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**MAHATMA PHULE KRISHI VIDYAPEETH, RAHURI
DIST. AHMEDNAGAR (MAHARASHTRA)**

ANNUAL REPORT

CROP PRODUCTION

2013-14

Submitted by

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**All India Coordinated Research Project on Sugarcane
REGIONAL SUGARCANE AND JAGGERY RESEARCH
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Weather Condition during Crop Period (February, 2012 to February, 2014)

The Regional Sugarcane and Jaggery Research Station, Kolhapur is geographically situated at an elevation of 574 meter above the sea level on 16°.43' North latitude and 74°.13' East longitude. It comes under the Sub-Montane Zone of Maharashtra. The weather parameters during the seasonal crop growth period from December, 2012 to February, 2014 are presented in Table 1 and 2.

The planting of seasonal sugarcane was completed in second fortnight of December 2012 to January 2013. During germination phase of sugarcane the maximum and minimum temperature were 31.14°C and 14.97°C, respectively with average morning humidity of 80.83%. This was favorable condition for good germination. The tillering phase was completed in the month of February 2013 to April 2013. The average maximum temperature 35.82°C and average minimum 18.33 °C with average morning humidity 75.78 % which was solicited for tillering phase.

There was even distribution of rains during the monsoon season. During early growth and grand growth of crop the total rainfall received was 322 and 626 mm respectively. There was flood situation w.e.f. 23.7.13 to 4.8.13 (for 12 days) during grand growth stage. The water level rose to 6' due to flood in plots near river bank.

The maturity phase of crop was started from 45 MW to 48 MW of 2013. The average maximum temperature 30.56⁰ C and minimum temperature 17.8⁰ C with 82.8 % humidity were observed.

The incidence of early shoot borer was observed in late planted crop (after 15th February) and late ratoon, hence, required to undertake plant protection measures for control of early shoot borer during tillering phase of sugarcane. In grand growth period, the incidence of White Wooly Aphid was noticed more in some part of submontane zone (Chandgad, Gadhinglaj and Ajara), whereas, lower incidence of white fly was noticed as compared to previous years. The incidence of white grub (*Leucopholis* and *Holotricha spp.*) is increasing day by day in the region.

Rust and Ring spot, these fungal diseases have been occurred every year with high intensity during monsoon period. Besides this, the outbreak of brown spot with high intensity in the region since last three years is a threat to sugarcane crop particularly CoM 0265 variety. Another viral disease yellow leaf is increased from grand growth period on Co 86032. Therefore it is necessary to procure and multiply pure seed material by following thermo-therapy method.

The total rainfall of 1038.8 mm in 76 rainy days was received during entire crop period.

Table 1. Week wise weather data recorded at Zonal Agricultural Research Station, Shenda Park farm, Kolhapur for the year 2012-13-14.

M W	Period	Rain mm.	RD	Mean Temp °C		Wind Speed kmph	BSS Hrs	Relative Humidity		Evap. mm.
				Max.	Min.			M	E	
	December 12									
49	03/12 – 09/12	00.0	0	31.1	16.3	Faulty	08.0	84	42	07.8
50	10/12 – 16/12	00.0	0	30.7	16.5	Faulty	08.2	79	44	06.4
51	17/12 – 23/11	00.0	0	29.3	13.8	Faulty	07.7	78	35	04.2
52	24/12 – 31/12	00.0	0	30.9	14.0	Faulty	07.6	72	28	04.0
	January 13									
01.	01/01-07/01	00.0	0	31.6	15.9	NA	6.5	88	41	4.5
02.	08/01-14/01	00.0	0	31.0	14.5	NA	7.2	79	31	4.2
03.	15/01-21/01	00.0	0	32.0	13.7	NA	8.5	84	29	4.3
04.	22/01-28/01	00.0	0	32.4	14.5	NA	7.2	86	29	4.1
05.	29/01-04/02	00.0	0	31.9	15.3	NA	7.3	80	32	4.2
	February 13									
06.	05/02-11/02	00.0	0	32.5	15.2	1.4	7.7	88	34	4.2
07.	12/02-18/02	00.8	0	32.1	17.4	2.3	8.0	78	34	3.9
08.	19/02-25/02	00.0	0	33.7	15.8	1.4	9.3	78	27	4.2
09.	26/02-04/03	00.0	0	34.3	17.6	2.7	9.1	69	24	5.6
	March, 13									
10.	05/03 – 11/03	00.0	0	35.8	19.4	2.8	8.5	67	27	6.1
11.	12/03 – 18/03	00.6	0	35.7	18.7	2.1	7.3	79	31	5.5
12.	19/03 – 25/03	00.0	0	35.7	18.1	1.9	7.8	63	24	6.2
13.	26/03 – 01/04	00.0	0	37.1	19.0	2.2	8.3	73	28	6.3
	April, 13									
14.	02/04 – 08/04	00.0	0	38.6	18.6	2.2	9.3	66	22	6.3
15.	09/04 – 15/04	00.0	0	39.2	20.8	2.3	8.3	65	26	7.6
16.	16/04 – 22/04	00.0	0	35.6	17.5	2.7	9.5	83	31	7.0
17.	23/04 – 29/04	00.0	0	38.4	20.6	3.0	8.8	84	31	6.8
18.	30/04 – 06/05	02.6	0	39.4	20.9	2.8	8.9	80	29	6.4
	May, 13									
19.	07/05 – 13/05	02.0	0	38.9	21.4	3.1	8.1	83	31	7.5
20.	14/05 – 20/05	00.0	0	37.2	22.2	3.1	6.2	83	42	6.4
21.	21/05 – 27/05	06.8	1	34.6	21.6	4.1	7.8	85	44	5.5
22.	28/05 – 03/06	34.8	2	34.6	21.6	3.2	6.7	83	55	4.7
	June 13									
23.	04/06 – 10/06	78.0	4	30.2	21.7	1.8	3.9	96	71	1.4
24.	11/06 – 17/06	78.6	5	27.8	21.4	3.0	0.7	95	88	0.8
25.	18/06 – 24/06	49.5	6	28.2	21.2	1.8	2.0	98	85	0.7
26.	25/06 – 01/07	72.3	5	27.2	21.5	2.3	2.6	97	85	0.7

M W	Period	Rain mm.	RD	Mean Temp °C		Wind Speed kmph	BSS Hrs	RH		Evap. mm.
				Max.	Min.			M	E	
	July 2013									
27.	02/07 – 08/07	44.3	5	26.9	21.4	1.8	0.0	96	84	1.8
28.	09/07 - 15/07	81.9	5	25.9	20.9	1.3	0.2	98	93	1.6
29.	16/07 – 22/07	146.2	6	24.7	20.7	1.9	0.0	99	96	2.3
30.	23/07 – 29/07	110.2	7	24.8	20.7	3.6	0.7	96	90	2.0
31.	30/07 – 05/08	73.4	7	25.9	20.8	3.7	0.7	99	88	1.4
	August 2013									
32.	06/08 – 12/08	12.9	2	27.4	21.2	1.6	2.5	98	85	1.9
33.	13/08 – 19/08	30.5	3	26.5	21.2	1.3	1.5	98	84	2.1
34.	20/08 – 26/08	24.8	3	28.4	20.7	1.8	3.4	96	74	2.9
35.	27/08 – 02/09	5.8	1	29.7	20.5	0.8	5.4	98	71	3.6
	Sept 2013									
36.	03/09 - 09/09	08.4	1	30.6	20.5	0.5	4.3	97	67	3.3
37.	10/09 - 16/09	50.6	4	29.7	21.2	0.3	3.6	98	74	3.3
38.	17/09 - 23/09	24.7	2	28.1	20.9	1.0	2.2	98	85	2.3
39.	24/09- 30/09	12.3	1	29.2	20.6	1.1	4.7	99	73	4.0
	Oct 2013									
40.	01/10 - 07/10	02.9	0	29.6	21.1	0.9	4.4	98	67	2.6
41.	08/10 – 14/10	00.0	0	30.9	20.5	0.7	7.2	98	65	3.8
42.	15/10 – 21/10	09.6	1	33.3	20.4	0.7	6.3	87	54	4.3
43.	22/10 – 28/10	53.3	3	31.3	21.2	0.9	4.4	91	50	3.5
	Nov 2013									
44.	29/10 – 04/11	00.0	0	30.9	19.6	0.7	7.5	90	56	5.2
45.	05/11 – 11/11	00.0	0	30.8	18.6	1.2	7.6	88	57	3.5
46.	12/11 – 18/11	00.0	0	29.9	15.8	1.7	8.0	70	45	3.5
47.	19/11 – 25/11	00.0	0	31.2	17.1	1.0	8.0	82	42	4.7
48.	26/11 – 2/12	15.8	1	30.0	17.9	0.8	5.5	84	63	3.2
	Dec 2013									
49.	3/12 – 9/12	00.0	0	29.8	15.7	1.5	8.3	87	34	3.6
50.	10/12 – 16/12	00.0	0	30.4	13.6	1.1	6.6	73	31	4.0
51.	17/12- 23/12	00.0	0	29.7	12.2	0.3	8.3	82	34	3.1
52.	24/12-31/12	00.0	0	29.4	13.7	0.7	7.6	89	49	4.0
	January 14									
01.	01/01-07/01	00.0	0	29.9	13.8	0.7	6.6	88	43	5.0
02.	08/01-14/01	00.0	0	31.6	14.4	0.0	7.4	91	32	3.5
03.	15/01-21/01	00.0	0	31.2	15.5	0.2	7.7	91	38	3.4
04.	22/01-28/01	00.0	0	29.7	16.7	1.1	3.8	80	40	3.5
05.	29/01-04/02	00.0	0	30.4	14.2	0.4	6.2	73	36	3.3
	February 14									
06.	05/02-11/02	00.0	0	33.4	15.2	0.0	8.4	80	25	4.4
07.	12/02-18/02	00.0	0	30.3	14.4	0.3	9.3	84	38	5.1
08.	19/02-25/02	00.0	0	32.5	17.2	0.5	6.9	85	39	4.2
09.	26/02-04/03	05.2	1	32.1	16.6	0.4	6.8	87	48	3.8

Table 2: Weather conditions during the year December, 2012 to February, 14

Growth Stages	Month	Met. Week	Temperature (°C)		Wind Speed (kmph)	BSS (hrs)	Humidity (%)		Rainfall (mm)	Rainy Days (Nos.)
			Maxi.	Mini.			Mor.	Even.		
Germination	Dec.,12	49-52	30.5	15.15	-	7.875	78.25	37.25	0	0
	Jan. 13	1-5	31.78	14.78	-	7.34	83.4	32.4	0	0
	Average	--	31.14	14.97	-	7.61	80.83	34.83	0*	0*
Tillering	Feb. 13	6-9	33.15	16.5	1.95	8.525	78.25	29.75	0.8	0
	Mar.13	10-13	36.075	18.8	2.25	7.975	70.5	27.5	0.6	0
	April13	14-18	38.24	19.68	2.6	8.96	75.6	27.8	2.6	0
	Average	--	35.82	18.33	2.3	8.49	75.78	28.35	4.0*	0*
Early Growth	May.13	19-22	36.325	21.7	3.375	7.2	83.5	43	43.6	3
	June,13	23-26	28.35	21.45	2.225	2.3	96.5	82.25	278.4	20
	Average	--	32.34	21.58	2.8	4.75	90	62.63	322*	23*
Grand Growth	July 13	27-31	25.64	20.9	2.46	0.32	97.6	90.2	456	30
	Aug.13	32-35	28	20.9	1.375	3.2	97.5	78.5	74	9
	Sept. 13	36-39	29.4	20.8	0.725	3.7	98	74.75	96	8
	Average	--	27.68	20.87	1.52	2.41	97.7	81.15	626*	47*
Flowering & maturity	Oct. 13	40-44	31.275	20.8	0.8	5.575	93.5	59	65.8	4
	Nov. 13	45-48	30.56	17.8	1.08	7.32	82.8	52.6	15.8	1
	Dec. 13	49-52	29.825	13.8	0.9	7.7	82.75	37	0.0	0
	Jan. 14	1-5	30.56	14.92	0.48	6.34	84.6	37.8	0.0	0
	Feb. 14	6-9	32.075	15.85	0.3	7.85	84.0	37.5	5.2	1
	Average	--	30.86	16.63	0.71	6.96	85.53	44.78	86.8*	6*
	Total rainfall (mm) upto Feb.,14								1038.8	76*

I) CROP PRODUCTION

1. **Title of the Project** 1.AS 42 :Agronomic Evaluation
2. **Name of the Scientists** Prof.D.M.Veer, Plant Pathologist
Miss.K.B.Patil , Tech.Astt.
Shri.N.B.Ghodake, Tech.Astt.
3. **Name of Experiment** 42 (A) Agronomic evaluation of promising sugarcane genotypes Plant Cane I (Early Group)
4. **Objectives of the Experiment** To work out management of package of practices for sugarcane genotypes.
5. **Experimental details** Regional Sugarcane and Jaggery Research Station, Kolhapur, FRBD, 3, 10R X4.5 m, 4/01/2013, 08/02/2014, irrigated, medium soil, pH 6.8, E.C. (dSm⁻¹) 1.5, organic carbon (%) 0.8, Avail.N 216.36 kg ha⁻¹, Avail. P 15.2 kg ha⁻¹, Avail K 281.55 kg ha⁻¹
6. **Treatment details**
 - A) Sugarcane varieties :
V₁ -- PI 06132
V₂ – PI 07132
V₃ – CoN 07071
V₄ – CoC 671
 - B) Fertilizer levels :
N₁ : 75 % N (187.50:115:115 kg ha⁻¹)
N₂ : 100 % N (250:115:115 kg ha⁻¹)
N₃ : 125 % N (312.50:115:115 kg ha⁻¹)
(Recommended dose is 250 N:115 P₂O₅:115 K₂O kg ha⁻¹)

7. Results

7.1 Growth Parameters

The data regarding growth parameters are presented in Table 1 and 2.

Genotype

It was revealed that, the growth parameters were affected significantly due to various genotypes except single cane weight. The sugarcane genotype CoN 07071 recorded significantly higher germination (55.47 %) and millable height (273.67 cm) over rest of the genotypes. Whereas, another genotype PI 07132 recorded significantly higher number of tillers (1,24,510 ha⁻¹) as well as number of millable canes (1,22,880 ha⁻¹) and number of internodes (21.25 cane⁻¹) but was found at par with PI 06132 in respect to number of tillers (1,17,020 ha⁻¹) and number of millable canes (1,14,060 ha⁻¹). The standard check variety CoC 671 recorded significantly highest diameter of internode (3.49 cm) and numerically highest single cane weight (1.23 kg).

Fertilizer levels

All growth parameters were found non significant except germination due to different levels of fertilizer. Significantly higher germination (22.15 %) was recorded at 75 % RD N:P₂O₅:K₂O ha⁻¹ and was found at par with other levels of fertilizer. Among the fertilizer levels, 100 % RD N:P₂O₅:K₂O ha⁻¹ numerically higher number of tillers (1,14,180 ha⁻¹), number of millable canes (1,11,360 ha⁻¹) and millable height (247.67 cm) whereas, 125 % RD N:P₂O₅:K₂O ha⁻¹ fertilizer level recorded numerically highest diameter of internode (3.09 cm), number of internodes (20.01 cane⁻¹) and single cane weight (1.20 kg).

Interaction effect

The interaction effect between genotypes and fertilizer levels was found to be non significant.

7.2 Cane yield and CCS yield

The data pertaining to cane and CCS yield is presented in Table 3.

Genotypes

The cane yield was influenced significantly due to different sugarcane genotypes. Among the tested genotypes, PI 07132 recorded significantly higher cane yield (128.05 t ha⁻¹) followed by PI 06132 (124.53 t ha⁻¹) and CoN 07071 (123.06 t ha⁻¹) and found at par with each other. However, significantly higher CCS yield (20.39 t ha⁻¹) was recorded by CoN 07071 and found at par with PI 06132 (20.09 t ha⁻¹) and PI 07132 (19.65 t ha⁻¹).

Fertilizer levels

The cane and CCS yield were influenced significantly due to different fertilizer levels. The fertilizer level 125 % RD N:P₂O₅:K₂O ha⁻¹ recorded significantly higher cane yield (126.72 t ha⁻¹) and CCS yield (20.60 t ha⁻¹) followed by 100 % RD N:P₂O₅:K₂O ha⁻¹ which recorded cane yield (115.44 t ha⁻¹) and CCS yield (18.83 t ha⁻¹).

Interaction effect

The interaction effect between genotypes and fertilizer levels was found to be non significant.

7.3 Quality parameters

The data on quality parameters of sugarcane juice *viz.*, brix, sucrose, purity and CCS percentage are presented in Table 4.

Genotypes

The quality parameters were affected significantly due to various genotypes. The standard check variety CoC 671 recorded significantly higher brix (23.25 %), sucrose (21.25 %) and CCS percentage (17.55 %), whereas significantly higher purity (94.03 %) was recorded by PI 06132.

Fertilizer levels

The quality parameters were influenced significantly except sucrose percentage due to different fertilizer levels. The fertilizer level 75 % RD N:P₂O₅:K₂O ha⁻¹ recorded significantly higher brix (22.15 %) and CCS percentage (16.71 %) whereas, 125 % RD N:P₂O₅:K₂O ha⁻¹ recorded significantly higher purity (95.09 %).

Interaction effect

The quality parameters *viz.*, purity and CCS percentage were affected significantly due to the interaction effect between genotypes and fertilizer levels.

Table 1: Mean data on growth parameters as affected by various treatments (2013-14 Season I).

Sr. No.	Treatments Details	Growth parameters		
		Germination at 45 DAP (%)	No. of tillers (000' ha ⁻¹)	NMC (000'ha ⁻¹)
A.	Varieties			
	V ₁ : PI 06132	50.44	117.02	114.06
	V ₂ : PI 07132	49.54	124.51	122.88
	V ₃ : CoN 07071	55.47	107.84	105.00
	V ₄ : CoC 671	46.54	101.20	98.72
	S.E.+	2.23	3.37	3.38
	C.D. 0.05	6.84	9.87	9.92
B	Fertilizer levels			
	N ₁ : 75 % RD N:P ₂ O ₅ :K ₂ O	22.15	111.72	109.41
	N ₂ : 100 % RD N:P ₂ O ₅ :K ₂ O	21.94	114.18	111.36
	N ₃ : 125 % RD N:P ₂ O ₅ :K ₂ O	21.69	112.03	109.73
	S.E. ±	2.02	2.91	2.93
	C.D. 0.05	5.92	N.S.	N.S.
	Interaction (A x B)			
	S.E.±	4.04	5.8	5.8
	C.D. 0.05	N.S.	N.S.	N.S.
	G.M.	50.50	112.64	110.16

**Table2: Mean data on growth parameters as affected by various treatments.
(2013-14 Season I)**

Sr. No.	Treatments Details	Growth parameters			
		Millable height (cm)	Diameter (cm)	No. of internodes Per cane	Single cane weight (kg)
A.	Varieties				
	V ₁ : PI 06132	225.56	2.96	18.73	1.12
	V ₂ : PI 07132	228.00	2.66	21.25	1.17
	V ₃ : CoN 07071	273.67	3.02	19.57	1.17
	V ₄ : CoC 671	251.11	3.49	19.76	1.23
	S.E. ±	2.12	0.068	0.24	0.036
	C.D. 0.05	6.21	0.20	0.71	N.S.
B	Fertilizer levels				
	N ₁ : 75 % RD N:P ₂ O ₅ :K ₂ O	241.25	3.05	19.57	1.18
	N ₂ : 100 % RD N:P ₂ O ₅ :K ₂ O	247.67	2.95	19.92	1.14
	N ₃ : 125 % RD N:P ₂ O ₅ :K ₂ O	244.83	3.09	20.01	1.20
	S.E. ±	1.83	0.059	0.21	0.031
	C.D. 0.05	N.S.	N.S.	N.S.	N.S.
	Interaction (A x B)				
	S.E. ±	3.66	0.12	0.42	0.062
	C.D. 0.05	N.S.	N.S.	N.S.	N.S.
	G.M.	244.58	3.03	19.83	1.17

Table 3: Mean cane and CCS yield (tha⁻¹) as affected by various treatments.(2013-14 Season I)

Sr. No.	Treatment	Yield (t ha ⁻¹)	
		Cane	CCS
A.	Varieties		
	V ₁ : PI 06132	124.53	20.09
	V ₂ : PI 07132	128.05	19.65
	V ₃ : CoN 07071	123.06	20.39
	V ₄ : CoC 671	97.29	17.05
	S.E. ±	4.06	0.66
	C.D. 0.05	11.91	1.95
B	Fertilizer levels		
	N ₁ : 75 % RD N:P ₂ O ₅ :K ₂ O	112.52	18.46
	N ₂ : 100 % RD N:P ₂ O ₅ :K ₂ O	115.44	18.83
	N ₃ : 125 % RD N:P ₂ O ₅ :K ₂ O	126.72	20.60
	S.E. ±	3.52	0.58
	C.D. 0.05	10.31	1.69
	Interaction (A x B)		
	S.E. ±	7.03	1.154
	C.D. 0.05	N.S.	N.S.
	G.M.	118.23	19.29

Table 4: Mean data on quality parameters as affected by various treatments (2013-14 Season I)

Sr. No.	Treatments Details	Quality parameters			
		Brix %	Sucrose %	Purity %	CCS %
A	Varieties				
	V ₁ : PI 06132	21.47	20.18	94.03	16.05
	V ₂ : PI 07132	20.64	19.39	93.96	15.43
	V ₃ : CoN 07071	22.36	20.89	93.45	16.75
	V ₄ : CoC 671	23.25	21.25	91.42	17.55
	S.E. ±	0.094	0.14	0.61	0.09
	C.D. 0.05	0.27	0.42	1.8	0.25
B	Fertilizer levels				
	N ₁ : 75 % RD N:P ₂ O ₅ :K ₂ O	22.15	20.30	91.7	16.71
	N ₂ : 100 % RD N:P ₂ O ₅ :K ₂ O	21.94	20.37	92.85	16.48
	N ₃ : 125 % RD N:P ₂ O ₅ :K ₂ O	21.69	20.61	95.09	16.15
	S.E. ±	0.81	0.12	0.53	0.08
	C.D. 0.05	0.24	N.S.	1.56	0.22
	Interaction (A x B)				
	S.E. ±	0.162	0.25	1.062	0.15
	C.D. 0.05	N.S.	N.S.	3.11	0.44
	G.M.	21.93	20.43	93.21	16.45

1. Title of the Project	2.AS 42 (B):Agronomic Evaluation
2. Name of the Scientists	Prof.D.M.Veer, Plant Pathologist Miss. K.B.Patil , Tech.Astt. Shri.N.B.Ghodake, Tech.Astt.
3. Name of Experiment	AS: 42 (B) Agronomic evaluation of promising sugarcane genotypes – Plant Cane I (Midlate Group).
4. Objectives of the Experiment	To work out management of package of practices for sugarcane genotypes.
5. Experimental details	Regional Sugarcane and Jaggery Research Station, Kolhapur, FRBD, 3, 10R X4.5 m, 04-01-2013, 08/02/2014, irrigated, medium soil, pH 6.8, E.C.(dSm ⁻¹) 1.4, organic carbon (%) 0.8, Avail.N 213.36 kg ha ⁻¹ , Avail. P 14.6 kg ha ⁻¹ , Avail K 286.45 kg ha ⁻¹
6. Treatment details	A) Sugarcane varieties : V ₁ - Co 08009 V ₂ – Co 08016 V ₃ – Co 09909 V ₄ – Co 99004 B) Fertilizer levels : N ₁ : 75 % N (187.50:115:115 kg ha ⁻¹) N ₂ : 100 % N (250:115:115 kg ha ⁻¹) N ₃ : 125 % N (312.50:115:115 kg ha ⁻¹) (Recommended dose is 250 N:115 P ₂ O ₅ :115 K ₂ O kg ha ⁻¹)

7. Results

7.1 Growth Parameters

The data regarding growth parameters are presented in Table 1 and 2.

Genotype

It was revealed that, the growth parameters were affected significantly due to various genotypes except number of tillers and single cane weight. The sugarcane genotype Co 08008 recorded significantly higher germination (61.75 %) and found at par with rest of the genotypes except standard check variety Co 99004. Another sugarcane genotype Co 09009 recorded significantly higher number of millable canes (1,13,880 ha⁻¹) whereas, significantly higher millable height (262 cm) was recorded by standard check variety Co 99004. Significantly higher diameter (3.10 cm) and number of internodes (18.27 cane⁻¹) were recorded by Co 08016.

Fertilizer levels

All growth parameters were found non significant except number of internodes due to different levels of fertilizer. The fertilizer level 100 % RD N:P₂O₅:K₂O ha⁻¹ recorded

significantly higher number of internodes (18.02 cane⁻¹) and found at par with 125 % RD N:P₂O₅:K₂O ha⁻¹ fertilizer level (17.85 cane⁻¹).

Interaction effect

The interaction effect between genotypes and fertilizer levels was found to be non significant.

7.2 Cane yield and CCS yield

The data pertaining to cane and CCS yield is presented in Table 3.

Genotypes

The cane yield and CCS yield were influenced significantly due to different sugarcane genotypes. Among the tested genotypes, Co 08016 recorded significantly higher cane yield (118.68 t ha⁻¹) and CCS yield (17.60 t ha⁻¹) and found at par with Co 09009 and Co 08008.

Fertilizer levels and Interaction effect

The cane and CCS yield were influenced non significantly due to different fertilizer levels and interaction effect between genotypes and fertilizer levels.

7.3 Quality parameters

The data pertaining to quality parameters of sugarcane juice *viz.*, brix, sucrose, purity and CCS percentage are presented in Table 4.

Genotypes

The quality parameters were found to be influenced significantly due to various genotypes except purity. The standard check variety Co 99004 recorded significantly higher brix (22.92 %), sucrose (21.42 %) and CCS percentage (15.20 %), but found at par with Co 08016 (14.81 %) only in respect of CCS percentage.

Fertilizer levels

Different levels of fertilizers had significant impact only in respect of brix where 125 % RD N:P₂O₅:K₂O ha⁻¹ fertilizer level recorded significantly higher brix (22.69 %).

Interaction effect

The quality parameters *viz.* purity and CCS percentage were affected non significantly due to the interaction effect between genotypes and fertilizer levels.

Table 1: Mean data on growth parameters as affected by various treatments (2013-14 Season I)

Sr. No.	Treatments Details	Growth parameters		
		Germination at 45 DAP (%)	No. of tillers (000' ha ⁻¹)	NMC (000'ha ⁻¹)
A.	Varieties			
	V ₁ : Co 08008	61.75	112.65	107.42
	V ₂ : Co 08016	60.54	113.46	110.69
	V ₃ : Co 09009	59.94	117.08	113.88
	V ₄ : Co 99004	49.84	107.20	99.54
	S.E. ±	2.001	2.4	2.19
	C.D. 0.05	5.87	N.S.	6.43
B	Fertilizer levels			
	N ₁ : 75 % RD N:P ₂ O ₅ :K ₂ O	58.16	109.88	105.18
	N ₂ : 100 % RD N:P ₂ O ₅ :K ₂ O	56.15	113.53	109.02
	N ₃ : 125 % RD N:P ₂ O ₅ :K ₂ O	59.75	114.38	109.45
	S.E. ±	1.73	2.09	1.9
	C.D. 0.05	N.S.	N.S.	N.S.
	Interaction (A x B)			
	S.E. ±	3.47	4.17	3.8
	C.D. 0.05	N.S.	N.S.	N.S.
	G.M.	58.02	112.60	1.47

**Table2: Mean data on growth parameters as affected by various treatments.
(2013-14 Season I)**

Sr. No.	Treatments Details	Growth parameters			
		Millable height (cm)	Diameter (cm)	No. of internodes Per cane	Single cane weight (kg)
A.	Varieties				
	V ₁ : Co 08008	251.00	2.66	16.24	1.35
	V ₂ : Co 08016	256.33	3.10	18.27	1.57
	V ₃ : Co 09009	234.56	2.61	18.12	1.49
	V ₄ : Co 99004	262.00	2.84	17.93	1.47
	S.E. ±	1.39	0.06	0.30	0.051
	C.D. 0.05	4.07	0.16	0.87	N.S.
B	Fertilizer levels				
	N ₁ : 75 % RD N:P ₂ O ₅ :K ₂ O	248.83	2.73	17.06	1.41
	N ₂ : 100 % RD N:P ₂ O ₅ :K ₂ O	251.50	2.82	18.02	1.44
	N ₃ : 125 % RD N:P ₂ O ₅ :K ₂ O	252.58	2.80	17.85	1.56
	S.E. ±	1.2	0.05	0.26	0.04
	C.D. 0.05	N.S.	N.S.	0.75	N.S.
	Interaction (A x B)				
	S.E. ±	2.4	0.1	0.51	0.09
	C.D. 0.05	N.S.	N.S.	N.S.	N.S.
	G.M.	250.97	2.80	17.64	1.47

Table 3: Mean cane and CCS yield (t ha⁻¹) as affected by various treatments. (2013-14 Season I)

Sr. No.	Treatment	Yield (t ha ⁻¹)	
		Cane	CCS
A.	Varieties		
	V ₁ : Co 08008	112.34	16.23
	V ₂ : Co 08016	118.68	17.60
	V ₃ : Co 09009	117.24	16.99
	V ₄ : Co 99004	100.30	15.25
	S.E. ±	3.23	0.49
	C.D. 0.05	9.47	1.43
B	Fertilizer levels		
	N ₁ : 75 % RD N:P ₂ O ₅ :K ₂ O	107.95	15.83
	N ₂ : 100 % RD N:P ₂ O ₅ :K ₂ O	113.86	16.63
	N ₃ : 125 % RD N:P ₂ O ₅ :K ₂ O	114.62	17.10
	S.E. ±	2.8	0.42
	C.D. 0.05	N.S.	N.S.
	Interaction (A x B)		
	S.E. ±	5.59	0.84
	C.D. 0.05	N.S.	N.S.
	C.V. %	112.40	16.52

**Table 4: Mean data on quality parameters as affected by various treatments.
(2013-14 Season I).**

Sr. No.	Treatments Details	Quality parameters			
		Brix %	Sucrose %	Purity %	CCS %
A	Varieties				
	V ₁ : Co08008	21.92	20.41	93.16	14.46
	V ₂ : Co08016	22.42	20.90	93.23	14.81
	V ₃ : Co09009	22.03	20.47	92.96	14.49
	V ₄ : Co99004	22.92	21.42	93.47	15.20
	S.E. ±	0.16	0.16	0.5	0.14
	C.D. 0.05	0.46	0.49	N.S.	0.41
B	Fertilizer levels				
	N ₁ : 75 % RD N:P ₂ O ₅ :K ₂ O	22.07	20.67	93.67	14.68
	N ₂ : 100 % RD N:P ₂ O ₅ :K ₂ O	22.19	20.65	93.03	14.62
	N ₃ : 125 % RD N:P ₂ O ₅ :K ₂ O	22.69	21.09	92.93	14.93
	S.E. ±	0.14	0.14	0.44	0.12
	C.D. 0.05	0.4	N.S.	N.S.	N.S.
	Interaction (A x B)				
	S.E. ±	0.27	0.28	0.885	0.24
	C.D. 0.05	N.S.	N.S.	N.S.	N.S.
	G.M.	22.32	20.80	93.21	14.74

1.	Title of the Project	Mechanization in sugarcane
2.	Name of the Scientists	Prof.D.M.Veer, Plant Pathologist Miss. K.B.Patil , Tech.Asstt Shri.N.B.Ghodake, Tech.Astt.
3.	Name of the experiment	AS 63: Plant geometry in relation to mechanization in sugarcane
4.	Objectives of the Experiment	1. To work out optimum plant geometry for use of farm machinery. 2. To study varietal response to different planting geometry.
5.	Experimental details	Regional Sugarcane and Jaggery Research Station, Kolhapur, Split Plot, 3, 6m X 8 m, 22/01/2013, 18/02/2014, irrigated, medium soil, pH 7.3, E.C.(dSm ⁻¹) 0.9, organic carbon (%) 0.75, Avail.N 210.06 kg ha ⁻¹ , Avail. P 16.6 kg ha ⁻¹ , Avail K 290 kg ha ⁻¹
6.	Year of Start	2011-12
7.	Year of completion	2013-14
8.	Treatment details	A. Plant geometry (i) 120 cm row distance (ii)150 cm row distance (iii)75:150 cm for tropical region(Paired) B. Varieties and Genotype: (Four genotypes with distinct plant morphological traits) i) Co 86032 ii) CoM 0265 iii) Co 92005 iv) Co 99010

9. Results

9.1 Growth Parameters

The data regarding growth parameters are presented in Table 1 and 2.

Plant geometry

It was revealed that, growth parameters were found non significant except number of internodes due to except diameter and number of internodes due to defferent planting geometry. Significantly higher diameter of internode (3.07 cm) was recorded by 150 cm and 75:150 cm row distance. Whereas, 150cm row distance recorded significantly higher number of internodes (21.51 cane⁻¹) followed by 120 cm row distance (21.44 cane⁻¹).

Genotype

All growth parameters were influenced significantly except single cane weight due to different sugarcane genotypes. The sugarcane variety CoM 0265 recorded significantly

higher number of tillers (1,13,880 ha⁻¹), number of millable canes (1,13,880 ha⁻¹), millable height (253 cm) and diameter of internode (3.14 cm). The sugarcane genotype Co 99010 recorded significantly higher germination (50.00 %) and found at par with rest of genotypes except Co 92005. However, Co 92005 recorded significantly higher number of internodes (21.99 cane⁻¹).

Interaction effect

The interaction effect between genotypes and plant geometry had significant effect on all growth parameters except single cane weight.

9.2 Cane yield and CCS yield

The data pertaining to cane and CCS yield is presented in Table 3.

Plant geometry

It was revealed that, plant geometry had non significant effect on cane yield and CCS yield.

Genotype

All cane and CCS yield were influenced significantly due to different sugarcane genotypes. The sugarcane variety CoM 0265 recorded significantly higher cane yield (130.27 t ha⁻¹) and CCS yield (18.43 t ha⁻¹) and found at par with Co 86032 which recorded 119.32 t ha⁻¹ and 16.83 t ha⁻¹ cane and CCS yield, respectively.

Interaction effect

The interaction effect between genotypes and plant geometry had significant effect on cane and CCS yield.

9.3 Quality parameters

The data pertaining to quality parameters of sugarcane juice *viz.* brix, sucrose, purity and CCS percentage are presented in Table 4.

Plant geometry

It was revealed that, plant geometry had non significant effect on quality parameters of sugarcane juice.

Genotype

The sugarcane genotypes influenced quality parameters significantly. The sugarcane variety Co 92005 recorded significantly higher brix (21.90 %), sucrose (20.26 %) and CCS

percentage (14.34 %) and found at par with Co 86032 in respect of sucrose (19.91 %) and CCS percentage (14.16 %). However, CoM 0265 recorded significantly higher purity (94.24 %) which was also found at par with Co 86032 (93.28 %).

Interaction effect

The interaction effect between genotypes and plant geometry had significant effect on quality parameters.

**Table 1: Mean data on growth parameters as affected by various treatments.
(2013-14 Plant Cane II)**

Sr. No.	Treatments Details	Growth parameters		
		Germination at 45 DAP (%)	No. of tillers (000' ha ⁻¹)	NMC (000'ha ⁻¹)
A.	Plant geometry			
	120 cm row distance	46.15	112.32	113.16
	150 cm row distance	48.13	120.49	118.20
	75:150 cm	49.39	124.79	116.47
	S.E.±	1.06	4.22	3.36
	C.D. 0.05	N.S.	N.S.	N.S.
	C.V.	7.67	12.26	10.03
B	Genotype			
	Co 86032	48.33	123.48	118.83
	CoM 0265	47.96	129.75	125.00
	Co 92005	45.26	107.94	106.28
	Co 99010	50.00	115.62	113.66
	S.E.±	1.07	2.90	2.64
	C.D. 0.05	3.19	8.61	7.84
	C.V.	6.72	7.29	6.83
	Interaction (A x B)			
	S.E.±	1.609	4.345	3.96
	C.D. 0.05	4.489	12.054	10.98
	G.M.	47.89	119.20	115.94

**Table 2: Mean data on growth parameters as affected by various treatments.
(2013-14 Plant Cane II)**

Sr. No .	Treatments Details	Growth parameters			
		Millable height (cm)	Diameter (cm)	No. of internodes Per cane	Single cane weight (kg)
A.	Plant geometry				
	120 cm row distance	240.92	2.90	21.44	1.29
	150 cm row distance	247.92	3.07	21.51	1.30
	75:150 cm	245.75	3.07	20.90	1.24
	S.E.±	3.40	0.03	0.06	0.05
	C.D. 0.05	N.S.	0.11	0.24	N.S.
	C.V. %	4.81	3.33	1.0	14.88
B	Genotype				
	Co 86032	248.78	3.05	20.91	1.17
	CoM 0265	253.00	3.14	20.98	1.39
	Co 92005	246.56	2.91	21.99	1.30
	Co 99010	231.11	2.95	21.26	1.25
	S.E. ±	3.78	0.04	0.14	0.07
	C.D. 0.05	11.23	0.11	0.4	N.S.
	C.V. %	4.63	3.59	1.92	15.57
	Interaction (A x B)				
	S.E. ±	5.67	0.05	0.20	0.99
	C.D. 0.05	15.72	0.15	0.91	N.S.
	G.M.	244.86	3.01	21.28	1.28

**Table 3: Mean data on growth parameters as affected by various treatments.
(2013-14 Season II)**

Sr. No.	Treatments Details	Yield (t ha ⁻¹)		Quality parameters			
		Cane	CCS	Brix %	Sucrose %	Purity %	CCS %
A.	Plant geometry						
1	120 cm row distance	117.33	16.60	21.28	19.92	93.65	14.09
2	150 cm row distance	115.71	16.15	21.32	19.77	92.74	13.96
3	75:150 cm	118.99	16.88	21.57	20.05	92.97	14.22
	S.E. ±	3.50	0.58	0.12	0.24	0.69	0.20
	C.D. 0.05	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
	C.V.	10.34	12.12	1.95	4.11	2.57	5.02
B	Genotype						
1	Co 86032	119.32	16.83	21.34	19.91	93.28	14.16
2	CoM 0265	130.27	18.43	21.07	19.85	94.24	13.99
3	Co 92005	115.04	15.82	21.90	20.26	92.54	14.34
4	Co 99010	104.73	15.09	21.23	19.63	92.42	13.89
	SE ±	4.18	0.58	0.12	0.13	0.39	0.09
	CD 0.05	12.43	1.73	0.37	0.38	1.17	0.28
	C.V.	10.69	10.56	1.73	1.92	1.27	2.01
	Interaction (A x B)						
	SE ±	6.27	0.87	0.18	0.19	0.59	0.14
	CD 0.05	17.39	2.24	1.12	1.16	1.17	2.25
	G.M.	117.34	16.54	21.39	19.91	93.12	14.09

1. Title of the Project	2.Plant nutrition
2. Name of the Scientists	Prof.D.M.Veer, Plant Pathologist Miss. K.B.Patil , Tech.Asstt. Shri.N.B.Ghodake, Tech.Astt.
3. Name of Experiment	AS-64 Response of sugarcane crop to different plant nutrients in varied agro-ecological situations Plant Cane II
4. Objectives of the Experiment	To study differential response of sugarcane crop to different nutrients.
5. Experimental details	Regional Sugarcane and Jaggery Research Station, Kolhapur, RBD, 12 m(R) x 4.5m, 20/12/2012, 05/03/2014 , irrigated, medium soil, pH 7.6, E.C. (dSm ⁻¹) 0.75, organic carbon (%) 0.86, Avail.N 217 kg ha ⁻¹ , Avail. P 16.3 kg ha ⁻¹ , Avail K 283.6 kg ha ⁻¹
6. Treatment details	Sr.No. Treatment 1. Control 2. N 3. N + P ₂ O ₅ 3. N:P ₂ O ₅ :K ₂ O 4. N:P ₂ O ₅ :K ₂ O + S 6. N:P ₂ O ₅ :K ₂ O +Zn 7. N:P ₂ O ₅ :K ₂ O +Fe 8. N:P ₂ O ₅ :K ₂ O + Mn 9. N:P ₂ O ₅ :K ₂ O +S+ Zn 10. N:P ₂ O ₅ :K ₂ O +S+Zn+Fe 11. N:P ₂ O ₅ :K ₂ O +S+Zn+Fe+Mn 12. Soil test based fertilizer application 13. FYM @ 20 t/ha S : 60 kg/ha –elemental sulphur Zn: 50 kg ZnSO ₄ /ha Fe: 20 kg FeSO ₄ /ha Mn : 10 kg MnSO ₄ /ha N, P, K as per recommendations

7. Results

7.1 Growth Parameters

The data pertaining to growth parameters are presented in Table 1 and 2. All the growth parameters were found to be influenced significantly due to various treatments. Among the treatments, T₁₀ (N:P₂O₅:K₂O+S+Zn+Fe) recorded significantly higher germination (50.40 %), number of tillers (1,30,320 ha⁻¹), number of millable canes (1,26,800 ha⁻¹), millable height (249.55 cm) and diameter (3.42 cm). however, treatment T₁₁ (N:P₂O₅:K₂O+S+Zn+Fe+Mn) and T₁₂ (soil test based fertilizer application) recorded significantly higher number of internodes (20.85 cane⁻¹) and single cane weight (1.29 kg), respectively.

7.2 Cane yield and CCS yield

The data pertaining to cane and CCS yield is presented in Table 3. Different treatments affected the cane and CCS yield significantly. The treatment T₁₁ (N:P₂O₅:K₂O+S+Zn+Fe+Mn) recorded significantly higher cane yield (120.83 t ha⁻¹) and CCS yield (17.84 t ha⁻¹).

7.3 Quality parameters

The data pertaining to quality parameters of sugarcane juice *viz.*, brix, sucrose, purity and CCS percentage as influenced by different treatments are presented in Table 4. It was revealed that, the quality parameters were influenced non significantly due to various treatments.

Table 1: Mean data on growth parameters as affected by various treatments (Plant Cane III 2013-14)

Tr. No	Treatments Details	Growth parameters		
		Germination (%) at 45 DAP	No. of Tillers (000'ha ⁻¹)	NMC (000'ha ⁻¹)
1	Control	33.24	49.74	43.27
2	N	36.40	71.22	64.41
3	N + P ₂ O ₅	39.77	98.31	87.25
4	N + P ₂ O ₅ + K ₂ O	43.40	104.91	101.00
5	N:P ₂ O ₅ :K ₂ O +S	43.34	116.99	114.55
6	N:P ₂ O ₅ :K ₂ O +Zn	46.37	114.76	113.14
7	N:P ₂ O ₅ :K ₂ O +Fe	44.48	108.95	113.48
8	N:P ₂ O ₅ :K ₂ O +Mn	43.99	112.23	109.30
9	N:P ₂ O ₅ :K ₂ O +S+Zn	47.31	127.23	123.86
10	N:P ₂ O ₅ :K ₂ O +S+Zn+Fe	50.40	130.32	126.80
11	N:P ₂ O ₅ :K ₂ O +S+Zn+Fe+Mn	49.98	128.88	126.63
12	Soil test based fertilizer application	49.14	124.40	122.96
13	FYM @ 20 t/ha	36.49	57.36	50.23
	Mean	43.41	103.48	99.76
	SE±	3.49	7.64	7.72
	CD 0.05	10.57	23.13	23.36
	CV %	11.38	10.44	10.94

**Table 2: Mean data on growth parameters as affected by various treatments.
(Plant Cane III 2013-14)**

Tr. No	Treatments Details	Growth parameters			
		Millable height (cm)	Diameter (cm)	No. of internodes per cane	Single cane weight (kg)
1	Control	197.20	1.98	16.30	0.78
2	N	217.68	2.96	18.25	0.85
3	N + P ₂ O ₅	237.01	3.17	18.95	0.92
4	N:P ₂ O ₅ :K ₂ O	239.31	3.25	18.65	1.15
5	N:P ₂ O ₅ :K ₂ O +S	242.18	3.37	18.55	1.12
6	N:P ₂ O ₅ :K ₂ O +Zn	240.80	3.40	19.50	1.11
7	N:P ₂ O ₅ :K ₂ O +Fe	242.81	3.39	18.90	1.12
8	N:P ₂ O ₅ :K ₂ O + Mn	245.18	3.26	19.10	1.08
9	N:P ₂ O ₅ :K ₂ O + S+ Zn	249.05	3.23	18.95	1.14
10	N:P ₂ O ₅ :K ₂ O +S+Zn+Fe	249.55	3.42	20.41	1.14
11	N:P ₂ O ₅ :K ₂ O +S+Zn+Fe+Mn	245.66	3.41	20.85	1.24
12	Soil test based fertilizer application	245.02	3.36	20.21	1.29
13.	FYM @ 20 t/ha	222.50	2.95	18.10	0.83
	GM	236.46	3.17	18.98	1.06
	SE±	9.18	0.16	0.55	0.10
	CD 0.05	27.77	0.47	1.67	0.30
	CV %	5.49	6.94	4.11	13.10

**Table 3: Mean cane and CCS yield (t ha⁻¹) as affected by various treatments.
(Plant Cane III 2013-14)**

Tr. No	Treatments Details	Yield (t ha ⁻¹)	
		Cane	CCS
1	Control	40.01	5.62
2	N	60.85	8.68
3	N + P ₂ O ₅	76.14	11.04
4	N:P ₂ O ₅ :K ₂ O	99.58	14.49
5	N:P ₂ O ₅ :K ₂ O +S	105.640	15.31
6	N:P ₂ O ₅ :K ₂ O +Zn	110.96	15.92
7	N:P ₂ O ₅ :K ₂ O +Fe	113.66	15.96
8	N:P ₂ O ₅ :K ₂ O + Mn	115.10	16.36
9	N:P ₂ O ₅ :K ₂ O + S+ Zn	118.61	16.75
10	N:P ₂ O ₅ :K ₂ O +S+Zn+Fe	119.30	17.11
11	N:P ₂ O ₅ :K ₂ O +S+Zn+Fe+Mn	120.83	17.84
12	Soil test based fertilizer application	118.65	17.17
13	FYM @ 20 t/ha	68.31	9.76
	GM	94.83	14.00
	SE±	9.39	1.29
	CD 0.05	28.42	3.89
	CV %	13.62	12.99

**Table 4 : Mean data on quality parameters as affected by various treatments
(Plant Cane III 2013-14)**

Tr. No	Treatments Details	Quality parameters			
		Brix%	Sucrose %	Purity %	CCS %
1	Control	20.94	19.80	94.53	14.12
2	N	21.69	20.15	92.90	14.26
3	N + P ₂ O ₅	21.44	20.31	94.73	14.50
4	N:P ₂ O ₅ :K ₂ O	21.69	20.43	94.17	14.54
5	N:P ₂ O ₅ :K ₂ O +S	21.44	20.30	94.69	14.49
6	N:P ₂ O ₅ :K ₂ O +Zn	21.44	20.17	94.06	14.35
7	N:P ₂ O ₅ :K ₂ O +Fe	20.94	19.75	94.29	14.06
8	N:P ₂ O ₅ :K ₂ O + Mn	21.44	20.03	93.44	14.21
9	N:P ₂ O ₅ :K ₂ O + S+ Zn	21.19	191.88	93.84	14.13
10	N:P ₂ O ₅ :K ₂ O +S+Zn+Fe	21.44	20.16	94.01	14.34
11	N:P ₂ O ₅ :K ₂ O +S+Zn+Fe+Mn	21.94	20.74	94.52	14.79
12	Soil test based fertilizer application	21.44	20.29	94.65	14.48
13	FYM @ 20 t/ha	21.44	20.11	93.78	14.29
	GM	21.42	20.16	94.12	14.35
	SE±	0.24	0.24	0.82	0.20
	CD 0.05	N.S.	N.S.	N.S.	N.S.
	CV %	1.60	1.67	1.23	1.96

TECHNICAL PROGRAMME

2014-2015

All-India Co-ordinated Research Project on Sugarcane, Kolhapur.

CROP PRODUCTION:

I) ICAR Trials		
1.	AS 42	(A) Agronomic evaluation of promising sugarcane genotypes (Early Group)- Plant cane I.
2.	AS 42	(B) Agronomic evaluation of promising sugarcane Genotypes (Midlate Group) Plant cane I.
3.	AS 64	Response of sugarcane crop to different plant nutrients in varied agro-ecological situations II.
4	AS 68	Impact of integrated application of organics and inorganics in improving soil health and sugarcane productivity.