AICRP(Sugarcane)

Annual report for the year 2015-16

CROP PRODUCTION
Regional Agricultural Research Station,
Anakapalle

Rainfall, Mean Temperatures and RH during crop growth period of 2015-16 at Regional Agricultural Research Station, Anakapalle.

Month & Year	Rainfall mm	No. of Rainy Days	Temperature (ºC)		R.H%		B.S.S.H	Evaporation (mm)
			Max	Min	F.N	A.N		
January, 2014	000.0	0	29.5	14.6	94	52	6.1	2.9
February, 2014	000.0	0	31.1	14.1	94	44	7.6	3.9
March, 2014	000.0	0	34.6	18.2	88	41	7.3	5.1
April, 2014	000.0	0	37.0	22.2	85	49	6.9	5.8
May, 2014	115.8	6	36.7	22.9	84	58	7.4	5.5
June, 2014	049.0	4	37.8	24.4	84	54	5.1	5.3
July, 2014	100.4	8	33.2	22.8	94	73	2.0	2.8
August, 2014	255.6	13	33.6	22.2	96	75	4.5	3.2
September, 2014	116.0	8	33.0	22.1	93	68	4.5	3.5
October, 2014	**316.4**	**10**	32.6	21.4	88	61	5.3	3.8
November, 2014	030.6	3	31.9	19.8	86	53	5.3	3.1
December, 2014	025.8	2	30.9	17.6	84	46	5.8	3.5
Total/Mean	1009.6	54	33.5	20.2	89.2	56.2	5.65	4.03

AGRONOMY

I. V. Project No : AS 42

VI. Project Title : Agronomic evaluation of new promising sugarcane genotypes (Mid late) – Ratoon under irrigated conditions.

VII. Serial number of the year of experimentation : III year

VIII. Location : Regional Agricultural Research Station, Anakapalle

IX. Objectives : To work out optimum nutrient requirement of sugarcane varieties from advanced varietal trial.

X. Technical programme on which the report is based : Project Coordinator, AICRP on Sugarcane, Agronomy / Soil Science sub-committee. Technical Programme of work for the year 2015-16 finalized during the 30th Biennial workshop of AICRP(Sugarcane) held on 1st and 2nd November,2014 at IISR, Lucknow.

a. Treatments :

Varieties : Four

V1: 2004A104
V2: 2007A177
V3: 2007A126
V4: Co 7219

Nitrogen levels : Three

F1: 75% of the recommended dose of N
F2: 100% of the recommended dose of N
F3: 125% of the recommended dose of N

b. Design : Factorial RBD

c. Replications : Three

d. Plot size : 8m x 4.8m (6 rows)

e. Manuring : N as per the treatments applied in two equal splits at the time of rationing and 45 days after ratooning.
P_2O_5 & K_2O as per the recommended dose were applied as basal at the time of ratooning.

f. Irrigations : Irrigations were given once in 6 days during formative phase till the onset of monsoon rains and once in 21 days during maturity phase from November till harvest.

g. Date of Ratooning : 12.03.2015

h. Date of harvesting : 02.01.2016

i. Designation and name of the Participants :
1. Dr. V. Gouri, Scientist (Agronomy)
2. Dr. M.Bharata Lakshmi, Principal Scientist (Agronomy)
3. Dr.T.Chitkala Devi, Principal Scientist(Agronomy)
4. Dr.K.V.Ramana Murthy, Principal Scientist(Agronomy)

j. Year of trial : III year

k. Results recorded previously : During 2014-15 application of 'N' at 125% recommended dose registered significantly higher cane

yield of 60.5 t/ha than lower levels of 75% (54.1 t/ha) and 100% (56.2 t/ha) recommended nitrogen. Among the three new mid late genotypes under test 2004A104 proved superior (59.9 t/ha) to 2007A126 (54.7 t/ha) and 2007A177 (53.3 t/ha) but found on par with the check variety Co 7219(59.4 t/ha). Due to heavy rainfall (231.0 mm) received during the month of October due to hud hud cyclone, when crop was in grand growth phase the crop was lodged and hence the yields obtained were very low.

l. Data recorded during the year:

Initial Soil Analysis:

Initial soil analysis was done. Soil of the experimental site was neutral in pH (7.1), normal in E.C (0.238dSm^{-1}) low in organic carbon (0.61%), low in available nitrogen (198 kg N /ha), medium in available phosphorus (47.9 kg/ha) and high in available potassium (313 kg /ha).

Tiller Population at 180 DAR:

Tiller population at 180 days after ratooning varied significantly with the genotype and level of nitrogen. Among different new mid late sugarcane genotypes 2004A104 recorded significantly higher number of tillers (Table-1) as compared to 2007A126 and 2007 A 177. Application of nitrogen at 125% recommended dose registered significantly higher number of tillers (1,15,754 /ha) as compared to 75% (1,00,795/ha) and 100% (1,06,851/ha) recommended nitrogen.

Number of millable canes/ha:

Significant differences in number of millable canes at harvest were observed due to different sugarcane genotypes and levels of nitrogen (Table-1). Application of nitrogen at 125% recommended dose registered significantly higher number of millable canes (70,197/ha) than 100% (66,812/ha) recommended nitrogen. Significantly lower number of millable canes were recorded with the application of 75% (60,069/ha) recommended dose. Among the new genotypes 2004A104 (70,718/ha) had higher number of millable canes than 2007A126 (63,117) and 2007A177 (62,230/ha). However the check variety Co7219 recorded 66,705 millable canes /ha.

Juice sucrose (%):

Cane juices were analyzed for sucrose content at harvest (Table – 1). Percent juice sucrose did not vary significantly both with sugarcane genotypes and application of different nitrogen doses.

Commercial cane sugar (%):

Commercial cane sugar percent was calculated treatment wise. Commercial cane sugar percent did not vary with application of different doses of nitrogen fertilizers and also with different mid late sugarcane genotypes. However 2007 A 177 recorded higher CCS percent (12.2) as compared to other new genotypes under study.

Cane yield (t/ha):

Cane yield per plot was recorded at harvest expressed in t/ha and presented in Table 1. Cane yield of ratoon crop of new mid late sugarcane genotypes under irrigated conditions varied significantly due to different N levels. Application of nitrogen at 125%

recommended dose registered significantly higher cane yield of 71.3 t/ha than lower levels of 75% (59.8 t/ha) and 100% (64.6 t/ha) recommended nitrogen. Among the new mid late genotypes under test, 2004A104 (68.1 t/ha) proved significantly superior over 2007A126 (64.4 t/ha) and 2007A177 (62.4 t/ha) but was on par with the check variety Co 7219(65.9 t/ha).

Sugar yield (t/ha):

Sugar yield was computed treatment wise and data are presented in table – 1. Highest Sugar yield was observed with application of 125 per cent nitrogen. Among the different new genotypes 2004 A 104 recorded highest sugar yield of 8.1 t/ha.

Summary:

Performance of new promising mid late sugarcane genotypes (Ratoon) viz., 2004A104, 2007A177 and 2007A16 along with check Co 7219 was studied under graded levels of Nitrogen under irrigated conditions at Regional Agricultural Research Station, Anakapalle during 2015-16 season. The results showed that application of 'N' at 125% recommended dose registered significantly higher cane yield of 71.3 t/ha than lower levels of 75% (59.8 t/ha) and 100% (64.6 t/ha) recommended nitrogen. Among the three new mid late genotypes under test 2004A104 proved superior (68.1 t/ha) to 2007A126 (64.4 t/ha) and 2007A177 (62.4 t/ha) but found on par with the check variety Co 7219 (65.9 t/ha).

Pooled data:

Pooled data mean (two plant crops) of number of millable canes (NMC), juice sucrose %, cane yield and sugar yield was calculated and presented in table-2. Three years study (two plant crops and one ratoon) on performance of new promising mid late sugarcane genotypes viz., 2004A104, 2007A177 and 2007A126 along with check Co7219 under graded levels of nitrogen in irrigated conditions indicated that, among different sugarcane genotypes (Mid late group) 2007A126 and 2004A104 recorded higher number of millable canes (65,300/ha and 61,800/ha) and cane yield (69.4 t/ha and 68 t/ha). Three tested genotypes performed well and registered higher number of millable canes (65,500/ha), cane yield (72.8 t/ha) and sugar yield (8.9 t/ha) at 125% (140 Kg N/ha) recommended nitrogen. However highest mean juice sucrose per cent was recorded at 100%recommended dose of nitrogen (table-2).

Table -1:Yield and quality of promising sugarcane genotypes (mid late group- Ratoon) as influenced by different levels of nitrogen under irrigated conditions during 2015-16.

Treatment	Tiller population/ha at 180DAP	NMC/ha	Cane yield (t/ha)	Juice sucrose (%)	CCS (%)	Sugar yield (t/ha)
Genotypes:						
2004A104	1,30,985	70,718	68.1	16.6	11.2	8.1
2007A177	81,315	62,230	62.4	16.9	12.2	7.6
2007A126	88,723	63,117	64.4	16.4	11.7	7.5
Co7219	1,29,839	66,705	65.9	16.6	11.9	7.9
SEm ±	330	609	1.24	0.25	0.26	0.24
C.D (0.05)	1007	1853	3.6	NS	NS	NS
N levels (RDN-224 Kg N/ha)						
N1- 75% RDN	1,00,795	60,069	59.8	16.6	12.0	7.1
N2-100% RDN	1,06,851	66,812	64.6	16.8	12.2	7.8
N3-125% RDN	1,15,754	70,197	71.3	16.5	11.9	8.5
SEm ±	467	337	1.07	0.21	0.23	0.20
C.D (0.05)	1401	1009	3.15	NS	NS	NS
C.V(%)						
Interaction (VxN)						
C.D (0.05)	NS	NS	NS	NS	NS	

Table 2 : Pooled data of number of millable canes, juice sucrose %, cane yield and sugar yield of new mid late promising sugarcane genotypes as influenced by different levels of nitrogen under irrigated conditions (2013-14 to 2015-16).

Treatments	Number of millable Canes (000/ha)			Mean of two plant crops	Juice sucrose %			Mean of two plant crops	Cane yield (t/ha)			Mean of two plant crops	Sugar yield (t/ha)			Mean of two plant crops
	2013-14 (plant)	2014-15 (plant)	2015-16 Ratoon		2013-14	2014-15	2015-16 Ratoon		2013-14	2014-15	2015-16 Ratoon		2013-14	2014-15	2015-16 Ratoon	
Genotypes																
V1-2004A104	59.3	64.2	70.7	61.8	15.8	17.7	16.6	16.8	76.1	59.9	68.1	68.0	9.0	7.5	8.1	8.3
V2-2007A177	42.5	52.3	62.2	47.4	16.1	17.6	16.9	16.9	68.0	53.3	62.4	60.7	7.9	6.5	7.6	7.2
V3-2007A 126	71.3	59.3	63.1	65.3	15.3	17.1	16.4	16.2	84.1	54.7	64.4	69.4	9.4	6.7	7.5	8.1
V4-Co 7219	75.2	63.7	66.7	69.5	16.6	17.7	16.6	17.15	88.9	59.4	65.9	74.15	10.8	7.5	7.9	9.2
S.Em±	4.13	6.21	6.09		0.30	0.26	0.25		0.94	0.88	1.24	0.9				
C.D. (P = 0.05)	13.83	18.50	18.53		NS	NS	NS		2.8	2.6	3.6	2.68				
Nitrogen Levels																
N1:75% of RDN (84 kg N/ha)	56.5	59.2	60.0	57.9	16.4	17.4	16.6	16.9	74.1	54.1	59.8	64.1	8.7	6.7	7.1	7.7
N2:100% of RDN (112 kg N/ha)	61.8	61.0	66.8	61.4	15.3	17.1	16.8	16.2	78.7	56.2	64.6	67.5	9.1	6.8	7.8	8.0
N3:125% of RDN (140 kg N/ha)	67.9	63.1	70.2	65.5	16.6	17.8	16.5	17.2	85.1	60.5	71.3	72.8	10.0	7.7	8.5	8.9
S.Em±	4.08	5.90	3.37		0.31	0.25	0.21		0.81	0.76	1.07	0.7				
C.D. (P = 0.05)	11.97	17.10	10.09		NS	NS	**NS**		2.4	2.2		2.13				
Interaction(VXN)	NS	NS	NS		NS	NS	NS		NS		NS	NS				

I. V. Project No : AS 42

VI. Project Title : Agronomic evaluation of new promising sugarcane genotypes (Early group) under irrigated conditions.

VII. Serial number of the year of experimentation : I year

VIII. Location : Regional Agricultural Research Station, Anakapalle

IX. Objectives : To work out optimum nutrient requirement of sugarcane varieties from advanced varietal trial (Early).

X. Technical programme on which the report is based : Project Coordinator, AICRP on Sugarcane, Agronomy / Soil Science sub-committee. Technical Programme of work for the year 2015-16 finalized during the 30th Biennial workshop of AICRP(Sugarcane) held on 1st and 2nd November,2014 at IISR, Lucknow.

a. Treatments :

Varieties : Three

V1: 2006A64
V2: 2006A102
V3: 2006A 223
V4: 2007 A 81
V5: 93A145

Nitrogen levels : Three

F1: 75% of the recommended dose of NPK
F2: 100% of the recommended dose of NPK
F3: 125% of the recommended dose of NPK

b. Design : Factorial RBD

c. Replications : Three

d. Plot size : 6.0 m X 3.2 m

e. Manuring : As per the treatments

Recommended dose:

112kg N + 100kg P2O5 + 120kg K2O / ha.

Entire dose of phosphorous and potassium was applied as basal at the time of planting. Nitrogen was applied in two equal split doses at 45 DAP and 90 DAP as per treatments.

f. Irrigations : Irrigations were given once in 6 days during formative phase till the onset of monsoon rains and once in 21 days during maturity phase from November till harvest.

g. Date of Planting : 20.01.2015

h. Date of harvesting : 10.12.2016

i. Designation and name of the Participants : 1.Dr. V. Gouri, Scientist (Agronomy)
2.Dr.M.Bharata Lakshmi, Principal Scientist(Agronomy)
3. Dr.K.V.RamanaMurthy, Principal Scientist(Agronomy)
4. Dr.T.Chitkala Devi, Principal Scientist(Agronomy)

j. Year of trial : I year

k. Results recorded previously : New trial

l. **Data recorded during the year**:

Initial Soil Analysis:

Initial soil analysis was done. Soil was neutral in pH (7.46), normal in E.C(0.18 dSm^{-1}) low in organic carbon (0.56%), low in available nitrogen (241 kg N /ha), high in available phosphorus (66.2 kg/ha) and high in available potassium (242 kg / K_2O /ha).

Germination per cent:

Germination per cent was recorded at 35 days after planting expressed in % and presented in table-3. Germination percentage did not vary significantly due to application of different doses of nitrogen fertilizers. Among the varieties 2006A102 recorded significantly higher germination percentage (75.9) followed by 2006A64 (65.4) than the check variety 93A145 (60.4). 2006A223 recorded significantly lower germination 50.4%.

Tiller population at 180 DAP:

Tiller population at 180 DAP of different new early sugarcane genotypes varied significantly due to different nitrogen doses. Application of nitrogen fertilizer at 125% recommended dose to early sugarcane genotypes significantly increased the tiller population (1,41,354/ha) as compared to 75% recommended dose of nitrogen fertilizer (1,33,229/ha) and 100% recommended dose of nitrogen fertilizer (1,36,041/ha). Among different new early sugarcane genotypes 2006A64 recorded significantly higher tiller population of 1,59,375/ha followed by 2006A102 (1,47,596/ha) as compared to 2006A223 (99,826/ha) and the check variety 93A145 (1,34,722/ha) .

Number of millable canes/ha:

Number of millable canes varied significantly due to different nitrogen doses (Table 3). Application of nitrogen fertilizer at 125% recommended dose to early sugarcane genotypes significantly increased the number of millable canes (88,875/ha) as compared to 75% recommended dose of nitrogen fertilizer (75,687/ha) and 100% recommended dose of nitrogen fertilizer (80,822/ha). Among the genotypes 2006 A 64 recorded significantly higher number of millable canes (93,958/ha) than 2006 A 223(59,895/ha) and the check variety 93A145 (80,833/ha).

Cane yield (t/ha):

Cane yield per plot was recorded at harvest expressed in t/ha and presented in Table 3. Cane yield of new early sugarcane genotypes under irrigated conditions varied significantly due to different N levels. Application of nitrogen at 125% recommended dose registered significantly higher cane yield 97.0 t/ha than lower levels of application of 75% (86.3 t/ha) and 100% (92.4 t/ha) recommended nitrogen. Among the new early sugarcane genotypes under test, 2006A64 (100.7 t/ha) followed by 2006 A 102 (96.8 t/ha) and 2007 A 81(94.5 t/ha) proved significantly superior over 2006 A 223 (87.0 t/ha) and the check variety 93 A 145 (82.9 t/ha).

Juice Sucrose (%):

Significant differences in juice sucrose (%) were not observed either with genotype or nitrogen dose.

Commercial cane sugar(%):

Commercial cane sugar percent was calculated treatment wise. Commercial cane sugar percent did not varied with the levels of nitrogen fertilizer. Among the different early sugarcane genotypes 2006 A 64 recorded significantly higher CCS % of 12.7 and the check variety 93 A 145 recorded significantly lower CCS % of 11.6 .

Sugar yield (t/ha):

Sugar yield was calculated based on CCS% and cane yield. Significant variations were not found in sugar yield both with the levels of nitrogen and genotypes.

Summary:

Performance of new promising early sugarcane genotypes viz., 2006A64, 2006A102, 2006A223, 2007A 81 along with the check 93A145 was studied under graded levels of nitrogen under irrigated conditions at Regional Agricultural Research Station, Anakapalle during 2015-16 season. The results showed that application of 'N' at 125% recommended dose registered significantly higher cane yield of 97.0 t/ha than lower levels of 75% (86.3 t/ha) and 100% (92.4 t/ha) recommended nitrogen. Among the four new early genotypes under test 2006A64 proved superior (100.7 t/ha) as compared to other genotypes . The check variety 93A145recorded significantly lower cane yield of 82.9 t/ha.

Table -3: Yield and quality of promising sugarcane genotypes (Early group) as influenced by different levels of nitrogen under irrigated conditions during 2015-16.

Treatment	Germination Per cent	Tiller population at 180 DAP	NMC/ ha	Cane yield (t/ha)	Juice sucrose (%)	CCS (%)	Sugar yield (t/ha)
Genotypes							
2006 A 64	65.4	1,59,375	93,958	100.7	17.7	12.7	12.8
2006 A 102	75.9	1,47,596	88,437	96.8	17.3	12.4	12.0
2006 A 223	50.4	99,826	59,895	87.0	17.2	12.4	10.8
2007 A 81	58.1	1,43,055	85,850	94.5	17.0	12.1	11.4
93 A 145	60.4	1,34,722	80,833	82.9	16.5	11.6	9.6
SEm $\pm$	1.6	538	345	1.2	0.13	0.01	-
C.D (0.05)	4.6	1559	1002	3.5	NS	0.4	-
Fertilizer levels (Rec.dose-112 Kg N:100 P_2O_5:120 K_2O)							
F1- 75% RDN	60.5	1,33,229	75,687	86.3	17.3	12.4	10.8
F2-100% RDN	62.2	1,36,041	80,822	92.4	17.1	12.2	11.3
F3-125% RDN	63.4	1,41,354	88,875	97.0	17.0	12.1	11.8
SEm $\pm$	1.21	295	268	0.92	0.10	0.1	-
C.D (0.05)	NS	1207	777	2.7	NS	NS	-
Interaction (VxN)							
C.D (0.05)	NS	NS	NS	NS	NS	NS	
C.V(%)	6.1	11.2	11.1	4.24	2.29	3.0	

I. V. Project No : AS 68

VI. Project Title : Impact of integrated application of organics and in-organics in improving soil health and sugarcane productivity

VII. Serial number of the year of experimentation : II year

VIII. Location : Regional Agricultural Research Station, Anakapalle

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

X. Technical programme on which the report is based : Project Coordinator, AICRP on Sugarcane, Agronomy / Soil Science sub-committee. Technical Programme of work for the year 2015-16 finalized during the 30th Biennial workshop of AICRP(Sugarcane) held on 1st and 2nd November,2014 at IISR, Lucknow.

a. Treatments :

	Sugarcane (Plant crop)	Ratoon - I	Ratoon - II
T1	No organic + 50% RDF	Application of trash at 10 tonnes /ha + 50% RDF	Application of trash at 10 tonnes /ha + 50% RDF
T2	No organic + 100% RDF	Application of trash at 10 tonnes /ha + 100% RDF	Application of trash at 10 tonnes /ha + 100% RDF
T3	No organic + Soil test based recommendation.	Application of trash at 10 tonnes /ha + soil test basis (NPK application).	Application of trash at 10 tonnes /ha + soil test basis (NPK application).
T4	Application of FYM @ 20 t/ha + 50% RDF (inorganic source).	Application of FYM @ 20 t/ ha + 50% RDF (inorganic source).	Application of FYM @ 20 t/ ha + 50% RDF (inorganic source).
T5	Application of FYM @ 20 t/ha + 100% RDF (inorganic source).	Application of FYM @ 20 t / ha + 100% RDF (inorganic source).	Application of FYM @ 20 tonnes / ha + 100% RDF (inorganic source).
T6	Application of FYM @ 20 t/ha + inorganic nutrient application based on soil test(rating chart)	Application of FYM @ 20 t / ha + in organic nutrient application based on soil test (NPK application).	Application of FYM @ 20 t/ ha + in organic nutrient application based on soil test (NPK application).
T7	Application of FYM @ 10 t/ha + Biofertilizer (Azotobactor + PSB) + 50% RDF	Application of FYM @ 10 t / ha + bio-fertilizer (*Azotobacter* + *PSB*) + 50% RDF.	Application of FYM @ 10 t / ha + bio-fertilizer (*Azotobacter* + *PSB*) + 50% RDF.
T8	Application of FYM/Compost @ 10 tonnes/ha + Biofertilizer (Azotobactor + PSB) + 100%RDF	Application of FYM / Compost @ 10 tonnes / ha + bio-fertilizer (*Azotobacter* / *Acetobacter* + *PSB*) + 100% RDF.	Application of FYM / Compost @ 10 tonnes / ha + bio-fertilizer (*Azotobacter* + *PSB*) + 100% RDF.
T9	Application of FYM @ 10 t/ha + Biofertilizer (Azotobactor + PSB) + Soil test basis	Application of FYM @ 10 t/ ha + bio-fertilizer (*Azotobacter* + *PSB*) + soil test basis (NPK application).	Application of FYM @ 10 t/ ha + bio-fertilizer (*Azotobacter*+ *PSB*) + soil test basis (NPK application).

b. Design : RBD

c. Replications	:	Three
d. Plot size	:	6.4 m X 4.8m (6 rows)
e. Manuring	:	As per Treatments.
f. Irrigations	:	Irrigations were given once in 6 days during formative phase till the onset of monsoon rains and once in 21 days during maturity phase from November till harvest.
g. Date of planting	:	17.02.2015
h.Date of harvesting	:	06.02.2016
i. Designation and name of the Participants	:	1. Dr. V. Gouri, Scientist (Agronomy) 2.Dr.T.Chitkala Devi, Principal Scientist (Agronomy) 3.Dr.M.Bharata Lakshmi, Principal Scientist (Agronomy) 4.Dr. N. Raj Kumar, Scientist (Plant Pathology) 5.Dr.K.V.Ramana Murthy, Principal Scientist (Agronomy)
j. Year of trial	:	II year
k. Results recorded previously	:	* During 2014-15 season plant crop was severely lodged, water logged and damaged on account of heavy rain fall and high speed gales during hudhud cyclone. Hence the plant crop was raised during 2015-16 as per the discussions held with P.I crop production at Biennial workshop, IISR, Lucknow.

l. Data recorded during the year:

Initial soil analysis:

Initial soil analysis was done. Soil was neutral in pH (7.81), normal in E.C (0.1 dSm^{-1}), low in organic carbon (0.51%), low in available nitrogen (230 kg N /ha), medium in available phosphorus (40.25 Kg/ha) and high in available potassium (386 kg K_2O /ha).

Germination per cent:

Germination was recorded at 45 days after planting and expressed in % and presented in table-4. Significant variation in germination per cent was not observed due to application of different organic and inorganic nutrients. However application of FYM @ 10 t/ha + inorganic nutrient application based on soil test recorded significantly higher germination per cent of 77.8. Lowest germination percent (68.3) was observed in application of FYM @ 20 t/ha + 50% RDF (inorganic source) treatment.

Tiller population at 120 DAP:

Tiller population at 120 DAP varied significantly due to application of different organic and inorganic nutrient treatments. Application of FYM @ 10 t/ha + Biofertilizer (Azotobactor + PSB) + inorganic nutrient application based on soil test recorded significantly higher number of tillers as compared to other treatments. Application of 50 % recommended dose of fertilizers recorded significantly lower number of tillers (1,40,288/ha).

Number of millable canes/ha:

Significant differences were observed in number of millable canes due to different organic and inorganic treatments. Application of FYM @ 10 t/ha + Biofertilizer (Azotobactor + PSB) + inorganic nutrient application based on soil test basis recorded significantly higher number of millable canes (80,078/ha) at harvest. Number of millable canes recorded in application of FYM @ 10 t/ha + Biofertilizer (Azotobactor + PSB) + 100%RDF (78,776 /ha) or application of FYM @ 10 t/ha + Biofertilizer (Azotobactor + PSB) + 50% RDF (77691/ha) or application of FYM @ 20 t/ha + inorganic nutrient application based on soil test (77,366/ha) treatments were on par. Significantly lower number of millable canes were recorded in application of 50 percent recommended dose of inorganic fertilizer (69,227/ha).

Length of Millable Cane (LMC cm):

Length of the millable cane was measured at harvest in cm and data are presented in Table-4 .Significantly longest canes were registered in application of nutrients on soil test basis (331.0 cm) but found on par with all other treatments except application of no organics + 50% RDF(292.2 cm).

Juice sucrose (%):

Cane juices were analyzed for sucrose content at harvest (Table-4). Per cent juice sucrose values did not vary significantly due to different organic and inorganic treatments. How ever, the per cent juice sucrose values in different treatments varied between 15.4 to 18.0.

Commercial cane sugar (%):

Commercial cane sugar was calculated treatment wise and presented in table-4. CCS% did not vary significantly due to different treatments.

Cane yield (t/ha):

Cane yield was recorded at harvest and presented in Table -4 . Application of FYM @ 10 t/ha + Biofertilizer+inorganic nutrient application based on soil test registered significantly higher cane yield of 95.6 t/ha as compared to application of 50 % RDF+FYM@20 t/ha (89.7 t/ha) or application of fertilizers based on soil test (86.9 t/ha) or 100% RDF(85.9 t/ha) but found on par with application of FYM @ 10 t/ha+ Biofertilizer+ 100%RDF (95.4 t/ha) or application of FYM @ 20 t/ha + inorganic nutrient application based on soil test (94.1 t/ha) or application of FYM @ 20 t/ha + 100% RDF (93.7 t/ha) or application of FYM @ 10 t/ha + Biofertilizer (Azotobactor + PSB) + 50% RDF(90.9 t/ha). Application of only 50 per cent inorganic nutrients registered significantly lower cane yield of 80.4 t/ha.

Sugar yield:

Sugar yield was computed treatment wise. Sugar yield ranged from 9.7 to 11.8 t/ha.

Summary:

Studies on impact of integrated application of organics and in-organics in improving soil health and sugarcane productivity was studied at Regional Agricultural Research Station, Anakapalle during 2015-16 season. The results indicated that application of FYM @ 10 t/ha + Biofertilizer+inorganic nutrient application based on soil test (95.6 t/ha) or application of FYM @ 10 t/ha+ Biofertilizer+ 100%RDF (95.4 t/ha) registered significantly higher cane yield as compared to the other treatments. Application of only 50% RDF registered lowest cane yield of 80.4 t/ha.

Table -4: Yield attributes, yield and quality of sugarcane as influenced by application of organic and inorganic plant nutrients during 2015-16

Treatment	Germination % at 45 DAS	Tiller population at 120 DAP (/ha)	LMC (cm)	NMC/ha	Cane yield (t/ha)	Juice sucrose (%)	CCS (%)	Sugar yield (t/ha)
No organic + 50% RDF	70.0	1,40,299	292.2	69,227	80.4	16.8	12.1	9.7
No organic + 100% RDF	71.3	1,43,880	309.5	71,397	85.9	17.6	12.8	11.0
No organic + Soil test based recommendation.	70.4	1,45,507	331.0	72,266	86.9	17.6	12.7	11.0
Application of FYM @ 20 t/ha + 50% RDF (inorganic source).	68.3	1,40,624	311.5	71,831	89.7	15.4	11.0	9.8
Application of FYM @ 20 t/ha + 100% RDF (inorganic source).	74.8	1,44,422	311.2	75,304	93.7	16.5	11.8	11.1
Application of FYM @ 20 t/ha + inorganic nutrient application based on soil test	77.8	1,45,508	327.8	77,366	94.1	16.8	12.2	11.0
Application of FYM @ 10 t/ha + Biofertilizer (Azotobactor + PSB) + 50% RDF	71.7	1,41,601	310.7	77,691	90.9	18.0	13.0	11.8
Application of FYM @ 10 t/ha + Biofertilizer (Azotobactor + PSB) + 100%RDF	73.8	1,47,560	310.3	78,776	95.4	16.6	12.3	11.6
Application of FYM @ 10 t/ha + Biofertilizer (Azotobactor + PSB) + inorganic nutrient application based on Soil test basis	74.9	1,53,921	328.2	80,078	95.6	16.5	11.8	11.2
SEm±	6.13	1143	5.25	626	1.9	0.40	0.44	0.53
C.D (0.05)	NS	3425	22.2	1877	5.7	NS	NS	NS
C.V(%)	11.3	3.2	4.1	7.0	6.6	4.1	6.25	8.4

I. V. Project No : AS 69

VI. Project Title : Use of plant growth regulators (PGRs) for enhanced yield and quality of sugarcane

VII. Serial number of the year of experimentation : I year

VIII. Location : Regional Agricultural Research Station, Anakapalle

IX. Objectives : 1.To accelerate rate and extent of sugarcane germination through the use of PGRs.
2.To assess the effect of PGRs on sugarcane germination, growth, yield and juice quality.

X. Technical programme on which the report is based : Project Coordinator, AICRP on Sugarcane, Agronomy / Soil Science sub-committee. Technical Programme of work for the year 2015-16 finalized during the 30th Biennial workshop of AICRP(Sugarcane) held on 1st and 2nd November,2014 at IISR, Lucknow.

a. Treatments : 8
T1: Conventional planting/farmers practice(3 bud setts)
T2: Planting of setts after over night soaking in water
T3: Planting of setts after over night soaking in 50 ppm ehrel solution
T4: Planting of setts after over night soaking in 100 ppm ehrel solution
T5: T1+GA_3 spray (35 ppm) at 90. 120 and 150 DAP
T6: T2+GA_3 spray (35 ppm) at 90. 120 and 150 DAP
T7: T3+GA_3 spray (35 ppm) at 90. 120 and 150 DAP
T8: T4+GA_3 spray (35 ppm) at 90. 120 and 150 DAP

b. Design : RBD

c. Replications : Three

d. Plot size : 7.0 m X 4.8m (6 rows)

g. Date of planting : 02.03.2015

h.Date of harvesting : 27.01.2016

i. Designation and name of the Participants :
1. Dr. V. Gouri, Scientist (Agronomy)
2. Dr.Ch.Mukund Rao, Principal Scientist(Plant Physiology)
3. Dr.M.Bharata Lakshmi, Principal Scientist (Sugarcane)
4. Dr.K.V.Ramana Murthy, Principal Scientist(Agronomy)
5. Dr.T.Chitkala Devi, Principal Scientist(Agronomy)

j. Year of Trial: First Year

k. Results recorded previously: New trial

l. Data recorded during the year:

Germination per cent:

Germination was recorded at 20 and 45 days after planting expressed in % and presented in table- 5. At 20 DAP, significant differences were not observed due to different treatments. However, Planting of setts after over night soaking in 50 ppm ethrel solution recorded highest per cent germination of 80.3 %. At 45 days, planting of setts after soaking in 50 ppm (86.6%) or 100 ppm (83.8%) ethrel solution recorded significantly higher per cent germination as compared to other treatments. Conventional 3 bud sett planting recorded significantly lower per cent germination of 76.2.

Tiller population at 90 DAP:

Number of tillers at 90 days after planting before spraying of GA3 was recorded and data are presented in table -5. Planting of setts after soaking in 100 ppm (1,56,548/ha) or 50 ppm (1,54,762/ha) ethrel solution recorded significantly more number of tillers as compared to other treatments. Planting of setts after over night soaking in water recorded significantly lower number of tiller population (1,17,261/ha) at 90 DAP.

Tiller population at 180 DAP:

At 180 days, significant variations were observed in tiller population among the treatments. Planting of setts after over night soaking in 50 ppm ethrel solution followed by spraying of GA3 at 90, 120 and 150 days after planting recorded significantly higher number of tillers (1,46,428/ha) as compared to other treatments. Planting of setts after over night soaking in water recorded significantly lower number of tillers (1,14,286/ha).

Plant height (cm) at 90 DAP:

Plant height at 90 days after planting was recorded before spraying of GA_3 and data were presented in table -5. Plant height did not varied significantly due to different treatments. How ever tallest plants (145.5 cm) were observed in planting of setts after soaking in water followed by GA_3 spray at 90, 120 and 150 days after planting treatment.

Plant height (cm) at 180 DAP:

At 180 days after planting after spraying of GA3 three times at 90,120 and 150 DAP, significant differences were observed in plant height among different treatments. Plant height in all GA_3 sprayed treatments recorded significantly higher plant height as compared to the other treatments. Spraying of GA_3 in conventional three budded sett planting recorded significantly taller plants (283.4 cm) but found on par with planting of setts after overnight soaking in water (278.2 cm) or 50 ppm (279.0 cm) or 100ppm (273.2 cm) ethrel solution followed by spraying of GA_3 at 90, 120 and 150 days after planting. Significantly lower plant height was observed in planting of setts after over night soaking in water (254.0cm).

Length of Millable Cane (cm):

Length of the millable cane was measured at harvest in cm and data are presented in Table-5. Significantly longer canes were recorded in planting of setts after soaking in 100 ppm (350.0 cm) or 50 ppm (345.0 cm) ethrel solution and spraying of GA_3 at 90, 120 and 150 days after planting. Conventional 3 bud sett planting recorded significantly lower length of millable cane (280.0 cm) at harvest.

Number of millable canes/ha:

Significant differences were observed in number of millable canes due to application of different plant growth regulators (PGRs). Significantly higher number of miillable canes were recorded in planting of setts after overnight soaking in 100 ppm ethrel solution followed by spraying of GA_3 at 90,120 and 150 days after planting (70,833/ha) but found on par with planting of setts after overnight soaking in 50 ppm ethrel solution (70,486/ha) or water (68,750/ha) followed by spraying of GA_3 at 90,120 and 150 days after planting. Conventional three budded sett planting recorded significantly lower number of millable canes (65,972/ha) at harvest.

Juice sucrose (%):

Cane juices were analysed for sucrose content at harvest (Table-5). Per cent juice sucrose values did not vary significantly due to application of PGRs. However, the per cent juice sucrose values in different treatments varied between 15.94 to 16.76.

Commercial cane sugar (%):

Commercial cane sugar was calculated treatment wise and presented in table-5. CCS% did not vary significantly due to different treatments.

Cane yield (t/ha):

Cane yield was recorded at harvest and presented in Table -5. Significantly highest cane yield (92.0 t/ha) was recorded in planting of setts after overnight soaking in 100 ppm ethrel solution followed by spraying of GA_3 at 90,120 and 150 days after planting but found on par with planting of setts after overnight soaking in 50 ppm ethrel solution followed by spraying of GA_3 at 90,120 and 150 days after planting (90.6 t/ha). Conventional 3 budded sett planting recorded significantly lower cane yield of 80.0 t/ha.

Sugar yield:

Sugar yield was computed treatment wise. Sugar yield did not varied significantly due to different treatments but highest sugar yield (10.6 t/ha) was recorded with T8 treatment i.e planting of setts after overnight soaking in 100 ppm ethrel solution followed by spraying of GA_3 at 90,120 and 150 days after planting.

Summary:

Studies on use of plant growth regulators (PGRs) for enhanced yield and quality of sugarcane was studied at Regional Agricultural Research Station, Anakapalle during 2015-16 season. First year experimentation results indicated that significantly higher cane yield was recorded in planting of setts after overnight soaking in 100 ppm (92.0 t/ha) or 50 ppm ethrel solution (90.6 t/ha) followed by spraying of GA_3 at 90,120 and 150 days after planting (90.6 t/ha). Conventional 3 budded sett planting recorded significantly lower cane yield of 80.0 t/ha.

Table:5-Yield attributes, yield and quality of sugarcane as influenced by sett treatment with different plant growth regulators during 2015-16

Treatment	Germination (%) at 20 DAP	Germination (%) at 45 DAP	Tiller population at 90 DAP	Tiller population at 180 DAP	Plant height (cm) at 90 DAP	Plant height (cm) at 180 DAP	LMC (cm)	NMC /ha	Cane yield (t/ha)	Juice Sucrose (%)	CCS (%)	Sugar Yield (t/ha)
T1:Conventional 3 bud sett planting	69.9	76.2	1,33,929	1,26,190	141.1	254.8	280.0	65,972	80.0	16.37	11.1	8.9
T2:Planting of setts after over night soaking in water	53.9	67.8	1,17,261	1,14,286	128.0	254.0	290.5	66,667	81.6	16.76	11.6	9.4
T3:Planting of setts after over night soaking in 50 ppm ethrel solution	80.3	86.6	1,54,762	1,41,667	135.8	266.7	295.3	67,708	84.4	16.31	11.3	9.5
T4-Planting of setts after over night soaking in 100 ppm ethrel solution	70.8	83.8	1,56,548	1,41,667	138.6	262.2	299.0	68,055	85.1	15.66	10.7	9.1
T5:T1+GA_3 Spray (35 ppm) at 90,120 and 150 DAP	69.0	79.6	1,48,809	1,34,524	140.6	283.8	335.0	68,402	86.1	16.28	11.2	9.6
T6:T2+GA3 Spray (35 ppm) at 90,120 and 150 DAP	68.3	80.1	1,37,202	1,38,095	145.5	278.2	340.0	68,750	87.5	15.94	11.0	9.6
T7-:T3+GA_3 Spray (35 ppm) at 90,120 and 150 DAP	73.6	81.3	1,46,286	1,46,428	143.9	279.0	350.0	70,486	90.6	16.14	10.9	9.9
T8:T4+GA_3 Spray (35 ppm) at 90,120 and 150 DAP	71.5	80.6	1,38,988	1,41,071	120.5	273.2	345.0	70,833	92.0	16.56	11.3	10.4
SEm±	5.86	1.44	2102	1381	5.7	4.4	12.1	731	1.2	0.54	0.52	0.47
C.D (0.05)	NS	4.4	6378	4191	NS	13.4	36.7	2215	3.5	NS	NS	NS
C.V(%)	14.5	11.1	5.6	5.8	7.2	4.85	6.64	1.85	2.34	5.8	8.0	8.5