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**ALL INDIA CO-ORDINATED RESEARCH PROJECT**

**ON**

**SUGARCANE**

**(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)**

**(ANNUAL REPORT AGRONOMY)**

**(2014-2015)**

**CENTRE: PUSA (BIHAR)**



**SUGARCANE RESEARCH INSTITUTE  
RAJENDRA AGRICULTURAL UNIVERSITY  
BIHAR, PUSA (SAMASTIPUR) -848 125**

# ***CONTENTS***

<b>Sl. No.</b>	<b>Project No.</b>	<b>Title</b>	<b>Page No.</b>
1.	-	Meteorological data during 2014 - 15	02
2.	AS 42	Agronomic evaluation of early and mid-late promising new sugarcane genotypes	3-8
3.	AS 63	Planting geometry in relation to mechanization in sugarcane	9-12
4.	AS 65	To enhance the productivity of sugarcane under wheat-sugarcane cropping system	13-16

**FORM – A**

**Discipline** : Agronomy **Latitude** : 25<sup>0</sup>59' N  
**Longitude** : 85<sup>0</sup>40' E  
**Altitude** : 52.1 m  
**Year** : 2014-15 **Soil type** : Sandy loam  
**Zone** : North Central and Eastern **State** : Bihar  
**Location** : Pusa

**Meteorological data**

Month	Temperature <sup>0</sup> C		Relative Humidity		Rain fall (mm)	No. of Rainy days
	Mean maximum	Mean minimum	7 Hrs. (%)	14 Hrs. (%)		
January, 2014	19.4	9.5	90	68	9.5	1
February, 2014	22.3	10.7	90	60	32.4	3
March, 2014	29.9	15.3	83	41	10.6	1
April, 2014	37.1	19.5	69	28	0.0	0
May, 2014	37.6	24.1	72	38	64.0	3
June, 2014	36.0	26.4	83	58	93.2	6
July, 2014	32.5	26.5	89	73	339.8	12
August, 2014	32.7	26.2	91	76	351.9	13
September, 2014	32.5	25.2	90	68	129.4	9
October, 2014	31.5	21.5	90	58	81.6	4
November, 2014	28.7	13.9	87	41	0.0	0
December, 2014	19.9	10.6	92	70	0.0	0
January, 2015	19.4	9.6	89	68	8.4	1
February, 2015	24.6	12.1	90	56	1.2	1

Station name with full address  
Sugarcane Research Institute,  
Pusa (Samastipur) Bihar

**Signature of Scientist**  
Name : Dr. Navnit Kumar  
Jr. Scientist-cum- Asstt. Prof. (Agronomy)

## FORM – B

**Name of the Co-ordinated Project** : Agronomic evaluation of early and mid-late promising new sugarcane genotypes

**Objective: To work out agronomy of sugarcane genotypes of advance varietal trail (AVT)**

Discipline : Agronomy State : Bihar

Zone : North Central and Eastern Location : Pusa

Project code : As 42 Year : 2014-2015

### General information about the trial

1. Design of experiment : R.B.D. (factorial)
2. Number of replication: 3 (three)
3. Treatments : 9 (Nine)

#### (a) *Genotype: 03*

Early			Mid-late		
Station name		AICRP naming	Station name		AICRP naming
V <sub>1</sub>	- CoP 111	(CoP 11436)	V <sub>1</sub>	- CoP 123	CoP 12438
V <sub>2</sub>	- CoP 112	(CoP 11437)	V <sub>2</sub>	- CoP 092	CoP 09436
V <sub>3</sub>	- CoP 081	(CoP 08436)	V <sub>3</sub>	- BO 155	BO 155

#### (b) *Level of nitrogen (% RDN):03*

- (i) 75% recommended dose of nitrogen
  - (ii) 100 % recommended dose of nitrogen
  - (iii) 125% recommended dose of nitrogen
4. Recommended dose of fertilizer *i.e* 150 kg N, 85 kg P<sub>2</sub>O<sub>5</sub> and 60 kg K<sub>2</sub>O/ha.
  5. Fertilizer application: As per the treatment, half of total N and full dose of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O were applied as basal and remaining N in two splits after 1<sup>st</sup> irrigation and earthing up.
  6. Date of Planting:  
Early: 03.02.2014 Mid-late: 05.2.2014
  7. Date of harvesting  
Early & mid-late: 30.01.2015
  8. Crop grown in previous season- Rice
  9. Plot size

(a) Gross plot size:  $8 \times 5.40$  m.

(b) Net plot size:  $8 \times 3.60$  m.

10. Planting distance

(a) Distance between two rows: 90 cm

(b) Length of gross plot: 8 m

(c) No. of rows in gross plot: 6 (six)

(d) No. of rows in net plot: 4 (four)

11. Soil type: sandy loam

12. pH value : 8.1

13. Soil fertility status at the time of planting.

<u>Soil test status</u>	<u>Values</u>
N- Low	216 kg N/ha
P- Medium	23 kg P <sub>2</sub> O <sub>5</sub> /ha
K- Low	121 kg K <sub>2</sub> O/ha

14. No. of irrigations given: 03

15. No. of weeding: 02

16. No. of hoeing: 01

17. Plant protection measures.

<u>Pesticides/fungicides</u>	<u>Applied dose</u>	<u>Date</u>
1. Monocrotophos 40 EC	1.00 Lit/ha	19.07.2014
2. Monocrotophos 40 EC	1.00 Lit/ha	19.08.2014

18. Damage to the crop due to

<u>Cause</u>	<u>Intensity of damage</u>	<u>Nature of damage</u>
Shoot borer	Slight	Partial
Top borer	Slight	Partial

19. The experiment is valuable: Yes

20. Name of the Co-operator: - Dr. Harendra Singh & Dr. Navnit Kumar

21. Signature of Scientist In charge:

22. Name & Designation: Dr. Navnit Kumar, Jr. Scientist (Agronomy)

**Result: AS 42 Agronomic evaluations of early promising new sugarcane genotypes 2014-15**

**Result of II<sup>nd</sup> year**

The data on growth, yield attributes, cane yield and sucrose percent juice as affected by early genotypes and levels of nitrogen have been presented in Table 2.

*Effect of Variety:* Among early genotypes, BO 112 recorded significantly higher germination percentage (37.6 %) though it was on a par with CoP 111. Similarly, significantly higher plant population (181.7 thousand/ha), millable canes (125.9 thousand/ha) and cane yield (95.9 t/ha) were recorded by the genotype BO 112 though it was on a par with CoP 081 in respect of millable canes and cane yield. Genotypes failed to exhibit significant influence on sucrose percent juice (Table 2).

*Nitrogen level:* The growth parameters such as plant populations and millable canes recorded marked increase upto 100% recommended dose of nitrogen, and were on a par with 125% RDN. Though significantly higher cane yield was noticed upto 125% RDF. Pol percent juice remained unaffected by level of nitrogen (Table 2). Interaction effect on V X N was found to be non-significant.

***Summary***

From the results it may be summarized that sugarcane early genotypes CoP 112 and CoP 081 should be fertilized with 125% recommended dose of nitrogen for getting higher yield of sugarcane.

**Result: AS 42 Agronomic evaluation of mid-late promising new sugarcane genotypes 2014-15**

**Result of II<sup>nd</sup> year**

The data on growth, yield attributes, cane yield and sucrose percent in juice as affected by mid-late genotypes and level of nitrogen have been summarized and presented in Table 3.

*Effect of Variety:* The data indicated that mid-late genotype CoP 092 recorded significantly higher plant population (194.8 thousand/ha), millable canes (132.2

thousand/ha) and cane yield (103.0 t/ha) when compared with BO 155 and statistically similar to CoP 123. Sucrose % juice did not cross the level of significance.

***Nitrogen level:*** The application of different levels of nitrogen had significant impact on plant population, millable canes and cane yield while, the effect on germination and sucrose in juice were non-significant. The significantly higher plant population (204.3 thousand/ ha) was recorded with each incremental level of nitrogen upto 125% RDF. However, significantly higher millable canes (124.7 thousand/ha) and cane yields (94.2 t/ha) were noticed up to 100 % RDN, which were statistically similar to 125 % RDN.

Interaction effect were found to be non – significant.

### ***Summary***

The investigations showed that sugarcane mid-late genotype CoP 092 can be grown with 100 % recommended dose of nitrogen to get higher productivity under north Bihar conditions.

**Table-2. AS 42: Effect of early promising genotypes of sugarcane and levels of nitrogen on growth, yield and quality of sugarcane during 2014-15 at Pusa, Bihar**

Treatment	Germination (%)	Plant population ('000/ha)	NMC ('000/ha)	Cane yield (t/ha)	Pol (%) in juice
<i>Early promising genotype</i>					
CoP 111	37.5	133.1	105.0	72.2	16.78
CoP 112	37.6	181.7	125.9	95.9	17.51
CoP 081	31.0	157.0	118.4	88.4	16.92
SEm ±	1.60	7.99	4.79	3.70	0.22
CD (P = 0.05)	4.8	24.0	14.4	11.1	NS
<i>Level of nitrogen (% RDN)</i>					
75%	33.9	128.2	99.8	68.7	17.21
100%	35.6	160.1	119.5	87.1	17.10
125%	36.5	183.5	130.0	100.7	16.90
SEm ±	1.60	7.99	4.79	3.70	0.22
CD (P = 0.05)	NS	24.0	14.4	11.1	NS
CV (%)	13.6	15.3	12.4	13.0	3.95



**Table-3. AS 42: Effect of mid- late promising genotypes of sugarcane and levels of nitrogen on growth, yield and quality of sugarcane during 2014-2015 at Pusa, Bihar**

Treatment	Germination (%)	Plant population ('000/ha)	NMC ('000/ha)	Cane yield (t/ha)	Pol in juice (%)
<i>Midlate promising genotype</i>					
CoP 123	33.1	170.6	124.6	92.3	16.76
CoP 092	35.0	194.8	132.2	103.0	16.85
BO 155	34.4	141.4	111.2	82.9	16.64
SEm ±	1.96	9.39	5.09	4.30	0.18
CD (P = 0.05)	NS	28.1	15.3	12.9	NS
<i>Level of nitrogen (% RDN)</i>					
75%	33.3	131.4	103.8	77.5	16.86
100%	34.4	171.3	124.7	94.2	16.77
125%	34.9	204.3	139.5	106.4	16.62
SEm ±	1.96	9.39	5.09	4.30	0.18
CD (P = 0.05)	NS	28.1	15.3	12.9	NS
CV (%)	17.3	16.7	12.5	13.9	3.3

## FORM - B

Name of the Co-ordinated Project : Planting geometry in relation to mechanization in sugarcane.  
Objective : To work out optimum plant geometry for use of farm machinery.  
Discipline : Agronomy  
Zone : North Central and Eastern  
State : Bihar  
Location : Pusa, Bihar  
Project code No. : AS 63  
Year of start : 2012-2013  
Year : **2014-15**

### **Treatment:**

#### **1. *Planting geometry: (03)***

120 cm row distance

150 cm row distance

30:120 cm (paired row)

#### **2. *Genotype: (04)***

(i) BO 139

(ii) BO 153

(iii) CoP 9301

(iv) CoLk 94184

3. Design: Split plot

4. Replication: 3

5. Treatment: 12

6. Plot size: 6.0 x 8.0 m.

7. Planting season: Spring (Feb. –March)

8. Date of planting: 07.02.2014  
 9. Date of harvesting: 03.02.2015  
 10. Soil type: Sandy loam  
 11. pH value: 8.2  
 12. Soil fertility status at the time of planting.

<u>Soil test status</u>	<u>Values</u>
N- Low	216 kg N/ha.
P- Low	22 kg P <sub>2</sub> O <sub>5</sub> /ha
K- Low	119 kg K <sub>2</sub> O/ha.

13. No. of irrigations given: 03.  
 14. No. of weeding: 02.  
 15. No. of hoeing: 01.  
 16. Plant protection measures.

<u>Pesticides/fungicides</u>	<u>Applied dose</u>	<u>Date</u>
1. Monocrotophos 40 EC	1.00 lit/ha	14.07.2014
2. Monocrotophos 40 EC	1.00 lit/ha	20.08.2014

17. Damage to the crop due to

<u>Cause</u>	<u>Intensity of damage</u>	<u>Nature of damage</u>
Shoot borer	Slight	Partial
Top borer	Slight	Partial

18. The experiment is valuable: Yes  
 19. Name of the Co-operator: - Dr. Harendra Singh & Dr. Navnit Kumar  
 20. Signature of Scientist In charge:  
 21. Name & Designation: Dr. Navnit Kumar, Jr. Scientist (Agronomy)

**Result AS 63: Planting geometry in relation to mechanization in sugarcane****Results of III<sup>rd</sup> year**

The data on growth, yield attributes, cane yield and sucrose percent juice as influenced by planting geometry and variety have been summarized and presented in Table 4.

***Effect of planting geometry:*** Significantly higher plant population (161.6 thousand/ ha) was recorded at 30:120 cm row spacing. Similarly marked variation in millable canes (112.1 thousand/ ha) and cane yield (85.6 t/ha) were noticed at 30:120 cm row spacing though, which was statistically similar to 120 cm row spacing. However, pol percent juice did not varied significantly by planting geometry.

***Effect of Variety:*** The varieties differed significantly in terms of growth, yield attributes, cane yield and pol percent in juice. The variety BO 153 recorded significantly higher plant population (154.3 thousand/ha), millable canes (105.9 thousand/ha) and cane yield (80.8 t/ha). However, significantly higher pol percent (17.65 %) juice was recorded by the variety CoP 9301.

None of the interaction was found to be significant.

***Summary***

The study showed that variety BO 153 can be grown at 30: 120 cm or 120 cm row spacing for getting higher productivity of sugarcane under north Bihar conditions.

**Table- 4. AS 63: Effect of planting geometry and variety on growth, yield and quality of sugarcane during 2014 – 15 at Pusa, Bihar**

Treatment	Germination (%)	Plant population (000/ha)	NMC (000/ha)	Cane yield (t/ha)	Pol in juice (%)
<b>Planting geometry</b>					
120 cm	31.3	121.7	89.8	70.2	17.19
150 cm	29.7	88.5	66.1	58.4	17.05
30:120 cm	30.4	161.6	112.1	85.6	17.36
SEm ±	3.19	9.38	6.88	4.65	0.274
CD (P = 0.05)	NS	36.9	27.1	18.3	NS
CV (%)	18.2	13.1	13.3	11.3	2.75
<b>Variety</b>					
BO 139	23.9	101.6	78.7	73.4	16.82
BO 153	32.3	154.3	105.9	80.8	17.11
CoP 9301	34.5	109.0	79.4	61.7	17.65
CoLK 94184	31.1	130.7	93.4	69.7	17.22
SEm ±	1.32	4.33	2.40	2.37	0.134
CD (P = 0.05)	3.9	12.9	7.1	7.1	0.40
CV (%)	13.0	10.5	8.0	10.0	2.33

## FORM- B

Name of the Co-ordinated Project	:	Enhancing sugarcane productivity and profitability under wheat-sugarcane cropping system.
Objective :	:	To enhance the productivity of sugarcane under wheat-sugarcane cropping system.
Discipline	:	Agronomy
Zone	:	North Central and Eastern
State	:	Bihar
Location	:	Pusa
Project code No.	:	AS 65
Year of start	:	2011-12
Year	:	<b>2014-15</b>

### General Information about the trial

1. Design of Expt.: R.B.D.
2. No. of replication : 3 (Three)
3. Treatments : 9 (nine)

### Treatment

T<sub>1</sub>: Autumn planted sugarcane

T<sub>2</sub>: T<sub>1</sub>+wheat (1:2)

T<sub>3</sub>: T<sub>1</sub> + wheat (1:3).

T<sub>4</sub>: Wheat sown on 15<sup>th</sup> Nov.-Late Sugarcane.

T<sub>5</sub>: Wheat sown on 15<sup>th</sup> Dec.-Late Sugarcane.

T<sub>6</sub>: FIRB sowing of wheat at 15<sup>th</sup> Nov. (75 cm with 3 rows of wheat) + sugarcane in furrow in 3<sup>rd</sup> week of February.

T<sub>7</sub>: FIRB sowing of wheat at 15<sup>th</sup> Nov. (75 cm with 3 rows of wheat) + sugarcane in furrow in 3<sup>rd</sup> week of March.

T<sub>8</sub>: T<sub>6</sub> with 15<sup>th</sup> Dec. sowing of wheat.

T<sub>9</sub>: T<sub>7</sub> with 15<sup>th</sup> Dec. sowing of wheat.

4. Fertilizer application: As per recommended rate of fertilizers *i.e.* 150 kg N, 85 kg P<sub>2</sub>O<sub>5</sub> and 60 kg K<sub>2</sub>O/ha. Half of total N and full dose of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O were applied as basal. Rest half of N was applied in two equal splits.

5. Name of the variety: BO 141
6. Date of planting: As per treatment
7. Date of harvesting: 06.02.2015 (Sugarcane)
8. Gross plot size:  $8 \times 5.40$  m
  - (a) Distance between two rows: 90 cm
  - (b) Length of rows in gross plot: 8 m
  - (c) No. of rows in gross plot: 6 (six)
  - (d) No. of rows in net plot: 4 (four)
  - (e) Net plot size  $8 \times 3.60$  m
9. Soil type: sandy loam
10. pH value : 8.2
11. Soil fertility status at the time of planting.

<u>Soil test status</u>	<u>Values</u>
N- Low	216 kg N/ha.
P- Low	21 kg P <sub>2</sub> O <sub>5</sub> /ha
K-Low	125 kg K <sub>2</sub> O/ha.

12. No. of irrigations given: As per treatment
13. No. of weeding : As per treatments in technical programme.
14. No. of hoeing: As per treatments in technical programme.
15. Plant protection measures.

<u>Pesticides/fungicides</u>	<u>Applied dose</u>	<u>Date</u>
1. Monocrotophos 40 EC	1.00 Lit/ha	01 .07.2014
2. Monocrotophos 40 EC	1.00 Lit/ha	02 .08.2014

16. Damage to the crop due to

<u>Cause</u>	<u>Intensity of damage</u>	<u>Nature of damage</u>
Shoot borer	Slight	Partial
Top borer	Slight	Partial

17. The experiment is valuable: Yes
18. Name of the Co-operator: - Dr. Harendra Singh & Dr. Navnit Kumar
19. Signature of Scientist In charge:
20. Name & Designation: Dr. Navnit Kumar, Jr. Scientist (Agronomy)





### **Result: AS-65**

**Results of III<sup>rd</sup> year:** The data obtained on growth, yield attributes and yield of sugarcane and wheat and pol percent in juice as affected by different treatments have been summarized and presented in Table 5.

Sole sugarcane (T<sub>1</sub>) recorded significantly higher plant population (172.1 thousand/ha), millable canes (121.0 thousand/ha) and cane yield (93.3 t/ha) was statistically similar to T<sub>2</sub> in case of plant population, T<sub>2</sub>, T<sub>3</sub>, and T<sub>6</sub> in case of millable canes and T<sub>2</sub>, T<sub>3</sub>, T<sub>6</sub>, T<sub>7</sub> and T<sub>8</sub> in case of cane yield. The effect of treatments on pol percent juice was found to be non-significant. Maximum wheat grain (5.27 t/ha) and straw yield (6.32 t/ha) were recorded due to wheat sown on 15<sup>th</sup> Nov. followed by late planted sugarcane (T<sub>4</sub>) was statistically similar to wheat sown on 15<sup>th</sup> December followed by late sugarcane (T<sub>5</sub>) and significantly superior to rest of the combinations. The higher cane equivalent yield of 117.8 t/ha was recorded by T<sub>3</sub> which was followed by T<sub>4</sub> and T<sub>6</sub>.

### ***Summary***

Accommodation of three rows of wheat between two rows of sugarcane (T<sub>3</sub>) recorded higher sugarcane equivalent yield (117.8 t/ha) followed in order by wheat sown on 15<sup>th</sup> Nov. - late sugarcane (T<sub>4</sub>) and FIRB sowing of wheat on 15<sup>th</sup> Nov. + sugarcane planted in furrow during 3<sup>rd</sup> week of February.

**Table: 5. AS 65 Yield and yield attributing characters of sugarcane under wheat-sugar cropping system during 2014-15 at Pusa, Bihar**

Treatment	Germination %	Plant population ('000/ha)	NMC ('000/ha)	Cane yield (t/ha)	Pol in juice (%)	Germination (%)	Tillers (Row/m)	Grain yield	Straw yield	CEY (t/ha)
Sugarcane						Wheat				
T <sub>1</sub>	34	172.1	121.0	93.3	17.20	-	-	-	-	93.3
T <sub>2</sub>	33	152.8	109.2	86.9	17.00	39	85	2.41	3.02	109.1
T <sub>3</sub>	33	148.9	106.7	85.3	16.63	40	82	3.55	4.43	117.8
T <sub>4</sub>	32	128.8	93.3	68.2	19.90	39	80	5.27	6.32	116.0
T <sub>5</sub>	32	122.6	83.1	66.0	16.60	37	79	4.72	5.96	109.5
T <sub>6</sub>	30	148.7	103.6	81.6	17.01	39	79	3.43	4.28	113.1
T <sub>7</sub>	30	139.1	101.5	80.0	17.15	40	72	3.29	4.27	110.6
T <sub>8</sub>	31	141.7	102.4	81.0	16.75	38	68	2.82	3.38	106.6
T <sub>9</sub>	31	144.5	100.4	78.8	16.91	38	65	2.73	3.28	103.5
SEm ±	2.21	6.77	5.80	4.70	0.73	2.65	3.73	0.234	0.293	-
CD (P = 0.05)	NS	20.3	17.4	14.1	NS	NS	11.3	0.71	0.89	-
CV (%)	12.1	8.1	9.8	10.2	3.43	11.9	8.5	11.48	11.65	-

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