Abstract of the research work done in Sugarcane Agronomy and Soil Science 2013-14

1) Title :- Initial Varietal Trial (Early)

The genotypes CoM 10082 (91.03 t ha^{-1} and 10.50 t ha^{-1}) found significantly superior than all the genotype in respect of cane yield and sugar yield respectively.

2) Title :- Initial Varietal Trial (Midlate)

The genotypes Co 10033 (109.69 t ha^{-1} and 13.45 t ha^{-1}) found significantly superior than all the genotype in respect of cane yield and sugar yield respectively.

3) Title :- Advanced Varietal Trial (Midlate) II Plant

Genotype Co 08016 (69.01 t ha^{-1}) were recorded significantly superior and at par with the check Co 86032, CoSnk 08101 and Co 08009 and in respect of cane yield. Regarding Sugar yield the genotypes Co 08009 (7.74 t ha^{-1}) was recorded significantly superior and at par with CoSnk 08101, Co 86032 check, Co 08016 and check Co 99004.

Weather and Season

During kharif 2013-14 total rainfall received was 908.4 mm which was 15.13 % more than normal (789 mm). Maximum rains were received during July, 2013 to Sep., 2013. There was shortage of irrigation water during April, May and June, 2013 it affected the cane growth during these months.

The higher incidence of early shoot borer (14.61 %) observed during June 2013. The maximum per cent infestation internodes due to mealy bugs (7.59 %) and scales (13.39 %) was observed during Dec. 2013.

Pokkah boeng and grasshy shoot disease incidence was observed in the range of 2.55 to 4.08 % and 2.00 % respectively on sugarcane cultivar Co 86032. No other pest and diseases were observed during the year report.

Table 1: Weekly weather data for the year 2013 recorded at Agromet Observatory, Dr. P.D.K.V., Akola

Met Week	Date	Rainfall (mm)	Temperature (Oc) Max	Min	RH I %	RH II %
1	2	3	4	5	6	7
1	1-7 Jan.13	8.00	29.3	13.0	78	29
2	8-14	0.00	28.0	9.1	68	16
3	15-21	0.00	30.8	13.0	68	28
4	22-28	19.5	27.2	14.2	78	37
5	29-4 Feb.	0.00	30.1	14.9	62	22
6	5-11	0.7	31.5	17.3	72	34
7	12-18	3.5	31.0	16.0	73	27
8	19-25	2.7	31.6	14.4	69	24
9	26-4 Mar.	0.00	34.5	14.6	53	14
10	5-11	0.00	36.6	15.2	40	16
11	12-18	0.00	36.7	20.0	58	28
12	19-25	2.5	37.4	22.3	57	28
13	26-1 Apr.	0.00	39.0	22.8	48	27
14	2-8	0.00	39.7	23.3	33	13
15	9-15	0.00	41.3	26.2	32	14
16	16-22	1.5	38.9	24.5	46	21
17	23-29	0.00	41.0	25.6	43	18
18	30-6 May	0.00	43.9	29.4	28	13
19	7-13	0.00	43.3	29.2	33	13
20	14-20	0.00	43.3	29.9	38	15
21	21-27	0.00	43.6	29.6	45	19
22	28-3 June	0.00	41.4	29.3	54	30
23	4-10	47.3	35.3	24.5	83	47
24	11-17	138.0	31.3	23.7	89	67
25	18-24	31.5	32.6	24.6	86	57
26	25-1 July	50.1	29.2	23.4	91	68
27	2-8	56.0	30.5	23.8	91	65
28	9-15	35.6	30.3	23.5	91	70
29	16-22	48.0	27.4	22.9	94	81
30	23-29	88.4	28.1	22.9	92	78
31	30-5 Aug.	109.0	26.8	22.3	95	89
32	6-12	6.5	29.0	23.1	90	70
33	13-19	7.0	30.4	23.3	88	62
34	20-26	47.9	25.1	21.8	95	89
35	27-2 Sept.	4.5	30.2	22.8	85	53
36	3-9	2.0	32.2	22.6	83	47
37	10-16	44.7	34.2	23.1	86	46
38	17-23	104.3	30.2	22.8	92	69
39	24-30	0.9	31.9	22.8	81	46
40	1-7 Oct.	68.4	31.5	23.1	92	62
41	8-14	15.4	31.4	22.3	90	53
42	15-21	1.0	33.5	20.4	82	37
43	22-28	1.5	31.3	20.3	88	49
44	29-4 Nov.	0.00	32.7	15.9	85	29
45	5-11	0.00	31.6	15.6	85	30
46	12-18	0.00	29.5	13.4	72	26
47	19-25	0.00	31.0	14.5	82	30
48	26-2 Dec.	0.00	30.4	16.3	78	35
49	3-9	0.00	29.6	12.5	81	23
50	10-16	0.00	28.9	8.4	82	17
51	17-23	0.00	29.5	9.8	84	21
52	24-31	0.00	28.8	13.6	84	31

DR.PANJABRAO DESHMUKH AGRICULTURAL UNIVERSITY,
KRISHI NAGAR, AKOLA

Crop Improvement

Experiment No. :- 1

Project code	:	-
University Project Code No.	:	-
Agency Code No.	:	-
Name of Department / Section	:	
Name and address of department	:	Sugarcane Res. Centre, Dr.P.D.K.V. Akola
Name of Section/Research station	:	Sugarcane Res. Centre, Dr.P.D.K.V. Akola
Location of Project	:	Sugarcane Res. Centre, Dr.P.D.K.V. Akola
Project Title	:	Crop improvement in sugarcane zonal varietal trial IVT Early
Duration of project	:	1 years
Date of start	:	2013-2014.
Summary of results	:	The genotypes CoM 10082 (91.03 t ha^{-1} and 10.50 t ha^{-1}) found significantly superior than all other genotype in respect of cane yield and sugar yield respectively.

Introduction and Objectives

	Immediate objectives	:	To identify the ability of early genotypes for their cane and sugar yield potential.
	Long term objectives	:	To increase the productivity of cane and sugar in the region.

Project Technical Profile :

1.	Project Title	:	Initial Varietal Trial Early
2.	Progressive year	:	2013-14
3.	Design	:	RBD
4.	Treatments (15 Genotypes)		

1. Co 10004	2. Co 10005	3. Co 10006	4. Co 10024
5. Co 10026	6. Co 10027	7. CoM 10081	8. CoM 10082
9.CoN 10071	10. CoN 10072	11. CoT 10366	12. CoT 10367
13. Co 85004 (C)	14. Co 94008 (C)	15. CoC 671 (C)	

5.	Plot size	:	6.00 x 4.50 m^2
6.	Seed rate	:	25000 Setts ha^{-1}
7.	No. of replications	:	Three
8.	Date of planting	:	01/02/2013
9.	Date of harvesting	:	14/01/2014
10.	Fertilizer	:	175:100:100 N, P_2O_5 and K_2O kg ha^{-1}
11.	Results	:	Results are given in Table 1 to 3

Table 1: Cane yield, Sugar yield and ancillary data

Sr. No.	Genotypes	Cane yield t ha^{-1}	Millable canes ha^{-1}	Sugar yield t ha^{-1}	Height (cm)	Internodes (No.)	Cane diameter (cm)
1	Co 10004	51.85	51852	5.82	244	21.90	3.14
2	Co 10005	69.52	91605	7.33	222	21.10	2.91
3	Co 10006	62.50	68765	7.58	235	19.40	2.76
4	Co 10024	81.55	65679	9.61	237	19.10	2.80
5	Co 10026	57.13	74938	5.91	225	19.10	2.94
6	Co 10027	81.41	65926	9.77	252	21.50	2.66
7	CoM 10081	57.67	67284	6.55	249	24.20	2.47
8	CoM 10082	91.03	68272	10.50	220	19.60	2.82
9	CoN 10071	81.83	57284	10.22	249	21.90	3.02
10	CoN 10072	67.18	70741	7.02	253	23.00	2.72
11	CoT 10366	76.90	67284	9.14	209	20.00	3.01
12	CoT 10367	76.67	76667	7.70	188	14.40	2.68
13	Co 85004 (C)	67.21	70864	8.29	200	20.40	2.54
14	Co 94008 (C)	79.65	69753	10.18	208	21.50	2.62
15	CoC 671 (C)	72.93	69753	7.28	244	24.10	3.09
	'F' Test	Sig	Sig	Sig	Sig	Sig	Sig
	SEm±	3.58	2600	0.76	13.13	1.07	0.12
	CD at 5%	10.37	7528	2.20	38.03	3.11	0.36
	C.V. %	8.66					

Results:-

Cane & Sugar yield:

It is revealed from Table 1 that the genotypes CoM 10082 produced significantly higher yield (91.03 t ha^{-1}) than check and other genotypes and was at par with CoN 10071, Co 10024 and Co 10027. However, similar trend was also recorded as regards sugar yield (10.50 t ha^{-1}).

Ancillary Growth Character:-

In respect of millable canes, the genotype Co 10005 (91605 ha^{-1}) produced significantly higher millable canes than rest of the all genotypes. As regards cane height the genotype CoN 10072 (253 cm) and CoN 10071 were found significantly superior than rest of the genotypes and at par with each other except genotypes CoT 10366, CoT 10367, Co 85004 (C) and Co 94008 (C). The genotypes CoM 10081 (24.2), check CoC 671, CoN 10072, CoN 10071, Co 10004, Co 94008 (C), Co 10027 and Co 10005 were recorded significantly higher number of internodes than remaining genotypes and were at par with each other. The entry Co 10004 (3.14 cm), check CoC 671 (3.09 cm), CoN 10071, CoT 10366, Co

10026, Co 10005, CoM 10082 and Co 10024 were recorded significantly higher cane diameter than rest of all genotypes and were on par with each other.

Table 2: Sugarcane Juice quality at harvest.

Sr. No.	Genotypes	Brix	Pol %	C.C.S. %	Purity %
1	Co 10004	20.81	16.95	11.25	81.42
2	Co 10005	20.99	16.28	10.51	77.69
3	Co 10006	20.67	17.52	11.87	85.00
4	Co 10024	20.15	17.07	11.56	84.75
5	Co 10026	19.66	15.80	10.41	80.41
6	Co 10027	20.34	17.55	11.99	86.56
7	CoM 10081	20.22	16.92	11.39	83.75
8	CoM 10082	20.90	17.25	11.52	82.69
9	CoN 10071	20.28	17.95	12.42	88.39
10	CoN 10072	19.37	15.82	10.51	81.75
11	CoT 10366	18.98	17.06	11.90	89.97
12	CoT 10367	19.15	15.29	10.04	79.85
13	Co 85004 (C)	20.19	17.87	12.37	88.63
14	Co 94008 (C)	18.67	17.84	12.78	95.55
15	CoC 671 (C)	20.72	15.70	10.00	75.98
	'F' Test	Sig	NS	NS	Sig
	SEm±	0.38	0.71	0.69	3.23
	CD at 5%	1.10	--	--	9.36

Juice quality:

Table 2 revealed that, the genotype Co 10005 (20.99 %) recorded significantly higher brix and on par with all the entries except Co 10026, CoN 10072, CoT 10366, CoT 10367 and check Co 94008. The CoN 10071 recorded numerically higher pol % (17.95 %) but statistically does not reach to the level of significance. CCS % did not showed significant difference. Regarding purity % the Check Co 94008 (95.55 %) recorded significantly higher and at par with the genotypes viz. CoT 10366, check Co 85004, CoN 10071 and CoN 10027.

Experiment No. :- 2

Project code	:	-
University Project Code No.	:	-
Agency Code No.	:	-
Name of Department / Section	:	
Name and address of department	:	Sugarcane Res. Centre, Dr.P.D.K.V. Akola
Name of Section/Research station	:	Sugarcane Res. Centre, Dr.P.D.K.V. Akola
Location of Project	:	Sugarcane Res. Centre, Dr.P.D.K.V. Akola.
Project Title	:	Crop improvement in sugarcane zonal varietal trial IVT Midlate
Duration of project	:	1 years
Date of start	:	2013-2014.
Summary of results	:	The genotypes Co 10033 (109.69 t ha^{-1} and 13.45 t ha^{-1}) found significantly superior than all other genotype in respect of cane yield and sugar yield respectively.

Objectives

	Immediate objectives	:	To identify the ability of midlate genotypes for their cane and sugar yield potential.
	Long term objectives	:	To increase the productivity of cane and sugar in the region.

Project Technical Profile :

1.	Project Title	:	Initial Varietal Trial Midlate
2.	Progressive year	:	2013-14
3.	Design	:	RBD
4.	Treatments (16 Genotypes)		

1. Co 10015	2. Co 10017	3. Co 10031	4. Co 10033
5. CoM 10083	6. CoM 10084	7. CoN 10073	8. CoT 10368
9.CoT 10369	10. CoVC 10061	11. CoVSI 10121	12. CoVSI 10122
13. PI 10131	14. PI 10132	15. Co 86032 (C)	16. Co 99004 (C)

5.	Plot size	:	6.00 x 4.50 m^2
6.	Seed rate	:	25000 Setts ha^{-1}
7.	No. of replications	:	Three
8.	Date of Planting	:	23/01/2013
9.	Date of harvesting	:	14/01/2014
10.	Fertilizer	:	175:100:100 N, P_2O_5 and K_2O kg ha^{-1}
11.	Results	:	Results are given in Table 3 to 4

Table 3: Cane yield, Sugar yield and ancillary data

Sr. No.	Genotypes	Cane yield t ha^{-1}	Millable canes ha^{-1}	Sugar yield t ha^{-1}	Height (cm)	Internodes (No.)	Cane diameter (cm)
1	Co 10015	90.05	84815	8.46	188	16.9	2.65
2	Co 10017	95.90	85926	9.35	219	22.1	2.31
3	Co 10031	85.81	67037	6.93	199	19.9	3.05
4	Co 10033	109.69	79136	13.45	278	23.3	2.66
5	CoM 10083	80.83	68642	7.90	152	26.6	2.65
6	CoM 10084	69.14	61728	9.15	191	22.7	2.27
7	CoN 10073	88.53	89753	9.48	232	16.4	2.61
8	CoT 10368	82.23	73210	8.21	264	19.5	2.61
9	CoT 10369	79.35	67284	9.81	186	22.3	3.14
10	CoVC 10061	98.33	73951	7.26	160	15.6	3.33
11	CoVSI 10121	79.59	64938	8.65	263	20.5	2.64
12	CoVSI 10122	59.38	50617	6.32	226	19.0	2.90
13	PI 10131	70.16	54815	6.67	173	19.4	3.12
14	PI 10132	61.87	50617	6.13	218	20.2	2.70
15	Co 86032 (C)	83.95	79012	9.00	193	19.4	2.46
16	Co 99004 (C)	77.67	63457	8.17	231	18.8	2.77
	'F' Test	Sig	Sig	Sig	Sig	Sig	Sig
	SEm±	5.37	3612	0.68	12.68	1.03	0.10
	CD at 5%	15.51	10430	1.97	36.61	2.97	0.29
	C.V. %	11.34					

Cane Yield:-

Genotype Co 10033 (109.69 t ha^{-1}) produced significantly higher cane yield and were observed to be at par with the genotypes viz. CoVC 10061 and Co 10017.

Sugar yield:-

The genotypes Co 10033 (13.45 t ha^{-1}) recorded significantly higher sugar yield than rest of the all genotypes, and checks.

Ancillary Growth Character:-

In respect of millable canes, CoN 10073 (89,753 ha^{-1}) recorded significantly higher millable cane and was at par with Co 10017 (85,926 ha^{-1}) and Co 10015 (84,815 ha^{-1}). Genotype Co 10033 recorded significantly more height (278 cm) and were at par with genotypes CoT 10368 and CoVSI 10121. Number of internodes observed were significantly

higher with CoM 10083 (26.6) was also at par with Co 10033, CoM 10084, CoT 10369, Co 10017, CoVSI 10121 and PI 10132. The genotype CoVC 10061 (3.33 cm) recorded significantly higher cane diameter and was at par with genotypes CoT 10369, PI 10131 and Co 10031.

Table 4: Sugarcane Juice quality at harvest.

Sr. No.	Genotypes	Brix	Pol %	C.C.S. %	Purity %
1	Co 10015	21.42	15.32	9.40	71.49
2	Co 10017	19.61	15.17	9.78	77.35
3	Co 10031	20.93	13.88	8.07	66.59
4	Co 10033	19.99	17.73	12.28	88.66
5	CoM 10083	20.60	15.45	9.77	75.00
6	CoM 10084	20.26	18.75	13.25	92.57
7	CoN 10073	17.95	15.87	10.98	88.46
8	CoT 10368	21.00	15.82	10.04	75.59
9	CoT 10369	21.33	18.11	12.28	84.92
10	CoVC 10061	19.33	12.80	7.43	66.68
11	CoVSI 10121	21.06	16.65	10.86	79.59
12	CoVSI 10122	17.48	15.40	10.63	88.16
13	PI 10131	21.58	15.48	9.52	71.83
14	PI 10132	21.28	15.78	9.91	74.28
15	Co 86032 (C)	20.37	16.27	10.68	80.07
16	Co 99004 (C)	20.14	16.04	10.51	79.64
	'F' Test	Sig	Sig	Sig	Sig
	SEm±	0.53	0.48	0.53	3.20
	CD at 5%	1.53	1.38	1.54	9.24

Juice quality:

The entry PI 10131 recorded significantly higher brix (21.58 %) and was on par with all genotypes except CoVSI 10121, Co 10017, Co 10033, CoN 10073, CoVC 10061 and CoVSI 10122. Regarding Pol % and CCS % the genotype CoM 10084 (18.75 % & 13.25 %) was found significantly higher than rest of these genotypes and was at par with CoT 10369 and Co 10033. As regards Purity % the CoM 10084 was recorded significantly higher purity % (92.57 %) and was at par with genotypes CoM 10033, CoM 10073 COVSI 10122 and CoT 10369.

Experiment No. :- 3

Project code	:	-
University Project Code No.	:	-
Agency Code No.	:	-
Name of Department / Section	:	
Name and address of department	:	Sugarcane Res. Centre, Dr.P.D.K.V. Akola
Name of Section/Research station	:	Sugarcane Res. Centre, Dr.P.D.K.V. Akola
Location of Project	:	Sugarcane Res. Centre, Dr.P.D.K.V. Akola.
Project Title	:	Crop improvement in sugarcane zonal varietal trial AVT Midlate II Plant
Duration of project	:	2 years
Date of start	:	January 2012-2013.
Summary of results	:	Genotype Co 08016 recorded significantly higher cane yield (69.01 t ha^{-1}) than Co 08008, Co 08020 and check Co 99004 not was at par with other genotypes and check also. Regarding Sugar yield the genotypes Co 08009 (7.74 t ha^{-1}) was observed significantly over other genotype was at par with CoSnk 08101, Co 86032 check, Co 08016 and check Co 99004.

Objectives

	Immediate objectives	:	To identify the ability of midlate genotypes for their cane and sugar yield potential.
	Long term objectives	:	To increase the productivity of cane and sugar in the region.

Project Technical Profile :

1.	Project Title	:	Advanced Varietal Trial (Midlate) II Plant
2.	Progressive year	:	2013-14
3.	Design	:	RBD
4.	Treatments (07 Genotypes)		1) Co 08008 2) Co 08009 3) Co 08016 4) Co 08020 5) CoSnk 08101 6) Co 86032 (Ch) 7) Co 99004 (Ch)
5.	Plot size	:	6.00 x 4.50 m^2
6.	Seed rate	:	25000 Setts ha^{-1}
7.	No. of replications	:	Three
8.	Date of Ratooning	:	22/01/2013
9.	Date of harvesting	:	25/01/2014
10.	Fertilizer	:	175:100:100 N, P_2O_5 and K_2O kg ha^{-1}
11.	Results	:	Results are given in Table 5 to 6

Table 5: Cane yield, Sugar yield and Ancillary data

Sr. No.	Genotypes	Cane yield (t ha^{-1})	Millable canes (ha^{-1})	Sugar yield (t ha^{-1})	Height (cm)	Internodes (No.)	Cane diameter (cm)
1	Co 08008	49.23	53333	5.74	191	19.7	2.69
2	Co 08009	64.35	59753	7.74	198	22.3	2.75
3	Co 08016	69.04	71605	6.54	186	20.8	2.62
4	Co 08020	50.38	49136	4.24	184	20.5	2.80
5	CoSnk 08101	57.61	59012	7.50	179	18.7	2.59
6	Co 86032(Ch)	68.66	67037	7.35	204	17.9	2.68
7	Co 99004(Ch)	49.51	56667	6.38	189	17.7	2.67
	'F' Test	Sig	Sig	Sig	NS	Sig	NS
	SEm±	4.25	4153	0.56	6.33	0.76	0.06
	CD at 5%	13.08	12795	1.72	--	2.35	--
	C.V. %	12.59					

Cane Yield:-

Genotype Co 08016 (69.01 t ha^{-1}) recorded significantly higher cane yield than rest of the all genotypes but was at par with the genotypes Co 86032 check, CoSnk 08101 and Co 08009.

Sugar yield:-

The genotypes Co 08009 (7.74 t ha^{-1}) was found to be significantly superior over than genotypes except CoSnk 08101, Co 86032 check, Co 08016 and check Co 99004. The latter were at par with earlier one.

Ancillary Growth Character:-

As regards the millable canes the genotype Co 08016 (71,605 ha^{-1}) recorded significantly higher millable cane than all genotypes except Co 86032 check, Co 08009 and CoSnk 08101 were it was observed at par. In case of Cane height check Co 86032 was recorded numerically more height (204 cm) but statistically does not reach to the level of significance. In respect of number of internode the genotype Co 08009 recorded significantly higher internodes i.e. 22.3 and was at par with Co 08016, Co 08020 and Co 08008. Regarding cane diameter none of the genotypes showed significant difference.

Table 6: Sugarcane Juice quality at harvest.

Sr. No.	Genotypes	Brix	Pol %	C.C.S. %	Purity %
1	Co 08008	20.64	17.30	11.65	83.83
2	Co 08009	20.29	17.55	12.02	86.59
3	Co 08016	20.52	15.14	9.48	73.79
4	Co 08020	20.47	14.04	8.37	68.63
5	CoSnk 08101	20.04	18.48	13.03	92.22
6	Co 86032(Ch)	20.45	16.35	10.74	79.92
7	Co 99004(Ch)	18.89	18.05	12.93	95.58
	'F' Test	Sig	Sig	Sig	Sig
	SEm±	0.27	0.56	0.56	2.72
	CD at 5%	0.83	1.73	1.73	8.38

Juice quality:

As regards Brix, the genotype Co 08008 (20.64) recorded significantly more brix and at par with all entries except check Co 99004. In respect of pol % CoSnk 08101 (18.48 %) was observed significantly higher and was at par with check Co 99004, Co 08009 and Co 08008. The similar trend was observed in case of CCS %. However, as regards purity % check Co 99004 recorded (95.58 %) significantly more value than rest of all entries but was observed at par with genotype CoSnk 08101.

Technical Programme for the Year 2014-15 (Approved by AICRP (Sugarcane))

I. Crop Improvement

1. Zonal Varietal Trial IVT (early)
2. Zonal Varietal Trial IVT (midlate)
3. Zonal Varietal Trial AVT plant I (early)
4. Zonal Varietal Trial AVT plant I (midlate) (multiplication of AVT entries 2015-16)

On going and new Research Programme to be under taken during 2014-2015

I. Crop Improvement

1. Zonal Varietal Trial IVT (early)
2. Zonal Varietal Trial IVT (midlate)
3. Zonal Varietal Trial AVT (early) I plant
4. Zonal Varietal Trial AVT plant I (midlate) (multiplication of AVT entries 2015-16)
5. Multiplication of IVT entries of Early and Midlate groups (2014-15)

CONTENTS

(For office use only)

A REPORT
OF

THE RESEARCH WORK DONE
ON

SUGARCANE BREEDING

DURING 2013-14

Submitted to

ALL INDIA COORDINATED RSEARCH PROJECT ON SUGARCANE

Submitted by

SENIOR RESEARCH SCIENTIST
SUGARCANE RESEARCH CENTRE

DR.PANJABRAO DESHMUKH KRISHI VIDYAPEETH,
AKOLA 444 104 (M.S.)