

UNIVERSITY OF AGRICULTURAL SCIENCES

BENGALURU



ANNUAL REPORT

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**ALL INDIA CO-ORDINATED RESEARCH PROJECT
ON SUGARCANE**

Submitted by

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Submitted to,

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**ZONAL AGRICULTURAL RESEARCH STATION
VC. Farm, Mandya - 571405**

AS 42 : Evaluation of promising sugarcane genotypes

Objective : To workout agronomy of promising sugarcane genotypes from advance varietal trial (AVT)

Technical program:

Genotypes (4)

V₁: CoSnk 05104

V₂: CoSnk 05103

V₃: CoVC 99463

V₄: Co 62175

Fertilizer doses (3)

F₁: 75% RDF

F₂: 100% RDF

F₃: 125% RDF

RDF : 250:100:125 kg NPK ha⁻¹.

Design: Factorial RBD (4 X 3 = 12 treatments)

Replication: 3

Date of planting: 24.09.2010

Date of harvest: 18.10.2011

Results:

Table: Yield & yield attributes of sugarcane influenced by different genotypes and fertilizer levels at ZARS, Mandya

Treatments	Germn. percentage	Cane weight (kg)	Cane length (m)	Cane girth (cm)	NMC ('000 ha ⁻¹)	Cane yield (MT ha ⁻¹)	CCS (%)
V: Genotypes							
V ₁ : CoSnk 05104	42.34	1.67	2.82	2.95	77.61	119.55	12.17
V ₂ : CoSnk 05103	42.44	1.68	2.75	2.93	78.04	121.22	12.30
V ₃ : CoVC 99463	39.93	1.64	2.98	2.78	82.54	126.77	12.10
V ₄ : Co 62175	40.59	1.25	2.61	2.65	107.50	125.33	12.08
S.Em _±	1.01	0.07	0.08	0.05	2.61	3.36	0.18
CD (p=0.05)	NS	0.19	0.23	0.14	7.65	NS	NS
Fertilizer levels							
F ₁ : 75% RDF	41.53	1.44	2.60	2.72	81.14	116.96	11.98
F ₂ : 100% RDF	41.20	1.64	2.88	2.88	88.94	128.54	12.26
F ₃ : 125% RDF	41.25	1.61	2.89	2.90	89.20	124.13	12.25
S.Em _±	0.88	0.06	0.07	0.04	2.26	2.91	0.15
CD (p=0.05)	NS	0.17	0.20	0.12	6.62	8.53	NS
Interaction							
S.Em _±	1.75	0.11	0.14	0.08	4.52	5.82	0.30
CD (p=0.05)	NS	NS	NS	NS	NS	NS	NS

Inference: The trial was initiated with promising genotypes of AVT trial (CoSnk 05104, CoSnk 05103, CoVC 99463 taking Co 62175 as a check variety) under three different fertilizer level

(75%, 100% and 125% RDF). The germination percentage and CCS (%) with different genotypes, fertilizer levels and their interaction didn't varied significantly.

Among the tested genotypes, cane yield didn't varied significantly. However, thicker cane with higher cane weight was observed with CoSnk 05103 (2.95 cm and 1.67 kg, respectively) and CoSnk 05104 (2.93 cm and 1.68 kg, respectively). Significantly taller cane was observed with CoVC 99463 (2.98 m) and higher NMC with Co 62175 (107.50 thousand ha⁻¹).

Yield and yield attributes of sugarcane varied significantly with different levels of fertilizer application. Application of 100% and 125% RDF recorded significantly higher cane yield (128.54 & 124.13 MT ha⁻¹, respectively), number of millable cane (88.92 & 89.20 thousand ha⁻¹ respectively) and cane weight (1.64 & 1.61 kg, respectively) over application 75% RDF (116.96 MT ha⁻¹, 81.14 thousand ha⁻¹ and 1.44 kg, respectively).

Summary: Promising genotypes of AVT trial CoSnk 05104, CoSnk 05103, CoVC 99463 performed at par with the check variety Co 62175. Recommended dose of fertilizer was sufficient to realize higher cane yield compared with either increase or decrease of 25 per cent of recommended dose.

AS 60: Studies on seed cane economy in sugarcane cultivation

Objectives: To economize the use of seed cane through sett size and sett treatment

Technical program:

Design: Factorial RBD No. of replications: 3

No. of treatments: 3 (Sett size) X 2 (Sett No.) X 2 (Sett treatment) = 12

Date of Planting: 07.09.2010 Date of harvest: 20.10.2011

Results:

The germination, yield and yield attributes varied significantly with sett size, treatment and sett rate.

Three budded sett recorded higher cane yield (112.34 MT ha⁻¹), germination (36.83%), Cane weight (1.49 kg) and number of millable cane (77.08 thousands ha⁻¹) followed by two budded (106.26 MT ha⁻¹, 34.03% 1.49 kg & 72.80 thousand ha⁻¹, respectively) which were on par with each other and significantly superior over single budded sett (91.86 MT ha⁻¹, 31.96% 1.34 kg & 67.19 thousand ha⁻¹, respectively).

Seed treatment with Bavistin recorded higher cane yield (110.95 MT ha⁻¹) compared to treating setts with Bavistin + GA (96.02 MT ha⁻¹).

Recommended seed rate recorded higher cane yield (107.92 MT ha⁻¹) and number of millable cane (76.40 thousands ha⁻¹) compared to 75 per cent recommended seed rate (99.05 MT ha⁻¹ & 68.31 thousand ha⁻¹, respectively).

Table: Yield & yield attributes of sugarcane as influenced by different treatments

Treatment	Cane Yield (t/ha)	Germn. Per cent	NMC ('000/ha)	Cane weight (kg)	Cane length (m)	Cane girth (cm)
S: Sett size						
S ₁ : 3 eye budded sett	112.34	36.83	77.08	1.49	2.09	2.86
S ₂ : 2 eye budded sett	106.26	34.03	72.80	1.49	2.07	2.82
S ₃ : 1 eye budded sett	91.86	31.96	67.19	1.34	2.04	2.83
S.Em _±	4.79	0.64	2.64	0.02	0.04	0.04
CD (p=0.05)	14.04	1.88	7.76	0.06	NS	NS
T: Sett treatment						
T ₁ : Bavistin	110.95	36.19	75.85	1.46	2.07	2.82
T ₂ : Bavistin +GA	96.02	32.36	68.87	1.41	2.06	2.86
S.Em _±	3.91	0.52	2.16	0.02	0.04	0.03
CD (p=0.05)	11.46	1.53	6.33	NS	NS	NS
R: Sett rate						
R ₁ : 100% (1,20,000)	107.92	34.39	76.40	1.44	2.09	2.85
R ₂ : 75% (80,000)	99.05	34.16	68.31	1.44	2.04	2.83
S.Em _±	3.91	0.52	2.16	0.02	0.04	0.03
CD (p=0.05)	NS	NS	6.33	NS	NS	NS
Interaction	NS	NS	NS	NS	NS	NS
CV (%)	16.02	6.46	12.66	5.24	7.29	4.92

Summary: Recommended sett rate (1,20,000 buds ha⁻¹) with three or two budded setts and bavistin treatment recorded significantly higher cane yield and yield attributes .

AS 61: Optimizing Irrigation Schedule in Sugarcane Under different planting methods

Objectives: To enhance water and crop productivity in sugarcane

Technical program:

Design : Factorial RBD

No. of replications : 3

No. of treatments : 3 (Planting method) X 3 (Irrigation schedule) = 9

Date of Planting: 18.12.2010

Date of harvest: 05.01.2012

Results:

Table: Yield & yield attributes of sugarcane as influenced by different methods of planting and irrigation regimes at ZARS, Mandya

Treatment	Germn. (%)	Cane length (m)	NMC ('000/ha)	Cane weight (kg)	Cane Yield (MT/ha)	WUE (MT ha-cm ⁻¹)
P: Planting methods						
P ₁ : Conventional (90 cm rows)	42.08	2.39	79.05	1.38	109.39	0.59
P ₂ : Paired (30:150 cm rows)	40.24	2.46	88.22	1.45	132.75	0.72
P ₃ : Paired cum trench (30:150 cm rows)	41.31	2.51	88.38	1.46	133.27	0.73
S.Em _±	1.04	0.04	1.25	0.02	1.90	0.01
CD (p=0.05)	NS	NS	3.75	0.05	5.70	0.03
I: Irrigation schedule (IW/CPE Ratio)						
I ₁ : 0.6 IW/CPE	40.58	2.42	85.17	1.39	121.44	0.74
I ₂ : 0.9 IW/CPE	41.58	2.45	84.53	1.44	125.99	0.68
I ₃ : 1.2 IW/CPE	41.48	2.49	85.94	1.46	127.98	0.62
S.Em _±	1.04	0.04	1.25	0.02	1.90	0.01
CD (p=0.05)	NS	NS	NS	NS	NS	0.03
Interaction	NS	NS	NS	NS	NS	NS

Inference: Yield and yield attributes of sugarcane varied significantly with different methods of planting and irrigation schedules.

Paired cum trench method of planting recorded higher cane yield (133.27 MT ha⁻¹), cane weight (1.46 kg), number of millable cane (88.38 thousand) & cane length (2.51 m) followed by Paired rows (30:150) (132.75 MT ha⁻¹, 1.46 kg, 88.22 thousand ha⁻¹) which were at par with each other. Conventional planting (90 cm) recorded significantly lower yield and yield attributes (109.39 MT ha⁻¹, 1.38 kg & 79.05 thousand ha⁻¹).

Among the irrigation schedules, Irrigation with 1.2 IW/CPE ratio recorded higher cane yield (127.98 MT ha⁻¹, cane length (2.49 m) followed by 0.9 IW/CPE ratio (125.99 MT ha⁻¹, 2.45 m, respectively) which were statistically at par with each other and significantly superior over 0.6 IW/CPE ratio (121.44 MT ha⁻¹, 2.42 m, respectively).

The water use efficiency was higher with paired cum trench planting (0.73 MT ha-cm⁻¹) followed by paired row planting (0.72 MT ha-cm⁻¹) because of higher cane yield. Lower water use efficiency was observed with conventional planting (0.59 MT ha-cm⁻¹). Irrigation at 0.6 IW/CPE ratio recorded higher water use efficiency (0.74 MT ha-cm⁻¹) followed by 0.9 IW/CPE ratio (0.68 MT ha-cm⁻¹) and 1.2 IW/CPE ratio (0.62 MT ha-cm⁻¹).

Summary: Paired cum trench method of planting and irrigation scheduling at 0.9 IW/CPE ratio was found satisfactory with respect to cane yield and water use efficiency.

AS 62: Management of Binding weeds in Sugarcane

Objectives: To find out suitable herbicide for binding weeds in sugarcane

Technical program:

Design: RBD No. of replications: Three No. of treatments: 10

Date of Planting: 06.10.2010 Date of harvest: 12.10.2011

Results:

Table: Yield & yield attributes of sugarcane as influenced by different weed management practices

Treatment	Germn. (%)	Cane length (m)	Cane girth (cm)	Internode length (cm)	NMC ('000/ha)	Cane weight (kg)	Cane Yield (MT/ha)
T ₁ Control (Weedy check)	49.3	1.43	2.42	10.73	65.1	0.90	58.20
T ₂ Hoeing at 30,60, 90 DAP	52.0	1.55	2.51	11.94	73.7	0.94	66.87
T ₃ Atrazine @ 2 kg a.i ha ⁻¹ (PE) followed by 2,4-D @ 1 kg a.i. ha ⁻¹ at 60 DAP	50.3	1.71	2.73	12.96	79.0	1.02	77.87
T ₄ Atrazine @ 2 kg a.i ha ⁻¹ after 1st irrigation and hoeing followed by 2,4-D @ 1 kg a.i. ha ⁻¹ at 75 DAP	47.3	1.77	2.85	13.69	81.4	1.08	87.29
T ₅ Metribuzine @ 1.25 kg a.i ha ⁻¹ (PE) followed by 2,4-D @ 1 kg a.i. ha ⁻¹ at 75 DAP	47.0	1.91	2.76	13.20	86.1	1.07	92.16
T ₆ Atrazine @ 2 kg a.i ha ⁻¹ (PE) + Almix @ 20 g ha ⁻¹ at 75 DAP	44.0	1.87	2.62	13.34	89.9	1.06	85.31
T ₇ Metribuzine @ 1.25 kg a.i ha ⁻¹ (PE) + Almix @ 20 g ha ⁻¹ at 75 DAP	49.0	1.76	2.56	13.40	84.6	1.16	86.01
T ₈ Atrazine @ 2 kg a.i ha ⁻¹ (PE) + Ethoxysulfuron @ 50 g a.i. ha ⁻¹ at 75 DAP	44.3	1.71	2.67	13.04	85.5	1.06	78.70
T ₉ Atrazine @ 2 kg a.i ha ⁻¹ (PE) + Dicamba @ 350 g a.i. ha ⁻¹ at 75 DAP	44.0	1.70	2.61	12.99	87.0	1.01	83.61
T ₁₀ Metribuzine @ 1.25 kg a.i ha ⁻¹ (PE) + Dicamba @ 350 g a.i. ha ⁻¹ at 75 DAP	45.0	1.79	2.59	12.90	86.3	1.06	87.11
S.Em _±	2.8	0.13	0.09	1.01	4.5	0.09	6.18
CD (p=0.05)	NS	NS	NS	NS	13.3	NS	18.37
CV (%)	10.3	9.39	5.67	13.63	9.5	14.95	13.33

Table: Weed attributes in sugarcane influenced by different weed management practices

Treatment	Weed count (No. m ⁻²)		Weed DW (g m ⁻²)		WCE (%)
	60 DAP	120 DAP	60 DAP	120 DAP	
T ₁ : Control (Weedy check)	15.00 (225.33)*	14.35 (205.67)	4.29 (18.24)	4.59 (20.79)	-
T ₂ : Hoeing at 30,60, 90 DAP	10.04 (100.67)	10.46 (109.67)	2.83 (7.75)	3.33 (10.95)	46.68
T ₃ : Atrazine @ 2 kg a.i ha ⁻¹ (PE) followed by 2,4-D @ 1 kg a.i. ha ⁻¹ at 60 DAP	6.70 (45.00)	7.71 (59.67)	1.97 (3.65)	2.52 (6.23)	70.99
T ₄ : Atrazine @ 2 kg a.i ha ⁻¹ after 1 st irrigation & hoeing + 2,4-D @ 1 kg a.i. ha ⁻¹ at 75 DAP	6.60 (43.33)	7.25 (53.33)	1.86 (3.22)	2.33 (5.26)	74.07
T ₅ : Metribuzine @ 1.25 kg a.i ha ⁻¹ (PE) + 2,4-D @ 1 kg a.i. ha ⁻¹ at 75 DAP	5.65 (32.67)	6.42 (41.00)	1.67 (2.62)	2.12 (4.26)	80.06
T ₆ : Atrazine @ 2 kg a.i ha ⁻¹ (PE) + Almix @ 20 g ha ⁻¹ at 75 DAP	6.41 (41.33)	6.57 (43.00)	1.80 (3.03)	2.11 (4.23)	79.09
T ₇ : Metribuzine @ 1.25 kg a.i ha ⁻¹ (PE) + Almix @ 20 g ha ⁻¹ at 75 DAP	5.99 (35.67)	6.42 (41.00)	1.69 (2.61)	2.10 (4.18)	80.06
T ₈ : Atrazine @ 2 kg a.i ha ⁻¹ (PE) + Ethoxysulfuron @ 50 g ai. ha ⁻¹ at 75 DAP	6.15 (38.00)	6.37 (40.33)	1.72 (2.71)	2.17 (4.46)	80.39
T ₉ : Atrazine @ 2 kg a.i ha ⁻¹ (PE) + Dicamba @ 350 g a.i. ha ⁻¹ at 75 DAP	6.10 (37.33)	6.24 (38.67)	1.82 (3.10)	2.10 (4.16)	81.20
T ₁₀ : Metribuzine @ 1.25 kg a.i ha ⁻¹ (PE) + Dicamba @ 350 g a.i. ha ⁻¹ at 75 DAP	5.88 (34.67)	6.16 (37.67)	1.83 (3.15)	2.06 (4.00)	81.69
S.Em ₊	0.38	0.36	0.10	0.13	-
CD (p=0.05)	1.14	1.06	0.31	0.39	-
CV (%)	8.92	7.94	8.30	8.90	-

Note: * $\sqrt{(x + 0.25)}$ transformed. Figures in the parenthesis indicate the original values.

Inference: Pre-emergent application of Metribuzine @ 1.25 kg a.i ha⁻¹ + 2,4-D @ 1 kg a.i. ha⁻¹ at 75 DAP recorded significantly higher cane yield (92.16 MT ha⁻¹) cane weight (1.07 kg), number of millable cane (86.1 thousand), cane length (1.91 m) & cane girth (2.76 cm) which is statistically at par with different combination of pre-emergent herbicides (Atrazine & Metribuzine) and Post emergent herbicides (Dicamba, ethoxysulfuron, Almix). Significantly lower yield was observed in weedy check.

Higher weed count and dry weight at 60 and 120 DAP was observed with control treatment which were significantly higher compared to all other treatments. Metribuzine as pre-emergent application followed by Dicamba as post emergent application recorded higher weed control efficiency (81.69%). Better weed control efficiency was noticed with treatments receiving pre-emergent application of atrazine / metribuzine with different combination of post-emergent herbicides (T₃ to T₁₀) over hoeing (T₂) or un-weeded check (T₁).

Summary: Application of either atrazine or metribuzine as pre-emergent spray followed by a post-emergent spray can suppress the weeds better than hoeing at 30, 60 & 90 DAS.

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

Objectives: To study the differential response of sugarcane crop to different nutrients

Technical program

Design : RBD No. of treatments : 12 No. of replications : 3
Date of Planting: 19.01.2011 Date of harvest: 25.01.2012

Results:

Table: Yield & yield attributes of sugarcane as influenced by different treatments

Treatment	Germination (%)	Cane weight (kg)	Cane length (m)	cane girth (cm)	Internode length (cm)	NMC ('000 ha ⁻¹)	Cane yield (MT ha ⁻¹)
T ₁ Control (No fertilizer)	38.5	0.96	1.66	2.18	10.29	58.01	65.05
T ₂ N	37.9	1.21	2.00	2.65	11.51	64.40	82.36
T ₃ NP	38.6	1.42	2.18	2.75	11.89	70.33	96.64
T ₄ NPK	40.3	1.52	2.23	2.75	12.58	71.53	103.59
T ₅ NPK + S	37.5	1.54	2.28	2.78	12.67	71.13	104.95
T ₆ NPK + Zn	37.6	1.55	2.30	2.82	12.63	70.80	105.17
T ₇ NPK + Fe	34.0	1.53	2.21	2.83	12.61	70.73	103.81
T ₈ NPK + Mn	37.7	1.52	2.30	2.86	12.88	70.05	103.59
T ₉ NPK + S + Zn	36.1	1.63	2.40	2.89	13.61	70.27	110.92
T ₁₀ NPK + S + Zn + Fe	37.4	1.70	2.48	2.95	13.69	71.96	115.86
T ₁₁ NPK + S + Zn + Fe + Mn	35.7	1.73	2.49	2.96	13.79	71.97	117.49
T ₁₂ Soil test based fertilizer application	36.6	1.80	2.51	2.99	13.93	73.00	122.51
S.Em _±	1.8	0.10	0.08	0.10	0.67	2.79	6.66
CD (p=0.05)	NS	0.29	0.24	0.30	1.95	8.20	19.53

Inference: Nutrients in isolation and different combinations were tried to identify the role of different nutrients. Sugarcane responded to combination of nutrients comprising all the primary nutrients significantly over the one or two primary nutrients only. Higher cane yield was recorded with application of nutrients based on soil test (122.51 MT ha⁻¹) which was significantly superior over control (65.05 MT ha⁻¹), N alone (82.36 MT ha⁻¹) and NP only (96.64 MT ha⁻¹), but was at par with application of all the three primary nutrients slowly or in combination with secondary and micro nutrients. Similar trends were also observed in respect of yield attributes.

Summary: Sugarcane responded to combination of nutrients comprising all the primary nutrients significantly over N and NP alone.

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Date : 27.04.2012

To,

Dr. V.P. SINGH
The Principal Investigator (Crop Production), AICRP (Sugarcane)
Director of Research,
Rajendra Agricultural University,
Pusa – 848 125 Samastipur Dist, Bihar

Sir,

Sub: Submission of the annual report 2011-12 – reg.

With reference to the above subject, I am here with submitting the hard copy of the annual report of the trials conducted at Mandya center. The soft copy has already been mailed to your Email. This is for your kind information and needful.

Thanking you

Yours faithfully,

Date: 27.04.2012
Place: Mandya

(Thimmegowda, M.N.)