Annual Report of All India Coordinated Research Project on Sugarcane
(Agronomy & Soil Science) for the year 2014-15
Centre- Uchani (Karnal)

AS 42 : Agronomic evaluation of promising new sugarcane genotypes.

Objectives : To work out agronomy of sugarcane varieties from advanced varietal trial
Year of start : 2014-15 (Continued with new genotypes)
Treatments :

A. Genotypes – 6(Three in early and three in mid-late groups in separate trials)
i) Early : CoLk 9202, CoS 92046 and CoH 9262
ii) Mid-late : Co 10036, CoP10221 and Co10231

B. Fertility levels - 3
i) 75% of recommended doses of N (112.5 kg/ha)
ii) 100% of recommended doses of N (150 kg/ha)
iii) 125% of recommended doses of N (187.5 kg/ha)

The experiments were conducted on early and mid late sugarcane varieties as mentioned above in Factorial RBD with three replications. The crop was planted at 75 cm row spacing on March 22, 2014. The soil of the experimental field was clay loam in texture having pH 7.8, EC 0.4 dsm^{-1}, organic carbon 0.33%, available P 12.4 kg/ha and available K 156 kg/ha. Recommended doses of phosphorus (50 kg P_2O_5/ha) and potash (50 kg K_2O/ha) were applied at the time of planting whereas nitrogen as per treatments was applied in three equal splits. Recommended dose of Nitrogen is 150 kg/ha. The crop was irrigated at 8-10 days intervals during pre-monsoon period and 20 days interval during post monsoon period. The harvesting of the experiment was done on March 10, 2015.

In early group, significantly higher germination was recorded in variety CoH 9262 as compare to rest of the varieties. Variety CoLk 9202 produced significantly highest cane (75.5 t/ha) and sugar yield (8.69 t/ha). Varieties CoS 92046 and CoH 9262 were found at par with each other in most of the characters except CCS% and sugar yield. CoH 9262 produced significantly higher CCS % and sugar yield as compared to CoS 92046. All the varieties responded upto 25 % higher than recommended dose of nitrogen (187 kg/ha).

In late group, varieties CoP10221 and Co 10036 being at par in all the characters produced significantly higher values of germination, tillers, millable cane, cane yield and sugar yield as compared to variety Co 10231. No significant differences were observed among varieties in terms of Commercial cane sugar (%). All the varieties responded upto 25 % higher than recommended dose of nitrogen (187 kg/ha)

Summary: In early group, variety CoLk 9202 produced significantly highest cane (75.5 t/ha) and sugar yield (8.69 t/ha). CoH 9262 produced significantly higher CCS % and sugar yield as compared rest of the varieties. In mid late group, varieties CoP10231 and Co 10036 being at par produced significantly higher cane yield and sugar yield as compared to variety Co 10031. All the varieties responded upto 25 % higher than recommended dose of nitrogen (187 kg/ha) irrespective of maturity group.

Table 1: Effect of different fertility levels on growth, yield and quality of early group varieties

Treatments	Germination (%)	No. of tillers (000/ha)	No. of millable canes (000/ha)	Single cane weight (g)	Cane yield (t/ha)	CCS (%)	Sugar yield (t/ha)
Genotypes							
CoLk 9202	44.1	124.3	94.2	800	75.5	11.51	8.69
CoS 92046	43	118.8	90.0	705	63.5	11.50	7.13
CoH 9262	46.3	122.1	92.3	708	65.4	12.08	7.90
CD at 5%	1.3	NS	3.1	12	2.2	0.15	0.35
Nitrogen dose							
75% of recom.	44.4	115.8	87.4	715	62.6	11.52	7.21
Recommended	44.8	122.9	93.1	746	69.6	11.81	8.20
125% of recom.	44.3	126.4	96.0	752	72.3	11.77	8.49
CD at 5%	NS	3.5	2.5	11	2.3	0.18	0.12

* Recommended Nitrogen - 150 kg /ha

Table 2: Effect of different fertility levels on growth, yield and quality of mid- late varieties

Treatments	Germination (%)	No. of tillers (000/ha)	No. of millable canes (000/ha)	Single cane weight (g)	Cane yield (t/ha)	CCS (%)	Sugar yield (t/ha)
Genotypes							
Co 10036	40.8	113.4	88.7	840	73.7	11.93	8.80
CoP10221	45.2	124.6	96.5	860	82.2	11.93	9.80
Co10231	44.4	122.7	95.0	852	80.0	11.87	9.52
CD at 5%	2.2	5.5	3.7	12	3.2	NS	0.43
Nitrogen dose							
75% of recom.	43.2	113.6	87.8	828	71.9	11.86	8.53
Recommended	43.6	121.0	94.0	860	80.0	11.92	9.55
125% of recom.	43.7	126.2	98.4	864	84.1	11.92	10.00
CD at 5%	NS	4.2	2.9	13	2.4	NS	0.32

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

Objective: To study differential response of sugarcane to different nutrients.

Year of start: 2011-12

Treatments:

1. Control(No fertilizer)
2. N
3. NP
4. NPK
5. NPK + S
6. NPK + Zn
7. NPK + Fe
8. NPK+ Mn
9. NPK+ S + Zn
10. NPK+ S + Zn + Fe
11. NPK+ S + Zn + Fe + Mn
12. Soil test based fertilizer application

Results achieved: The experiment was conducted on clay loam in texture having pH 8.0, EC 0.44 dsm^{-1}, organic carbon 0.38%, available P 11.5 kg/ha and available K 133.0 kg/ha, available S (11.8 kg/ha), available Zn (0.9 ppm) and available Fe (3.8 ppm) and available Mn (7.5 ppm). Sugarcane variety CoH 119 (Mid group) was planted on March 28, 2014 at 75 cm spacing in randomized block design with three replications. Recommended doses of phosphorus (50 kg P_2O_5/ha), potash (50 kg K_2O/ha) and Sulphur (60 kg/ha) were applied at the time of planting whereas recommended dose of nitrogen (150 kg N/ha) was applied in three equal splits as top dressing (April, May & June). Zinc, Fe and Mn were applied thrice (April, May & June) as foliar spray. The crop was irrigated at 8-10 days intervals during pre-monsoon period and 20 days interval during post monsoon period. The plant crop was harvested on February 26, 2015.

Treatment T_{11}- NPK+Zn+S+Fe+Mn gave highest number of millable canes (88.0 thousands/ha), cane yield (91.2 t/ha). The application of N over control, NP over N alone, NPK over NP, and NPKS over NPK significantly increased cane yield of plant crop (Table 3). The application of individual micronutrient (Fe, Mn and Zn) in combination NPK did not significantly increased cane yield over NPK

alone. However, the combined application of these micro nutrients significantly increased the cane yield over NPK alone.

Summary: The application of individual micronutrient (Fe, Mn and Zn) in combination NPK did not significantly increase cane yield over NPK. However, the combined application of these micro nutrients significantly increased cane yield over NPK alone. The application of N over control, NP over N alone, NPK over NP, and NPKS over NPK significantly increased cane yield.

Table 3: Effect of different treatments on sugarcane growth and yield of plant crop.

	NMC (000/ha)	Cane height (cm)	Cane yield (t/ha)	CCS (%)	Sugar yield (t/ha)
T_1: Control (No fertilizer)	73.7	147.3	47.1	12.31	5.80
T_2: N	77.4	158.5	61.8	12.83	7.93
T_3: NP	78.0	167.0	71.9	13.01	9.35
T_4: NPK	84.1	175.1	80.4	13.45	10.81
T_5: NPK + S	76.3	180.3	84.7	13.53	11.46
T_6: NPK + Zn	84.6	176.4	81.4	13.37	10.88
T_7: NPK + Fe	85.0	168.5	81.3	13.24	10.76
T_8: NPK + Mn	85.3	168.0	80.6	13.27	10.70
T_9: NPK + S + Zn	84.0	184.3	87.0	14.14	12.30
T_{10}: NPK + S + Zn + Fe	87.6	190.1	90.6	14.69	13.31
T_{11}: NPK + S + Zn + Fe + Mn	88.0	196.0	91.2	14.49	13.21
T_{12}: Soil test based fertilizer application	78.5	168.0	80.5	13.41	10.80
CD at 5%	2.3	5.2	2.8	0.35	0.46

AS-65 : Enhancing sugarcane productivity and profitability under wheat sugarcane cropping system

Objective : To enhance the productivity of sugarcane under wheat- sugarcane cropping system

Year of start : 2011 (autumn)

Treatments:

T_1: Autumn planted sugarcane

T_2: T_1 + Wheat (1:2)

T_3: T_1 + Wheat (1:3)

T_4: Wheat sown on 15th Nov. followed by sugarcane planting after wheat harvest

T_5: Wheat sown on 15th Dec. followed by sugarcane planting after wheat harvest

T_6: FIRB sowing of wheat 15th Nov. + Sugarcane in furrows in 3rd week of February

T_7: FIRB sowing of wheat 15th Nov. + Sugarcane in furrows in 3rd week of March

T_8: FIRB sowing of wheat 15th Dec. + Sugarcane in furrows in 3rd week of February

T_9: FIRB sowing of wheat 15th Dec. + Sugarcane in furrows in 3rd week of March

Results achieved:

Sugarcane variety CoH 150 and wheat variety HD 2967 were planted as per treatment in different dates of planting in randomized block design with three replications. The soil of the experimental field was clay loam in texture having pH 7.9, EC 0.4 dsm^{-1}, organic carbon 0.38%, available P 12.3 kg/ha and available K 156 kg/ha. Recommended doses of phosphorus (50 kg P_2O_5/ha) and potash (50 kg K_2O/ha) were applied at the time of planting whereas nitrogen (150 kg N/ha) was applied in three equal splits in case of sugarcane crop Whereas in wheat crop full dose of phosphorus (60 kg/ha) and potash (60 kg/ha) were applied at the time of planting and nitrogen (150 kg/ha) was applied in two equal splits (21 and 42 days after sowing). Crops were irrigated as per the requirement of wheat crop upto harvesting of wheat and later on sugarcane was irrigated at 8-10 days intervals during pre-monsoon period and 20 days interval during post monsoon period. Wheat crop was harvested on April 15, 2014. Planting of sugarcane (after wheat harvest) in treatment T_4 and T_5 was done as per dates mentioned in the following table.

Tr. No.	Planting of sugarcane	Harvesting of sugarcane
1	25-10-2013	10-01-2015
2	25-10-2013	10-01-2015
3	25-10-2013	10-01-2015
4	20-04-2014	20-03-2015

5	20-04-2014	20-03-2015
6	20-02-2014	18-3-2015
7	20-3-2014	18-3-2015
8	20-2-2014	18-3-2015
9	20-3-2014	18-3-2015

Wheat crop:

Data presented in table 4 revealed that wheat sown with autumn cane on October 25, 2013 in 1:2 and 1:3 ratio and 15th November on raised bed or by conventional method produced higher grain yield of (56.6-58.2 q/ha) as compared to wheat sown on 15th December (49.4-50.6 q/ha).

Sugarcane

Autumn planted cane recorded significantly higher germination, tillers, millable canes and cane yield as compared to spring and late planting. Lowest germination was recorded in late planting of sugarcane after wheat harvest. Treatments T_1, T_2 and T_3 being at par recorded significantly higher number of tillers, millable canes, cane weight ,cane yield and sugar yield as compared to rest of the treatments (Table 4 & Table 5). FIRB sowing of wheat on 15th November + planting of sugarcane in standing crop of wheat in February or March (T_6, T_7) and FIRB sowing of wheat on 15th December + planting of sugarcane in standing crop of wheat in February or March (T_8, T_9) being at par produced significantly higher number of tillers, NMC, cane weight, cane yield and sugar yield as compared to late planting of sugarcane after wheat harvesting (T_4 and T_5). There was a yield reduction of 40 % with late planting of sugarcane after wheat harvesting as compared to planting of sugarcane in February or March in standing crop of wheat (Table 5). Wheat sown with autumn cane on Oct. 25, 2013 in 1:2 and 1:3 ratio and 15th November on bed or by conventional method produced higher grain yield of (53.0-55.2 q/ha) as compared to wheat sown on 15th December (44.2-44.4 q/ha). Autumn planted cane as sole or intercropped with wheat in 1:2 and 1:3 ratio recorded significantly cane yield as compared to spring and late planting. Lowest germination was recorded in late planting of sugarcane after wheat harvest. There was a yield reduction of about 40% with late planting of sugarcane after wheat harvesting as compared to planting of sugarcane in February or March in standing crop of wheat. Maximum cane equivalent yield was recorded in autumn sugarcane + wheat intercropping system of 1:2 (127.0 t/ha) and 1:3 ratio (126.0 t/ha) and closely followed by FIRB sowing of wheat on 15th November or 15th December + sugarcane in furrows in 3rd week of February or March (104.2-109.2 t/ha) and lowest in T_4 (75.0 t/ha)and T_5 (70.3 t/ha) treatments.

Summary: Wheat sown with autumn cane on Oct. 25, 2013 in 1:2 and 1:3 ratio and 15th November on bed or by conventional method produced higher grain yield of (53.0-55.2 q/ha) as compared to wheat sown on 15th December (44.2-44.4 q/ha). Autumn planted cane as sole or intercropped with wheat in 1:2 and 1:3 ratio recorded significantly cane yield as compared to spring and late planting. Lowest germination was recorded in late planting of sugarcane after wheat harvest. There was a yield reduction of about 40% with late planting of sugarcane after wheat harvesting as compared to planting of sugarcane in February or March in standing crop of wheat. Maximum cane equivalent yield was recorded in autumn sugarcane + wheat intercropping system of 1:2 (127.0 t/ha) and 1:3 ratio (126.0 t/ha) and closely followed by FIRB sowing of wheat on 15th November or 15th December + sugarcane in furrows in 3rd week of February or March (104.2-109.2 t/ha) and lowest in T_4 (75.0 t/ha) and T_5 (70.3 t/ha) treatments.

Table 4: Effect of different treatments on wheat and growth parameters of sugarcane

Sr. No.	Treatments	Wheat Grain yield (q/ha)	S. cane germi. (%)	Tillers (000/ha)	NMC (000/ha)	Cane wt.(g)
T_1	Autumn planted sugarcane	---	50.6	138.3	106.3	975
T_2	T_1 + Wheat (1:2)	55.2	48.6	135.6	104.8	971
T_3	T_1 + Wheat (1:3)	54.6	48.1	135.1	104.2	969
T_4	Wheat sown on 15th Nov. followed by sugarcane planting after wheat harvest	53.0	38.2	77.1	76.4	660
T_5	Wheat sown on 15th Dec. followed by sugarcane planting after wheat harvest	44.4	38.4	76.2	76	656
T_6	FIRB sowing of wheat 15th Nov. + Sugarcane in furrows in 3rd week of February	54.2	45.5	126.6	100.3	835
T_7	FIRB sowing of wheat 15th Nov. + Sugarcane in furrows in 3rd week of March	54.1	46.3	127	101.4	836
T_8	FIRB sowing of wheat 15th Dec. + Sugarcane in furrows in 3rd week of February	44.2	45.4	128.8	100.8	834
T_9	FIRB sowing of wheat 15th Dec. + Sugarcane in furrows in 3rd week of March	44.3	46.6	129.5	101.6	832
	CD at 5%	1.8	2.7	5.9	6.5	18

Table 5: Effect of different treatments on cane yield, CCS (%) and sugar yield.

Sr. No.	Treatments	Cane yield (t/ha)	Equivalent yield (t/ha)	Total cane yield (t/ha)	CCS (%)	Sugar yield (t/ha)
T_1	Autumn planted sugarcane	102.9	--	102.9	12.26	12.62
T_2	T_1 + Wheat (1:2)	100.8	26.2	127.0	12.22	15.52
T_3	T_1 + Wheat (1:3)	100.0	26.0	126.0	12.24	15.42
T_4	Wheat sown on 15th Nov. followed by sugarcane planting after wheat harvest	49.8	25.2	75.0	11.15	8.36
T_5	Wheat sown on 15th Dec. followed by sugarcane planting after wheat harvest	49.2	21.1	70.3	11.18	7.86
T_6	FIRB sowing of wheat 15th Nov. + Sugarcane in furrows in 3rd week of February	82.7	25.8	108.5	11.85	12.86
T_7	FIRB sowing of wheat 15th Nov. + Sugarcane in furrows in 3rd week of March	83.8	25.7	109.5	11.9	13.03
T_8	FIRB sowing of wheat 15th Dec. + Sugarcane in furrows in 3rd week of February	83.2	21.0	104.2	11.88	12.38
T_9	FIRB sowing of wheat 15th Dec. + Sugarcane in furrows in 3rd week of March	83.6	21.1	104.7	11.86	12.42
CD at 5%		3.6			0.10	0.35

AS-66: Priming of cane node for accelerating germination.

Objectives:

1. To find out suitable cane node priming technique.
2. To assess the effect of cane node priming technique on acceleration of germination.

Year of start: 2012-13

Treatments

1. Un primed cane node
2. Treating cane node in hot water at 50°C for 2 hours.
3. Treating cane node in hot water (50°C) + urea solution (3%) for 2 hours.

4. Priming cane node with cattle dung, cattle urine and water in 1:2:5 ratio.
5. Conventional three bud sett planting.
6. Primed and sprouted cane node (incubated for 4 days after priming).

An early maturing variety CoH 160 was planted on clay loam soil in texture having pH 7.9, EC 0.4 dsm^{-1}, organic carbon 0.36%, available P 12.6 kg/ha and available K 160 kg/ha in randomized block design with three replications. The crop was planted at 75 cm row spacing on March 22, 2014. Cane node having buds and root bands with 4-5 cm length were taken for planting. After planting cane nodes in furrows were covered with 2-3cm soil layer. Cane nodes were planted at 10 cm depth with plant to plant spacing of 30 cm. Recommended doses of phosphorus (50 kg P_2O_5/ha) and potash (50 kg K_2O/ha) were applied at the time of planting whereas nitrogen was applied in three equal splits. The crop was irrigated at 8-10 days intervals during pre-monsoon period and 20 days interval during post monsoon period. The harvesting of the experiment was done on February 18, 2015.

No germination was noticed in any treatments at 10 days after planting. Highest germination was recorded in conventional three budded sett planting and planting of primed and sprouted cane node (Incubated for four days after priming) at 20,30 and 40 days after planting. Three bud planting recorded highest number of shoots (159.3 thousands/ha), millable canes (115.3 thousands/ha), cane weight (816 g), cane yield (92.9 t/ha), CCS (12.15 %) and sugar yield (11.29 t/ha) among all the treatments (Table 6 & Table 7). Among priming treatments, planting of primed and sprouted cane node (T_6) recorded highest germination at 40 DAS (53.0%), number of shoots (91.2 thousands/ha), millable canes (89.6 thousands/ha), cane weight (719 g), cane yield (63.6 t/ha) and sugar yield (7.65 t/ha). Planting of cane node after dipping in hot water (50^o C) +urea solution (3%) for 2 hours (T3) was found second best among priming treatments. Unprimed cane node recorded lowest number of number of shoots, millable canes, cane weight, cane yield and sugar yield (Table 6 & Table 7).

Summary: Three bud planting recorded highest number of shoots (159.3 thousands/ha), millable canes (115.3 thousands/ha), cane weight (816 g), cane yield (92.9 t/ha), CCS (12.15 %) and sugar yield (11.29 t/ha) among all the treatments . Among priming treatments, planting of primed and sprouted cane node (T_6) recorded highest germination at 40 DAS (53.0%), number of shoots (91.2 thousands/ha), millable canes (89.6 thousands/ha), cane weight (719 g), cane yield (63.6 t/ha) and sugar yield (7.65 t/ha).

Table 6: Effect of different treatments on germination and no. of shoots of sugarcane

	Treatments	Germination	No. of shoots

		(%)			(000/ha)
		20 DAP	30 DAP	40 DAP	120 DAP
T_1	Un-primed cane node	16.8	27.6	36.1	73.2
T_2	Treating cane node in hot water at 50^oC for 2 hours.	20.2	31.0	42.3	78.8
T_3	Treating cane node in hot water (50^o C) +urea solution (3%) for 2 hours	29.6	40.9	48.5	85.1
T_4	Priming cane node with cattle dung, cattle urine and water in1:2:5 ratio.	20.3	34.3	45.1	79.4
T_5	Conventional 3-bud sett planting.	42.7	46.3	53.9	159.3
T_6	Primed and sprouted cane node (Incubated for four days after priming)	39.2	44.8	53.0	91.2
CD at 5%		3.1	3.8	4.1	8.6

Table 7: Effect of different treatments on growth and cane yield of sugarcane

	Treatments	NMC (000/ha)	Cane height (cm)	Cane weight (g)	Cane yield (t/ha)	CCS (%)	Sugar yield (t/ha)
T_1	Un-primed cane node	72.3	118	675	48.2	11.86	5.72
T_2	Treating cane node in hot water at 50^oC for 2 hours.	76.2	137	682	51.4	11.89	6.12
T_3	Treating cane node in hot water (50^o C) + urea solution (3%) for 2 hours	82.6	180	710	57.9	11.83	6.85
T_4	Priming cane node with cattle dung, cattle urine and water in1:2:5 ratio.	78.1	186	681	52.6	11.85	6.23
T_5	Conventional 3-bud sett planting.	115.3	220	816	92.9	12.15	11.29
T_6	Primed and sprouted node (Incubated for four days after priming)	89.6	180	719	63.6	12.02	7.65
CD at 5%		6.7	16	28	3.8	0.11	0.48

AS 68: Impact of integrated application of organics and inorganics in improving soil health and sugarcane productivity

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

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

Year of start: 2014 – 2015

Treatment:

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

Results achieved: The experiment was conducted on clay loam in texture having pH 8.0, EC 0.44 dsm^{-1}, organic carbon 0.38%, available P 12.2 kg/ha and available K 159.2 kg/ha, available S (12.8 kg/ha), available Zn (0.9 ppm) and available Fe (4.1 ppm) and available Mn (7.8 ppm). Sugarcane variety CoH 160 (Early maturing and good ratooner was planted on March 28, 2014 at 75 cm spacing in randomized block design with three replications. Doses of phosphorus, potash as per treatments were applied at the time of planting whereas dose of nitrogen was applied in three equal splits as top dressing (April, May & June). Recommended dose of Nitrogen, phosphorus and potash were 150, 50 and 50 kg/ha, respectively. The values for Nitrogen, phosphorus and potash on soil test basis were 172, 56 and 60 kg/ha, respectively. The crop was irrigated at 8-10 days intervals during pre-monsoon period and 20 days interval during post monsoon period. The plant crop was harvested on February 24, 2015.

No significant differences were observed in germination percent among different treatments. The treatments with 100 % RDF and soil test based fertilizer with and without FYM application being at par produced significantly higher number of tillers, millable canes and cane yield as compared to the treatments of 50 % RDF with and without FYM (Table 8). Application of 20 t/ha FYM with 50 % RDF or 100% RDF or Soil test based fertilizers application produced similar number of tillers, mlillable canes, cane yield in comparison to the treatments of 10 t/ha FYM + Biofertilizers application with 50 % RDF or 100% RDF or Soil test based fertilizers application. FYM/Compost 20 t/ ha + 100% RDF through inorganic source (T6) and FYM/Compost @ 10 t/ ha + biofertilizer (*Azotobacter/ Acetobacter + PSB*) + soil test basis (T9) were found best and at par treatments in terms of number of tillers, millable canes and cane and sugar yield as compared to rest of the treatments. So FYM 10t /ha can be saved with application of biofertilizer in sugarcane crop in addition in increasing the population of soil micro organism. There was a yield reduction of 55.1, 52.1 and 52.0 % in yield of sugarcane with 50 % RDF alone over soil test basis alone, 50 % RDF+ FYM 20 t/ha over soil test basis + FYM 20 t/ha and 50 % RDF + FYM 10 t/ha+ biofertilzers over soil test basis fertilizer application + FYM 10 t/ha+ biofertilizers, respectively (Table 8).

Summary: FYM/Compost 20 t/ ha + 100% RDF through inorganic source (T6) and FYM/Compost @ 10 t/ ha + biofertilizer (*Azotobacter/ Acetobacter + PSB*) + soil test basis (T9) were found best and at par treatments in terms of number of tillers (43.6, 152.6 thousands/ha) , millable canes (122.8, 121.9 thousands/ha) and cane yield (107.8, 106.8 t/ha) and sugar yield (13.26, 13.13 t/ha) as compared to rest of the treatments.

Table 8: Effect of different treatments on sugarcane plant crop

Tr.	Sugarcane (plant crop)	Germination (%)	No. of tillers (000/ha)	No. of millable canes (000/ha)	Single cane weight (g)	Cane yield (t/ha)	Sugar yield (t/ha)
T1	No organic + 50% RDF	43.1	90.5	64.9	660	42.3	5.12
T2	No organic + 100% RDF	44.6	138.1	109.0	850	91.6	11.26
T3	No organic + soil test based recommendation	44.0	143.2	113.0	853	95.3	11.73
T4	Application of FYM @ 20 t/ ha + 50% RDF	45.8	112.2	76.1	709	53.4	6.50
T5	Application of FYM @ 20 t/ ha + 100% RDF	46.1	148.4	118.6	883	103.8	12.74
T6	Application of FYM @ 20 t / ha + in organic nutrient application based on soil test (rating chart)	46.5	153.6	122.8	888	107.8	13.26
T7	Application of FYM @ 10 t/ ha + biofertilizer (*Azotobacter/ Acetobacter + PSB*) + 50% RDF	44.5	101.4	75.7	707	52.8	6.43
T8	Application of FYM @ 10 t/ ha + biofertilizer (*Azotobacter/ Acetobacter + PSB*) + 100% RDF	44.8	147.1	117.7	884	102.9	12.63
T9	Application of FYM @ 10 t/ ha + biofertilizer (*Azotobacter/ Acetobacter + PSB*) + soil test basis	45.0	152.6	121.9	887	106.8	13.13
	CD at 5%	NS	5.6	3.8	15	3.2	0.36

Summary of experiments conducted by Crop Production group (Agronomy& Soil Science) at CCSHAU, RRS, UCHANI, KARNAL
(2014-15)

Following experiments were allotted during 2014-15 and all the allotted experiments were conducted

AS 42: Agronomic evaluation of promising new sugarcane genotypes

In early group, variety CoLk 9202 produced significantly highest cane (75.5 t/ha) and sugar yield (8.69 t/ha). CoH 9262 produced significantly higher CCS % and sugar yield as compared rest of the varieties. In mid late group, varieties CoP 10221 and Co 10036 being at par produced significantly higher cane yield and sugar yield as compared to variety Co 10231. All the varieties responded upto 25 % higher than recommended dose of nitrogen (187 kg/ha) irrespective of maturity group.

AS-65 : Enhancing sugarcane productivity and profitability under wheat sugarcane cropping system

Wheat sown with autumn cane in last week of October in 1:2 and 1:3 ratio and 15th November on bed or by conventional method produced higher grain yield as compared to wheat sown on 15th December. Autumn planted cane as sole or intercropped with wheat in 1:2 and 1:3 ratio recorded significantly cane yield as compared to spring and late planting. There was a yield reduction of 40 % with late planting of sugarcane after wheat harvesting as compared to planting of sugarcane in February or March in standing crop of wheat. Maximum cane equivalent yield was recorded in autumn sugarcane + wheat intercropping system of 1:2 (127.0 t/ha) and 1:3 ratio (126.0 t/ha) and closely followed by FIRB sowing of wheat on 15th November or 15th December + sugarcane in furrows in 3rd week of February or March (104.2-109.2 t/ha) and lowest in T_4 (75.0 t/ha) and T_5 (70.3 t/ha) treatments

AS-66: Priming of cane node for accelerating germination

Three bud planting recorded highest number of shoots (159.3 thousands/ha), millable canes (115.3 thousands/ha), cane weight (816 g), cane yield (92.9 t/ha), CCS (12.15 %) and sugar yield (11.29 t/ha) among all the treatments. Among priming treatments, planting of primed and sprouted cane node (T_6) recorded highest germination at 40 DAS (53.0%), number of shoots (91.2 thousands/ha), millable canes (89.6 thousands/ha), cane weight (719 g), cane yield (63.6 t/ha) and sugar yield (7.65 t/ha).

AS-68: Impact of integrated application of organics and inorganics in improving soil health and sugarcane productivity

Soil test based fertilizer application gave higher cane yield over recommended dose of fertilizers with and without FYM or FYM + Bio-fertilizers. FYM/Compost 20 t/ ha + 100% RDF through inorganic source (T6) and FYM/Compost 10 t/ ha + biofertilizer (*Azotobacter/ Acetobacter* + *PSB*) + soil test basis (T9) were found best and at par treatments in terms of number of tillers (153.6, 152.6 thousands/ha) , millable canes (122.8, 121.9 thousands/ha) and cane yield (107.8, 106.8 t/ha) and sugar yield (13.26, 13.13 t/ha) as compared to rest of the treatments.