

ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE



**ANNUAL REPORT
(2012-13)**

**CROP PRODUCTION
(Agronomy and Soil Science)**

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Project No. AS 42**Title : Agronomic Evaluation of Promising Sugarcane Genotypes (Early group).**

The experiment was conducted to work out agronomy of Sugarcane genotypes of advanced varietal trial (AVT) with the following genotypes:

- 1) CoBln 04172 (17/99)
- 2) CoBln 05501 (185/00)
- 3) CoBln03172
- 4) CoBln07501

In the experiment, there were three levels fertilizers viz.-

- 75% of the recommended dose of N
- 100% of the recommended dose of N
- 125% of the recommended dose of N

The genotypes were planted on 16th March,2012 and harvested on 4th March,2013. The experimental field was clay loam in texture, poor in organic carbon (0.35%), low in available P (16.4 kg P₂O₅/ha) and in medium in available K (172 kg K₂O/ha) with ph 4.5.

AS 42.01 : Effect of genotypes (early group) and fertilizer levels on performance of Sugarcane

Treatments	Germination (%)	No. of shoots (000/ha)	NMC (000/ha)	Cane length (m)	Cane diameter (cm)	Sucrose (%)	Cane yield (t/ha)	CCS (%)
Genotypes								
CoBln 04172 (17/99)	31.70	72.14	69.63	2.79	2.55	18.28	66.24	12.55
CoBln 05501 (185/00)	35.73	75.86	73.01	2.90	2.55	18.03	69.59	12.61
CoBln03172	32.07	73.99	69.83	2.76	2.51	18.46	66.67	12.72
CoBln07501	26.67	70.90	68.24	2.83	2.56	17.06	66.39	11.99
CD at 5%	3.55	NS	NS	0.06	NS	NS	NS	NS
Fertility Levels								
F ₁ (75% of Recommended)	28.99	70.37	67.71	2.71	2.47	18.08	64.58	12.59
F ₂ (100% of Recommended)	34.54	77.15	74.10	2.93	2.66	17.70	71.20	12.15
F ₃ (125% of Recommended)	31.10	72.16	68.74	2.82	2.50	18.10	65.89	12.67
CD at 5%	3.08	4.32	3.93	0.05	0.08	NS	4.18	NS

Among the four early matured group genotypes (Table-AS42.01), var. CoBln 05501(185/00) showed better performances in all the yield attributing characters and recorded highest cane yield 69.59 t/ha followed by CoBln 03172 – 66.67 t/ha, CoBln 07501 – 66.39 t/ha and CoBln 04172 (17/99) – 66.24 t/ha. However, the performances of all parameters among these varieties are not statistically significant

In case of application of different fertilizer levels, a significantly increasing trend of germination percentage, shoot numbers, NMC, cane length, cane diameter and cane yield were observed in 100% of recommended N over 75% of recommended N. The cane yield in 100% of recommended N recorded 71.20 t/ha, which is significantly superior than 75% of recommended N which recorded cane yield 64.58 t/ha. But no further positive responses on different parameters have recorded in increasing of 125% of recommended dose of N .

Title : Agronomic Evaluation of Promising Sugarcane Genotypes (Mid-late group).

The experiment was conducted to work out agronomy of Sugarcane genotypes of advanced varietal trial (AVT) with the following genotypes:

- 1) CoBln 07502
- 2) CoBln 07503
- 3) CoBln04174 (12/99)
- 4) CoBln05502 (11/00)

In the experiment, there were three levels fertilizers viz.-

- 75% of the recommended dose of N
- 100% of the recommended dose of N
- 125% of the recommended dose of N

The genotypes were planted on 27th March,2012 and harvested on 28th March,2013. The experimental field was clay loam in texture, poor in organic carbon (0.35%), low in available P (16.4 kg P₂O₅/ha) and in medium in available K (172 kg K₂O/ha) with ph 4.5.

AS 42.02 : Effect of genotypes (mid-late group) and fertilizer levels on performance of Sugarcane.

Treatments	Germination (%)	No. of shoots (000/ha)	NMC (000/ha)	Cane length (m)	Cane diameter (cm)	Sucrose (%)	Cane yield (t/ha)	CCS (%)
Genotypes								
CoBln 07502	30.66	75.07	71.33	2.76	2.42	17.44	68.71	12.00
CoBln 07503	34.21	76.23	72.41	2.75	2.40	17.73	70.29	12.11
CoBln04174 (12/99)	31.15	73.37	69.94	2.75	2.36	16.43	67.98	11.48
CoBln05502 (11/00)	19.08	69.09	65.74	2.71	2.37	17.01	64.46	11.80
CD at 5%	3.28	3.60	3.31	NS	NS	0.90	2.45	NS
Fertility Levels								
F ₁ (75% of Recommended)	26.21	69.07	66.08	2.67	2.30	16.85	64.64	11.57
F ₂ (100% of Recommended)	31.02	77.48	73.40	2.85	2.49	17.29	70.86	11.89
F ₃ (125% of Recommended)	29.10	73.78	70.08	2.71	2.38	17.33	68.08	12.08
CD at 5%	2.84	3.12	2.87	0.06	0.05	NS	2.12	NS

Among the four mid- late group genotypes (Table-AS42.02), var. CoBln 07503 recorded significantly higher results in all yield attributing characters and cane yield recorded 70.29 t/ha followed by var. CoBln 07502 – 68.71 t/ha, CoBln 04174 (12/99) – 67.98 t/ha and CoBln 05502 (11/00) – 64.46 t/ha.

In case application of fertilizers similar results were obtained as were in early matured genotypes. The cane yield in 100% of recommended N recorded 70.86 t/ha, which is significantly superior than 75% of recommended N which recorded cane yield 64.64 t/ha. But no further positive responses on different parameters have recorded in increasing of 125% of recommended dose of N

Project No.AS.64.

Title : Response of sugarcane crop to different plant nutrients in varied agro ecological situations

The experiment was laid out with the objective of study differential response of sugarcane crop to different nutrients. The experimental crop Borak (Co Bln 9103) was planted on 30th March, 2012 and harvested on 3rd April, 2013. The experimental field was clay loam in texture, poor in organic carbon (0.45%), low in available P (20.26 kg P₂O₅/ha) and in medium in available K (170 kg K₂O/ha with pH 4.2. The available Fe, Mn and Zn in experimental plot were 69.8 ppm, 6.0 ppm and 0.80 ppm respectively.

The treatments for the experiments were as follows:

1. Control (No Fertilizer)
2. N
3. NP
4. NPK
5. NPK+S
6. NPK+Zn
7. NPK+Fe
8. NPK+Mn
9. NPK+S+Zn
10. NPK+S+Zn+Fe
11. NPK+S+Zn+Fe+Mn
12. Soil test based fertilizer application
13. FYM@20 t/

Table. AS.64.01. Effect of different nutrients on growth and yield of sugarcane

Treatments	Germination (%)	No.of shoots ('000/ha)	NMC ('000/ha)	Cane Length (m)	Cane Diameter (cm)	Yield (t/ha)	Sucrose (%)	CCS (%)
T ₁	43.9	85.4	77.4	2.5	2.1	67.0	17.6	11.8
T ₂	43.1	86.0	80.2	2.5	2.2	68.9	18.6	12.9
T ₃	45.4	87.5	80.0	2.6	2.3	69.8	17.9	11.9
T ₄	43.2	87.1	80.0	2.7	2.4	70.7	18.3	12.8
T ₅	45.3	88.5	81.7	2.7	2.4	73.4	18.2	12.3
T ₆	48.4	92.9	85.8	2.8	2.6	75.7	20.0	14.1
T ₇	44.5	88.8	80.0	2.7	2.5	72.5	19.2	13.4
T ₈	40.2	81.9	74.8	2.7	2.5	71.5	19.1	13.2
T ₉	37.3	77.8	72.1	2.9	2.6	72.1	18.5	12.4
T ₁₀	47.1	88.8	81.8	2.8	2.6	74.9	17.6	11.7
T ₁₁	64.7	95.7	88.8	2.8	2.8	82.7	18.5	12.5
T ₁₂	47.3	88.1	82.5	2.7	2.5	86.0	17.0	11.2
T ₁₃	48.3	80.9	74.1	2.7	2.5	71.1	18.4	12.2
SEM(±)	4.04	3.04	2.54	0.02	0.03	2.47	0.49	0.44
CD(5%)	11.78	8.86	7.42	0.08	0.1	7.20	1.44	1.3

Application of different plant nutrients (Table- AS.64.01) showed significant variances on germination percentage, number of shoots, NMC , cane length ,cane diameter, cane yield , sucrose (%) and CCS(%). The maximum cane yield (86.0 t/ha) recorded in the treatment T₁₂ i.e. Soil Test based fertilizer application followed by the treatment T₁₁ i.e NPK+S+Zn + Fe + Mn where yield was recorded 82.7 t/ha .However the cane yield in both the treatments T₁₁ and T₁₂ were statistically at par.

Project No. AS-66

Title : Priming of cane node for accelerating germination.

The experiment was conducted with a view to find out suitable cane node priming technique and to assess the effect of cane node on acceleration of germination.

The experimental crop Kolong (CoBln 9102) was planted on 5th of April, 2012 and was harvested on 17th of April, 2013. The experimental soil was clay loam in texture, poor in organic carbon (0.50 %) and in available P (20.23 kg P₂O₅/ ha) and medium in available K (172 Kg K₂O/ ha) with pH 4.9.

The treatments were :

- T₁ : Un- primed cane node
- T₂ : Treating cane node in hot water at 50⁰ C for 2 hours.
- T₃ : Treating cane node in hot water (50⁰ C) and urea solution (3 %) for 2hours.
- T₄ : Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio.
- T₅ : Conventional 3-bud sett planting.
- T₆ : Primed and sprouted cane node (incubated for four days after priming)

AS-66.01. : Effect of primed cane node on germination

Treatments	Germination (%)			
	10 DAP	20 DAP	30DAP	40 DAP
T ₁	4.4	18.2	36.0	42.9
T ₂	10.9	21.6	36.2	43.8
T ₃	11.3	23.0	36.8	44.7
T ₄	11.5	24.2	37.8	45.7
T ₅	17.0	38.5	51.2	61.9
T ₆	4.3	12.9	20.3	26.6
SEm	0.96	2.07	2.47	2.83
CD 5%	2.87	6.22	7.43	8.52

Priming of cane node varied germination percentages as data showed in the table AS-66.01. In the treatment T₅ - conventional 3-bud sett planting, the germination percentages recorded in different days after planting were observed significantly superior among the other treatments. The germination percentages 17.0, 38.5, 51.2 and 61.9 were recorded in 10, 20, 30 and 40 days after planting respectively which were statistically significant in comparison to other cane node treatments.

AS-66.02. : Effect of primed cane node on numbers of shoots and shoots per clump

Treatments	No. of shoots(*000/ha)				No. of shoots per clump(*000/ha)			
	60 DAP	90DAP	120 DAP	150DAP	60 DAP	90DAP	120 DAP	150DAP
T ₁	74.1	86.3	86.3	86.9	73.2	82.1	94.8	96.7
T ₂	76.3	84.7	91.0	95.0	76.8	83.0	96.9	99.0
T ₃	78.4	85.9	94.6	98.1	80.6	86.1	94.8	95.9
T ₄	80.2	88.0	97.4	100.5	83.2	87.8	95.0	97.4
T ₅	113.6	121.3	126.6	121.6	113.7	121.5	106.2	132.7
T ₆	48.0	60.2	72.5	72.4	48.9	63.6	71.2	74.9
SEm	5.51	4.73	3.86	5.01	5.46	5.56	11.39	6.57
CD5%	16.60	14.24	11.63	15.09	16.46	16.75	NS	19.79

Similar results (Table AS-66.02) were also recorded in the parameters number of shoots and shoots per clump. In the T₅ - conventional 3-bud sett planting, superior data of number of shoots 113.6, 121.3, 126.6 and 121.6 thousand/ha were obtained at 60,90, 120 and 150 days after planting respectively which were statistically significant over other cane node primed treatments. Similarly in the same treatment, highest significant data of shoots per clump 113.7, 121.5, 106.2 and 132.7 thousand/ha were obtained at 60,90, 120 and 150 days after planting respectively .

AS-66.03. : Effect of primed cane node on yield and quality parameters

Treatment	NMC (*000/ha)	Cane length (m)	Cane Diameter (cm)	Yield (t/ha)	Sucrose (%)	CCS (%)	Purity (%)
T ₁	80.8	2.7	2.4	69.3	17.2	11.8	86.5
T ₂	83.0	2.8	2.5	77.1	17.9	12.4	88.6
T ₃	87.5	2.8	2.6	78.5	16.9	11.4	83.8
T ₄	92.0	2.9	2.7	90.9	17.6	11.9	84.2
T ₅	118.2	2.9	2.8	86.8	18.0	12.4	88.4
T ₆	63.0	2.7	2.6	70.0	18.1	12.6	85.5
SEM	3.8	0.02	0.03	5.86	0.40	0.40	1.83
CD 5 %	11.45	0.06	0.08	NS	NS	NS	NS

Other yield attributing parameters (Table- AS-66.03) were also recorded in the similar trends. NMC 118.2 thousand/ha was recorded in the T₅ - conventional 3-bud sett planting which was significantly superior over other treatments. Highest cane yield 90.9 t/ha was recorded in the T₄ priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio. However, in the T₅, cane yield was obtained 86.8 t/ha and was significantly at par. Quality parameters data sucrose (%), CCS (%) and Purity (%) were observed no significance variances among the cane node treatments .

Table: A. Meteorological data-2012-13

Month/year	Temperature (o C)	RH(%)		Rain Fall (mm)	No.of Rainy days
		Morn.	Even.		
March./12	28.2	92	76	34.7	4
April/12	27.7	94	73	220.2	23
May,12	33.1	93	73	166.2	15
June,12	30.8	95	74	191.2	20
July,12	34.2	93	75	217.0	25
August,12	27.8	94	68	242.6	24
Sptember,12	31.3	94	82	267.6	22
October,12	31.2	89	72	214.3	12
November.12	28.7	89	73	0.0	0
December,12	24.6	90	72	20.2	2
January,13	22.9	88	70	10.0	3
February,13	28.5	87	70	9.0	2

Table: B. Rainfall data(mm.) of Sugarcane Research Station, Buralikson for the years 2000-2012

Month/Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
January	009.2	009.6	008.4	009.6	006.2	047.8	-	006.4	025.4	-	007.3	023.4	033.7
February	012.4	062.4	005.4	062.4	082.4	022.0	063.0	106.5	004.0	017.0	028.4	017.5	013.9
March	031.4	022.2	016.4	022.2	088.0	470.6	017.2	029.0	099.0	045.0	122.0	066.9	034.7
April	128.2	238.1	158.6	238.1	417.6	193.4	158.2	296.9	119.2	074.0	251.2	068.1	220.2
May	200.2	161.0	212.8	114.7	161.0	195.8	185.7	197.1	215.5	086.0	362.8	411.0	166.2
June	334.3	306.0	136.8	313.7	306.0	150.6	304.4	287.4	220.2	142.0	495.9	257.2	191.2
July	300.2	321.4	312.4	399.2	381.7	423.9	486.6	272.0	292.7	356.0	481.2	318.1	217.0
August	359.9	215.6	336.8	240.2	196.6	424.2	143.7	437.0	274.5	239.0	251.5	217.6	242.6
September	363.8	158.5	132.4	222.2	117.4	151.4	098.0	298.5	187.3	320.9	152.5	099.2	267.6
October	041.8	134.0	028.6	241.4	195.6	114.6	165.8	026.8	041.8	040.4	101.1	020.9	214.3
November	028.0	008.0	044.8	041.8	004.4	-	033.2	036.0	-	009.3	15.0	026.0	-
December	002.8	002.6	038.1	014.6	001.6	-	009.6	009.4	-	002.3	22.8	009.4	020.2
Total	1812.2	1639.4	1429.5	1920.1	1958.5	2194.3	1665.4	2003.0	1479.5	1331.9	2000.3	1535.3	1621.6

