Project No. AS – 42

Title: Agronomic evaluation of promising sugarcane genotypes (Spring Early)

Objective:
1) To find out the suitable sugarcane genotypes for early spring planting.
2 To find out suitable sugarcane genotypes for highest cane and CCS yield.
3) To find out the suitable fertilizer dose for promising sugarcane genotypes.
4) To find out suitable interaction of promising sugarcane genotypes and fertilizer dose for highest cane and CCS Yield.

Experimental Details:

Place	: CSRS, Padegaon,
Design	: Split plot
Replication	: 3
Plot Size: Gross	: 10 x 5 m^2,
Net	: 08 x 3 m^2,
Fertilizer dose	: 250:115:115 kg N, P_2O_5, K_2O ha^{-1},
Date of planting	: 07.01.2014
Date of harvesting	: 19.01.2015
Soil Status	: Irrigated, Medium black soil.

Treatment details:

No. of Main Treatments: 05

1) V_1 : Co 06001
2) V_2 : Co 06002
3) V_3 : Co 06022
4) V_4 : PI 06032
5) V_5 : CoC 671

No. of Sub Treatments : 03

1) F_1 - 75% RD of N
2) F_2 - 100% RD of N
3) F_3 - 125% RD of N

Results:

The data on second year trial for cane and CCS yields, growth observations and quality parameters are presented in Table 1 to 4.

Effect of genotypes:

Data presented in Table 1 revealed that the genotype Co 06002 recorded the highest cane (123.81 t ha^{-1}) and CCS yield (17.70 t ha^{-1}) and was significantly superior to all other genotypes. It was followed by Co 06001 (115.01 t ha^{-1} cane and 15.97 t ha^{-1} CCS yield).

Effect of nitrogen levels:

The nitrogen levels had a non significant effect on cane yield. While significantly the highest CCS yield (16.95 t ha^{-1}) was recorded with the application of 125% recommended dose of nitrogen. It was found at par with 100 % recommended dose of nitrogen (15.92 t ha^{-1}).

Effect of interactions:

The interactions between genotypes and fertilizer levels were found to be non significant for both cane and CCS yields.

Growth and yield attributes:

The data regarding growth and yield attributes are presented in Table 2.

Effect of genotypes:

The data presented in Table 2 revealed that the effect of genotypes was significant for all the parameters except number of internodes and average cane weight. The genotype Co 06002 recorded significantly the highest gramination (70.83 %), tillering ratio (1.76) millable height (286 cm), cane girth (10.0 cm), and millable canes per hectare (104140 ha^{-1}). However it was found at par with PI 06032 except millable cane ha^{-1}.

Effect of nitrogen levels:

Effect of N levels was significant for the tillering ratio, cane girth number of internodes per cane, NMC and average cane weight. Application of 125% recommended dose of nitrogen recorded the highest tillering ratio (1.73), cane girth (10.4 cm), number of internodes per cane (30), and average cane weight (1.21 kg $cane^{-1}$). The application of 100 % recommended N was found at par with 125 % recommended N in respect of tillering ratio, cane girth, number of internodes per cane and average cane weight.

Effect of interactions:

The interactions between genotypes and N levels with respect to all the parameter were found to be non significant.

Quality parameters:

The genotypes, N levels and their interactions recorded the significant influence on juice quality parameters (Table 3).

The genotype Co 06002 recorded significantly highest brix (22.01), sucrose (19.87%) and purity (92.96%). It was found at par with PI 06032 with respect to brix and sucrose. The CCS percentage was found significantly highest in genotype CoC671, which was found at par with Co-06002.

The application of 125% recommended dose of nitrogen recorded significantly highest brix (21.86), Sucrose (19.91%), Purity (92.68 %) and CCS (14.41%) which was found at par with application of 100% recommended dose of nitrogen.

Conclusion:

The genotype Co 06002 was found significantly superior for cane and CCS yields than the other genotypes followed by PI 06032. The application of 125 % recommended dose of nitrogen produced significantly higher CCS yields which was found at par with 100% recommended dose of nitrogen. While cane yield was not affected by different nitrogen levels.

Table 1. Cane and CCS yield affected by sugarcane genotypes and N levels

Treatments	Cane yield (t ha^{-1})	CCS yield (t ha^{-1})
A) Genotypes		
V_1– Co 06001	115.01	15.97
V_2 – Co 06002	123.81	17.70
V_3– Co 06022	105.23	14.70
V_4 – PI 06032	113.18	15.94
V_5 – CoC 671	112.06	15.41
SE±	**0.83**	**0.17**
C.D. at 5%	**2.72**	**0.55**
B) N levels		
F_1 - 75% N	110.69	14.64
F_2 - 100% N	113.42	15.92
F_3 – 125 % N	117.46	16.95
SE±	**2.14**	**0.45**
C.D. at 5%	**NS**	**1.33**
C) Interactions		
SE±	**4.79**	**1.01**
C.D. at 5%	**NS**	**NS**
General Mean	**113.86**	**15.84**

Table 2. Growth and yield attributes affected by sugarcane genotypes and N levels

Treatments	Germination (%)	Tillering ratio	Height (cm)	Girth (cm)	No. of internodes $cane^{-1}$	Millable canes (000 ha^{-1})	Avg. cane wt. (kg)
A) Genotypes							
V_1– Co 06001	67.93	1.68	272	9.6	24	100.44	1.15
V_2– Co 06002	70.83	1.76	286	10.0	27	104.14	1.19
V_3– Co 06022	63.21	1.56	267	9.3	22	93.21	1.13
V_4 – PI 06032	69.61	1.73	279	9.8	25	96.71	1.17
V_5 – CoC 671	66.38	1.59	269	9.5	24	98.49	1.14
SE±	0.84	0.02	2.42	0.10	1.30	1.61	0.01
C.D. at 5%	**2.73**	**0.05**	**7.89**	**0.33**	**NS**	**5.23**	**NS**
B) N levels							
F_1 - 75% N	63.13	1.60	268	8.8	18.00	101.68	1.09
F_2 - 100% N	67.76	1.67	276	9.8	26	96.70	1.17
F_3 – 125 % N	71.88	1.73	280	10.4	30	97.41	1.21
SE±	1.64	0.03	3.85	0.26	1.70	1.41	0.01
C.D. at 5%	**NS**	**0.10**	**NS**	**0.76**	**5.02**	**4.15**	**0.06**
C) Interactions							
SE±	3.66	0.07	8.60	0.58	3.80	3.15	0.04
C.D. at 5%	NS	NS	NS	NS	NS	NS	NS
General Mean	67.69	1.66	275	9.6	24	98.60	1.16

Table 3. Quality parameters as affected by sugaracane genotypes and N levels

Treatments	Brix (c)	Sucrose (%)	Purity (%)	CCS (%)
A) Genotypes				
V_1– Co 06001	21.46	19.56	91.85	13.89
V_2 – Co 06002	22.01	19.87	92.96	14.02
V_3– Co 06022	21.19	19.14	91.43	13.43
V_4 – PI 06032	21.67	19.76	92.12	13.73
V_5 – CoC 671	21.42	19.43	91.61	14.27
SE±	0.13	0.12	0.22	0.10
C.D. at 5%	**0.42**	**0.40**	**0.71**	**0.34**
B) N levels				
F_1 - 75% N	21.14	19.02	91.15	13.19
F_2 - 100% N	21.65	19.73	92.15	14.00
F_3 – 125 % N	21.86	19.91	92.68	14.41
SE±	0.19	0.18	0.35	0.17
C.D. at 5%	**0.55**	**0.53**	**1.04**	**0.49**
C) Interactions				
SE±	0.41	0.40	0.79	0.37
C.D. at 5%	**NS**	**NS**	**NS**	**NS**
General Mean	**21.55**	**19.55**	**91.99**	**13.87**

Table 4. Soil properties at harvest in different treatments

Treatments	pH	EC (dsm^{-1})	O.C.%	Available nutrient status (kg ha^{-1})		
				N	P_2O_5	K_2O
A) Genotypes						
V_1– Co 06001	8.06	0.36	0.62	188	15.3	247
V_2 – Co 06002	8.01	0.31	0.59	186	15.9	245
V_3– Co 06022	8.05	0.36	0.64	184	16.5	258
V_4 – PI 06032	8.07	0.35	**0.57**	189	17.9	279
V_5 – CoC 671	8.12	0.39	0.58	193	19.4	286
B) N levels						
F_1 - 75% N	8.07	0.35	0.61	182	17.9	270
F_2 - 100% N	8.09	0.32	0.63	185	16.4	265
F_3 – 125 % N	8.11	0.38	0.56	197	16.7	254
General Mean	**8.09**	**0.35**	**0.60**	**188**	**17**	**263**
Initial	**8.19**	**0.39**	**0.69**	**258**	**19.5**	**356**

Project No. AS – 42

Title: Agronomic Evaluation of promising Sugarcane genotypes (Spring Midlate)

Objective:
1) To find out the suitable sugarcane genotypes for early spring planting.
2)To find out suitable sugarcane genotypes for highest cane and CCS yield.
3)To find out the suitable fertilizer dose for promising sugarcane genotypes.
4)To find out suitable interaction of promising sugarcane genotypes and fertilizer dose for highest cane and CCS Yield.

Experimental Details :

Place	: CSRS, Padegaon,
Design	: Split plot
Replication	: 3
Plot Size: Gross	: 10 x 5 m^2,
Net	: 08 x 3 m^2,
Fertilizer dose	: 250:115:115 kg N, P_2O_5, K_2O ha^{-1},
Date of planting	: 13.01.2014
Date of harvesting	: 21.01.2015
Soil Status	: Irrigated, Medium black soil.

Treatment details :

No. of Main Treatments : 05

1) V_1 : Co 06012
2) V_2 : Co 06015
3) V_3 : Co 06027
4) V_4 : CoM 06082
5) V_5 : Co 86032

No. of Sub Treatments : 03

1) F_1 - 75% RD of N
2) F_2 - 100% RD of N
3) F_3 - 125% RD of N

Results:

The results of second year of the experiment on cane and CCS yields, growth observations and quality parameters are presented in Table 1 to 3.

Effect of genotypes:

Data presented in Table 1 revealed that the genotype Co 86032 recorded significantly the highest cane (126.86 t ha^{-1}) and CCS (19.25 t ha^{-1}) yields. It was followed by Co 06015.

Effect of nitrogen levels:

The N levels had a significant effect on cane yield only. Significantly the highest cane (122.63 t ha^{-1}) yield was recorded with the application of 125% recommended dose of N. It was found at par with 100% recommended dose of N (117.07 t ha^{-1})

Effect of interactions:

The interactions between genotypes and fertilizer levels were found to be non significant for both cane and CCS yields.

Growth and yield attributes:

The data regarding growth and yield attributes are presented in Table 2.

Effect of genotypes:

The data presented in Table 2 revealed that the effect of genotypes was found significant for all the parameters except cane girth and number of millable canes. The genotype Co 86032 recorded significantly the highest germination (71.48 %), tillering ratio, (1.79), millable height (294 cm), number of internodes per cane (27), and weight per cane (1.29 kg). However, it was at par with Co 06015 in respect of germination percentage, number of internodes per cane and average cane weight.

Effect of nitrogen levels:

Effect of N levels was found significant for tillering ratio, cane girth, number of internodes per cane and average cane weight. Application of 125% recommended dose of nitrogen recorded significantly the highest tillering ratio (1.76) ,cane girth (9.5 cm), number of internodes per cane (29.0) and the average cane weight (1.28 kg) over other levels. It was found at par with 100 % recommended dose of nitrogen for all these parameters.

Effect of interactions:

The genotype Co 86032 recorded significantly highest brix (21.97), sucrose (19.87%) and purity (92.17%) which was found at par with Co-06015.

Effect of N levels was found significant for only sucrose and 125% recommended dose of nitrogen recorded the highest sucrose (19.97%), it was found at par with application of 100% recommended dose.

Quality parameters:

The genotypes N levels and their interactions did not have significant influence on juice quality parameters (Table 3).

Conclusion:

The genotypes Co 86032 recorded significantly higher cane and CCS yields than the other genotypes and it was followed by Co-06015. The application of 125 percent recommended dose of nitrogen produced significantly higher cane yield and found at par with 100 % recommended dose of nitrogen.

Table 1. Cane and CCS yield as affected by sugarcane genotypes and N levels

Treatments	Cane yield (t ha^{-1})	CCS yield (t ha^{-1})
A) Genotypes		
V_1– Co 06012	117.67	16.45
V_2 – Co 06015	122.06	18.29
V_3– Co 06027	111.26	15.44
V_4 – CoM 06082	110.57	14.97
V_5 – Co 86032	126.86	19.25
SE±	**0.65**	**0.83**
C.D. at 5%	**2.12**	**2.71**
B) N levels		
F_1 - 75% N	113.36	16.63
F_2 - 100% N	117.07	16.50
F_3 – 125 % N	122.63	17.50
SE±	**1.96**	**0.69**
C.D. at 5%	**5.79**	**NS**
C) Interactions		
SE±	**4.93**	**1.54**
C.D. at 5%	**NS**	**NS**
General Mean	**117.68**	**16.88**

Table 2. Growth and yield attributes as affected by sugarcane genotypes and N levels

Treatments	Germination %	Tillering ratio	Height (cm)	Girth (cm)	No of internodes cane^{-1}	Millable canes (000 ha^{-1})	Avg. cane wt. (kg)
A) Genotypes							
V_1– Co 06012	68.73	1.71	281	9.0	24	95.00	1.24
V_2– Co 06015	70.12	1.76	286	9.4	25	96.18	1.27
V_3– Co 06027	65.74	1.63	273	8.9	24	93.55	1.19
V_4- CoM06082	62.15	1.59	269	8.7	22	97.02	1.14
V_5 – Co 86032	71.48	1.79	294	9.3	27	98.31	1.29
SE±	**0.73**	**0.01**	**1.75**	**0.2**	**0.61**	**1.02**	**0.01**
C.D. at 5%	**2.36**	**0.03**	**5.71**	**NS**	**2.00**	**NS**	**0.03**
B) N levels							
F_1 - 75% N	68.18	1.63	274	8.5	20	97.61	1.16
F_2 - 100% N	68.07	1.70	282	9.2	25	94.99	1.23
F_3 – 125 % N	71.69	1.76	286	9.5	29	95.44	1.28
SE±	**2.65**	**0.02**	**3.42**	**0.25**	**1.62**	**0.80**	**0.02**
C.D. at 5%	**NS**	**0.07**	**NS**	**0.72**	**4.77**	**NS**	**0.5**
C) Interactions							
SE±	**3.25**	**0.05**	**7.64**	**0.55**	**3.62**	**1.79**	**0.04**
C.D. at 5%	NS	NS	NS	NS	NS	NS	NS
General Mean	**67.64**	**1.70**	**281**	**9.1**	**24**	**96.01**	**1.23**

Table 3. Quality parameters of sugarcane affected by sugaracane genotypes and N levels

Treatments	Brix (c)	Sucrose (%)	Purity (%)	CCS (%)
A) Genotypes				
V_1– Co 06012	21.81	19.74	91.02	13.97
V_2 – Co 06015	21.76	19.81	91.36	14.39
V_3– Co 06027	21.46	19.56	90.62	13.89
V_4 – CoM 06082	21.02	19.46	89.62	13.53
V_5 – Co 86032	21.97	19.87	92.17	15.82
SE±	**0.09**	**0.09**	**0.27**	**0.70**
C.D. at 5%	**0.29**	**0.28**	**0.88**	**NS**
B) N levels				
F_1 - 75% N	21.60	19.45	90.34	14.63
F_2 - 100% N	21.36	19.65	90.99	14.08
F_3 – 125 % N	21.85	19.97	91.55	14.25
SE±	**0.18**	**0.13**	**0.42**	**0.55**
C.D. at 5%	**NS**	**0.39**	**NS**	**NS**
C) Interactions				
SE±	**0.40**	**0.30**	**0.94**	**1.23**
C.D. at 5%	**NS**	**NS**	**NS**	**NS**
General Mean	**21.60**	**19.69**	**90.96**	**14.32**

Table 4. Soil properties at harvest in different treatments

Treatments	pH	EC (dsm^{-1})	O.C. %	Available nutrient status (kg ha^{-1})		
				N	P_2O_5	K_2O
A) Genotypes						
V_1– Co 06012	8.15	0.37	0.62	184	17.8	269
V_2 – Co 06015	8.17	0.38	0.61	187	16.4	259
V_3– Co 06027	8.09	0.39	0.63	189	16.5	262
V_4 – CoM 06082	8.11	0.40	0.59	192	17.2	276
V_5 – Co 86032	8.10	0.38	0.59	198	19.7	284
B) N levels						
F_1 - 75% N	8.14	0.36	0.61	186	18.6	273
F_2 - 100% N	8.11	0.37	0.60	188	16.7	268
F_3 – 125 % N	8.12	0.40	0.63	196	17.2	269
General Mean	**8.12**	**0.38**	**0.61**	**190**	**17.5**	**270**
Initial	**8.19**	**0.42**	**0.69**	**284**	**20.14**	**324**

Project No. : AS 66

Title : Priming of cane node for accelerating germination.

Objective**:**

1) To find out suitable cane node priming technique.
2) To assess the effect of cane node on acceleration of germination

Experimental details:

Place	: CSRS, Padegaon,
Design	: Randomized Block Design
Replication	: 4
Plot Size: Gross	: 10 x 6 m^2,
Net	: 08 x 4 m^2
Variety	: Phule 265
Fertilizer dose	: 250:115:115 N: P_2O_5: K_2O kg ha^{-1}
Date of planting	: 05.02.2013
Date of harvesting	: 17.01.2015
Soil Status	: Irrigated, Medium black soil.

Treatments: 6

T_1 : Un-primed cane node.

T_2 :Treating cane node in hot water in 50^{o}Cfor 2 hours.

T_3 : Treating cane node in hot water in 50^{o}C and urea solution (3%) for 2hours

T_4 : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio

T_5 : Conventional 3 bud setts planting.

T_6 : Primed and sprouted cane node (Incubated for four days after priming)

(Put the single cane node in the slurry of cattle dung, cattle urine and water for 15 minutes. take out the buds and put in decomposed FYM and covered it with sugarcane trash for 4-5 days for sprouting.)

Results :

The data of second year trial on cane and CCS yields, growth observations and quality parameters of different treatments are presented in Table 1 & 2.

Effect on cane and CCS yields:

The data on cane and CCS yields presented in Table 1 revealed that priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio (T_4) recorded significantly the highest cane and CCS yield (138.81 and 20.18 t ha^{-1}). However, it was at par with treating cane node in hot water in 50^{o}c and urea solution (3%) for 2 hours (T_3) (133.13 and 19.41 t ha^{-1}) significantly lowest cane and CCS yield was observed in unprimed cane node.

Growth and yield attributes:

The data regarding growth and yield attributes are presented in Table 2. The germination (74.95%) was found significantly higher with conventional 3 bud setts planting and it was at par with T_4 , T_3 and T_2. The data revealed that the priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio (T_4) recorded

significantly higher tillering ratio (1.73), millable height (314 cm), cane girth (11.60 cm), However, it was at par the treatment treating cane node in hot water in 50°c and urea solution (3%) for 2 hours (T_3) for tillering ratio (1.68), millable height (305 cm), cane girth (11.10 cm).

The priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio (T_4) recorded significantly higher number of internodes (32), number millable canes (106000/ha) and weight per cane (1.31 kg). It was at par with the treating cane node in hot water in 50 ^{0}C for 2 hrs (T_2), treating cane node in hot water in 50 ^{0}C and urea solution (3%) for 2 hours (T_3), conventional 3 bud setts planting (T_5) and Primed and sprouted cane node (Incubated for four days after priming) (T_6).

Quality parameters:

The data regarding juice quality parameters are presented in Table 2 revealed that priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio (T_4) recorded significantly the highest brix (22.88), sucrose (20.97 %), purity (94.28%) and CCS (14.54 %) than the rest of the treatment.

Conclusion:

The priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio (T_4) recorded significantly the highest cane and CCS yield (138.81 and 20.18 t ha^{-1}). However, it was at par with treating cane node in hot water in 50°c and urea solution (3%) for 2 hours (T_3) (133.13 and 19.41 t ha^{-1}), than the rest of the treatment.

Table 1. Mean cane and CCS yields as affected by various treatments

Treatment	Cane yield (t/ha)	CCS yield (t/ha))
T_1 : Un-primed cane node.	117.76	16.79
T_2 :Treating cane node in hot water in 50°c for 2 hours.	129.24	18.51
T_3 : Treating cane node in hot water in 50°c urea solution (3%) for 2 hours	133.13	19.41
T_4 : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio	138.81	20.18
T_5 : Conventional 3 bud setts planting.	126.08	17.45
T_6 Primed and sprouted cane node (Incubated for four days after priming)	121.17	16.62
SE+	**3.03**	**0.44**
C.D at 5%	**9.14**	**1.32**
General Mean	**127.70**	**18.11**

Table : 2 Growth and juice quality attributes as affected by various treatments

Treatments	Germ. (%)	Tillering ratio	Height (cm)	Girth (cm)	No. of internodes	Millable canes (000 ha)	Av. cane wt. (kg)	Brix (c)	Sucrose (%)	Purity (%)	CCS (%)
T_1 : Un-primed cane node.	66.83	1.42	269	9.30	24	98	1.20	19.89	19.36	91.10	14.30
T_2: Treating cane node in hot water in 50ºc for 2 hours.	70.16	1.62	298	10.60	27	103	1.26	20.92	20.08	92.84	14.32
T_3 : Treating cane node in hot water in 50ºc urea solution (3%) for 2hours	72.13	1.68	305	11.10	29	103	1.29	21.43	20.67	92.87	14.38
T_4 : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio	74.63	1.73	314	11.60	32	106	1.31	22.88	20.97	94.28	14.54
T_5 : Conventional 3 bud setts planting.	74.95	1.56	276	10.40	26	101	1.25	20.63	20.02	92.34	13.84
T_6 Primed and sprouted cane node (Incubated for four days after priming)	66.97	1.49	274	10.00	24	99	1.23	20.09	19.43	91.12	13.72
SE+	**1.61**	**0.03**	**3.67**	**0.30**	**2.41**	**2.59**	**0.03**	**0.05**	**0.05**	**0.14**	**0.01**
C.D at 5%	**4.85**	**0.09**	**11.06**	**0.91**	**7.27**	**7.82**	**0.10**	**0.14**	**0.16**	**0.43**	**0.04**
General Mean	**69.64**	**1.58**	**289.33**	**10.50**	**27**	**102**	**1.26**	**20.97**	**20.09**	**92.43**	**14.18**

Project No. AS – 65

Title: Enhancing sugarcane productivity and profitability under Wheat – Sugarcane Cropping system.

Objectives : To enhance the productivity of sugarcane under wheat – sugarcane cropping system.

Experiment details :

Place	: CSRS, Padegaon,
Design	: Randomized Block Design
Replication	: 3
Plot Size: Gross	: 08 x 06 m^2,
Net	: 06 x 04 m^2
Variety	: Phule 265
Date of planting	: As per treatment
Soil Status	: Irrigated, Medium black soil.

Treatment Details : 09

T1 : Autumn planted sugarcane
T2 : Autumn planted planted sugarcane + Wheat (1:2)
T3 : Autumn planted planted sugarcane + Wheat (1:3)
T4 : Wheat sown on 15th November – Late Sugarcane
T5 : Wheat sown on 15th December – Late Sugaracne
T6 : FIRB sowing of wheat 15th November (75 cm with 3 rows of wheat)+ Sugarcane in furrows in third week of February
T7 : FIRB Sowing of wheat 15th November (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March
T8 : FIRB sowing of wheat 15th December (75 cm with 3 rows of wheat)+ Sugarcane in furrows in third week of February.
T9 : FIRB Sowing of wheat 15th December (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March.

Result

The data of second year trial on cane and CCS yield, intercrop yield, biometric observations, quality parameters, monetary returns, cost of cultivation and B:C ratio are presented in Table 1 to 5.

Cane, CCS and intercrop yields

Data presented in Table 1 revealed that, cane yield and CCS yield (145.21 t ha^{-1} and 20.61 t ha^{-1}, respectively) were significantly higher in treatment T_1 (autumn planted Sugarcane) than the rest of the treatments. Regarding intercropping, autumn planted sugarcane + wheat (1:2) (T_2) produced significantly higher cane yield and CCS yield (135.62 t ha^{-1} and 18.54 t ha^{-1}, respectively) than other treatments except autumn planted sugarcane + wheat (1:3) (T_3).

As regards intercrop yield FIRB sowing of wheat 15th November (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March (T_7) recorded higher wheat yield (39.16 q ha^{-1}) and found at par with FIRB Sowing of wheat 15th November (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of February (T_6).

Biometric observations

The data presented in Table 2 indicated that, the cane girth (10.87) was significantly higher in autumn planted sole sugarcane (T_1) over rest of the treatments; however, it was on par with treatment T_2, T_3 and T_4. Also NMC/ha (99208) was found significantly higher in autumn planted sole sugarcane over rest of the treatments. The growth observations

germination, tillering ratio millable height, number of internodes cane^{-1} and weight per cane were found to be non significant.

Quality parameters

The data presented in Table 3 showed that, there were no significant differences found with respect to quality parameters.

Economics

The data presented in Table 4 indicated that cane equivalent yield due to different treatments differed significantly. Significantly the highest cane equivalent yield (161.49 t ha^{-1}) recorded under autumn planted sugarcane + wheat (1:3) (T_3) which was at par with autumn planted sugarcane + wheat (1:2) (T_2) (158.89 t ha^{-1}).

The maximum gross monetary returns and net monetary returns were recorded by autumn planted sugarcane + wheat (1:3) (T_3) (Rs.363350/- and Rs.245452/-, respectively) which was followed by autumn planted sugarcane + wheat (1:2) (T_2) (Rs.357506/- and Rs.242223/-). The benefit: cost ratio was higher in autumn planted sugarcane + wheat (1:2) (3.10) followed by treatment autumn planted sugarcane + wheat (1:3) (3.08).

Conclusion

The autumn planted sugarcane produced significantly higher cane yield and CCS yield (145.21 t ha^{-1} and 20.61 t ha^{-1}, respectively). Under intercropping system, autumn planted sugarcane + wheat (1:2) produced significantly higher cane yield and CCS yield (135.62 t ha^{-1} and 18.54 t ha^{-1}, respectively). The intercropping of autumn planted sugarcane + wheat (1:2) was found to be more remunerative.

Table 1. Mean cane, CCS and intercrop yields as affected by various treatments

Treatments	Cane yield (t ha^{-1})	CCS yield (t ha^{-1})	Wheat yield (q ha^{-1})
T_1- Autumn planted sugarcane	145.21	20.61	0.00
T_2-Autumn planted sugarcane + Wheat (1:2)	135.62	18.54	26.18
T_3- Autumn planted sugarcane + Wheat (1:3)	135.48	18.14	29.26
T_4- Wheat sown on 15th November – Late Sugarcane	121.94	16.57	19.52
T_5- Wheat sown on 15th December – Late Sugarcane	112.07	15.52	18.47
T_6- FIRB sowing of wheat 15th November (75 cm with 3 rows of wheat)+ Sugarcane in furrows in third week of February	92.88	12.84	33.02
T_7- FIRB Sowing of wheat 15th November (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March	87.01	11.86	39.16
T_8- FIRB sowing of wheat 15th December (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of February.	93.58	12.71	30.02
T_9- FIRB Sowing of wheat 15th December (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March.	86.04	11.75	31.11
SE ±	**2.63**	**0.62**	**2.16**
CD at 5%	**7.87**	**1.86**	**6.47**
G.M.	**112.20**	**15.39**	**25.19**

Table 2. Mean ancillary observations as affected by various treatments

Treatments	Germi. (%)	Tillering Ratio	Millable height (cm)	Girth (cm)	No. of internodes/ cane	NMC (ha^{-1})	Wt/ cane (kg)
T_1- Autumn planted sugarcane	73.28	1.77	268	10.87	27	99208	1.46
T_2-Autumn planted sugarcane + Wheat (1:2)	71.43	1.65	266	10.56	25	90657	1.50
T_3- Autumn planted sugarcane + Wheat (1:3)	70.88	1.56	264	10.47	24	91317	1.48
T_4- Wheat sown on 15th November – Late Sugarcane	69.76	1.64	261	10.37	26	82619	1.48
T_5- Wheat sown on 15th December – Late Sugarcane	69.43	1.63	262	10.26	24	76389	1.47
T_6- FIRB sowing of wheat 15th November (75 cm with 3 rows of wheat)+ Sugarcane in furrows in third week of February	69.1	1.50	261	10.17	24	62291	1.49
T_7- FIRB Sowing of wheat 15th November (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March	68.1	1.48	260	10.07	23	59049	1.48
T_8- FIRB sowing of wheat 15th December (75 cm with 3 rows of wheat)+ Sugarcane in furrows in third week of February.	69.43	1.54	263	10.17	24	62341	1.50
T_9- FIRB Sowing of wheat 15th December (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March.	68.43	1.52	260	10.17	23	58029	1.49
SE ±	0.05	0.12	3.99	0.20	1.39	1714.45	0.05
CD at 5%	NS	NS	NS	0.59	NS	5139.87	NS
G.M.	69.98	1.59	263	10.34	24.33	75773	0.48

Table 3. Mean quality parameters of sugarcane as affected by different intercropping treatments

Treatments	Brix (c)	Sucrose (%)	Purity (%)	CCS (%)
T_1- Autumn planted sugarcane	21.78	19.70	85.88	13.48
T_2-Autumn planted sugarcane + Wheat (1:2)	22.76	19.68	86.74	13.68
T_3- Autumn planted sugarcane + Wheat (1:3)	22.57	20.05	88.08	1366
T_4- Wheat sown on 15th November – Late Sugarcane	22.90	20.08	86.68	13.57
T_5- Wheat sown on 15th December – Late Sugarcane	21.93	19.85	89.75	13.83
T_6- FIRB sowing of wheat 15th November (75 cm with 3 rows of wheat)+ Sugarcane in furrows in third week of February	22.12	20.00	89.87	13.81
T_7- FIRB Sowing of wheat 15th November (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March	21.82	19.78	89.14	13.61
T_8- FIRB sowing of wheat 15th December (75 cm with 3 rows of wheat)+ Sugarcane in furrows in third week of February.	21.96	19.48	88.00	13.57
T_9- FIRB Sowing of wheat 15th December (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March.	21.43	19.78	87.28	13.62
SE ±	**0.53**	**0.54**	**1.75**	**0.54**
CD at 5%	**NS**	**NS**	**NS**	**NS**
G.M.	**22.14**	**19.82**	**88.38**	**13.65**

Table 4. Economics of sugarcane intercropping as influenced by different treatments

Treatments	Cane yield (t ha^{-1})	Inter crop yield (t ha^{-1})	Cane equ. yield (t ha^{-1})	Gross monetary returns (Rs.ha^{-1})	Cost of production (Cost A) (Rs.ha^{-1})	Net returns (Rs.ha^{-1})	B:C ratio
T_1- Autumn planted sugarcane	145.21	0.00	145.21	326717	110033	216684	2.97
T_2-Autumn planted sugarcane + Wheat (1:2)	135.62	26.18	158.89	357506	115283	242223	3.10
T_3- Autumn planted sugarcane + Wheat (1:3)	135.48	29.26	161.49	363350	117908	245442	3.08
T_4- Wheat sown on 15th November – Late Sugarcane	121.94	19.5	139.29	313404	115283	198121	2.72
T_5- Wheat sown on 15th December – Late Sugarcane	112.07	18.47	128.49	289097	115283	173814	2.51
T_6- FIRB sowing of wheat 15th November (75 cm with 3 rows of wheat)+ Sugarcane in furrows in third week of February	92.88	33.02	122.23	275021	117908	157113	2.33
T_7- FIRB Sowing of wheat 15th November (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March	87.01	39.16	121.82	274086	117868	156218	2.33
T_8- FIRB sowing of wheat 15th December (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of February.	93.58	30.02	120.27	270603	117908	152695	2.30
T_9- FIRB Sowing of wheat 15th December (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March.	86.04	31.11	113.69	255803	117918	137885	2.17
SE +	**2.63**	**2.16**	**3.31**	**-**	**-**	**-**	**-**
CD at 5%	**7.87**	**6.47**	**9.92**	**-**	**-**	**-**	**-**
G.M.	**112.20**	**25.19**	**134.60**	**-**	**-**	**-**	**-**

Selling rate - 1. Sugarcane- Rs 2250 t^{-1}. 2. Wheat- Rs 2000 q^{-1}

Table 5. Mean data on soil properties at harvest as affected by different treatments

Treatments	pH	EC (dsm^{-1})	O.C. (%)	N $kgha^{-1}$	P_2O_5 $kgha^{-1}$	K_2O $kgha^{-1}$
Initial						
T_1- Autumn planted sugarcane	7.72	0.31	0.65	212	24	280
T_2-Autumn planted sugarcane + Wheat (1:2)	7.70	0.29	0.74	218	22	304
T_3- Autumn planted sugarcane + Wheat (1:3)	7.72	0.28	0.71	230	24	294
T_4- Wheat sown on 15th November – Late Sugarcane	7.79	0.27	0.72	235	28	298
T_5- Wheat sown on 15th December – Late Sugarcane	7.65	0.29	0.79	214	26	314
T_6- FIRB sowing of wheat 15th November (75 cm with 3 rows of wheat)+ Sugarcane in furrows in third week of February	7.73	0.27	0.82	217	22	310
T_7- FIRB Sowing of wheat 15th November (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March	7.74	0.33	0.82	234	27	321
T_8- FIRB sowing of wheat 15th December (75 cm with 3 rows of wheat)+ Sugarcane in furrows in third week of February.	7.64	0.31	0.79	200	28	305
T_9- FIRB Sowing of wheat 15th December (75 cm with 3 rows of wheat) + Sugarcane in furrows in third week of March.	7.68	0.30	0.82	204	25	301

There were no remarkable difference in soil pH, EC, organic carbon and available N, P_2O_5 and K_2O content in soil after harvest of sugarcane due to different intercrop combination of wheat there was slight decrease in soil pH, EC, N and increase in available K_2O and soil organic carbon in intercropped plot and no effect on available P_2O_5 status after harvest of both the crops

Title of expt.: Impact of integrated application of organics and inorganics in improving soil health and sugarcane productivity.

Objectives:

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

Experimental details:

Year of start	: 2014-15	Period of Expt.	:1 Plant + 2 ratoons
Variety	: CoM 0265(Phule 265)	Season	: Suru
Treatments	: Nine	Replications	: Three
Design	: RBD	Plot size	: 7.2 X 6.0 m
Date of planting	: 30.01.2014	Date of harvesting	:18.2.2016
Initial Status of Soil	: pH – 7.68, EC – 0.41 dSm^{-1}, Organic carbon – 0.69 % Available N – 261 kg ha^{-1}. , Available P – 23.7 kg ha^{-1}. , Available K – 268 kg ha^{-1}.		

Treatment details:

Tr. No	Treatments (Plant cane)
1.	No organic + 50% RDF
2.	No organic + 100% RDF
3.	No organic + RDF as per soil test
4.	FYM @ 20 t ha^{-1} + 50 % RDF
5.	FYM @ 20 t ha^{-1} + 100 % RDF
6.	FYM @ 20 t ha^{-1} + RDF as per soil test
7.	FYM @ 10 t ha^{-1} + BF (Aceto. + PSB) + 50 % RDF
8.	FYM @ 10 t ha^{-1} + BF (Aceto. + PSB) + 100 % RDF
9.	FYM @ 10 t ha^{-1} + BF (Aceto. + PSB) + RDF as per soil test

Results:

a. growth parameters :

The data in respect of growth parameters was presented in Table 1. The data on germination percentage was found to be nonsignificant, however the significantly higher tillering ratio and cane girth was observed in the treatment T_6 receiving 100 % RDF along with 20 t ha^{-1} FYM (2.22 and 9.98 cm, respectively) and it was at par with all other treatments except T_1 receiving 50 % RDF only. The treatment T_6 also recorded significantly higher milleable height (282 cm) and it was at par with T_9, T_5,T_8 and T_4.

b. Yield and yield contributing parameters :

The data in respect of yield and yield contributing parameters presented in Table 1 revealed that the treatment T_6 receiving 100 % RDF along with 20 t ha^{-1} FYM recorded significantly the higher average cane weight, number of milleable canes and cane yield (2.05 kg, 91.12 '000 ha^{-1} and 186.09 t ha^{-1}, respectively) and it was at par with T_9, T_5, T_8 and T_4 for average cane weight and cane yield and it was at par with T_5, T_9, T_8, T_4 and T_3. The treatment T_1 receiving 50 % RDF only recorded the lowest average cane weight, number of milleable canes and cane yield (1.74 kg, 74.88 '000 ha^{-1} and 129.76 t ha^{-1}, respectively).

The CCS per cent and CCS yield were significantly affected by the different organic and inorganic treatments. The treatment T_6 receiving 100 % RDF along with 20 t ha^{-1} FYM only recorded significantly the highest CCS percent and CCS yield

(13.88 % and 25.82 t ha^{-1} , respectively) and it was at par rest of the treatments except T_1 receiving 50 % RDF only, T_2 receiving 100 % RDF only and T_3 receiving RDF as per soil test.

b. Soil chemical properties:

The soil chemical properties have been analyzed from pre and post harvest soils of sugarcane and presented in Table 2. The soil pH was slightly reduced in all the integrated nutrient management treatments. The lowest soil pH (7.53) was recorded in treatment of T_4 receiving 50 % RDF along with 20 t ha^{-1} FYM and found highest in the treatment T_3 receiving RDF as per soil test (7.81). The soil EC was increased in all the treatments over the initials. The significantly lowest EC was noted in the treatment T_1 receiving 50 % RDF and T_2 receiving 100 % RDF only (0.49 dSm^{-1}) and it was at par with T_3 receiving RDF as per soil test (0.52 dSm^{-1}). The highest soil EC was recorded in treatment T_6 receiving RDF as per soil test along with 20 t ha^{-1} FYM (0.65 dSm^{-1}) and it was at par with all the integrated nutrient management treatments.

Soil organic carbon content was reduced in the inorganic treatments T_1, T_2 and T_3 and it was increased in all other all the integrated nutrient management treatments over the initial values. The treatments T_4 receiving 50 % RDF along with 20 t ha^{-1} FYM and T_6 receiving RDF as per soil test along with 20 t ha^{-1} FYM were recorded significantly the higher organic carbon (0.74 %) and it was at par with T_5, T_8, T_9 and T_7. The lowest organic carbon was recorded in the treatments T_1 receiving 50 % RDF only and T_3 receiving RDF as per soil test (0.66 %).

The treatment T_6 receiving RDF as per soil test along with 20 t FYM recorded significantly the higher available N and available P (318 and 26.5 kg ha^{-1}) however, the and significantly higher available K was recorded in the treatment T_5 receiving 100 % RDF along with 20 t ha^{-1} FYM (329 kg ha^{-1}) followed by T_6 receiving 100 % RDF as per soil test along with 20 t ha^{-1} FYM and T_8 receiving 100 % RDF along with 10 t ha^{-1} FYM and biofertilizers (319 and 305 t ha^{-1}).

e. Economics:

The data pertaining to gross returns, net returns and benefit-cost ratio as affected by different treatments are presented in Table No. 3a and 3b. It is revealed from the table 3b that, the application of RDF as per soil test along with 20 t ha^{-1} FYM (T_6) recorded significantly the higher per hectare gross return (Rs.4,18,710 ha^{-1}), and followed by T_9 receiving RDF as per soil test along with 10 t ha^{-1} FYM + biofertilizers and T_5 receiving 100 % RDF along with 20 t ha^{-1} FYM (Rs.4,10,400 and 4,05,383 ha^{-1}, respectively) and lowest in the treatment T_1 (Rs.2,91,968 ha^{-1}). The treatments T_9 reported significantly the higher per hectare net return (Rs.2, 69,901 ha^{-1}), and lowest in the treatment T_1 (Rs.1, 99,380 ha^{-1}). The highest benefit-cost ratio was reported in the treatments T_3 receiving only RDF as per soil test (2.43) and it was found lowest in the treatment T_4 (1.22).

f. Conclusion:

The application of recommended dose fertilizers as per soil test along with 20 t ha^{-1} FYM for preseasonal sugarcane was found beneficial in terms of yield, quality and soil health.

Table 1. Effect of different treatments on growth, yield and yield parameters of sugarcane.

Treat.	Germi-nation (%)	TR (120 days)	Girth (cm)	Milleable height (cm)	AC W (Kg)	NMC (000 ha^{-1})	Cane yield (tha^{-1})	CCS %	CCS yield ($t\ ha^{-1}$)
T_1	54.93	1.99	8.94	229	1.74	74.88	129.76	13.60	17.66
T_2	59.21	2.05	9.21	239	1.79	78.50	140.14	13.63	19.11
T_3	60.24	2.07	9.33	253	1.82	83.06	149.91	13.73	20.58
T_4	55.70	2.07	9.53	268	1.95	87.33	171.24	13.86	23.72
T_5	59.42	2.18	9.80	276	2.01	89.58	180.17	13.86	24.98
T_6	62.88	2.22	9.98	282	2.05	91.12	186.09	13.88	25.82
T_7	63.24	2.03	9.30	254	1.92	84.03	161.68	13.84	22.38
T_8	65.20	2.08	9.51	269	1.98	88.66	175.22	13.86	24.28
T_9	64.58	2.09	9.81	280	2.02	89.08	182.40	13.87	25.31
SE±	2.32	0.07	0.26	6.48	0.04	2.90	5.95	0.04	0.84
CD at 5%	NS	0.20	0.78	19.41	0.12	8.69	17.84	0.13	2.52

Table 2. Effect of different treatments on soil chemical properties at harvest of sugarcane

Treat.	pH	EC ($dS\ m^{-1}$)	Org. C. (%)	Av. Nutrients ($kg\ ha^{-1}$)		
				N	P	K
Initial	***7.68***	***0.41***	***0.69***	***261***	***23.7***	***268***
T_1	7.79	0.49	0.66	211	19.5	244
T_2	7.78	0.49	0.67	227	20.3	266
T_3	7.81	0.52	0.66	242	21.7	252
T_4	7.53	0.60	0.74	255	23.9	298
T_5	7.54	0.63	0.73	292	25.0	329
T_6	7.56	0.65	0.74	318	26.5	319
T_7	7.56	0.60	0.71	250	21.4	282
T_8	7.59	0.61	0.72	288	23.2	305
T_9	7.60	0.64	0.72	312	24.1	283
SE±	0.05	0.02	0.02	5.79	0.63	6.65
CD at 5%	0.16	0.05	0.06	17.36	1.89	19.94

Table 3a. Cost of different inputs (Rs. ha^{-1})

Tr. No.	Inputs applied			Fertilizer cost ($Rs.ha^{-1}$)	Cost of Cultivation (Rs)	Production Cost (Rs)
	FYM ($t\ ha^{-1}$)	Nutrient ($kg\ ha^{-1}$)	Biofertilizer ($kg\ ha^{-1}$)			

		N	P	K				
T_1	--	125	58	58		7831	84757	92588
T_2	--	250	115	115		13760	84757	98517
T_3	--	312.5	115	86.25		13722	84757	98479
T_4	20	125	58	58		89047	84757	173804
T_5	20	250	115	115		94976	84757	179733
T_6	20	312.5	115	86.25		94938	84757	179695
T_7	10	125	58	58	12.5	49851	84757	134608
T_8	10	250	115	115	12.5	55780	84757	140537
T_9	10	312.5	115	86.25	12.5	55742	84757	140499

Table 3b. Economics of different treatments

Treat.	Gross returns (Rs. ha^{-1})	Prod.cost (A) (Rs. ha^{-1})	Net returns (Rs. ha^{-1})	B : C Ratio
T_1	291968	92588	199380	2.15
T_2	315323	98517	216805	2.20
T_3	337305	98479	238826	2.43
T_4	385298	173804	211494	1.22
T_5	405383	179733	225649	1.26
T_6	418710	179695	239015	1.33
T_7	363780	134608	229172	1.70
T_8	394253	140537	253715	1.81
T_9	410400	140499	269901	1.92
SE ±	**13393**	**--**	**13393**	**--**
CD at 5 %	**40151**	**--**	**40151**	**--**

Rates of fertilizers:

Urea = Rs. 5.68 Kg $^{-1}$ SSP = Rs.7.82 Kg $^{-1}$ MOP = Rs. 16.84 Kg $^{-1}$

FYM = Rs.4500/ton

Cost of cultivation: Rs.84, 757 ha $^{-1}$ (Excluding cost of fertilizers)

Cane price: Rs. 2250 t $^{-1}$

B) Completed Experiments

Project No. AS – 42

Title: Agronomic evaluation of promising sugarcane genotypes (Spring Early)

Objective:
1) To find out the suitable sugarcane genotypes for early spring planting.
2 To find out suitable sugarcane genotypes for highest cane and CCS yield.
3) To find out the suitable fertilizer dose for promising sugarcane genotypes.
4) To find out suitable interaction of promising sugarcane genotypes and fertilizer dose for highest cane and CCS Yield.

Experimental Details:

Place	: CSRS, Padegaon,
Design	: Split plot
Replication	: 3
Plot Size: Gross	: 10 x 5 m^2,
Net	: 08 x 3 m^2,
Fertilizer dose	: 250:115:115 kg N, P_2O_5, K_2O ha^{-1},
Date of planting	: 19.01.2013, 07.01.2014
Date of harvesting	: 26.01.2014, 19.01.2015
Soil Status	: Irrigated, Medium black soil.

Treatment details:

No. of Main Treatments: 05

1) V_1 : Co 06001
2) V_2 : Co 06002
3) V_3 : Co 06022
4) V_4 : PI 06032
5) V_5 : CoC 671

No. of Sub Treatments : 03

1) F_1 - 75% RD of N
2) F_2 - 100% RD of N
3) F_3 - 125% RD of N

Results:

The pooled data on two years trial on cane and CCS yields, growth observations and quality parameters are presented in Table 1 to 4.

Effect of genotypes:

Data presented in Table 1 revealed that the genotype Co 06002 recorded the highest cane (122.63 t ha^{-1}) and CCS yield (16.88 t ha^{-1}) and was significantly superior to all other genotypes. It was followed by PI 06032 (113.98 t ha^{-1} cane and 15.76 t ha^{-1} CCS yield).

Effect of nitrogen levels:

The nitrogen levels had a significant effect on both cane and CCS yields. Significantly the highest cane (117.98 t ha^{-1}) and CCS (16.47 t ha^{-1}) yields were recorded with application of 125% recommended dose of nitrogen. It was followed by 100 % recommended dose of nitrogen with respect to cane yield. CCS yield was found at par with 100% recommended dose of nitrogen.

Effect of interactions:

The interactions between genotypes and fertilizer levels were found to be non significant for both cane and CCS yields.

Growth and yield attributes:

The data regarding growth and yield attributes are presented in Table 2.

Effect of genotypes:

The data presented in Table 2 revealed that the effect of genotypes was significant for all the parameters except gith and number of internodes. The genotype, Co 06002 recorded significantly the highest tillering ratio (1.71), millable height (285cm), millable canes per hectare (104020 ha^{-1}) and average weight per cane (1.19 kg). However, it was at par with PI 06032 in respect of average weight per cane.

Effect of nitrogen levels:

Effect of N levels was found significant for all the parameter except germination and millable cane. Application of 125% recommended dose of nitrogen recorded the highest tillering ratio (1.72), millable height (282 cm), cane girth (10.1 cm), number of internodes per cane (29), and average cane weight (1.17 kg $cane^{-1}$). The application of 100 % recommended N was found at par with 125 % recommended N in respect of tillering ratio, cane height, girth and average cane weight.

Effect of interactions:

The interactions between genotypes and N levels with respect to all the parameter were found to be non significant.

Quality parameters:

The data presented in Table 3 revealed that the genotype CoC 671 recorded significantly highest brix (21.89) and CCS (13.81%) ,while it was found at par with Co 06002. The nitrogen levels also shorted the significant effects on quality parameters. The application of 125% recommereded dose of nitrogen recorded significantly highest brix (21.89), sucrose (19.87%), purity (92.10%) and CCS (13.85%), while brix, sucrose and CCS were found at par with the application of 100% recommended dose of nitrogen.

The interactions effcet of the genotypes and N levels did not show any significant influence on juice quality parameters (Table 3).

Conclusion:

The genotype Co 06002 was found significantly superior for cane and CCS yields than the other genotypes followed by PI 06032. The application of 125 % recommended dose of nitrogen produced significantly higher cane and CCS yields followed by 100 % recommended dose of nitrogen.

Table 1. Cane and CCS yield as affected by sugarcane genotypes and N levels (Pooled mean)

Treatments	Cane yield (t ha^{-1})			CCS yield (t ha^{-1})		
	2013-14	2014-15	Pooled Mean	2013-14	2014-15	Pooled Mean
A) Genotypes						
V_1– Co 06001	110.06	115.01	112.54	14.69	15.97	15.35
V_2 – Co 06002	121.44	123.81	122.63	16.52	17.70	16.88
V_3– Co 06022	107.40	105.23	106.32	14.23	14.70	14.32
V_4 – PI 06032	114.77	113.18	113.98	15.60	15.94	15.76
V_5 – CoC 671	112.59	112.06	112.33	15.18	15.41	15.36
SE±	**0.68**	**0.83**	**0.54**	**0.25**	**0.17**	**0.06**
C.D. at 5%	**1.90**	**2.72**	**1.77**	**0.72**	**0.55**	**0.20**
B) N levels						
F_1 - 75% N	108.75	110.69	109.09	13.72	14.64	14.51

F_2 - 100% N	113.81	113.42	113.59	15.32	15.92	15.61
F_3 – 125 % N	118.23	117.46	117.98	16.68	16.95	16.47
SE±	**2.43**	**2.14**	**1.26**	**0.46**	**0.45**	**0.32**
C.D. at 5%	**6.56**	**NS**	**3.73**	**1.20**	**1.33**	**0.93**
C) Interactions						
SE±	**4.84**	**4.79**	**2.82**	**0.84**	**1.01**	**0.71**
C.D. at 5%	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
General Mean	**113.25**	**113.86**	**113.56**	**15.24**	**15.84**	**15.53**

Table 2. Growth and yield attributes as affected by sugarcane genotypes and N levels (Pooled mean)

Treatments	Germination (%)	Tillering ratio	Height (cm)	Girth (cm)	No. of internodes cane^{-1}	Millable canes (000 ha^{-1})	Avg. cane wt. (kg)
A) Genotypes							
V_1– Co 06001	66.66	1.63	273	9.5	23	98.76	1.14
V_2 – Co 06002	70.71	1.71	285	9.8	26	104.02	1.19
V_3– Co 06022	64.31	1.57	266	9.1	22	94.18	1.13
V_4 – PI 06032	69.39	1.67	280	9.7	24	97.45	1.17
V_5 – CoC 671	66.08	1.60	272	9.5	23	98.33	1.14
SE±	0.67	0.01	1.40	0.14	1.21	0.97	0.01
C.D. at 5%	**2.19**	**0.03**	**4.57**	**NS**	**NS**	**3.15**	**0.03**
B) N levels							
F_1 - 75% N	66.04	1.53	266	8.7	17	98.22	1.09
F_2 - 100% N	68.99	1.66	277	9.7	25	97.83	1.17
F_3 – 125 % N	72.45	1.72	282	10.1	29	99.59	1.20
SE±	2.70	0.03	3.33	0.25	1.04	0.61	0.02
C.D. at 5%	**NS**	**0.08**	9.83	**0.74**	**3.07**	**NS**	**0.05**
C) Interactions							
SE±	**2.53**	**0.06**	**7.45**	**0.56**	**2.33**	**1.36**	**0.04**
C.D. at 5%	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
General Mean	**67.43**	**1.63**	**275**	**9.5**	**23**	**98.55**	**1.15**

Table 3. Quality parameters of sugarcane as affected by sugaracane genotypes and N levels (Pooled mean)

Treatments	Brix (c)	Sucrose (%)	Purity (%)	CCS (%)
A) Genotypes				
V_1– Co 06001	21.57	19.65	88.48	13.62
V_2 – Co 06002	21.77	19.87	88.50	13.76
V_3– Co 06022	21.64	19.39	89.23	13.46
V_4 – PI 06032	21.32	19.66	89.71	13.67
V_5 – CoC 671	21.89	19.53	90.36	13.81
SE±	0.08	0.10	0.51	0.05
C.D. at 5%	**0.27**	**NS**	**NS**	**0.17**
B) N levels				
F_1 - 75% N	21.33	19.26	85.85	13.29
F_2 - 100% N	21.69	19.73	89.82	13.73
F_3 – 125 % N	21.89	19.87	92.10	13.85
SE±	0.15	0.15	0.68	0.14
C.D. at 5%	**0.44**	**0.43**	**1.20**	**0.40**
C) Interactions				
SE±	0.34	0.32	1.52	0.31
C.D. at 5%	**NS**	**NS**	**NS**	**NS**
General Mean	**21.64**	**19.62**	**89.25**	**13.66**

Table 4. Soil properties at harvest in different treatments (Pooled mean)

Treatments	pH	EC (dsm^{-1})	O.C. %	Available nutrient status (kg ha^{-1})		
				N	P_2O_5	K_2O
A) Genotypes						
V_1– Co 06001	8.05	0.35	0.60	185.5	15.6	245
V_2 – Co 06002	8.08	0.32	0.57	182.5	15.5	244
V_3– Co 06022	8.05	0.35	0.62	182.0	16.1	254
V_4 – PI 06032	8.05	0.35	0.56	187.5	17.8	275
V_5 – CoC 671	8.07	0.38	0.56	192.5	19.1	282
B) N levels						
F_1 - 75% N	8.05	0.34	0.59	180	18.0	269
F_2 - 100% N	8.06	0.33	0.60	184	16.1	261
F_3 – 125 % N	8.08	0.37	0.56	194	16.4	250
General Mean	**8.06**	**0.35**	**0.59**	**186**	**16.8**	**260**
Initial	**8.15**	**0.37**	**0.67**	**255**	**19.0**	**339**

Project No. AS – 42

Title: Agronomic Evaluation of promising Sugarcane genotypes (Spring Midlate)

Objective: 1) To find out the suitable sugarcane genotypes for early spring planting.
2)To find out suitable sugarcane genotypes for highest cane and CCS yield.
3)To find out the suitable fertilizer dose for promising sugarcane genotypes.
4)To find out suitable interaction of promising sugarcane genotypes and fertilizer dose for highest cane and CCS Yield.

Experimental Details :

Place	: CSRS, Padegaon,
Design	: Split plot
Replication	: 3
Plot Size: Gross	: 10 x 5 m^2,
Net	: 08 x 3 m^2,
Fertilizer dose	: 250:115:115 kg N, P_2O_5, K_2O ha^{-1},
Date of planting	: 19.01.2013, 13.01.2014
Date of harvesting	: 27.01.2014 21.01.2015
Soil Status	: Irrigated, Medium black soil.

Treatment details :

No. of Main Treatments : 05

1) V_1 : Co 06012
2) V_2 : Co 06015
3) V_3 : Co 06027
4) V_4 : CoM 06082
5) V_5 : Co 86032

No. of Sub Treatments : 03

1) F_1 - 75% RD of N
2) F_2 - 100% RD of N
3) F_3 - 125% RD of N

Results:

The pooled results of the two years of the experiment on cane and CCS yields, growth observations and quality parameters are presented in Table 1 to 3.

Effect of genotypes:

Data presented in Table 1 revealed that the genotype Co 86032 recorded significantly the highest cane (122.78 t ha^{-1}) yield. It was followed by Co 06015. The effect of genotypes on CCS yield was found to be non significant.

Effect of nitrogen levels:

The perusal of data shown in table I revealed that the N levels had non significant effect on both cane and CCS yields.

Effect of interactions:

The interactions between genotypes and fertilizer levels were found to be non significant for both cane and CCS yields.

Growth and yield attributes:

The data regarding growth and yield attributes are presented in Table 2.

Effect of genotypes:

The data presented in Table 2 revealed that the effect of genotypes was found significant for all the parameters except number of millable canes and average cane weight. The genotype Co 86032 recorded significantly the highest germination (70.97 %), tillering ratio (1.80), millable height (293 cm), cane girth (9.41 cm), number of internodes per cane (25), and weight per cane (1.28 kg). However, it was at par with Co 06015 in respect of germination percentage, and cane girth, number of internodes and average cane weight.

Effect of nitrogen levels:

Effect of N levels was significant for the tillering ratio, girth, number of internodes per cane and average cane weight. Application of 125% recommended dose of nitrogen recorded significantly the highest tillering ratio (1.73), cane girth (9.61cm) number of internodes per cane (28.0) and the average cane weight (1.28 kg) over other levels. It was found at par with 100 % recommended dose of nitrogen for all these parameters except number of internodes.

Effect of interactions:

The interactions between genotypes and nitrogen levels in respect of all the parameter were found to be non significant.

Quality parameters:

The data presented in Table 3 revealed that the genotype Co 86032 recorded significantly higher brix (22.03), sucrose (19.78%) and purity (91.42%) it was found at par with Co-06015 with respect to sucrose and purity.

Conclusion:

The genotypes Co 86032 recorded significantly higher cane yield than the other genotypes and it was followed by Co-06015. The application of different levels of of nitrogen shown non significants results with respect to cane and CCS yields.

Table 1. Cane and CCS yield as affected by sugarcane genotypes and N levels (Pooled mean)

Treatments	Cane yield(t ha^{-1})	CCS yield(t ha^{-1})

	2013-14	2014-15	Pooled Mean	2013-14	2014-15	Pooled Mean
A) Genotypes						
V_1– Co 06012	116.03	117.67	116.85	16.31	16.45	16.23
V_2 – Co 06015	118.14	122.06	120.10	16.24	18.29	17.60
V_3– Co 06027	117.06	111.26	114.16	15.62	15.44	15.80
V_4 – CoM 06082	112.27	110.57	111.42	15.14	14.97	15.93
V_5 – Co 86032	118.70	126.86	122.78	17.14	19.25	17.32
SE±	**0.47**	**0.65**	**0.36**	**0.20**	**0.83**	**0.60**
C.D. at 5%	**1.36**	**2.12**	**1.18**	**0.58**	**2.71**	**NS**
B) N levels						
F_1 - 75% N	116.43	113.36	115.53	15.20	16.63	16.20
F_2 - 100% N	116.57	117.07	116.75	16.07	16.50	16.68
F_3 – 125 % N	117.70	122.63	118.90	17.00	17.50	16.85
SE±	**2.24**	**1.96**	**1.14**	**0.27**	**0.69**	**0.49**
C.D. at 5%	**5.82**	**5.79**	**NS**	**0.73**	**NS**	**NS**
C) Interactions						
SE±	**4.56**	**4.93**	**2.55**	**0.35**	**1.54**	**1.10**
C.D. at 5%	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
General Mean	**117.61**	**117.68**	**117.06**	**16.09**	**16.88**	**16.58**

Table 2Growth and yield attributes as affected by sugarcane genotypes and N levels (Pooled mean)

Treatments	Germination %	Tillering ratio	Height (cm)	Girth (cm)	No of internodes cane^{-1}	Millable canes (000 ha^{-1})	Avg. cane wt. (kg)
A) Genotypes							
V_1– Co 06012	67.74	1.69	280	9.10	24	96.05	1.23
V_2 – Co 06015	70.29	1.74	284	9.35	24	95.46	1.27
V_3– Co 06027	6.11	1.62	274	8.95	23	95.27	1.18
V_4 – CoM 06082	63.29	1.55	262	8.80	22	98.64	1.13
V_5 – Co 86032	70.97	1.80	293	9.41	25	98.08	1.28
SE±	**0.52**	**0.01**	**1.68**	**0.11**	**0.49**	**0.66**	**0.07**
C.D. at 5%	**1.69**	**0.03**	**5.48**	**0.36**	**1.61**	**2.15**	**0.02**
B) N levels							
F_1 - 75% N	68.16	1.61	273	8.51	18	95.49	1.15
F_2 - 100% N	68.33	1.69	277	9.25	24	96.40	1.23
F_3 – 125 % N	72.34	1.73	285	9.61	29	98.22	1.28
SE±	**1.39**	**0.02**	**3.30**	**0.25**	**1.53**	**0.96**	**0.017**
C.D. at 5%	**NS**	**0.07**	**NS**	**0.74**	**4.51**	**NS**	**0.05**
C) Interactions							
SE±	**3.10**	**0.05**	**7.38**	**0.56**	**3.42**	**2.16**	**0.03**
C.D. at 5%	NS	NS	NS	0.74	NS	NS	NS
General Mean	**67.68**	**1.68**	**278**	**9.12**	**23.24**	**96.70**	**1.22**

Table 3. Quality parameters as affeced by sugarcane genotypes and N levels (Pooled mean)

Treatments	Brix (c)	Sucrose (%)	Purity (%)	CCS (%)
A) Genotypes				
V_1– Co 06012	21.61	19.71	90.57	13.88
V_2 – Co 06015	21.70	19.78	90.98	14.10
V_3– Co 06027	21.35	19.58	89.50	13.84
V_4 – CoM 06082	21.08	19.51	85.40	14.28
V_5 – Co 86032	22.03	19.78	91.42	14.67
SE±	**0.05**	**0.04**	**0.27**	**0.50**
C.D. at 5%	**0.18**	**0.15**	**0.88**	**NS**
B) N levels				
F_1 - 75% N	21.43	19.47	88.63	13.87
F_2 - 100% N	21.46	19.62	89.74	14.43
F_3 – 125 % N	21.77	19.92	90.33	14.16
SE±	**0.19**	**0.10**	**0.43**	**0.37**
C.D. at 5%	**NS**	**0.30**	**1.27**	**NS**
C) Interactions				
SE±	**0.44**	**0.23**	**0.96**	**0.84**
C.D. at 5%	**NS**	**NS**	**NS**	**NS**
General Mean	**21.55**	**19.67**	**89.57**	**14.15**

Table 4. Soil properties at harvest in different genotypes at varying N levels (Pooled mean)

Treatments	pH	EC (dsm^{-1})	O.C.%	Available nutrient status (kg ha^{-1})		
				N	P_2O_5	K_2O
A) Genotypes						
V_1– Co 06012	8.13	0.37	0.61	185	17.7	268
V_2 – Co 06015	8.14	0.38	0.60	184	16.3	256
V_3– Co 06027	8.09	0.37	0.62	186	16.7	258
V_4 – CoM 06082	8.10	0.40	0.59	189	17.5	273
V_5 – Co 86032	8.10	0.39	0.59	196	19.6	280
B) N levels						
F_1 - 75% N	8.11	0.35	0.61	183	18.6	272
F_2 - 100% N	8.10	0.37	0.60	187	16.7	267
F_3 – 125 % N	8.11	0.40	0.60	194	17.3	262
General Mean	**8.10**	**0.37**	**0.60**	**188**	**17.5**	**267**
Initial	**8.16**	**0.39**	**0.69**	**278**	**19.0**	**318**

Project No. : AS 66

Title : Priming of cane node for accelerating germination.

Objective**:** 1. To find out suitable cane node priming technique.

1. To assess the effect of cane node on acceleration of germination

Experimental details:

Place	: CSRS, Padegaon,
Design	: Randomized Block Design
Replication	: 4
Plot Size: Gross	: 10 x 6 m^2,
Net	: 08 x 4 m^2
Variety	: Phule 265
Fertilizer dose	: 250:115:115 N: P_2O_5: K_2O kg ha^{-1}
Date of planting	: 25.02.2012, 16.02.2013, 05.12.2013
Date of harvesting	: 07.03.2013, 30.01.2014, 17.01.2015
Soil Status	: Irrigated, Medium black soil.

Treatments: 6

T_1 : Un-primed cane node.

T_2 : Treating cane node in hot water in 50^{o}Cfor 2 hours.

T_3 : Treating cane node in hot water in 50^{o}C and urea solution (3%) for 2 hours

T_4 : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio

T_5 : Conventional 3 bud setts planting.

T_6 : Primed and sprouted cane node (Incubated for four days after priming)

(Put the single cane node in the slurry of cattle dung, cattle urine and water for 15 minutes. take out the buds and put in decomposed FYM and covered it with sugarcane trash for 4-5 days for sprouting.)

Results :

The pooled mean data of 3 year trials on cane and CCS yields, growth observations and quality parameters of different treatments are presented in Table 1 and 2.

Effect on cane and CCS yields:

The data on cane and CCS yields presented in Table 1 revealed that priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio (T_4) recorded significantly the highest cane and CCS yield (135.43 and 17.82 t ha^{-1}). However, cane yield was found at par with treating cane node in hot water in 50^{o}c and urea solution (3%) for 2 hours (T_3) (131.63 t ha^{-1}) and CCS yield was found at par with treating cane node in hot water in 50^{o}c and urea solution (3%) for 2 hours (T_3) (17.28 t ha^{-1}), treating cane node in hot water in 50^{o}C for 2 hours (T_2) (16.46 t ha^{-1}) and conventional 3 bud setts planting (T_5) (16.33 t ha^{-1}). The lowest cane and CCS yield was observed in unprimed cane node.

Growth and yield attributes:

The data regarding growth and yield attributes are presented in Table 2. The perusal of data revealed that the conventional 3 bud setts planting (T_5) recorded significantly higher germination (73.17%) However, it was at par the priming cane node

with cattle dung plus cattle urine and water in 1:2:5 ratio (T_4) (72.67), treating cane node in hot water in 50^{o}c and urea solution (3%) for 2 hours (T_3) (69.96).

The priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio (T_4) recorded significantly higher tillering ratio (1.74), It was found at par with the treatment treating cane node in hot water in 50^{o}c and urea solution (3%) for 2 hours (T_3). The number millable canes(109000/ha) are recorded significantly higher in the priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio (T_4) and found at par with the rest of the treatments except un-primed cane node (T_1) and Primed and sprouted cane node (Incubated for four days after priming) (T_6). The milliable height (306 cm), cane girth (11.2 cm) and the weight per cane (1.24 kg) recorded numerically highest in the priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio (T_4).

Quality parameters:

The data regarding juice quality parameters are presented in Table 2 revealed that priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio (T_4) recorded significantly the highest brix (22.44), sucrose (20.54 %) and CCS (14.38 %). than the rest of the treatment.While CCS per cent was found at par with treatment T_3

Conclusion:

The priming cane node with cattle dung plus cattle urine and water in 1:2:5 ratio (T_4) recorded significantly the highest cane and CCS yield (135.43 and 17.82 t ha^{-1}) and the cane yield was at par with treating cane node in hot water in 50^{o}c and urea solution (3%) for 2 hours (T_3) (131.63 t ha^{-1}), CCS yield was found at par with tratment T_3, T_2 and T_5. The lowest cane and CCS yield was observed in unprimed cane node.

Table 1. Pooled mean cane and CCS yields as affected by various treatments

Treatment	Cane yield (t/ha)				CCS yield (t/ha))			
	2012-13	**2013-14**	**2014-15**	**Pooled mean**	**2012-13**	**2013-14**	**2014-15**	**Pooled mean**
T_1 : Un-primed cane node.	115.26	116.96	117.76	**116.66**	15.71	13.68	16.84	**15.44**
T_2 :Treating cane node in hot water in 50^{o}c for 2 hours.	127.36	128.86	129.24	**128.49**	17.26	13.62	18.51	**16.46**
T_3 : Treating cane node in hot water in 50^{o}c urea solution (3%) for 2 hours	129.97	131.77	133.16	**131.63**	18.44	14.24	19.15	**17.28**
T_4 : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio	132.78	134.68	138.84	**135.43**	18.94	14.33	20.18	**17.82**
T_5 : Conventional 3 bud setts planting.	122.78	124.48	126.08	**124.45**	17.35	14.18	17.45	**16.33**
T_6 Primed and sprouted cane node (Incubated for four days after priming)	118.00	119.80	121.17	**119.66**	16.28	13.84	16.62	**15.58**
SE+	**4.06**	**3.88**	**3.03**	**2.05**	**0.58**	**0.10**	**0.44**	**0.72**
C.D at 5%	**12.23**	**10.86**	**9.14**	**6.15**	**1.73**	**0.28**	**1.32**	**2.13**
General Mean	**124.36**	**126.09**	**127.70**	**126.05**	**17.33**	**13.98**	**18.11**	**16.48**

Table : 2 Pooled mean of Growth and juice quality attributes as affected by various treatment

Treatments	Germ. (%)	Tillering ratio	Height (cm)	Girth (cm)	No. of internodes	Millable canes (000 ha)	Av. cane wt. (kg)	Brix (c)	Sucrose (%)	Purity (%)	CCS (%)
T_1 : Un-primed cane node.	66.23	1.47	274	901	23	101	1.16	20.48	19.31	92.00	13.87
T_2 :Treating cane node in hot water in 50ºc for 2 hours.	67.88	1.61	288	9.9	26	106	1.21	20.57	19.44	93.17	13.84
T_3 : Treating cane node in hot water in 50ºc urea solution (3%) for 2hours	69.96	1.65	296	10.5	28	108	1.23	21.33	20.19	93.35	14.57
T_4 : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio	72.67	1.74	306	11.2	29	109	1.24	22.44	20.54	93.27	14.38
T_5 : Conventional 3 bud setts planting.	73.10	1.41	270	9.9	24	104	1.20	20.30	19.53	95.33	14.05
T_6 Primed and sprouted cane node (Incubated for four days after priming)	68.24	1.36	267	9.6	22	102	1.18	20.21	19.35	93.86	13.79
SE+	**1.73**	**0.03**	**2.65**	**0.15**	**0.81**	**1.76**	**0.02**	**0.14**	**0.12**	**0.70**	**0.11**
C.D at 5%	**5.24**	**0.10**	**NS**	**NS**	**2.41**	**5.22**	**NS**	**0.42**	**0.36**	**NS**	**0.32**
General Mean	**69.26**	**1.54**	**284**	**10.0**	**25**	**105**	**1.20**	**20.89**	**19.76**	**93.50**	**14.03**