

## AGRONOMY

There were following six experiments at Faridkot during 2012-13 as listed below:

1. Experiment (AS 42): Agronomical evaluation of promising new sugarcane genotypes
  - A. Early Genotypes
  - B. Midlate genotypes
2. Experiment (AS 63): Plant geometry in relation to mechanization in sugarcane
3. Experiment (AS 64): Response of sugarcane to different plant nutrients in varied agro ecological situations
4. Experiment (AS 65): Enhancing sugarcane productivity and profitability under wheat-sugarcane cropping system
5. Experiment (AS 66): Priming of cane node for accelerating germination
6. Experiment (AS67)\*: Optimization of fertigation schedule for sugarcane through micro irrigation technique under different agro-climatic conditions (\*with modified treatments)

### EXPERIMENT WISE RESULTS

Experiment (AS 42): Agronomical evaluation of promising new sugarcane genotypes

#### A. Early Genotypes

Treatments:

**Genotypes:** 3 (CoPb 09181, CoPb 08211 and CoPb 08212)

**Fertilizer levels (kg N/ha):** 3 (N<sub>1</sub>: 112.5; N<sub>2</sub>: 150.0 and N<sub>3</sub>: 187.5)

**Date of Planting:** 15.02.2012, **Design:** Factorial randomized block design

#### **Initial Soil Status:**

Sandy Loam, pH: 7.9, EC: 0.28 m mhos/cm, OC: 0.30%

P<sub>2</sub>O<sub>5</sub>: 8.75 kg per ha, K<sub>2</sub>O: 487.5 kg per ha

#### **Results:**

##### **Genotypes**

CoPb 09181 was significantly better in cane yield (105.1 t/ha) and cane weight (1397g) than both the genotypes (Table 1a). Number of millable cane was the highest in CoPb 08212 followed by CoPb 08211 and CoPb 09181. Sucrose % was at better in CoPb 08211 than both the genotypes.

##### **N Levels**

There was increase in number of millable canes and cane yield upto 125% recommended N but statistically significant increase was there with 100% recommended N.

**Table 1a: Agronomical evaluation of promising sugarcane genotypes (Early) at Faridkot during 2012-13**

Treatments	Germi nation (%)	No. of Shoots 000/ha	NMC 000/ha	Cane length (cm)	Cane diameter (cm)	Single cane wt. (g)	Cane yield (t/ha)	Sucrose (%)
Genotypes								
CoPb 09181	43.8	151.7	92.9	221	2.78	1397	105.1	16.69
CoPb 08211	26.8	120.6	93.2	160	2.61	841	61.6	19.56
CoPb 08212	36.9	156.2	100.6	204	2.37	964	88.5	18.63
CD (5%)	6.4	20.0	NS	31	0.26	122	8.9	0.60
N levels (kg N/ha)								
112.5	35.3	132.2	87.8	190	2.62	1061	78.5	18.39
150.0	36.8	148.3	98.5	200	2.54	1063	87.9	18.36
187.5	35.5	148.1	100.6	196	2.59	1078	88.8	18.12
CD (5%)	NS	NS	NS	NS	NS	NS	8.9	NS

## **B. Midlate Genotypes:**

### **Treatments:**

**Genotypes:** 3 (CoPb 08217, CoH 08263 and CoH 08264)

**Fertilizer levels (kg N/ha):** 3 (N<sub>1</sub>: 112.5; N<sub>2</sub>: 150 and N<sub>3</sub>: 187.5)

**Date of Planting:** 15.02.2012, **Design:** Factorial randomized block design

### **Initial Soil Status:**

Sandy Loam, pH: 7.9, EC: 0.28 m mhos/cm, OC: 0.30%

P<sub>2</sub>O<sub>5</sub>: 8.75 kg per ha, K<sub>2</sub>O: 487.5 kg per ha

### **Results:**

#### **Genotypes**

CoH 08264 was significantly better in cane yield (100.5 t/ha) than CoPb 08217 (84.3 t/ha) and was at par with CoH 08263 (92.7 t/ha). Sucrose % was the highest in CoPb 08217 followed by CoH 08264 (Table 1b).

#### **N Levels**

There was increase in number of millable canes and cane yield upto 125% recommended N but statistically significant increase was there with 100% recommended N.

### **Conclusion:**

In early genotypes CoPb 09181 was promising in cane yield. In midlate group CoH 08264 and CoH 08263 were better in cane yield and CoPb 08217 was better in sucrose% in juice. The response to N fertilizer was upto 100% recommended dose.

**Table 1b: Agronomical evaluation of promising sugarcane genotypes (Midlate) at Faridkot during 2012-13**

Treatments	Germination (%)	No. of Shoots 000/ha	NMC 000/ha	Cane length (cm)	Cane diameter (cm)	Single cane wt. (g)	Cane yield (t/ha)	Sucrose (%)
Genotypes								
CoPb 08217	48.0	166.5	86.5	238	2.46	1149	84.3	16.52
CoH 08263	47.0	176.8	93.2	196	2.84	1247	92.7	15.47
CoH 08264	31.2	169.5	104.1	188	2.71	1205	100.5	16.42
CD (5%)	3.8	NS	7.0	16	0.22	NS	10.1	0.75
N levels (kg N/ha)								
112.5	42.8	161.9	86.1	204	2.68	1164	82.2	16.29
150.0	43.1	171.7	98.0	212	2.70	1215	95.4	15.77
187.5	40.3	179.2	99.8	206	2.63	1222	100.0	16.35
CD (5%)	NS	NS	7.0	NS	NS	NS	10.1	NS

**AS 63: Plant geometry in relation to mechanization in sugarcane**

**Objective:**

1. To work out optimum plant geometry for use of farm machinery
2. To study varietal response to different planting geometry

**Date of planting:** 23.02.2012

**Treatments:**

**A. Plant geometry**

- i. 120 cm row distance
- ii. 150 cm row distance
- iii. 30:120 cm paired

**B. Genotype:**

- i. CoPb 09181
- ii. CoJ 64
- iii. CoJ 88
- iv. CoS 8436

**Design:** Split plot

**Replication:** Three

**Initial Soil Status:**

Sandy Loam, pH: 7.9, EC: 0.28 m mhos/cm, OC: 0.39%,  
P<sub>2</sub>O<sub>5</sub>: 4.5 kg per ha, K<sub>2</sub>O: 442.5 kg per ha

**Results:** At wider row spacing of 150 cm there is significant reduction in shoots, millable canes and cane yield (Table 2a and 2b). Although there is improvement in cane diameter and

single cane weight at wider spacing. In paired row (120:30 cm) there are more number of shoots and millable canes but there is significant reduction in cane weight.

Among the varieties CoPb 09181 and CoJ 88 are significantly better than other two varieties. CoPb 09181 has the highest single cane weight and cane yield. CoJ 88 has the highest number of shoots and millable canes. CoJ 64 has the highest sucrose % followed by CoJ 88 and CoPb 09181.

All the varieties except CoS 8436 showed the reduction in cane yield when planted at 150 cm row spacing (Table 2b). The varieties, CoJ 64, CoJ 88 and CoS 8436 when planted at spacing of 150 cm between rows were at par in cane yield.

**Table 2a- Growth, yield and quality of sugarcane under different planting methods and varieties at Faridkot during 2012-13**

Treatments	Ger. (%)	Tillers 000/ha	NMC 000/ha	Cane length (cm)	Cane diameter (cm)	Single cane wt. (g)	Sucrose (%)
<b>Plant geometry</b>							
120 cm row distance	32.0	104.6	88.6	175	2.63	1031	17.58
150 cm row distance	42.9	81.8	70.1	180	2.75	1066	17.42
30:120 cm paired	40.4	148.9	106.6	172	2.36	841	17.99
CD (5%)	4.2	3.7	11.7	NS	0.08	129	NS
<b>Varieties</b>							
CoPb 09181	36.9	97.2	87.5	220	2.83	1479	17.59
CoJ 64	44.1	113.7	88.6	163	2.39	741	18.25
CoJ 88	32.9	132.4	97.7	189	2.44	904	18.14
CoS 8436	39.8	103.7	79.8	130	2.64	792	16.68
CD (5%)	4.7	14	10.7	31	0.11	144	0.61

**Table 2b. Cane yield (t/ha) of sugarcane varieties under different planting methods at Faridkot during 2012-13**

Variety	Planting method			
	120 cm row distance	150 cm row distance	30:120 cm paired row	Mean
CoPb 09181	86.6	67.8	92.6	82.3
CoJ 64	65.3	52.5	61.1	59.7
CoJ 88	87.0	60.2	91.5	79.6
CoS 8436	56.0	51.7	54.3	54.0
Mean	73.7	58.1	74.9	
CD (5%)				
Planting methods	7.1			
Varieties	4.7			
Planting method X variety	8.1			

## **AS 64: Response of sugarcane to different plant nutrients in varied agro ecological situations**

**Date of Planting:** 20.02.2012

**Variety:** CoH 119

### **Initial Soil Status:**

Sandy Loam, pH: 7.8, EC: 0.30 m mhos/cm, OC: 0.28%

P<sub>2</sub>O<sub>5</sub>: 7.97 kg per ha, K<sub>2</sub>O: 448 kg per ha, S= 98 ppm, Zn= 3.3 ppm, Fe= 11.8 ppm, Mn= 3.6 ppm

### **Treatments:**

T1: Control (No fertilizer)

T2: N (150 kg/ha)

T3: NP

T4: NPK

T5: NPK +S

T6: NPK +Zn

T7: NPK +Fe

T8: NPK +Mn

T9: NPK +S +Zn

T10: NPK +S +Zn +Fe

T11: NPK +S +Zn +Fe + Mn

T12: Soil test based fertilizer application (190 kg N and 30 kg P<sub>2</sub>O<sub>5</sub>/ha)

T13: FYM 20 t/ha

(P= 60 kg P<sub>2</sub>O<sub>5</sub>/ha, K= 60 kg K/ha, S= 40 kg/ha elemental sulphur, Zn= 25 kg ZnSO<sub>4</sub>/ha, Fe= Foliar spray of 1% Fe SO<sub>4</sub> thrice in weekly intervals at vegetative stage, Mn= 5 kg Mn SO<sub>4</sub>/ha )

**Results:** Cane yield in all the nutritional treatments was significantly better than control (Table 3). Application of all additional nutrients (except S) with recommended nitrogen fertilizer (T2) gave significantly higher cane yield. There was improvement in cane yield when all the nutrients were applied in combination with each other.

**Table 3: Growth, yield and quality of sugarcane during 2012-13 under various treatments**

Treatments	Germination (%)	No. of Shoots 000/ha	NMC 000/ha	Cane length (cm)	Cane diameter (cm)	Single cane wt. (g)	Cane yield (t/ha)	Sucrose (%)
T <sub>1</sub> : No fertilizer	39.3	112.3	82.2	189	2.67	1058	81.2	16.20
T <sub>2</sub> : N (150 kg/ha)	36.1	140.6	94.9	210	2.83	1238	103.8	16.70
T <sub>3</sub> : NP	37.9	157.2	99.4	223	2.77	1395	109.1	16.46
T <sub>4</sub> : NPK	38.9	159.5	100.4	220	2.83	1341	113.5	16.64
T <sub>5</sub> : NPK +S	37.0	154.3	101.8	220	2.77	1323	114.3	16.34
T <sub>6</sub> : NPK +Zn	42.0	157.5	107.7	231	2.97	1350	123.2	16.82
T <sub>7</sub> : NPK +Fe	39.5	156.4	108.9	217	2.87	1369	123.6	16.98
T <sub>8</sub> : NPK +Mn	39.5	164.6	114.7	222	2.83	1355	126.9	16.42
T <sub>9</sub> : NPK +S +Zn	41.0	160.2	110.3	218	2.80	1370	131.3	16.56
T <sub>10</sub> : NPK +S + Zn + Fe	40.1	168.4	107.5	213	2.97	1332	132.5	16.52
T <sub>11</sub> : NPK +S + Zn + Fe + Mn	37.7	162.2	101.8	212	2.87	1377	131.3	16.40
T <sub>12</sub> : Soil test based (190 kg N and 30 kg P <sub>2</sub> O <sub>5</sub> /ha)	40.9	154.3	100.0	224	2.90	1381	122.4	16.09
T <sub>13</sub> : FYM 20 t/ha	41.1	160.8	95.6	215	2.77	1302	107.1	16.61
CD (5%)	NS	26.4	11.5	NS	NS	NS	16.7	NS

**AS 65: Enhancing sugarcane productivity and profitability under wheat-sugarcane cropping system****Objective:** To enhance the productivity of sugarcane under wheat-sugarcane cropping system**Treatments:**T<sub>1</sub>: Autumn sugarcaneT<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 Nov. – late sugarcaneT<sub>5</sub>: Wheat sown on 15 Dec. – late sugarcaneT<sub>6</sub>: FIRB wheat 15<sup>th</sup> Nov. (75 cm with 3 rows of wheat) + sugarcane in furrows in 3<sup>rd</sup> week of FebruaryT<sub>7</sub>: FIRB wheat 15<sup>th</sup> Nov. (75 cm with 3 rows of wheat) + sugarcane in furrows in 3<sup>rd</sup> week of MarchT<sub>8</sub>: FIRB wheat 15<sup>th</sup> Dec. (75 cm with 3 rows of wheat) + sugarcane in furrows in 3<sup>rd</sup> week of FebruaryT<sub>9</sub>: FIRB wheat 15<sup>th</sup> Dec. (75 cm with 3 rows of wheat) + sugarcane in furrows in 3<sup>rd</sup> week of March**DOS of Wheat:** 15.11.2011, 16.12.2011

**Sugarcane:** T1-T3: 23.10.2011  
 T4-T5: 25.04.2012  
 T6, T8: 23.02.2012  
 T7, T9: 21.03.2012

**Results:** The wheat sown in November is significantly better than December sowing (Table 4). The sugarcane sown in furrows of FIRB sown wheat in the February and March was significantly better than sugarcane planted after wheat harvest and was at par with autumn sole sugarcane. Same was case for germination, number of shoots, number of millable canes and cane length.

**Table 4: Growth, yield and quality of sugarcane during 2012-13 under various treatments**

Treatments	Germination (%)	No. of Shoots 000/ha	NMC 000/ha	Cane length (cm)	Cane diameter (cm)	Single cane wt. (g)	Cane yield (t/ha)	Sucrose (%)	Wheat yield (q/ha)
T <sub>1</sub>	42.8	162.8	109.1	195	2.31	869	89.3	18.97	-
T <sub>2</sub>	44.3	163.3	101.0	196	2.34	807	74.7	19.05	30.6
T <sub>3</sub>	45.9	163.5	100.9	199	2.47	837	71.2	18.32	34.5
T <sub>4</sub>	25.7	118.6	74.3	170	2.40	760	47.6	17.89	47.7
T <sub>5</sub>	25.6	117.7	71.2	175	2.41	757	47.0	17.91	27.2
T <sub>6</sub>	44.1	194.1	110.6	194	2.35	841	89.8	18.07	47.0
T <sub>7</sub>	46.7	194.6	109.9	191	2.32	848	85.7	18.56	48.9
T <sub>8</sub>	45.8	191.7	108.8	190	2.46	829	85.7	18.31	30.3
T <sub>9</sub>	48.7	190.4	107.0	192	2.44	848	87.3	18.19	30.9
CD (5%)	5.6	23.1	10.8	NS	NS	NS	9.8	NS	6.4

**AS 66: Priming of cane node for accelerating germination**

**Objectives:**

- i. To find out suitable cane node priming technique
- ii. To assess the effect of cane node on acceleration of germination

**DOP:** 05.03.2012

**Design:** RBD

**Replication:** Four

**Treatments:**

T1: Un- primed cane nodes

T2: Treating cane node in hot water at 50 °C for 2 hours

T3: Treating the cane node in hot water (50 °C) urea solution (3%) for 2 hours

T4: Priming cane nod 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)

(\*Put the single cane node in the slurry of cattle dung, cattle urine and water for 15 minutes. Take out the buds and put in decomposed FYM and cover it with sugarcane trash for 4-5 days for sprouting)

Note: Depth of planting = 10 cm, soil cover= 2.5 cm and plant to plant spacing: 30 cm

**Results:** Germination% of single bud was significantly better than three budded setts (Table 5). Three budded planting was significantly better than all single bud treatments. Among single bud treatments priming has some positive effect but not statistically significant.

**Table 5: Growth, yield and quality of sugarcane during 2012-13 under various treatments**

Treatments	Germination (%)		No. of Shoots 000/ha	NMC 000/ha	Cane length (cm)	Cane diameter (cm)	Single cane wt. (g)	Cane yield (t/ha)	Sucrose (%)
	30DAS	40DAS							
T <sub>1</sub>	44.7	45.1	65.4	57.8	152	2.41	744	39.3	17.06
T <sub>2</sub>	46.6	48.5	66.3	63.9	151	2.39	773	45.6	17.19
T <sub>3</sub>	52.1	55.4	69.3	66.9	158	2.55	779	46.7	17.37
T <sub>4</sub>	50.4	56.9	80.6	65.6	153	2.46	775	45.0	17.25
T <sub>5</sub>	35.1	38.1	123.5	103.7	180	2.55	869	70.2	17.66
T <sub>6</sub>	53.9	59.5	80.9	63.7	152	2.47	781	42.8	17.38
CD (5%)	5.8	11.0	12.4	13.5	NS	NS	NS	6.8	NS

**AS-67: Optimization of fertigation schedule for sugarcane through micro irrigation technique under different agro-climatic conditions**

Objective: To economize water use in cultivation and improve sugarcane productivity.

\*Treatments: **A. Irrigation water/ method applied:**

I<sub>1</sub>: Drip irrigation at 75% Pan Evaporation (PE)-irrigation once in two days.

I<sub>2</sub>: Drip irrigation at 100% Pan Evaporation (PE)-irrigation once in two days.

I<sub>3</sub>: Drip irrigation at 125% Pan Evaporation (PE)-irrigation once in two days.

I<sub>4</sub>: Farmer's practice-surface irrigation

**B. Nitrogen Levels:**

N1: 100% recommended dose of nitrogen (RDN)

N2: 75% (RDN)

N3: 50% (RDN)

*\*Treatments modified*



DOP: 10.04.2013

**Treatment combinations:** 12, Design: Strip Plot, Replication: 3

**Results:** Drip irrigation at 125% CPE/IW ratio was significantly better in cane yield than other treatments (Table 6). When drip irrigation was applied at 100% CPE/IW the cane yield was at par with farmer's practice.

**Table 6: Yield and quality of sugarcane under different irrigation methods and nitrogen levels at Faridkot during 2012-13**

Treatments	No. of Shoots 000/ha	NMC 000/ha	Cane length (cm)	Cane diameter (cm)	Single cane wt. (g)	Cane yield (t/ha)	Sucrose (%)
<b>Irrigation water/ method applied:</b>							
Drip irrigation at 75% Pan Evaporation (PE)-irrigation once in two days	132.7	75.8	146	2.38	675	44.6	17.39
Drip irrigation at 100% Pan Evaporation (PE)-irrigation once in two days	152.5	84.1	150	2.28	666	53.1	17.42
Drip irrigation at 125% Pan Evaporation (PE)-irrigation once in two days	175.9	93.5	158	2.41	727	65.3	17.81
Farmer's practice-surface irrigation	150.0	78.3	156	2.28	708	51.3	17.84
CD (5%)	23.5	8.5	NS	0.09	NS	10.3	NS
<b>N levels (kg N/ha)</b>							
N1 : 100% recommended dose of nitrogen (RDN)	160.7	87.7	156	2.34	715	57.5	17.66
N2 : 75% (RDN)	151.3	85.1	153	2.36	695	53.1	17.63
N3 : 50% (RDN)	146.3	75.9	148	2.31	672	50.2	17.56
CD (5%)	NS	4.9	NS	NS	NS	NS	NS