was influenced by various nutrient management treatments, however they were non-significant. Higher cane yield (57.06 t/ha) was recorded with treatment T9 (NPK + S + Zn) followed by the treatment T11 (NPK+S+Zn+Fe+Mn) with cane yield (51.31 t/ha) and T6 (NPK+Zn), cane yield (50.49 t/ha) as compared to other treatments. Lowest cane yield was recorded with control plot (41.96 t/ha) (Table 1). The initial lower soil organic carbon content and available nitrogen, phosphorus and medium potassium nutrients affected cane yield in treatments, where nutrient were applied alone (N or NP or NPK) as compared to in combination of NPK with other nutrient like S, Zn, Fe and Mn. Cane quality parameters were not affected by any of the nutrient applied.Application of recommended dose of NPK (150:60:60 kg/ha) with S (40 kg/ha) and Zn (25 kg $ZnSO_4$/ha) produced higher cane yield (57.06 t/ha).

Table 1. Growth, yield and juice quality parameters of sugarcane to different nutrients

Treatment	**Shoot count ('000/ha)**	**NMC**	**Cane yield**	**Juice quality parameters at harvest (%)**

	90 DAP	120 DAP	('000/ha)	(t/ha)	Brix	Sucrose	Purity
T1 Control	114.5	125.9	99.53	41.96	19.22	16.61	86.43
T2 N	117.2	128.9	101.95	45.65	18.91	16.29	86.17
T3 NP	106.8	117.6	92.93	46.25	18.69	16.09	86.06
T4 NPK	80.3	88.3	69.83	47.90	18.77	16.03	85.39
T5 NPKS	101.9	112.1	88.62	45.86	18.71	16.02	85.57
T6 NPKZn	98.9	108.9	86.06	**50.49**	18.94	16.12	85.15
T7 NPKFe	106.7	117.4	92.79	44.11	18.61	15.92	85.62
T8 NPKMn	78.9	86.9	68.68	43.59	19.17	16.58	86.47
T9 NPKSZn	114.8	126.2	99.80	**57.06**	19.19	16.67	86.93
T10 NPKSZnFe	101.9	112.1	88.62	49.93	19.01	16.31	85.80
T11 NPKSZnFeMn	117.2	128.9	101.95	**51.31**	19.05	16.36	85.90
12 FYM 20 t/ha	110.6	121.6	96.16	48.29	18.35	15.64	85.23
CD (5%)	21.0	23.1	18.26	NS	NS	NS	NS

DAP: Days after planting

AS 65: Enhancing Sugarcane Productivity and Profitability under Wheat – Sugarcane Cropping System

The field experiment was conducted during 2012-14 to enhance the productivity of sugarcane under wheat – sugarcane cropping system. The experiment comprising 9 treatments viz.; T_1: Autumn planted sugarcane, T_2 : T_1+ wheat (1:2), T_3: T_1+ wheat (1:3), T_4: wheat sown on 15th November – late sugarcane, T_5: wheat sown on 15th December – late sugarcane, T_6: wheat sown (three rows) on 15th November under FIRB + sugarcane in furrows at 75 cm in 3rd week of February, T_7: wheat sown (three rows) on 15th November under FIRB + sugarcane in furrows at 75 cm in 3rd week of March, T_8: T_6 with sowing of wheat on 15th December and T_9: T_7 with sowing of wheat on 15th December was laid out in Randomized Block Design with three replications. The findings reveals that wheat grain yield was the highest (46.6 q/ha) in November sown wheat in the treatment T4. Wheat yielded almost the same in flat as well as FIRB method. However, wheat sown in the month of November yielded higher than wheat sown in December due to higher number of ear heads per running meters, number of grains per ear head and test weight. Wheat (Nov.) + sugarcane (Feb/March) under FIRB method produced higher wheat yield (44.1 q/ha) over

wheat (Nov) + sugarcane (Oct) in 3:1 row ratio (40.2 q/ha) as well as 2:1 row ratio (33.5 q/ha).

Tiller population recorded at different stages indicated that tiller count in autumn planted sole sugarcane and sugarcane planted with wheat in 3rd week of February under FIRB system was higher compared with sugarcane planted with wheat in 3rd week of March under FIRB. The lowest tiller population was observed in sugarcane planted with wheat (1:3) under flat method followed by wheat – sugarcane system. The highest tiller count (231.8 thousands/ha) was recorded in the month of July in sugarcane planted in 3rd week of February with wheat under FIRB system and the lowest (86.4 thousands/ha) in sugarcane + wheat (1:3). The highest plant height (247 cm) was observed in autumn planted sole sugarcane followed by sugarcane + wheat (1:2) and wheat + sugarcane under FIRB system. The cane yield was the highest (89.0 tonnes/ha) in autumn planted sole sugarcane. Sugarcane planted in 3rd week of February in standing wheat under FIRB method (82.5 tonnes/ha) was significantly higher than sugarcane planted in 3rd week of March in wheat under FIRB and sugarcane + wheat (1:2) due to higher NMC, cane length, cane weight and number of internodes. The lowest cane yield was recorded in wheat – sugarcane system (59.3 tonnes/ha) and sugarcane + wheat in1:3 row ratio (60.3 tonnes/ha).

AS-66:Priming cane node for accelerating germination

Results of an experiment planted with the objective of assessing suitable cane node priming technique for accelerating germination indicated that the priming of cane nodes with hot water (50^{o}C)+ 3% urea solution for 2 hrs (T_3) or cattle dung, cattle urine and water in 1:2:5 ratio and planted directly in the field (T_4) or after incubation (4 days) (T_6) exhibited significantly higher germination of cane buds (78.21%) at 10, 20, 30 and 40 days after planting (DAP) as compared to un-primed cane nodes (T_1) (19.03, 28.64, 39.84 and 54.60%) or treating them with hot water at 50^{o}C for 2 hrs. only (T_2) (14.58, 30.24, 37.15 and 44.33%). Conventionally planted crop with 3-bud setts produced the lowest germination at all the dates, and it was 38.68% at 40 days after planting. Number of tillers and millable canes and yield of cane also exhibited the same trend as the germination of cane buds obtained in different treatments except in the conventional planting (T_5) where number of tillers and millable canes were almost the same with that of T_3, T_4 and T_6 treatments, which was by virtue of three times more number of cane buds planting. Accordingly, cane yields obtained under T_3,T_4,T_5 and T_6 treatments being statistically at par among themselves were significantly higher to the tune of 12.65 and 11.29% than that of T_1 and T_2 treatments (un-

primed cane nodes or treated with hot water only). Conventional planting with 3-bud setts although produced cane yield at par with primed cane node treatments but with the use of huge seed cane (72 q/ha) whereas only 17.52 q/ha seed cane was used in cane node planting method. CCS% cane did not differ significantly due to different treatments in the test (Table 1).

Table 1: Effect of cane node priming techniques on the growth, yield and quality of sugarcane

Treatment	Germination % of cane buds				No. of tillers (000/ha)	No. of millable canes (000/ha)	Cane yield (t/ha)	CCS% cane
	10 DAP	20 DAP	30 DAP	40 DAP				
T_1 : Un-primed cane node	19.03	28.64	39.84	54.60	168	103	67.48	11.34
T_2 : Treating cane node in hot water at 50°C for 2 hours	14.58	30.24	37.15	44.33	163	105	68.53	11.03
T_3 : Treating cane node in hot water (50°C) and 3% urea solution for 2 hours.	24.33	52.35	60.76	75.68	182	112	75.50	11.20
T_4 : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio	30.38	40.77	65.47	75.24	206	117	77.53	11.13
T_5 : Conventional 3-bud setts planting	7.03	15.33	28.33	38.68	215	120	78.42	11.31
Primed and sprouted cane node (incubated for 4 days after priming)	20.35	49.33	67.81	74.38	209	117	77.54	11.09
CD (P=0.05)	7.08	15.80	4.51	5.47	9.01	5.91	4.56	NS

AS67: Optimization of fertigation schedule for sugarcane through micro-irrigation technique under different agro-climatic conditions

Sugarcane ratoon crop was initiated during first week of April, 2013 and the crop was harvested in the last week of March, 2014. It was observed that irrigation treatments significantly influenced shoot count at 60 and 120 days of ratooning. However, nitrogen doses did not influence the shoot count. Irrigation X nitrogen interaction was non-significant at 60 days of ratooning but it was significant at 120 days of ratooning (Tables 1 and 2). Length of sugarcane plant leaf was also significantly influenced by irrigation treatments but leaf width remained unaffected with irrigation and nitrogen treatments both (Table 3 and 4). Irrigation treatments significantly affected number of millable canes (Table 5). However, the effect of nitrogen and interaction of Nitrogen X Irrigation was non-significant on number of millable canes. Cane stalk length and diameter were also significantly influenced by irrigation treatments (Table 6 and 7). Irrigation Xnitrogen interaction effect was also observed on cane stalk length. Highest sugarcane yield of 94.10 t/ha was observed when sugarcane was drip fertigated with recommended dose of nitrogen and water equivalent to 125 % pan evaporation (Table 8). However, irrigation water use efficiency (IWUE) was the highest at 2946.88 kg/ha-cm when fertigation was done and the amount of irrigation water was kept as 75 per cent of pan evaporation (Table 9). The sugarcane yield and IWUE was not influenced significantly by doses of nitrogen in fertigation treatments. With surface irrigation, the mean sugarcane yield and IWUE were 76.43 t/ha and 955.32 kg/ha-cm respectively. Sugarcane juice quality generally remained unaffected with irrigation and nitrogen treatments. However lower dose of nitrogen resulted in higher sucrose, brix and purity (Table 10, 11 and 12).

Table 1. Shoot count after 60 days of ratooning

Nitrogen / Irrigation	Nitrogen application rate			
	N1 = 100% recommended dose of N	N2 = 75% recommended dose of N	N3 = 50% recommended dose of N	Average
I1= Sub Surface Drip at 75% PE	261111	263333	250000	258148
I2 = Sub Surface Drip at 100% PE	280556	272778	259444	270926
I3 = Sub Surface Drip at 125% PE	261667	239444	266111	255741
I4=Farmers practice surface irrigation	233889	237222	255556	242222
Average	259306	253194	257778	
SE (Irrigation)				8532
CD (Irrigation)				27139
SE (Nitrogen)				7389
CD (Nitrogen)				NS
SE (IxN)				8532
CD(IxN)				NS

Table 2. Shoot count after 120 days of ratooning

Nitrogen / Irrigation	Nitrogen application rate			
	N1 = 100% recommended dose of N	N2 = 75% recommended dose of N	N3 = 50% recommended dose of N	Average
I1= Sub Surface Drip at 75% PE	163333	171111	176111	170185
I2 = Sub Surface Drip at 100% PE	167778	176667	172778	172407
I3 = Sub Surface Drip at 125% PE	181111	183333	171111	178519
I4=Farmers practice surface irrigation	169444	165556	173889	169630
Average	170417	174167	173472	
SE (Irrigation)				1977
CD (Irrigation)				6290
SE (Nitrogen)				1712
CD (Nitrogen)				NS
SE (IxN)				1977
CD(IxN)				4838

Table 3. Length of leaf soon before onset of monsoon

Nitrogen / Irrigation	Nitrogen application rate			
	N1 = 100% recommended dose of N	N2 = 75% recommended dose of N	N3 = 50% recommended dose of N	Average
I1= Sub Surface Drip at 75% PE	115.9	115.7	110.5	114.0
I2 = Sub Surface Drip at 100% PE	114.1	108.6	111.0	111.2
I3 = Sub Surface Drip at 125% PE	118.6	118.1	115.5	117.4
I4=Farmers practice surface irrigation	99.3	102.0	98.1	99.8
Average	112.0	111.1	108.8	
SE (Irrigation)				2.2
CD (Irrigation)				7.0
SE (Nitrogen)				1.9
CD (Nitrogen)				NS
SE (IxN)				2.2
CD(IxN)				NS

Table 4. Width of leaf soon before onset of monsoon

Nitrogen / Irrigation	Nitrogen application rate			
	N1 = 100% recommended dose of N	N2 = 75% recommended dose of N	N3 = 50% recommended dose of N	Average
I1= Sub Surface Drip at 75% PE	3.50	3.30	3.07	3.29
I2 = Sub Surface Drip at 100% PE	3.37	3.13	3.20	3.23
I3 = Sub Surface Drip at 125% PE	3.07	3.43	3.17	3.22
I4=Farmers practice surface irrigation	3.03	3.13	3.27	3.14
Average	3.24	3.25	3.18	
SE (Irrigation)				0.13
CD (Irrigation)				NS
SE (Nitrogen)				0.11
CD (Nitrogen)				NS
SE (IxN)				0.13
CD(IxN)				NS

Table 5. Number of millable canes

Nitrogen / Irrigation	Nitrogen application rate			
	N1 = 100% recommended dose of N	N2 = 75% recommended dose of N	N3 = 50% recommended dose of N	Average
I1= Sub Surface Drip at 75% PE	124222	119278	117944	120481
I2 = Sub Surface Drip at 100% PE	124111	124389	121556	123352
I3 = Sub Surface Drip at 125% PE	121944	128944	122278	124389
I4=Farmers practice surface irrigation	115222	120000	113944	116389
Average	121375	123153	118931	
SE (Irrigation)				2800
CD (Irrigation)				8908
SE (Nitrogen)				2425
CD (Nitrogen)				NS
SE (IxN)				2800
CD(IxN)				NS

Table 6. Cane stalk length at harvest (cm)

Nitrogen / Irrigation	Nitrogen application rate			
	N1 = 100% recommended dose of N	N2 = 75% recommended dose of N	N3 = 50% recommended dose of N	Average
I1= Sub Surface Drip at 75% PE	234.9	241.0	247.7	241.2
I2 = Sub Surface Drip at 100% PE	240.1	249.1	242.9	244.0
I3 = Sub Surface Drip at 125% PE	286.3	248.1	254.0	262.8
I4=Farmers practice surface irrigation	241.2	237.3	238.5	239.0
Average	250.6	243.9	245.8	
SE (Irrigation)				4.67
CD (Irrigation)				14.86
SE (Nitrogen)				4.05
CD (Nitrogen)				NS
SE (IxN)				4.67
CD(IxN)				11.43

Table 7. Cane stalk diameter (cm)

Nitrogen / Irrigation	Nitrogen application rate			
	N1 = 100% recommended dose of N	N2 = 75% recommended dose of N	N3 = 50% recommended dose of N	Average
I1= Sub Surface Drip at 75% PE	1.86	1.95	2.07	1.96
I2 = Sub Surface Drip at 100% PE	1.94	2.00	2.03	1.99
I3 = Sub Surface Drip at 125% PE	2.31	2.06	2.09	2.15
I4=Farmers practice surface irrigation	1.99	1.95	1.92	1.95
Average	2.03	1.99	2.03	
SE (Irrigation)				0.07
CD (Irrigation)				0.23
SE (Nitrogen)				0.06
CD (Nitrogen)				NS
SE (IxN)				0.07
CD(IxN)				NS

Table 8. Sugarcane yield (t/ha)

Nitrogen / Irrigation	Nitrogen application rate			
	N1 = 100% recommended dose of N	N2 = 75% recommended dose of N	N3 = 50% recommended dose of N	Average
I1= Sub Surface Drip at 75% PE	82.39	80.89	83.99	82.42
I2 = Sub Surface Drip at 100% PE	84.03	83.35	83.40	83.59
I3 = Sub Surface Drip at 125% PE	94.10	91.00	89.31	91.47
I4=Farmers practice surface irrigation	79.54	76.42	73.32	76.43
Average	85.01	82.91	82.50	
SE (Irrigation)				1.41
CD (Irrigation)				4.50
SE (Nitrogen)				1.22
CD (Nitrogen)				NS
SE (IxN)				1.41
CD(IxN)				NS

Table 9. Irrigation water use efficiency (kg/ha-cm)

Nitrogen / Irrigation	Irrigation water applied (ha-cm)	Nitrogen application rate			
		N1 = 100% recommended dose of N	N2 = 75% recommended dose of N	N3 = 50% recommended dose of N	Average
I1= Sub Surface Drip at 75% PE	28.5	2890.84	2838.21	2946.88	2891.98
I2 = Sub Surface Drip at 100% PE	38	2211.26	2193.35	2194.81	2199.81
I3 = Sub Surface Drip at 125% PE	47.5	1980.99	1915.79	1880.12	1925.63
I4=Farmers practice surface irrigation	80	994.27	955.21	916.49	955.32
Average		2019.34	1975.64	1984.58	
SE (Irrigation)					36.89
CD (Irrigation)					117.35
SE (Nitrogen)					31.95
CD (Nitrogen)					NS
SE (IxN)					36.89
CD(IxN)					NS

Table 10 Corrected brix at harvest

Nitrogen / Irrigation	Nitrogen application rate			
	N1 = 100% recommended dose of N	N2 = 75% recommended dose of N	N3 = 50% recommended dose of N	Average
I1= Sub Surface Drip at 75% PE	19.68	19.04	20.90	19.87
I2 = Sub Surface Drip at 100% PE	19.89	20.20	20.29	20.13
I3 = Sub Surface Drip at 125% PE	19.25	20.22	20.23	19.90
I4=Farmers practice surface irrigation	19.72	20.55	20.17	20.15
Average	19.63	20.00	20.40	
SE (Irrigation)				0.31
CD (Irrigation)				NS
SE (Nitrogen)				0.27
CD (Nitrogen)				1.15
SE (IxN)				0.31
CD(IxN)				NS

Table 11. Sucrose % juice

Nitrogen / Irrigation	Nitrogen application rate			
	N1 = 100% recommended dose of N	N2 = 75% recommended dose of N	N3 = 50% recommended dose of N	Average
I1= Sub Surface Drip at 75% PE	17.19	16.48	18.20	17.29
I2 = Sub Surface Drip at 100% PE	17.18	17.59	17.71	17.50
I3 = Sub Surface Drip at 125% PE	16.53	17.63	17.60	17.25
I4=Farmers practice surface irrigation	17.18	18.15	17.71	17.68
Average	17.02	17.46	17.81	
SE (Irrigation)				0.33
CD (Irrigation)				NS
SE (Nitrogen)				0.28
CD (Nitrogen)				1.22
SE (IxN)				0.33
CD(IxN)				NS

Table 12. Purity percentage

Nitrogen / Irrigation	Nitrogen application rate			
	N1 = 100% recommended dose of N	N2 = 75% recommended dose of N	N3 = 50% recommended dose of N	Average
I1= Sub Surface Drip at 75% PE	87.32	86.48	87.06	86.95
I2 = Sub Surface Drip at 100% PE	86.33	87.11	87.29	86.91
I3 = Sub Surface Drip at 125% PE	85.93	87.13	87.01	86.69
I4=Farmers practice surface irrigation	87.15	88.30	87.74	87.73
Average	86.68	87.25	87.27	
SE (Irrigation)				0.40
CD (Irrigation)				NS
SE (Nitrogen)				0.34
CD (Nitrogen)				NS
SE (IxN)				0.40
CD(IxN)				NS