Annual Report of All India Coordinated Research Project on Sugarcane
(Crop Production) for the year 2015-16
Centre- Sriganganagar

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 (Plant crop)

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)

The field experiment was conducted on local early maturing and good ratooner variety Co 6617 in RBD with three replications. The first ratoon crop was initiated during second fortnight of February. In 100 % RDF, Phosphorus (40 kg/ha) was applied at the time of preparing field for ratoon initiation, whereas doses of nitrogen (150 kg/ha) was applied in three equal splits as top dressing (At ratoon initiation, May & June). On soil test basis Nitrogen & phosphorus were applied @ 160 & 40 kg/ha, respectively.

The result indicated that no. of tillers, NMC, single cane weight and cane yield were influenced significantly due to different nutrient treatments while, the effect on CCS % was non-significant. The application of recommendation 100% RDF and soil test based fertilizers with FYM @ 20 t/ha produced significantly higher cane yield over all the treatments but at par with each other. The application of bio fertilizers with 10 t/ha FYM / hectare and inorganic fertilizers recorded significantly higher cane yield over alone application of trash @ 10 t/ha with organic fertilizers but at par cane yield with treatment T5 & T6.

Table 1: Effect of different treatments on sugarcane plant crop

Tr.	Sugarcane (plant crop)	Ratoon-I	Tillers (000/ha)	NMC (000/ha)	Cane weight (g)	Cane yield (t/ha)	CCS (%)
T1	No organic + 50% RDF	Application of trash at 10 t/ ha + 50% RDF	81.8	62.3	615	41.4	11.64
T2	No organic + 100% RDF	Application of trash at 10 t/ ha + 100% RDF	98.6	76.6	796	62.3	11.96
T3	No organic + soil test based recommendation	Application of trash at 10 t/ ha + soil test basis (NPK)	99.7	79.2	801	63.8	11.92
T4	Application of FYM @ 20 t/ ha + 50% RDF	Application of FYM/Compost @ 20 t/ ha + 50% RDF (inorganic)	89.4	72.8	767	56.7	12.01
T5	Application of FYM @ 20 t/ ha + 100% RDF	Application of FYM/Compost @ 20 t/ ha + 100% RDF (inorganic)	121.4	99.4	815	70.1	11.98
T6	Application of FYM @ 20 t / ha + inorganic nutrient based on soil test	Application of FYM/Compost @ 20 t/ ha + inorganic nutrient based on soil test (NPK application)	126.6	100.6	821	72.3	12.01
T7	Application of FYM @ 10 t/ ha + biofertilizer (*Azotobacter/ Acetobacter + PSB*) + 50% RDF	Application of FYM/Compost @ 10 t/ ha + biofertilizer (*Azotobacter/ Acetobacter + PSB*) + 50% RDF	91.8	69.7	638	49.1	12.10
T8	Application of FYM @ 10 t/ ha + biofertizer (*Azotobacter/ Acetobacter + PSB*) + 100% RDF	Application of FYM/Compost @ 10 t / ha + biofert. (*Azotobacter/ Acetobacter + PSB*) + 100% RDF	114.5	93.2	804	67.3	11.99
T9	Application of FYM @ 10 t/ ha + biofert. (*Azotobacter/ Acetobacter + PSB*) + soil test basis(NPK application)	Application of FYM/Compost @ 10 t/ ha + biofert. (*Azotobacter/ Acetobacter + PSB*) + soil test basis(NPK application)	116.7	94.4	807	68.8	12.08
	CD at 5%		11.5	8.7	18	6.1	NS

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

Objective : 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 – 2016

Treatments

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_3 spray (35 ppm) at 90, 120 and 150 DAP
6. T2+ GA_3 spray (35 ppm) at 90, 120 and 150 DAP
7. T3 + GA_3 (35 ppm) spray at 90, 120 and 150 DAP
8. T4 + GA_3 (35 ppm) spray at 90, 120 and 150 DAP

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

Treatments		Germination (%)	NMC (000/ha)	Single cane weight (g)	Cane yield (t/ha)	CCS (%)
1	Conventional planting/ (3-bud setts)	36.3	89.4	890	78.2	11.85
2	Planting of setts after overnight soaking in water	40.8	95.5	896	84.6	12.12
3	Planting of setts after overnight soaking in 50 ppm ethrel solution	44.9	102.3	904	89.3	12.28
4	Planting of setts after overnight soaking in 100 ppm ethrel solution	45.3	102.6	906	90.7	12.27
5	T1+GA_3 spray (35 ppm) at 90, 120 and 150 DAP	36.9	97.2	901	83.4	11.93
6	T2+ GA_3 spray (35 ppm) at 90, 120 and 150 DAP	41.3	101.9	912	89.2	12.34
7	T3 + GA_3 (35 ppm) spray at 90, 120 and 150 DAP	44.7	108.3	919	95.6	12.41
8	T4 + GA_3 (35 ppm) spray at 90, 120 and 150 DAP	45.6	109.4	920	96.5	12.39
	CD at 5%	3.6	5.2	NS	4.3	NS

The field experiment was conducted to study the response of plant growth regulators (PGRs) for enhancing cane yield and quality of sugarcane. The soil of the experimental field being sandy loam in texture, alkaline in reaction (8.3), tested low in organic carbon (0.34%), medium in available P_2O_5 (23 kg/ha) and high in available K_2O (375 kg/ha). The experiment was conducted on early maturing variety Co 6617 in RBD with three replication in spring season.

The result showed that soaking of sugarcane setts in water or 50 ppm or 100 ppm ethrel solutions resulted in significant increase in sugarcane germination, millable canes and cane yield over farmers/conventional practice. The application of GA3 (35 ppm) resulted in significant increase in number of millable canes & cane yield as compare to their untreated treatments. The overnight soaking with 100 ppm ethrel solution recorded at par cane yield with 50 ppm ethrel solution.