

Effect of Variety and Seeding Rate on Yield Response of Upland Rice (*Oryza sativa* L.) at Gimbo District, Southwestern Ethiopia

Merkine Mogiso Geja*

South Agricultural Research Institute, Bonga Agricultural Research Center, Bonga, Ethiopia

Field experiment was carried out under farmer's field during 2017 and 2018 main cropping season at Gimbo district in Kaffa zone, Southwestern Ethiopia. The objective of this study was to determine the effects of seeding rates on grain yield and yield components of upland rice varieties. The experiment was carried out using randomized complete block design with three replications. Five levels of seeding rates (60, 80, 100, 120 and 140 kg ha⁻¹) and three levels of varieties (Nerica-4, Suparica-1 and Local check) were studied. The main effect of seeding rate and variety had significant ($p < 0.05$) effect on all the studied parameters. However, the interaction effect of seeding rate and variety had only significant for number of panicles per square meter and grain yield. The pooled results revealed that Nerica-4 and Suparica-1 were produced the highest grain yield of 4553.9 and 4173.9 kg ha⁻¹, respectively at the seeding rate of 80 kg ha⁻¹ in the location. Increasing seed rate above 80 kg ha⁻¹ had significantly decreased the grain yield. The correlation analysis was also made to see the relationships between grain yield and yield components. Thus, number of panicles, filled spikelets per panicle, plant height and panicle length had positive and significant correlation with grain yield. In addition, partial budget analysis was also made to check the profitability of the

treatment combinations in the location. Based on this, the combination of Nerica-4 and Suparica-1 at seeding rate of 80 kg ha⁻¹ was found to be appropriate to get better yield and economically profitable. Therefore, it can be suggested for production. Use of improved agronomic practices and high yielding variety is the most important strategy to boost grain yield in crop production. In contrast, growing low yielding local rice cultivar without using improved agronomic practices, particularly inappropriate seeding rate together with poor soil management practices on farmer's field are some of the major constraints resulting in low rice yield in the rice growing areas of Kaffa zone. The results of combined data indicated significant differences ($p < 0.05$) for all the studied parameters. Based on the result of this study, among five seeding rates, the use of 80 kg ha⁻¹ is superior in most of the agronomic traits and economic analysis. Therefore, the most attractive rate for farmers of the study area with low cost of production and higher net benefits was 80 kg ha⁻¹ seeding rate in combination with Nerica-4 and Suparica-1. In conclusion growing of Nerica-4 and Suparica-1 alternatively at the seeding rate of 80 kg ha⁻¹ was gave better yield and higher economic benefit than others. Therefore, it can be suggested for production in the location.

*Corresponding author: Virendra Singh, PhD Scholar, School of Agricultural Sciences & Engineering, IFTM University, Moradabad, India, Tel: +91-9758531198; Email: virendra.singhed@gmail.com

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