

## Annual Report (Crop Production) of Faridkot for 2015-16

There were four experiments at Faridkot during 2015-16 as listed below:

1. AS 42: Agronomical evaluation of promising new sugarcane genotypes (Early and Midlate genotypes) - Plant and Ratoon
2. AS67\*: Optimization of fertigation schedule for sugarcane through micro irrigation technique under different agro-climatic conditions (\*with modified treatments)
3. AS 68: Impact of integrated application of organics and in organics in improving soil health and sugarcane productivity.
4. AS 69: Use of plant growth regulators (PGRs) for enhanced yield and quality of sugarcane

### Meteorological data:

Meteorological data was recorded during the crop season and is given in Table 1. The highest rainfall (162.0 mm) was in July 2015 followed by 144.0 mm in March, 2015 and there was 134.7 mm rain in June 2015, respectively. The highest values of maximum temperature (40.4 °C) in May 2015 followed by June (37.7 °C) and the lowest values (17.9 °C) were in January, 2016. The highest values of minimum temperature (27.0 °C) in August, 2015 followed by July (26.5 °C) and the lowest values (6.2 °C) were in January, 2016.

**Table 1: Meteorological data of Faridkot centre during 2015-16**

Month	Temperature (°C)		R.H. %		Rainfall (mm)	No. of rainy days
	Max.	Min.	Max.	Min.		
February 2015	22.9	10.3	83	51	48.9	3
March 2015	25.7	13.2	87	54	144.0	5
April 2015	34.1	19.8	75	49	45.2	3
May 2015	40.4	23.8	53	27	2.7	1
June 2015	37.7	25.5	63	38	134.7	7
July 2015	34.4	26.5	81	65	162.0	7
August 2015	34.4	27.0	83	67	118.2	6
September 2015	34.2	23.6	79	52	41.4	4
October 2015	32.8	18.5	82	41	1.9	0
November 2015	27.7	11.8	85	36	0.0	0
December 2015	21.8	6.2	89	43	0.0	0
January 2016	17.9	7.7	92	64	3.8	1
February 2016	23.0	8.3	92	47	23.2	2

## **EXPERIMENT WISE RESULTS**

**Project No. : AS 42**

**Title:** Agronomical evaluation of promising new sugarcane genotypes

**Objectives:** To work out agronomy of sugarcane genotypes of advanced varietal trial (AVT)

**Plant crop (2015-16):**

**A. Early group**

**Treatments:**

- **Genotypes:** 3 (Co 10035, CoH 10261 and CoJ 64)
- **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)

**Design:** Factorial RBD,

**Replications:** Three,

**Date of planting:** 10.02.2015

**Initial Soil Status:** pH: 8.4, EC: 0.18 dsm<sup>-1</sup>, OC= 0.51%, P =26.25 kg/ha, K= 750 kg/ha

**Results:**

**Genotypes**

CoH 10261 was significantly better in cane yield (107.7 t/ha), cane diameter (2.91 cm) and cane weight (1384 g) than both the genotypes (Table 2a). Cane length was the highest in CoJ 64 (215 cm) followed by Co 10035 (207 cm) and was significantly better than CoH 10261 (195 cm). Sucrose % was the highest in Co 10035 (16.22) followed by CoJ 64 (15.87) and was significantly better than CoH 10261 (14.43).

**N Levels**

There was increase in cane yield upto 125% recommended N but statistically significant increase was there with 100% recommended N.

## **B. Midlate Group**

**Title:** Agronomical evaluation of promising new sugarcane genotypes

**Objectives:** To work out agronomy of sugarcane genotypes of advanced varietal trial (AVT)

**Treatments:**

- **Genotypes:** 3 (CoPb 10181, CoPb 10182 and CoS 8436)
- **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)

**Design:** Factorial RBD,

**Replications:** Three,

**Date of planting:** 10.02.2015

**Initial Soil Status:** : 8.4, EC: 0.18 dsm<sup>-1</sup>, OC= 0.51%, P =26.25 kg/ha, K= 750 kg/ha

**Results:**

**Genotypes**

CoPb 10181 was significantly better in cane yield (120.9 t/ha) than CoS 8436 (76.1 t/ha) and CoPb 10182 (96.3 t/ha). Sucrose % was at par in all the genotypes (Table 2b).

**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, CoH 10261 was promising in cane yield and Co 10035 in sucrose%. In midlate group CoPb 10181 was promising in cane yield. The response to N fertilizer was upto 100% recommended dose.

**Table 2a: Agronomical evaluation of promising sugarcane genotypes (Early) at Faridkot during 2015-16**

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 (%)
<b>Genotypes</b>								
Co 10035	25.5	188.8	111.6	207	2.46	1022	80.4	16.22
CoH 10261	34.8	200.1	113.4	195	2.91	1384	107.9	14.43
CoJ 64	35.7	191.7	120.0	215	2.51	1218	99.2	15.87
CD (5%)	2.0	NS	NS	5	0.14	106	5.8	0.62
<b>N levels (kg N/ha)</b>								
112.5	31.4	186.7	105.8	204	2.52	1110	88.7	15.41
150.0	32.0	195.1	118.5	206	2.67	1224	98.1	15.73
187.5	32.5	198.7	120.7	206	2.68	1289	100.7	15.49
CD (5%)	NS	NS	9.9	NS	0.14	106	5.8	NS

**Table 2b: Agronomical evaluation of promising sugarcane genotypes (Midlate) at Faridkot during 2015-16**

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 (%)
<b>Genotypes</b>								
CoPb 10181	27.4	138.6	104.1	276	3.10	1877	120.9	15.83
CoPb 10182	21.4	129.9	98.0	261	2.80	1610	96.3	15.80
CoS 8436	35.3	121.5	97.4	185	2.95	1218	76.1	15.41
CD (5%)	2.0	12.2	NS	12	0.18	130	6.2	NS
<b>N levels (kg N/ha)</b>								
112.5	31.4	124.6	91.6	234	2.88	1490	89.3	15.80
150.0	30.3	131.4	103.0	244	2.99	1594	100.7	15.68
187.5	32.4	134.1	104.9	244	2.97	1621	103.3	15.54
CD (5%)	NS	NS	10.6	NS	NS	NS	6.2	NS

## **Ratoon 2015-16:**

**Project No. : AS 42**

**Title:** Agronomical evaluation of promising new sugarcane genotypes

**Objectives:** To work out agronomy of sugarcane genotypes of advanced varietal trial (AVT)

**Ratoon crop:**

**A. Early group**

**Treatments:**

- **Genotypes:** 3 (Co 10035, CoH 10261 and CoJ 64)
- **Fertilizer levels (kg N/ha):** 3 (N<sub>1</sub>: 168.75; N<sub>2</sub>: 225.0 and N<sub>3</sub>: 281.25)

**Design:** Factorial RBD,

**Replications:** Three,

**Date of Ratooning:** 25.12.2014

**Results:**

**Genotypes**

CoH 10261 was significantly better in cane yield (96.2 t/ha), cane diameter (2.78 cm) and cane weight (1130 g) than Co 10035 (Table 3a). Cane yield of CoJ 64 (92.3 t/ha) was at par with CoH 10261. Cane length was the highest in Co 10035 (211 cm) followed by CoJ 64 (190 cm) and CoH 10261 (178 cm). Sucrose % was the highest in CoJ64 (17.09) followed by Co10035 (16.81) and was significantly better than CoH 10261 (16.42).

**N Levels**

There was increase in cane yield upto 125% recommended N but statistically significant increase was there with 100% recommended N.

## **B. Midlate Group**

**Title:** Agronomical evaluation of promising new sugarcane genotypes

**Objectives:** To work out agronomy of sugarcane genotypes of advanced varietal trial (AVT)

**Treatments:**

- **Genotypes:** 3 (CoPb 10181, CoPb 10182 and CoS 8436)
- **Fertilizer levels (kg N/ha):** 3 (N<sub>1</sub>: 168.75; N<sub>2</sub>: 225.0 and N<sub>3</sub>: 281.25)

**Design:** Factorial RBD,

**Replications:** Three,

**Date of Ratooning:** 10.02.2015

**Results:**

**Genotypes**

CoPb 10181 was significantly better in cane yield (117.1 t/ha) than CoS 8436 (65.4 t/ha) and CoPb 10182 (110.6 t/ha). Sucrose % was significantly higher in CoPb 10181 (15.65) than all other genotypes (Table 3b).

**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 CoH 10261 was promising in cane yield and Co 10035 in sucrose%. In midlate group CoPb 10181 was promising in cane yield and sucrose%. The response to N fertilizer was upto 100% recommended dose.

**Table 3a: Agronomical evaluation of promising sugarcane genotypes (Early) in at Faridkot during 2015-16 (Ratoon)**

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>Genotypes</b>							
Co 10035	135.2	84.1	191	2.11	699	56.7	16.81
CoH 10261	163.5	118.7	178	2.78	1130	96.2	16.42
CoJ 64	162.4	117.3	190	2.34	852	92.3	17.09
CD (5%)	22.6	6.5	NS	0.13	140	6.2	0.31
<b>N levels (kg N/ha)</b>							
168.75	141.8	93.8	175	2.36	868	74.5	16.83
225.0	157.9	109.2	192	2.45	897	83.0	16.77
281.25	161.5	117.1	193	2.41	916	84.7	16.72
CD (5%)	NS	6.5	11	NS	NS	6.2	NS

**Table 3b: Agronomical evaluation of promising sugarcane genotypes (Midlate) at Faridkot during 2015-16 (Ratoon)**

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>Genotypes</b>							
CoPb 10181	164.8	121.4	252	2.55	1155	117.1	15.65
CoPb 10182	139.6	108.6	257	2.56	1113	110.6	14.48
CoS 8436	185.0	131.4	151	2.71	758	65.4	14.78
CD (5%)	11.5	12.2	20	NS	84	6.1	0.65
<b>N levels (kg N/ha)</b>							
168.75	154.2	111.7	216	2.58	952	89.4	14.86
225.0	165.3	122.8	223	2.61	1034	99.7	15.04
281.25	170.0	126.8	220	2.63	1040	103.9	15.02
CD (5%)	11.5	12.2	NS	NS	NS	6.1	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>: Surface drip irrigation in paired row trench at 60% CPE

I<sub>2</sub>: Surface drip irrigation in paired row trench at 80% CPE

I<sub>3</sub>: Surface drip irrigation in paired row trench at 100% CPE

**B. Nitrogen Levels (Fertigation):**

N1: 60% RDN

N2: 80% RDN

N3: 100% RDN (150 kg N/ha)

**Control:** I4: Flood Irrigation with RDN in trench planted sugarcane

*\*Treatments are modified*

**Replications:** 3

**Date of planting:** 27.03.2015

**Results:** Surface drip was laid in paired row trench plots planted at 30: 120 cm spacing. Drip irrigation at 100% CPE/IW ratio was significantly better than surface flood irrigation in cane yield (Table 4a). When drip irrigation was applied at 80% CPE/IW the cane yield was at par with surface irrigation. Irrigation water applied was about 48% less with drip irrigation (100% CPE) than flood irrigated plots. Cane yield with 100% recommended dose of nitrogen (RDN) applied to flood irrigated crop was at par with Fertigation 60% and 80% RDN in drip irrigated crop (Table 4b).

**Conclusion:** Surface drip irrigation in paired row trench planted sugarcane (120:30 cm) helped in saving of 48% irrigation water and 20% nitrogen fertilizer.



**Table 4a: Yield and water productivity of sugarcane under different surface drip irrigation methods at Faridkot during 2015-16**

<b>Irrigation treatments</b>	<b>Cane yield (t/ha)</b>	<b>Irrigation Water applied (cm)</b>	<b>Water expenses (cm)</b>	<b>Cane produced (kg) per 1000 litres of water applied</b>	<b>Cane produced (kg) per 1000 litres of water expense</b>
Surface drip irrigation at 60% CPE	65.8	32.6	82.2	20.2	8.01
Surface drip irrigation at 80% CPE	77.8	40.1	89.7	19.4	8.67
Surface drip irrigation at 100% PE	83.8	47.7	97.2	17.6	8.62
CD (5%)	5.7	-	-	1.4	NS
Flood Irrigation	71.1	92.5	142.1	7.7	5.00
CD (5%) Drip vs Flood	7.2	-	-	1.9	0.82

**Table 4b: Yield and water productivity of sugarcane under different Fertigation levels at Faridkot during 2015-16**

<b>Fertigation (RDN)*</b>	<b>Cane yield (t/ha)</b>	<b>Cane produced (kg) per 1000 litres of water applied</b>	<b>Cane produced (kg) per 1000 litres of water expense</b>
60% RDN	69.1	17.3	7.68
80% RDN	77.6	19.5	8.63
100% RDN	81.0	20.4	9.01
100% Soil application	75.6	19.0	8.42
CD (5%)	6.2	1.7	0.71
Flood Irrigation with RDN	71.1	7.7	5.00
CD (5%) Fertigation vs control	7.2	1.9	0.82

\*RDN: Recommended dose of nitrogen i.e. 150 kg N/ha

**AS-68 Impact of integrated application of organics and in organics in improving soil health and sugarcane productivity.**

**Objective** : To develop nutrient management strategy for sustaining soil health and sugarcane production.

**Year of start** : 2014 - 2015

**Cropping system** : Sugarcane – Ratoon-I – Ratoon-II

**Treatment & Methodology: (Plant 2014-15 and Ratoon 2015-16)**

Treatments	Sugarcane (Plant crop)	Ratoon-I
T1	No organic + 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
T3	No organic + soil test based recommendation	Application of trash at 10 tonnes/ ha + soil test basis (NPK application)
T4	Application of FYM @ 20 tonnes / ha + 50% RDF (inorganic source)	Application of FYM @ 20 tonnes / ha + 50% RDF (inorganic source)
T5	Application of FYM @ 20 tonnes / ha + 100% RDF (inorganic source)	Application of FYM @ 20 tonnes / ha + 100% RDF (inorganic source)
T6	Application of FYM @ 20 tonnes / ha + in organic nutrient application based on soil test (rating chart)	Application of FYM @ 20 tonnes / ha + in organic nutrient application based on soil test (NPK application)
T7	Application of FYM @ 10 tonnes / ha + biofertilizer* ( <i>Azotobacter/ Acetobacter + PSB</i> ) + 50% RDF	Application of FYM @ 10 tonnes / ha + biofertilizer ( <i>Azotobacter/ Acetobacter + PSB</i> ) + 50% RDF
T8	Application of FYM/Compost @ 10 tonnes / ha + biofertilizer ( <i>Azotobacter/ Acetobacter + PSB</i> ) + 100% RDF	Application of FYM @ 10 tonnes / ha + biofertilizer ( <i>Azotobacter/ Acetobacter + PSB</i> ) + 100% RDF
T9	Application of FYM@ 10 tonnes / ha + biofertilizer ( <i>Azotobacter/ Acetobacter + PSB</i> ) + soil test basis	Application of FYM @ 10 tonnes / ha + biofertilizer ( <i>Azotobacter/ Acetobacter + PSB</i> ) + soil test basis (NPK application)

\*The biofertilizer (*Azotobacter/Acetobacter+PSB*) was applied @ 5 kg/acre (solid based fertilizer  $10^{7-8}$ cfu), \*\*Trash was inoculated with cellulolytic organism *Trichoderma viride* @ 500 g/tonne.

**Design** : RBD

**Replications** : Three

**Date of planting:** 22.03.2014 **Date of Ratooning:** 23.02.2015

**Results (Ratoon 2015-16):** Cane yield (94.3 t/ha) was the highest (Table 5) with application of FYM/Compost @ 20 tonnes / ha + inorganic nutrient based on soil test (T<sub>6</sub>) which was significantly higher than all treatments except T<sub>5</sub> (89.9 t/ha), T<sub>9</sub> (86.4 t/ha) and T<sub>4</sub> (84.4 t/ha). These treatments also have the residual effect of FYM applied to plant crop.

**Table 5: Growth, yield and quality of sugarcane (Ratoon I) during 2015-16 under various**

<b>Treatments</b>	<b>No. of Shoots 000/ha</b>	<b>NMC 000/ha</b>	<b>Cane length (cm)</b>	<b>Cane diameter (cm)</b>	<b>Single cane wt. (g)</b>	<b>Cane yield (t/ha)</b>	<b>Sucrose (%)</b>	<b>CCS%</b>	<b>CCS t/ha</b>
T <sub>1</sub>	121.5	93.3	224.9	2.38	868	72.1	18.32	12.59	9.08
T <sub>2</sub>	127.2	96.0	232.2	2.37	893	75.6	18.00	12.44	9.40
T <sub>3</sub>	138.5	101.0	235.4	2.49	951	81.0	18.46	12.89	10.44
T <sub>4</sub>	128.4	102.0	222.2	2.28	924	84.4	18.63	12.67	10.70
T <sub>5</sub>	164.4	105.7	235.0	2.38	954	89.9	18.17	12.67	11.37
T <sub>6</sub>	178.3	111.6	245.5	2.41	979	94.3	18.29	12.78	12.04
T <sub>7</sub>	126.2	94.8	228.3	2.63	911	78.5	18.49	12.99	10.20
T <sub>8</sub>	142.0	102.2	236.6	2.40	940	82.0	18.51	12.91	10.59
T <sub>9</sub>	159.5	105.9	237.2	2.33	935	86.4	18.48	12.94	11.18
CD (5%)	15.6	7.9	NS	NS	NS	9.9	NS	NS	1.23

**treatments**

**AS-69 : Use of plant growth regulators (PGRs) for enhanced yield and quality of sugarcane**

**Objectives**

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

**Year of Start** : 2015-16

**Year of Completion** : 2017-18

**Treatments (8)** :

1. Conventional planting/ Farmers' practice (3-bud setts)
2. Planting of setts after overnight soaking in water
3. Planting of setts after overnight soaking in 50 ppm ethrel solution
4. Planting of setts after overnight soaking in 100 ppm ethrel solution
5. T1+GA<sub>3</sub> spray (35 ppm) at 90, 120 and 150 DAP
6. T2+ GA<sub>3</sub> spray (35 ppm) at 90, 120 and 150 DAP
7. T3 + GA<sub>3</sub> (35 ppm) spray at 90, 120 and 150 DAP
8. T4 + GA<sub>3</sub> (35 ppm) spray at 90, 120 and 150 DAP

**Design** : Randomized Block Design, **Variety:** Co 118

**Replication** : 3

**Results:** Germination of sugarcane was better with treating the seed by 100 ppm ethrel solution than no treatment (Table 6a). The highest cane yield (82.8 t/ha) was observed in T8 (planting of setts after overnight soaking in 100 ppm ethrel solution and GA<sub>3</sub> (35 ppm) spray at 90, 120 and 150 DAP) which was significantly better than all other treatments except T7, T4 and T3 (Table 6b). Number of shoots (88.3 thousands/ha) NMC (72.7 thousand /ha) and single cane wt. (1623 g) was also higher in T8 than other treatments.

**Table 6 a: Germination (%) of sugarcane during 2015-16 under various treatments**

Treatments	20 DAP	30 DAP	40 DAP	50 DAP	60 DAP
T <sub>1</sub>	4.3	13.5	18.5	24.8	26.6
T <sub>2</sub>	10.6	15.8	19.9	26.3	31.2
T <sub>3</sub>	7.5	17.4	20.6	27.4	31.1
T <sub>4</sub>	9.5	19.1	23.9	28.3	34.2
T <sub>5</sub>	5.2	13.4	22.9	24.6	27.3
T <sub>6</sub>	10.5	16.2	20.5	26.5	31.6
T <sub>7</sub>	9.7	17.3	21.4	26.6	31.3
T <sub>8</sub>	6.6	18.4	22.9	27.5	35.7
CD (5%)	1.8	3.4	NS	NS	5.5

**Table 6 b: Growth, yield and quality of Sugarcane during 2015-16 under various treatments**

Treatments	No. of Shoots 000/ha	NMC 000/ha	Cane length (cm)	Cane diameter (cm)	Single cane wt. (g)	Cane yield (t/ha)	Sucrose (%)	CCS%	CCS t/ha
T <sub>1</sub>	78.9	51.3	189	2.86	1337	58.9	16.89	11.78	6.92
T <sub>2</sub>	79.7	61.1	188	2.87	1387	63.8	16.75	11.54	7.37
T <sub>3</sub>	83.6	64.2	198	2.85	1480	73.9	17.21	11.77	8.69
T <sub>4</sub>	83.8	68.5	201	2.84	1507	76.7	17.55	12.10	9.27
T <sub>5</sub>	80.3	65.3	193	3.02	1527	64.4	17.13	11.92	7.67
T <sub>6</sub>	85.3	72.5	195	3.04	1597	72.2	17.31	12.10	8.74
T <sub>7</sub>	87.2	71.9	200	3.02	1613	77.8	17.47	12.30	9.56
T <sub>8</sub>	88.3	72.7	204	3.00	1623	82.8	17.58	12.24	10.13
CD (5%)	6.2	9.2	NS	NS	173	8.5	NS	NS	0.87