

Table 1. Weed density, DMP and yield in different treatments

Treatments	Weed flora	Weed flora	Weed DMP	Weed DMP	Yield of	Yield of	Yield of	Yield of
	(no./m ²)	(no./m ²)	(kg/ha)	(kg/ha)	inter crops	inter crops	main crop	main crop
	1994	1995	1994	1995	1994	1995	1994	1995
T1	14.7	18.2	45.2	44.5	96	55	294	278
T2	4.9	5.8	17.8	16.8	336	225	942	871
T3	9.2	11.9	30.6	27.1	297	205	848	865
T4	10.8	11.7	36.2	35.2	247	99	386	383
T5	7.1	8.9	23	21.4	238	121	767	620
T6	10.6	11.5	14.1	36.8	2789	179	441	688
T7	10.8	11.8	37.3	37.3	279	196	537	648
T8	10.7	11.3	35.6	34	263	186	438	647
T9	10.6	13.7	34.7	31.3	281	155	447	642
T10	11.9	12	42.9	40.3	315	157	493	740
T11	12.4	13	39.3	37.2	272	151	580	720
T12	6.8	9.5	25.1	21.4	351	210	959	947
T13	8.3	9.0	27.0	25.6	243	197	755	797
T14	5.9	5.8	22.8	24	292	200	447	929
T15	6.4	6.5	23	28.8	123	45	649	244
CD (5%)	0.5	1.2	0.84	2.0	24	17	32	96

Treatment details as per the text. DMP : Dry matter production

through out the cropping period was uneconomical. However, pre-emergence application of fluchloralin @ 1 kg/ha followed by hand weeding on 25 DAS was economical and on par with weed free check.

The data on WF and weed DMP revealed that pre-emergence application of fluchloralin @ 1 kg/ha followed by hand weeding on 25 DAS significantly reduced the weed density and weed DMP and it was comparable with weed free check. Ahuja and Yaduraju (1995) observed that decreased weed population and weed dry weight due to fluchloralin application in pigeonpea + wheat cropping system. It can be concluded that

pre-emergence application of fluchloralin @ 1 kg/ha followed by hand weeding on 25 DAS would help in increasing the yield of pigeonpea + black gram cropping system.

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EFFECT OF ORGANIC MANURES AND FERTILIZER NITROGEN ON POST HARVEST SOIL NUTRIENT STATUS, NUTRIENT UPTAKE AND YIELD OF TRANSPLANTED RICE

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ABSTRACT

Field experiments conducted at Annamalai University, Annamalai Nagar during *samba* 1991 and *navarai* 1992 showed that post harvest soil available nutrient status, crop nutrient uptake and grain yield of rice were favourably influenced by the application of bio-digested pressmud at 10 t/ha along with the recommended dose of fertilizer nitrogen viz. 150 and 120 kg N/ha for medium and short duration rice varieties respectively.

KEY WORDS : Organic manures, nitrogen, nutrient status, yield

The concept of integrated nitrogen management plays a pivotal role to augment crop production through efficient utilisation of organic and inorganic sources. Sakthivel (1990) observed that the combined application of organic amendments and inorganic fertilizers gave maximum grain yield of rice. Pressmud is well known for its manurial value and available in plenty in the sugarcane growing belts. A combination of organic manures and inorganic N fertilizers has been reported to increase N uptake and reduce N losses. Therefore, a field study was carried out to find out the effect of organic sources and fertilizer N on soil nutrient status, crop nutrient uptake and yield of rice.

MATERIALS AND METHODS

The field experiment was conducted during *samba* 1991 (July- December) and *navarai* 1992 (January-May) at Annamalai University experimental farm, Annamalainagar. The experiment was laid out in a split-plot design with three replications. The soil was clayey loam with a pH of 7.6, available N 228, P₂O₅ 12 and K₂O 326 kg/ha. The bio-digested pressmud analysed 2.71 per cent N, 0.92 per cent P₂O₅ and 0.80 per cent K₂O. The main plot treatments comprised of no organic manuring, pressmud at 5 t/ha and 10 t/ha, bio-digested pressmud at 5 t/ha and 10 t/ha and

biodigested cowdung at 5 t/ha. The four levels of fertilizer nitrogen viz., 0, 75, 112.5 and 150 kg N/ha for ADT 40 and 0, 60, 90 and 120 kg N/ha for ADT 36 (0, 50, 75 and 100% recommended dose) were assigned to sub plots. The recommended fertilizer schedule of 150:50:50 kg N, P₂O₅ and K₂O/ha and 120:38:38 kg N, P₂O₅ and K₂O were followed for the medium duration rice variety (ADT 40) and short duration rice variety (ADT 36) respectively. Half N and K₂O and full dose of P₂O₅ were applied as basal. The remaining N and K₂O were top dressed in 2 equal splits at maximum tillering and panicle initiation stages.

RESULTS AND DISCUSSION

Post harvest soil nutrient status

Bio-digested pressmud at 10 t/ha recorded the highest soil available N of 210.52 and 192.95 kg, available P of 19.38 and 18.84 kg and available K of 317 and 310 kg/ha in 1991 and 1992 respectively. Among the sub plot treatments, application of recommended level of fertilizer N recorded the highest post harvest soil available nutrient status in both the years (Table 1).

Bio-digested pressmud as an organic manure contributed a higher quantity of N supplement by virtue of its higher N analysis. During anaerobic digestion, a notable amount of protein nitrogen

Table 1. Effect of organic manures and fertilizer N on soil nutrient status (kg/ha)

Treatments	Available Nitrogen		Available Phosphorus		Available Potassium		
	1991	1992	1991	1992	1991	1992	
Organic manures							
No manure (control)	161.66	150.74	16.93	16.88	283.91	277.75	
Pressmud at 5 t/ha	190.16	175.21	17.86	17.35	295.00	288.00	
Pressmud at 10 t/ha	197.63	182.67	18.34	17.84	304.25	296.75	
Bio-digested pressmud at 5 t/ha	197.84	182.42	18.32	17.85	301.00	294.00	
Bio-digested pressmud at 10 t/ha	210.52	192.95	19.38	18.84	317.00	310.00	
Bio-digested cowdung at 5 t/ha	190.32	175.33	17.88	17.38	297.16	290.16	
CD (P = 0.05)	0.44	0.28	0.02	0.03	3.87	3.86	
N levels (kg/ha)							
1991	1992						
(ADT 40)	(ADT 36)						
0	0	172.59	160.25	17.71	17.29	294.88	287.88
150	120	208.42	191.61	18.48	18.06	304.50	297.50
112.5	90	196.01	180.69	18.22	17.81	300.66	294.00
75	60	188.50	173.66	18.01	17.59	298.55	291.72
CD (P = 0.05)		0.24	0.27	0.03	0.01	0.92	0.92

Table 2. Effect of organic manures and fertilizer N on crop nutrient uptake (kg/ha) and grain yield (t/ha)

Treatments	N uptake		P ₂ O ₅ uptake		K ₂ O uptake		Grain yield		
	1991	1992	1991	1992	1991	1992	1991	1992	
Organic manures									
No manure (control)	105.94	87.76	32.12	27.71	117.20	100.98	4.45	3.60	
Pressmud at 5 t/ha	127.12	96.11	35.30	31.87	136.75	114.13	5.00	4.03	
Pressmud at 10 t/ha	137.43	101.33	37.30	35.21	150.06	117.38	5.44	4.42	
Bio-digested pressmud at 5 t/ha	137.07	101.03	36.94	35.04	150.31	116.96	5.42	4.37	
Bio-digested pressmud at 10 t/ha	147.66	104.84	40.60	36.51	159.79	121.54	5.75	4.79	
Bio-digested cowdung at 5 t/ha	128.02	96.21	35.62	32.17	136.98	114.65	5.02	4.05	
CD (P = 0.05)	0.87	0.31	0.56	1.24	0.61	0.40	0.02	0.05	
N levels (Kg/ha)									
1991	1992								
(ADT 40)	(ADT 36)								
0	0	117.33	87.31	29.32	25.81	124.61	102.33	4.61	3.74
150	120	145.61	109.21	46.90	43.13	155.64	128.99	5.72	4.71
112.5	90	132.47	101.08	37.50	34.27	144.87	114.69	5.37	4.36
75	60	127.33	93.87	31.53	29.15	139.65	111.43	5.02	4.03
CD (P = 0.05)		0.45	0.14	0.48	0.83	0.29	0.37	0.019	0.031

might have been mineralised to ammoniacal form. The increase in soil available P was due to appreciable amount of P present in bio-digested pressmud and also due to solubilisation of insoluble forms of phosphate by organic acids produced during the decomposition process. The increase in available K in the soil might be due to high K content of bio-digested pressmud.

Crop nutrient uptake

Bio-digested pressmud at 10 t/ha significantly increased the crop uptake of 147.66 and 104.84 kg N, 40.60 and 36.51 kg P and 159.79 and 121.54 kg/ha K in 1991 and 1992 respectively. Application of recommended dose of fertilizer N recorded the highest uptake of nutrients by crop (Table 2). Higher content and availability of N during decomposition might have resulted in increased N uptake due to biodigested pressmud application. Further, higher dose of N fertilizer might have increased the uptake of N by the way of increased dry matter production. Similar findings were reported by Dinesh Chandra and Mishra (1991).

The higher dose of fertilizer N along with bio-digested pressmud might have favourably influenced the P and K content and uptake by the

crop through better rooting pattern as reported by Abdul Salam and Subramanian (1988).

Grain yield

Application of bio-digested pressmud at 10 t/ha registered the highest grain yield of 5.75 and 4.79 t/ha in 1991 and 1992 respectively. The increase of yield over control was 29.2 and 33.1 per cent in 1991 and 1992 respectively. Application of recommended dose of fertilizer N produced the highest grain yield of 5.72 and 4.71 in 1991 and 1992 respectively. The increase of yield over control was 24.1 and 25.9 per cent in 1991 and 1992 respectively. This might be due to better nutrient uptake by the crop which favourably influenced the growth and yield of rice.

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