

## EFFECT OF FARMYARD MANURE AND AMMONIUM SULPHATE ON THE AVAILABLE NUTRIENT CONTENT OF SOIL

S. CHELLAMUTHU<sup>1</sup>, G. V. KOTHANDARAMAN<sup>2</sup> and P. DURAISWAMY

A Field experiment was conducted to study the effect of FYM and  $(\text{NH}_4)_2\text{SO}_4$  on the available nutrient status of soil. The study revealed that the organic carbon content of the soil was increased by the application of FYM and  $(\text{NH}_4)_2\text{SO}_4$ . Total N, available N and P were increased by the increased application of N either as FYM or as  $(\text{NH}_4)_2\text{SO}_4$ . In the FYM treated plots, the total N content increased from 0.045 per cent to 0.074 per cent.

Nitrogenous fertilizers not only provides the source of N for plants but also increase the availability of other plant nutrients. It is evident that the application of either FYM or  $(\text{NH}_4)_2\text{SO}_4$  alone or in combinations increased the availability of carbon, phosphorus and potassium. Hence an experiment was conducted to study the effect of FYM and  $(\text{NH}_4)_2\text{SO}_4$  on the available nutrient status of soil.

### MATERIALS AND METHODS

A field experiment was conducted during kharif 1978, with the variety Co. 7 & Co.9 ragi in a split plot design replicated thrice consisting the varieties as main plots and levels of N as sub-plot treatments. The N was applied @ 0, 30, 60 and 90 kg/ha in the form of FYM and  $(\text{NH}_4)_2\text{SO}_4$  alone and in combinations. The entire dose of P and K was applied as basal dressing in the form of superphosphate at 45 kg  $\text{P}_2\text{O}_5$ /ha and muriate of potash 22.5 kg  $\text{K}_2\text{O}$ /ha respectively. The crop was transplanted with a spacing of 15 x 15 cm with a plot size of 20 m<sup>2</sup>. The entire dose of FYM was applied as basal dressing while

$(\text{NH}_4)_2\text{SO}_4$  was applied twice i.e. 50% N basally and the remaining 50% at tillering stage. The post harvest soil samples were collected and analysed as per the method suggested by Jackson (1967) for total N content of soil, soil organic carbon, available N, P and K status and the results were discussed.

### RESULTS AND DISCUSSION

#### i) *Organic carbon status of soil*

Organic carbon content was significantly influenced by the treatments. Application of N from both the sources had a highly significant influence on the organic carbon content of soil (Table 1). Sankaran (1977) also reported that higher organic carbon content was noted in black soil. This may be due to the better Ca status and retentive capacity for humus in the black soil. The increase of organic carbon in soil by the addition of organic manures was also earlier reported by Bache Byron *et al* (1969) and Toru Kubota (1971).

1 & 3 : Assistant Professors. Department of Soil Science and Agricultural Chemistry, Tamil Nadu Agricultural University, Coimbatore-3.

2 : Dean, P. G. Studies, Tamil Nadu Agricultural University, Coimbatore-3.

Table 1 : Organic carbon content of soil (%) — (Mean value)

Source and Levels of N Kg/ha	Farmyard Manure				N Levels	Ammonium Sulphate			
	0	30	60	90		0	30	60	90
Varieties									
Co. 7	0.338	0.338	0.335	0.421	0.349	0.356	0.369	0.377	0.363
Co. 9	0.314	0.346	0.400	0.422	0.360	0.365	0.367	0.390	0.370
Mean	0.326	0.342	0.378	0.421	0.355	0.360	0.368	0.383	

Sources	SED	CD (P=0.05)
Between Varieties	0.002	0.004
Between levels of FYM	0.003	0.006
Between levels of (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	0.004	0.007

Table 2 : Total Nitrogen status of soil (%) Mean values

Sources and levels of N kg/ha	Farmyard Manure				N Levels	Ammonium Sulphate			
	0	30	60	90		0	30	60	90
Varieties									
Co. 7	0.046	0.054	0.065	0.074	0.057	0.059	0.060	0.063	0.060
Co. 9	0.045	0.054	0.065	0.074	0.057	0.058	0.061	0.063	0.060
Mean	0.045	0.054	0.065	0.074	0.057	0.059	0.060	0.063	

Sources	SED	CD (P=0.05)
Between varieties		N.S.
Between levels of FYM	0.0003	0.0006
Between levels of (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	0.0003	0.0006

Table 3 : Available Nitrogen status of soil (Kg/ha) Mean values

Sources and levels of N kg/ha	Farmyard Manure				N Levels	Ammonium Sulphate			
	0	30	60	90		0	30	60	90
Varieties									
Co. 7	221.11	230.29	229.85	231.83	206.97	224.38	239.63	242.09	228.27
Co. 9	217.23	230.37	230.15	231.83	207.26	220.36	239.55	242.41	227.39
Mean	219.17	230.33	230.00	231.83	207.11	222.37	239.59	242.25	

Sources	SED	CD (P=0.05)
Between varieties	—	N.S.
Between levels of FYM	1.953	3.139
Between levels of (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	1.692	3.405

Table 4: Available Phosphorus status of soil (Kg/ha) Mean values

Sources and levels of N Kg/ha	Farmyard Manure				N Levels	Ammonium Sulphate			
	0	30	60	90		0	30	60	90
Varieties									
Co. 7	20.38	20.30	22.17	19.30	18.28	18.65	23.16	22.05	20.53
Co. 9	15.22	21.57	21.66	19.88	18.22	18.80	20.12	21.19	19.58
Mean	17.80	20.93	21.91	19.59	18.25	18.72	21.64	21.62	

Sources	SED	CD (P= 0.005)
Between varieties	0.160	0.344
Between levels of FYM	0.227	0.486
Between levels of (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	0.264	0.531

Table 5: Available Potassium status of soil (Kg/ha) Mean values

Sources and levels of N (Kg/ha)	Farmyard Manure				N Levels	Ammonium Sulphate			
	0	30	60	90		0	30	60	90
Varieties									
Co. 7	779.03	799.29	824.75	838.37	731.16	813.65	855.29	841.34	810.36
Co. 9	840.67	942.35	778.90	866.03	798.88	910.98	855.10	866.37	857.00
Mean	809.85	870.82	801.83	852.20	765.02	862.32	870.20	853.85	

Sources	SED	CD (P= 0.05)
Between varieties	4.212	9.034
Between levels of FYM	5.956	2.776
Between levels of (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	5.955	1.987

## ii) Total nitrogen status of soil :

Application of N in the form of farmyard manure as well as ammonium sulphate produced significant increase in the total N content of the soil. On FYM treated plot, the total N content increased from 0.045 per cent to 0.074 per cent. Substantial increase in the total N content was also brought out by ammonium sulphate (Table 2). Application of

organic manure as well as ammonium sulphate would have contributed to the total N status of the soil. This result was also substantiated by the earlier results of Atkinson and Sowden (1970) and Sankaran (1977).

## iii) Available nitrogen content of soil :

The availability of N varied due to treatment with farmyard manure

as well as ammonium sulphate. Application of N at higher levels (60 and 90 kg N/ha) were significantly superior to the lower levels. The availability of N was the highest at the highest level of N from (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> irrespective of the levels of FYM. The increased available N status of soil may be due to readily available form of N supplied from the ammonium sulphate (Table 3). Similar results were also reported by Debnath and Hajra (1972) and Sankaran (1977).

iv) *Available phosphorus content of soil:*

Application of N from both the sources at 60 kg/ha registered the highest available P content. This may be due to some organic acids produced during decomposition which caused the release of P from insoluble P compounds (Table 4). Similar results were reported by Sankaran (1977). This result was also in accordance with the work of Prasad *et al.*, (1971) and McIntosh and Varney (1973).

v) *Available potassium content of soil:*

The influence of FYM was significant in increasing the availability of K in soils. The availability was high at 30 kg N/ha. Application of N as (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> at 60 kg N/ha recorded significantly higher availability than the other levels (Table 5). This result is in conformity with the work of Nishita *et al.*, (1973) and Sankaran (1977).

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