INFLUENCE OF LEVELS OF NITROGEN, METHODS OF APPLICATION AND PLANT POPULATION ON THE PERFORMANCE OF THE HIGH YIELDING RICE VARIETY 'SABARI'

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CERTIFICATE

Certified that this thesis entitled "Influence of levels of nitrogen, methods of application and plant population on the performance of the high yielding rice variety Sabari" is a record of research work done independently by Sri. U. Mohamed Kunju, under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to him.

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ABSTRACT

An investigation was undertaken to study the effect of different levels and methods of nitrogen application and different plant populations on the growth, yield and quality of the rice variety *Sabari* in the Southern Region of Kerala. The treatments consisted of four levels of nitrogen (40, 80, 120 and 160 kg/ha), two methods of application of nitrogen (application of the entire dose through soil and 75 per cent through soil plus 25 per cent through foliage) and three levels of spacing viz. 10 x 10 cm (100 hills/m²), 10 x 15 cm (67 hills/m²) and 10 x 20 cm (50 hills/m²). The experiment was laid out in split-plot design, replicated thrice and conducted for two years at the Instructional Farm, College of Agriculture, Vellayani.

Growth characters like plant height, number of tillers per hill, leaf area index and dry matter production at different stages of growth increased with incremental doses of nitrogen. Closer planting resulted in smaller plants and higher number of tillers per unit area. The leaf area index was high in closer planting. Total dry matter production at harvest was more in 10 x 15 cm spacing. Foliar application of nitrogen (25 per cent) increased the total dry matter production at harvest. Increasing levels of nitrogen delayed flowering.
Number of panicles per unit area, length of panicle, weight of panicle, number of spikelets per panicle, number of filled grains per panicle and number of grains per unit area were increased due to incremental levels of nitrogen. Application of the second top dose of nitrogen through foliage produced more number of panicles. It also increased the weight of panicle, number of filled grains per panicle and number of filled grains per unit area. Test weight of grain was more at higher levels of nitrogen. Foliar application also increased the test weight of grain.

Maximum yield of grain was recorded at 120 kg N/ha which was on par with 160 kg N/ha. The average yields of grain at the 40, 80, 120 and 160 kg N levels were 3149, 3818, 4106 and 4027 kg/ha respectively. Foliar application of the second top dose of nitrogen was superior to soil application in increasing grain yield. Higher grain yield was obtained at 10 x 15 cm spacing. Quadratic response curve was found to be a suitable fit for nitrogen dose. The overall economic optimum level of nitrogen was 120 kg/ha. It was low (109 kg N/ha) at closer spacing and high (124 kg N/ha) at wider spacing.

Straw yield was increased with increasing levels of nitrogen application. Foliar application also increased the straw yield. Foliar application of nitrogen resulted in higher grain : straw ratio while higher levels of nitrogen decreased the ratio.
Increasing doses and foliar method of nitrogen application increased the nitrogen content of plants at flowering and of straw and grain at harvest. Protein content of grain was high at higher levels of nitrogen. It was also increased due to foliar application.

The uptakes of nitrogen, phosphorus and potassium were more at higher levels of nitrogen and foliar application. This was not influenced by different spacings.

Increasing levels of nitrogen application resulted in only a marginal increase in the residual available nitrogen status of the soil. Residual available phosphorus and potassium in the soil were not appreciably influenced by any of the treatments.

Net income and benefit : cost ratio were highest at 120 kg N/ha. Foliar application also increased the net income. Among the different spacings 10 x 15 cm spacing recorded the maximum net income.

A combination of 120 kg N/ha of which 25 per cent applied through foliage at the panicle initiation stage with 10 x 15 cm spacing was found to be the most ideal for maximum benefit from the rice variety Sabari under the agro-ecological situations of the Southern Region of Kerala.