

Integrated nutrient management for aromatic rice in West Bengal

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ABSTRACT

Field experiment was conducted during the wet season of 2006 and 2007 at Chinsurah, to evaluate an integrated nutrient management (INM) practices for enhancing grain yield of aromatic rice varieties in West Bengal. Experimental results revealed that the variety Kalajeera recorded significantly the highest grain yield (2.72 t ha⁻¹). Among the nutrient levels, application of 50% RFD + 50% FYM (2.92 t ha⁻¹) and 100% RFD (2.86 t ha⁻¹) were found equally effective in producing significantly higher grain yields. Even all the varieties could produce statistically similar yields at 50% RFD + 50% FYM and 100% RFD. Application of 50% RFD along with 50% FYM might be advocated not only for enhancing the grain yield of aromatic rice, but also for sustaining the soil fertility in the long run.

Key words: aromatic rice, grain yield, integrated nutrient management

India has a rich diversity of aromatic rices. Because of their exquisite aroma, superfine grains and exceptionally good cooking qualities, the demand for aromatic rice is growing rapidly in the international market. There is a huge potential to export aromatic rice produced in the country (Anon., 2007). The indigenous aromatic rice varieties are, however, poor yielders having poor response to fertilizer application (Singh *et al.*, 2009). As use of organic manures plays an important role to enhance the fertilizer use efficiency, reduce the cost of nutrient supply, increase production under rainfed condition and require less capital investment, especially under unfavourable weather conditions. Therefore, an integrated nutrient management (INM) practice is of utmost importance for enhancing crop productivity *vis-à-vis* sustaining soil fertility. Keeping this background in view, the present study was conducted to evaluate appropriate integrated nutrient management practice in aromatic rice.

A field experiment was conducted during the wet season of 2006 and 2007 at Chinsurah, in clay loam soil having pH 7.6, EC 0.5 ds m⁻¹, organic carbon 1.09%, total N 0.11%, available P₂O₅ 130 kg ha⁻¹ and available K₂O 411 kg ha⁻¹. The experiment was laid out in a split-plot design with four replications, keeping six different varieties *viz.* Kalanamak, Badshabhog, Indrabhog, Jawaphool, Kalajeera and Jeerasamba in main plots

and five levels of nutrient management *viz.* control (No NPK), 50% of recommended fertilizer dose (RFD), 100% RFD, 50% RFD + 50% FYM and 100% FYM in sub-plots. The crop was sown in the last week of June and transplanted in the first week of August during both the years. As per treatment schedule, the RFD was given at 50:25:25 kg N:P₂O₅:K₂O ha⁻¹ whereas organic manure was applied as FYM at 5 t ha⁻¹ at the time of final land preparation. In case of chemical fertilizers, the full dose of P₂O₅ and K₂O along with one-fourth of total N was applied as basal at the time of transplanting whereas the remaining half and one-fourth of total N were applied at tillering and panicle initiation stages, respectively. Observations on grain yield and yield attributes were recorded at harvest.

Experimental results revealed that the variety, Kalajeera recorded significantly the highest grain yield (2.71 t ha⁻¹) during both the years. This might be due to production of maximum panicle number (208 m⁻²) and panicle weight (1.99 g). Other high-yielders next to Kalajeera (2.72 t ha⁻¹) were Badshabhog (2.42 t ha⁻¹), Jeerasamba (2.30 t ha⁻¹) and Kalanamak (2.25 t ha⁻¹) (Table 1). These varieties were reported to be cultivated as indigenous aromatic rices in different states of the country (Singh and Singh, 2003). Yield performance was poor in Indrabhog (1.95 t ha⁻¹) owing to its lower values of panicle number (194.0 m⁻²) and panicle weight

Table 1. Effect of treatments on grain yield and yield attributes of aromatic rice (two years mean data)

Treatments	Panicle no. m ⁻² Mean	Panicle weight (g) Mean	Grain yield (t ha ⁻¹) Mean
Varieties			
Kalanamak	200	1.92	2.25
Badshahhog	197	1.89	2.42
Indrabhog	194	1.85	1.95
Jawaphool	198	1.91	2.02
Kalajeera	208	1.99	2.72
Jeerasamba	200	1.88	2.30
CD (P=0.05)	-	-	-
CV (%)	-	-	-
Nutrient levels			
Control	182	1.62	1.37
50% RFD	184	1.70	2.06
100% RFD	207	2.00	2.86
50% RFD + 50% FYM	218	2.15	2.92
100% FYM	201	1.89	2.17
CD (P=0.05)	-	-	-
CV (%)	-	-	-

FYM: Farm yard manure; RFD: Recommended fertilizer dose

(1.85 g). Regardless of the varieties, application of 50% RFD + 50% FYM was as good as 100% RFD in producing significantly higher grain yields over the others (Table 1). Maximum grain yield was recorded by 50% RFD + 50% FYM (2.92 t ha⁻¹) which was followed by 100% RFD (2.86 t ha⁻¹) and 100% FYM (2.17 t ha⁻¹). Similar was the trend in case of yield attributes also. Beneficial effects of FYM alone or in combination with fertilizers were earlier observed by Kumar *et al.* (2001). FYM enhanced the availability of other essential nutrients required for enhancing the cooking quality of rice (Dhiman *et al.*, 2003). Adhikary and Majumdar (2002) also suggested combined application of chemical fertilizers and organic manures for attaining higher grain yields. Higher yields under combined use of RFD and FYM could be attributed to well decomposition of FYM, which favoured better nutrient availability coupled with higher assimilation of nutrients. Singh *et al.* (2009) were of the similar opinion.

The interaction effect among the varieties and nutrient levels on grain yield was found significant during both the years. All the varieties produced statistically similar yields at 50% RFD + 50% FYM and 100% RFD. Singh *et al.* (2003) reported significant increase in percent milling yield due to combined application of

50% RFD + 50% FYM, compared with control. Many studies also showed a genetic variability for nutrient-use efficiency at a given level of fertilization with a significant genotype x nutrient interaction (Hegde *et al.*, 2007). Yield attributes *viz.* panicle number and panicle weight followed similar trends. From the present findings, it might be inferred that an INM practice involving application of 50% RFD along with 50% FYM would be effective for enhancing grain yield of aromatic rice varieties in West Bengal. It would also be helpful in restoring and sustaining the soil health as well as fertility in the long run.

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