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EFFICIENCY OF SOME ORGANIC MANURES ON CANE AND SUGAR YIELD

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ABSTRACT

Field experiments were conducted to study the effect of organic manures *viz.*, green manures, green leaf manures, pressmud and farm yard manure on cane and sugar yield of variety COC 85061 during early season of 1993 and 1994 in Sugarcane Research Station, Melalathur, Vellore district of Tamil Nadu with the nutrient status of low, medium and medium availability of N,P and K respectively. Results revealed that *in situ* incorporation of *Crotolaria juncea* with 175:63:113 kg of NPK ha^{-1} application registered maximum cane and sugar yield of 125 and 15.8 t ha^{-1} respectively. It was 14 per cent higher yield than the treatment with inorganic fertiliser of 225:63:113 NPK ha^{-1} application.

KEY WORDS: Sugarcane, Organic Manures

Sugarcane is an annual crop which responds well to fertiliser application. To increase the efficiency of applied fertiliser, application of farm yard manure (FYM) or organic manure is necessary. Nowadays, farmers are unable to apply the required FYM due to its unavailability. Hence, they are in a

Table 1. Treatment effects on cane yield and economics

Treatments	Cane yield (t ha^{-1})			CCS %			Sugar yield (t ha^{-1})			Benefit cost ratio		
	I	II	Mean	I	II	Mean	I	II	Mean	I	II	Mean
In-situ incorporation												
Sesbania rostrata	124	118	121	12.1	12.5	12.3	15.0	14.7	14.8	2.40	2.43	2.41
Sesbania aculeata	130	118	124	12.5	12.9	12.7	16.3	15.2	15.8	2.53	2.45	2.49
Crotolaria juncea	127	123	125	12.5	12.9	12.7	15.8	15.8	15.8	2.50	2.58	2.54
Teprosia purpurea	122	118	120	12.3	12.5	12.4	15.0	14.7	14.8	2.39	2.46	2.42
Mean												
Incorporation												
Sesbania rostrata	123	117	120	12.1	12.5	12.3	14.8	14.7	14.8	2.05	2.09	2.07
Sesbania aculeata	128	122	121	12.4	12.0	12.2	14.8	14.6	14.7	2.00	2.18	2.09
Crotolaria juncea	124	120	122	12.4	12.8	12.6	15.2	15.6	15.4	2.07	2.15	2.11
Teprosia purpurea	123	117	120	12.0	12.6	12.3	14.5	15.2	14.8	2.05	2.09	2.07
Mean	-	-	120	-	-	12.3	-	-	14.9	-	-	-
Glyricidia maculata	125	119	122	12.1	12.7	12.4	15.0	15.1	15.0	2.09	2.13	2.11
Pungamia glabra	119	113	116	12.1	12.5	12.3	14.0	14.5	14.2	1.99	2.02	2.00
Azadiracta indica	122	120	121	12.3	12.5	12.4	15.0	15.1	15.0	2.04	2.07	2.05
Mean	-	-	119	-	-	12.3	-	-	14.7	-	-	-
Pressmud	118	114	116	12.4	12.6	12.5	14.4	14.6	14.5	2.24	2.31	2.27
FYM	116	114	115	12.2	12.2	12.2	14.1	14.1	14.1	2.10	2.20	2.15
Fertiliser Alone (225:63:113 kg NPK ha^{-1})	110	104	107	11.7	11.9	11.8	12.8	12.4	12.6	2.17	2.19	2.18
CD (p=0.05)	4.2	3.5	3.2	NS	NS	NS	2.1	1.5	1.8	-	-	-

position to cultivate green manures *in situ* or outside the cane field and incorporate into their field for increasing the organic carbon content of the soil. Mohan Singh (1992) reported that green manuring saved the nitrogen to the tune of 50 kg ha^{-1} without compromising the cane yield. Hence to know the efficiency of green manuring, *insitu* as well as application from outside, on the cane yield this study was taken up.

MATERIALS AND METHODS

Field experiments were conducted to study the efficiency of bio-manure with organic manures along with reduced level of nitrogenous fertilisers. Soils were clay loam at Sugarcane Research Station, Melalathur. Soil pH was 7.3 and 7.6 and EC 1.1 dSm^{-1}. Available nutrient status were 193:10:210 kg ha^{-1} of NPK,which were low, medium and medium respectively. Test variety was COC 85061, planted during early season of 1993 and 1994.

Treatments were, intercropping of green manures viz., *Sesbania rostrata, S.aculeata, Crotolaria juncea, Teprosia purpurea,* sown in a single row with 10 kg ha^{-1} of seeds on the third day after planting of setts in the middle ridges. On 60th day of green manure was incorporated in the cane row, for the green leaf manures viz., *Glyricidia maculata, Pungamia glabra, Azadiracta indica,* the quantity used was as much as green manure. Pressmud and FYM at 12.5 t ha^{-1} each were organic manure treatments. If these 13 treatments, NPK as 175:63:113 kg ha^{-1} was applied Fertiliser alone treatment received 225:63:113 kg NPK ha^{-1}. These 14 treatments were replicated three times and experiment was lard out in randomized block design.

Table 2. Effect of treatments on millable cane, jaggery recovery and available nutrients (Mean for two years)

Treatments	Millable Cane 1000 ha^{-1}	Jagger recovery %	Organic carbon (%)	Available nutrients (kg ha^{-1})		
				N	P	K
		***In-situ* incorporation**				
Sesbania rostrata	91	10.1	0.66	168	18	228
Sesbania aculeata	93	10.3	0.68	176	18	230
Crotolaria juncea	98	10.3	0.68	175	18	227
Teprosia purpurea	92	10.2	0.65	160	17	230
Mean	93.5	10.2	0.66	169	18	229
		Incorporation				
Sesbania rostrata	90	9.6	0.66	161	17	226
Sesbania aculeata	91	9.8	0.67	171	18	228
Crotolaria juncea	92	9.9	0.66	173	18	228
Teprosia purpurea	89	9.7	0.65	150	16	229
Mean	90.5	9.7	0.66	163	17	228
Glyricidia maculata	93	9.9	0.66	163	17	228
Pungamia glabra	89	9.1	0.65	160	16	230
Azadiracta indica	90	9.7	0.65	163	17	227
Mean	90	9.5	0.65	161	17	228
Pressmud	90	9.5	0.65	167	15	228
FYM	89	9.1	0.64	166	13	224
Fertilizer Alone (225:63:113 kg NPK ha^{-1})	81	9.0	0.63	153	12	226
CD (p=0.05)	3.2	0.6	0.02	6.1	3.2	NS

Data on millable cane number, commercial cane sugar (CCS) percent, cane yield, jaggery recovery percent were recorded. Available nutrients of NPK and organic carbon content percent in the post-harvest soils were analysed. Sugar yield was calculated from cane yield and CCS percent.

RESULTS AND DISCUSSION

Recorded data on cane yield, CCS percent, sugar yield and economics are presented in Table. 1

Incorporation of green manures and green leaf manures had significant effect on increasing the cane and sugar yield. *In situ* incorporation of green manures had better result than brought from other fields. *Crotolaria juncea* recorded significantly higher mean cane, sugar yield and benefit cost ratio of 125, 15.8 and 2.54 respectively. This was followed by *Sesbania aculeata in situ* incorporation which registered the mean cane, sugar and benefit cost ratio of 124, 15.8 and 2.49 respectively.

Cane yield increase was 14.0, 12.1 and 11.2 percent by the treatments insitu green manures incorporation, from outside field green manures incorporation and green leaf manures incorporation respectively applied with 175:63:113 kg NPK ha^{-1} over inorganic fertiliser application alone. The advantage of green manuring over green leaf manure was addition of nodules which enriched the soil with nitrogen (Singh, 1963). However, the green manure incorporation either insitu or brought from outside the field and green leaf manure application had no significant effect on CCS percent.

Pressmud and FYM application also recorded significantly higher cane and sugar yield than fertiliser alone plot. However, it was lesser than green manure incorporation plot. Padwick (1983) reported that incorporation of green manure was alternate source to organic manures like pressmud and FYM.

Treatment effect on millable cane number, jaggery recovery percent, organic carbon percent in soil and available nutrients of N,P and K are shown in Table 2. *In-situ* incorporation of *Crotolaria juncea* with 175:63:113 kg NPK ha^{-1} registered significantly higher number of millable cane of 98,000 ha^{-1} which was followed by *Sesbania aculeata* insitu incorporation (93,000 ha^{-1}). When compared the nutrient availability, *insitu* incorporation recorded significantly more nitrogen than brought from outside, green leaf manure and other organic and inorganic source of manures. The residual nutrients were made available to the next crop after utilization by the cane crop. Phosphorus availability was more than inorganic fertiliser application and that was mobilized by the organic acids of the green manures from the soil colloids (Yadav, 1993.) This made the crop sturdy and uniform growth of cane.

Jaggery recovery percent and organic carbon content in post-harvest soils were higher in green manures and green leaf manures applied plot than the inorganic fertiliser application plot.

This study shows that green manure incorporation is not only an alternate source to FYM but also booster of higher cane yield.

REFERENCES

MOHAN SINGH. (1992). Potential for biological nitrogen fixation in sugarcane. Sugar crop news letter. Vol. No.1. Indian Institute of Sugarcane Research. Lucknow P. 3-4.

PADWICK, G.V. (1983). Fifty years of experiments agriculture. II. The maintenance of soil fertility in Tropical Africa. A Review - **Experimental Agriculture. 19:** 293-310.

SINGH, A. (1963). A critical evaluation of green manuring experiments on sugarcane in North India. **Empire Journal of Experimental Agriculture. 29:** 205-212.

YADAV, R.L. (1992). **Agronomy of Sugarcane Principle and Practice.** International book distributing co., Lucknow P. 372.

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