

EFFECT OF ORGANIC AND INORGANIC FERTILIZER N ON THE YIELD OF RAINFED RAGI

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ABSTRACT

Studies to evaluate the efficiency of organic and inorganic sources of N on rainfed ragi revealed that the application of FYM at 10 t/ha in combination with 40 kg N/ha registered the highest grain as well as straw yields.

Key words: Organic, Inorganic fertilizer, Yield, Rainfed ragi.

Ragi (*Eleusine coracana* Gaertn.) is one of the important millet crops of Tamil Nadu. Many high yielding varieties of ragi have been introduced recently with the main objective of getting better response to fertilizers and increasing yield. From the nutritional point of view, the beneficial influence of N on ragi was studied by Krishnamoorthy (1968). An integrated approach of recycling the organic wastes is aimed at now in the interest of farming community.

Among the various attempts for better utilization of organic wastes, recovering and recycling of plant and animal residues deserves due consideration as they are available in the farm itself. During the recent times integrated use of organic manures with inorganic and biofertilizers for increased soil productivity has been well established. Singh (1975) and Roy Chauduri (1977) found that application of farm yard manure increased the yield of wheat crop.

MATERIALS AND METHODS

Field experiments were conducted for two consecutive seasons during 1985 and 1986 with Paiyur-1 ragi at Regional Research Station, Paiyur. The soil of the experimental field was sandy loam with a pH of 8.0 and EC of 0.20 m.mhos/cm. The initial nutrient status of the soil was found to be low in N and medium in available

phosphorus and potassium respectively. The organic carbon content was 0.20 per cent.

The experiments were laid out in Randomised block design with 12 treatments and three replications. The treatments included control, Azospirillum, blanket recommendation of 40-20-0 NPK/ha, FYM @ 10 t/ha and 20 kg N and 40 kg N applied either in plough furrow or broadcasted and covered with plough. The inorganic levels of 20 and 40 kg N/ha were applied singly as well as in combination with FYM 10 t/ha in both the methods of application. Entire nitrogen in the form of urea was applied after 30 days after sowing crop growth.

Cultural operations were carried out as per the package of practices. At harvest data on biometrical characters, yield of grain and straw were recorded. Post harvest soil samples were analysed for available nutrient status.

RESULTS AND DISCUSSION

Plant height

Fertilizer application had registered its superiority in increasing the plant height significantly over the control. Combined application of organic and inorganic forms performed better than individual application of either or

Table 1. Organic and inorganic fertilizer N on rainfed ragi yield

Treatment	Plant height (cm)	Productive tillers/hill	Fingers/earhead	Yield (kg/ha)	
				Grain	Straw
Control	59.2	1.3	5.57	552	1200
Azospirillum	63.0	1.6	6.00	763	1532
40-20-0 NPK	64.5	2.4	6.39	873	1565
FYM 10 t/ha	66.3	2.0	6.63	852	1565
20 kg N-B	66.2	1.8	6.19	633	1798
40 kg N-B	66.2	2.0	6.72	643	1798
20 kg N-PF	68.4	2.6	6.33	709	1565
40 kg N-PF	70.5	2.9	6.68	727	1765
FYM 10 t/ha + 20 kg N-B	64.5	3.1	7.17	677	1865
FYM 10 t/ha + 40 kg N-B	71.6	3.3	6.47	1432	2098
FYM 10 t/ha + 20 kg N-PF	70.6	3.4	6.82	805	1732
FYM 10 t/ha + 40 kg N-PF	69.2	3.5	6.42	845	1931
SE 1.8	0.35	0.41	128	186	
CD(P=0.05)	5.2	1.04	NS	377	NS

N-PF = Nitrogen applied in plough Furrow

N-B = Nitrogen Broadcasted and covered with plough

organic or inorganic source. The treatment receiving FYM 10 t/ha in combination with 40 kg N/ha broadcasted and covered with country plough recorded the maximum plant height of 71.6 cm, as against 59.2cm in control.

Number of productive tillers/Hill

The treatments exhibited a similar trend as in the case of plant height. A maximum of 3.45 was recorded by the application of FYM 10 t/ha along with 40 kg N applied in the plough furrow as against control recording only 1.30 numbers. In all possibilities, plough furrow application of nitrogen produced more number of productive tillers than N-broadcasted and covered with plough.

Number of fingers/earhead

Application of FYM 10 t/ha in combination with 20 kg N/ha broadcasted and covered with plough recorded maximum number of fingers while the control recorded least value. Azospiril-

lum application performed better than the control but it was less effective than the organic and inorganic sources. In both the methods of N application, with increasing levels of N, the number of fingers also increased correspondingly. However, when the inorganic fertilizer was applied in combination with organic manure (FYM) it was observed that the number of fingers/earhead was more at 20 kg N/ha in both the methods of application and when the N level increased to 40 kg/ha, it recorded lesser number of fingers.

Grain and straw yields

Application of FYM at 10 t/ha in combination with 40 kg N broadcasted and covered with plough registered the maximum grain and straw yields. Combined application of organic and inorganic sources was far better than the individual applications. Similar trends were reported in wheat (Naik and Ballal, 1968, Lawra and Idnani, 1972) and sorghum (Helkiah *et al.*, 1981).

The increase in yield can be attributed to the fact of additional nutrients added, beneficial effect of the humus contributed by organic manures. The humus might have improved the physical condition of the soil, making a favourable environment for increased uptake of nutrient elements by the plants and resulting in the higher yield. Similar findings were also reported by Krishnamoorthy and Ravikumar (1973). Application of FYM alone @10 t/ha recorded 852 kg/ha of grain yield which is almost equal to the existing recommendation of 40-20-0 kg/ha of NPK respectively (873 kg/ha). This may be due to the fact that the addition of FYM reduced the bulk density of soil and as a result, the porosity and hydraulic conductivity of the soil have increased, thus creating a favourable conditions for the better availability and uptake of plant nutrients and possibly better air and water relations in soil (Helkalah *et al.*, 1981). Bairathi *et al.* (1974) and Sathyanarya *et al.* (1975) reported that organic matter addition had favourably influenced the hydraulic conductivity and total porosity of the soil.

Soil available nutrients

The analysis of post harvest soil samples revealed that the available N ranged from 133 to 160 kg/ha, P ranged from 11.7 to 15.2 kg/ha and K from 185 to 205 kg/ha. It is clear that combined application of organic and inorganic fertilizers are better than individual applications. However, the treatments failed to differ significantly.

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