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Original Research Article

Integrated Nutrient Management for Sustaining the Productivity of Rice - Groundnut Cropping System in Konkan Region

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A B S T R A C T

The nutrient management play a dominant role for increasing the productivity, as well as to maintain the soil health. There is no controversy about the importance of organic manures regarding their role. Organic manures not only regularly supply macro, micro and secondary nutrients, but also improve soil physical properties and soil biological health (Singh, 2001). Hence, it was considered necessary to evaluate the effect of different organic manures in Rice - groundnut cropping system. Unbalanced and continuous use of fertilizer in the intensive cropping system is leading to decrease in crop yields, imbalance of nutrient in soil adversely affect on soil physical properties. While integrated plant nutrient supply system relates to combined application of organic and inorganic sources of plant nutrient, aiming the maintenance of the soil fertility and plant nutrient supply to an optimum level for sustaining the crop productivity. In view of this there is need for alternative practices of managing nutrients more judiciously, efficiently and in balanced proportion to make rice based cropping system more sustainable. In this paper an attempt has been made to generate the data on integrated nutrient management in rice based cropping system.

Keywords

Rice, groundnut cropping, nutrient management

Introduction

The studies indicated that the organic manures like poultry manure, green manure with glyricidia can reduce the quantity of fertilizers to the extent of 50%. As far as the residual effect of manures are concerned, FYM + RDF, paddy straw + RDF, glyricidia + RDF found effective. Similarly, poultry manure + RDF, glyricidia + 50% RDF and paddy straw + 50% RDF were very much effective in residue producing equivalent dry pod and haulm yield of groundnut compared with residue of RDF alone. FYM + RDF, glyricidia + 50% RDF or poultry manure + 50% RDF proved very efficient organic sources and produce equivalent yield compararable with RDF alone.

Materials and Methods

A field experiments were conducted during 2005-2008, at Agronomy farm, College of Agriculture, Dapoli (M.S.) in a randomized block design with three replications. The soil was clay loam with slightly in reaction (pH 6.35), very high in organic carbon (1.29 %), medium in available N (235.86 Kg ha^{-1}) and low in available P_2O_5 (10.25 Kg ha^{-1}) and available K_2O (206.00Kg ha^{-1}). soil nine treatments of organic manures and their combination with to inorganic fertilizers were studied as a applied to rice as per the treatments. Twenty five days old seedlings Palghar – 1 was transplanted at 20x15 cm spacing. The residual effect of above treatments was studied on succeeding

groundnut application of recommended fertilizer dose of NPK was given to groundnut polythene film at 7 micron were used for mulching. TG-26 was sown for at 3 cm depth with 30x10 cm spacing. Two seeds were placed in each hole and covered by moist soil. All the recommended package at practices were followed to raise the crop successfully.

Results and Discussion

The grain and straw yields of rice were significantly affected due to different treatments. It was observed that application of poultry manure + RDF and glyricidia + RDF constantly produced the highest grain yield of rice in individual years, as well as averaged over three years and showed their superiority over all the remaining treatments, but both these treatments behaved similarly with each other. Similarly, FYM + RDF and poultry manure + 50% RDF showed their superiority over RDF, FYM + 50% RDF and paddy straw + 50% RDF, while the differences between former three treatments did not show significant variation. manure + RDF, glyricidia + RDF, FYM + RDF, poultry manure + 50% RDF, glyricidia + 50% RDF and paddy straw + RDF, but proved significantly superior than FYM + 50% RDF and paddy straw + 50 % RDF when pooled over three years.

Regarding straw yield, poultry manure, RDF and glyricidia + RDF proved significantly superior over all the remaining treatments. FYM + RDF, poultry manure + 50% RDF and glyricidia + 50% RDF did not show remarkable differences between them, but increased the yield significantly as compared to RDF only FYM + 50% RDF and paddy straw + 50% RDF. RDF alone showed its superiority over FYM + 50% RDF and paddy straw + 50% RDF. Application of RDF did not show marked increase in grain yield compared to poultry (Talathi, 2001). The dry pod yield of groundnut was very much influenced by the residual effect of organic manures and RDF applied to rice.

The residue of application of FYM + RDF, paddy straw + RDF, glyricidia + RDF and RDF alone. FYM + 100% RDF showed remarkable increase in groundnut pod yield compared to all the remaining treatments. These treatments produced 49.4, 48.5, 47.9 and 47.6 q/ha dry pod yield which were significantly higher than poultry manure + RDF, FYM + 50% RDF, paddy straw + 50% RDF, glyricidia + 50% RDF and poultry manure + 50% RDF, while the differences between former four treatments were not significant When pooled for 3 years. Similarly, the residual effect of poultry manure + RDF, FYM + 50% RDF, paddy straw + 50 % RDF and glyricidia + 50% RDF was very much conspicuous reflecting in increasing the yield of succeeding groundnut compared with poultry manure + 50% RDF, while the differences between former four treatments were of the similar order (Kathmale *et al.*, 2000).

In rice-groundnut cropping system, green manuring with glyricidia + RDF to rice, as well as RDF to succeeding groundnut was very much remunerative giving net profit of Rs. 66,444/ha/year followed by FYM + RDF Rs. 65980/ha/yeay and poultry manure + RDF Rs. 62579/ha/year and RDF alone Rs. and 61229/ha/year, respectively.

As far as the B: C ratio was concerned, the combined application of glyricidia + RDF recorded the highest B: C ratio of 2.37 followed by FYM + RDF 2.35, RDF alone 2.33, poultry manure + RDF 2.24, poultry manure + 50% RDF 2.23 and glyricidia + 50% RDF 2.11.

Table.1 Grain and Straw / Pod and haulm yield of rice / groundnut and production potential of rice-groundnut cropping system

Treatment	Grain yield of rice (q/ha)	Straw yield of rice (q/ha)	Pod yield (q/ha.)	Haulm yield (q/ha.)	Net profit (Rs ha^{-1})	B:C ratio
FYM + 100% RDF	52.11	53.89	49.38	58.38	65980.66	2.34
Glyricidia + 100% RDF	55.51	58.00	47.92	57.14	66444.00	2.37
Poultry manure + 100% RDF	55.90	58.10	46.67	54.74	62579.00	2.24
Paddy straw + 100% RDF	47.79	50.39	48.52	57.52	60973.66	2.22
FYM + 50% RDF	43.72	45.30	46.60	54.56	56680.70	2.17
Glyricidia + 50% RDF	49.24	52.37	45.33	52.85	58922.90	2.23
Poultry manure + 50% RDF	49.87	52.39	43.94	50.87	55321.30	2.11
Paddy straw + 50% RDF	38.99	40.80	46.29	53.52	52186.83	2.06
RDF only	44.87	47.66	47.57	56.22	61229.06	2.33
C D. (0.05)	2.80	4.09	2.21	2.77		

The studies indicated that the organic manures like poultry manure, green manure with glyricidia can reduce the quantity of fertilizers to the extent of 50%. As far as the residual effect of manures are concerned, FYM + RDF, paddy straw + RDF, glyricidia + RDF found effective. Similarly, poultry manure + RDF, glyricidia + 50% RDF and paddy straw + 50% RDF were very much effective in residue producing equivalent dry pod and haulm yield of groundnut compared with residue of RDF alone. FYM + RDF, glyricidia + 50% RDF or poultry manure + 50% RDF proved very efficient organic sources and produce equivalent yield compararable with RDF alone. Green manuring with glyricidia + RDF to rice, as well as RDF to succeeding groundnut was very much remunerative highest giving net profit followed by FYM + RDF. As far as the B: C ratio was concerned, the combined application of glyricidia + RDF recorded the highest B: C ratio of 2.37 followed by FYM + RDF 2.35.

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