

- different stages of oriental fruit moth. *J. Econ Entomol* 53: 463-471.
- GOMEZ, K. A. and A. A. GOMEZ 1976. *Statistical Procedure for Agricultural Research with Special Emphasis on Rice*. IRRI, Los Banos, Philippines, 368 p.
- MOHAMMED HANIFA, A. and S. CHELLIAH. 1981. Atomiser for use in insecticide evaluation. *Intl. Rice Res. Newsl.* 6 (5) : 18
- SINGH, O. P. U S MISRA and S. J. ALI. 1982
- Susceptibility of insect eggs to carbamates. *Indian J. Plant. Prot.* 10 : 79-80.
- SMITH, E. H. and E. H. SALKELD. 1966. The use and action of ovicides. *Ann. Rev. Entomol.*, 24 : 331-368.
- SNEDECOR, G. W. and W. G. COCHRAN. 1967. *Statistical Methods* Oxford and IBH Publ. Co., Calcutta. 539 p.

<https://doi.org/10.29321/MAJ.10.A02157>

Madras Agric. J. 74 [2] : 98—101 February, 1987

EFFECT OF ORGANIC AND INORGANIC FORMS OF NITROGEN ON THE CRUDE PROTEIN CONTENT OF RAGI (*Eleusine Coracana* GAERTN) CROP

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The crude protein content of the ragi grain and husk was higher in the variety Co. 9 compared to Co. 7. Application of FYM or $[(NH_4)_2SO_4]$ @ 90 kg N/ha increased the crude protein content of the grain and straw. The highest crude protein content of grain to the tune of 12.08 per cent was recorded by the combined application of FYM @ 90 kg N/ha and $[(NH_4)_2SO_4]$ @ 90 kg N/ha.

Judicious combination of organic and inorganic forms of fertilizers would increase the nutritive value of grains especially the protein content and mineral constituents. Among the inorganic elements, Nitrogen (N) is required in larger quantities than other elements. The farming systems in India

depend heavily on soil reserves to meet the N requirement of crops. This necessitates the application of both organic and inorganic forms of nitrogenous fertilizers to supplement soil N for successful crop production for which experiments were conducted and results furnished.

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Table 1. Data on Crude protein content in Ragi grain (in %) (Mean of 3 replications)

Varieties	Sources of Nitrogen								Mean
	Farm Yard Manure				Ammonium Sulphate				
	0	30	60	90	0	30	60	90	
Levels of Nitrogen									
Co. 7	7.36	8.43	8.90	10.16	6.97	8.59	9.47	9.69	8.68
Co. 9	7.12	8.14	9.49	11.76	7.15	8.93	10.29	10.14	9.13
Mean	7.24	8.29	9.20	10.96	7.06	8.76	9.38	9.92	

CD (P=0.05)

Between varieties	0.082
<i>Between levels of N</i>	
Between Farmyard manure	0.115
Between Ammonium sulphate	0.111

MATERIALS AND METHODS

A field experiment was conducted to study the effect of Farmyard Manure (FYM) and ammonium sulphate ($(\text{NH}_4)_2\text{SO}_4$) on the crude protein content of ragi crop, in a split plot design replicated thrice. The treatments consisted of the varieties Co. 7 and Co. 9 as main plots and levels of N as subplots @ 0, 30, 60 and 90 Kg N/ha in the form of FYM and $(\text{NH}_4)_2\text{SO}_4$ alone as well as in combinations. The entire doses of P and K were applied as basal in the form of superphosphate @ 45 Kg P_2O_5 /ha and Muriate of Potash @ 22.5 kg K_2O /ha respectively. At harvest the grain, straw and husk were estimated for their total N content by macrokjeldahls' method (Jackson, 1967) and multiplying the N content by the factor 6.25.

RESULTS AND DISCUSSION

In the variety Co 9, crude protein of 9.13 per cent was recorded in the grain compared to Co. 7, 8.68 per cent. Application of N either in the form of FYM or as $(\text{NH}_4)_2\text{SO}_4$ increased the crude protein content of grains. The crude protein content was only 7.24 per cent in control as against 10.96 per cent in the plots treated with FYM-N @ 90 kg/ha, but it was known to increase from 7.06 per cent to 9.92 per cent for the same dose applied as $(\text{NH}_4)_2\text{SO}_4$. Similar results were reported by Stabursvik and Heide (1974) (Table 1).

In the ragi straw the varieties did not differ in their crude protein content. Though the application of FYM increased the crude protein content in straw from 5.89 per cent in control as against 6.29 per cent at 90 kg N/ha. The highest crude protein

Table 2 Data on Crude protein content of Ragi straw (in%) (Mean of 3 replications)

Varieties	Sources of Nitrogen								Mean
	Farm Yard Manure				Ammonium Sulphate				
	0	30	60	90	0	30	60	90	
	[levels of Nitrogen]								
Co- 7	5.58	6.34	6.23	6.13	5.81	6.11	6.13	6.23	6.07
Co- 9	5.78	6.11	6.11	6.44	5.61	6.39	6.33	6.11	6.11
Mean	5.68	6.22	6.17	6.29	5.71	6.24	6.23	6.17	

CD (P=0.05)

Between varieties	NS
Between levels of N	
Within farm yard manure	0.119
Within ammonium sulphate	0.138

Table 3 Data on crude protein content of Ragi Husk [in %] (Mean of 3 replications)

Varieties	Sources of Nitrogen								Mean
	Farm yard Manure				Ammonium Sulphate				
	0	30	60	90	0	30	60	90	
	Levels of Nitrogen								
Co- 7	0.636	0.761	0.813	1.063	0.714	0.776	0.844	0.938	0.818
Co- 9	0.636	0.771	0.943	1.42	0.739	0.813	0.891	0.948	0.848
Mean	0.636	0.766	0.878	1.052	0.727	0.794	0.868	0.943	

CD [P=0.05]

Between varieties	0.025
Between levels of N	
Within farm yard manure	0.036
Within Ammonium sulphate	0.024

content of 6.55 per cent was registered by the combined application of N at 90 kg/ha as FYM and 30 kg N/ha as $(\text{NH}_4)_2\text{SO}_4$ and the difference in crude protein content was not significant. The combined effects of FYM and $(\text{NH}_4)_2\text{SO}_4$ increased the crude protein content in ragi straw was reported by Govindan (1975) (Table 2).

Higher crude protein content was observed in the ragi husks of the variety Co. 9 (0.88 per cent) compared to 0.81 per cent in Co. 7. Application of N irrespective of sources either organic or inorganic significantly increased the crude protein content, in ragi husk. However, $(\text{NH}_4)_2\text{SO}_4$ increased the crude protein content to an extent of 0.94 per cent @ 90 kg/ha as against 0.73 per cent in

control. Contrary to this, application of FYM had increased the crude protein content to 0.41 per cent @ 90 kg N/ha as FYM.

REFERENCES

- GOVINDAN, G. 1975. Studies on the Nitrogen uptake pattern of ragi (*Eleusine Coracana*) Var. Co. 10 as influenced by the quantity and time of application of Nitrogen. M. Sc (Ag). Dissertation submitted to and approved by the Tamil Nadu Agrl. University Coimbatore-3.
- JACKSON, M. L. 1967. Soil chemical Analysis, Prentice hall of India (Pvt) Ltd, New Delhi.
- STABURSVIK, A and O. M. HEIDE. 1974. Protein content and amino acid spectrum of Finger millet (*Eleusine coracana Gaertn*) as influenced by nitrogen and sulphur fertilizers. Plant and Soil. 41 : 549-571.