Title of dissertation				
Standardizing the best agronomic practices to improve grain quality and aroma of Bangladeshi fragrant rice				
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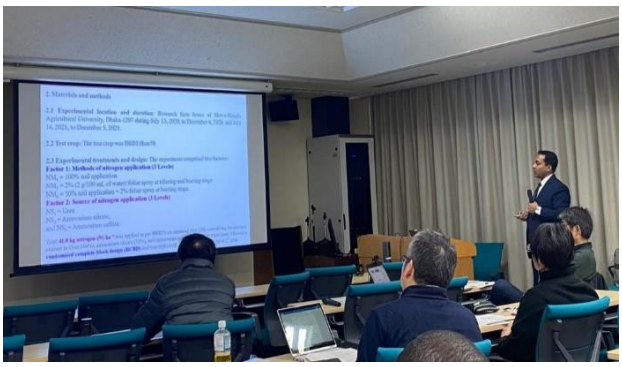
Keeping the better grain quality and retention of aroma for long time is the main bottleneck for the production and storage of fragrant rice in Bangladesh. From these perspectives, we conducted different experiments to standardize the best agronomic practices on how the grain quality and aroma has been changes in aromatic rice in the context of Bangladeshi cultivars. These experimental results were described in different chapter (2-6) in dissertation. In Chapter 2, we conducted a 2-year pot experiment to assess the effects of γ-aminobutyric acid (GABA) application on aromatic rice under shading and drought stress conditions. Here we used 1 rice variety (BRRI dhan80), eight (8) treatment combinations of GABA, shading and drought, designed with RCBD replicated five times. Results revealed that the GABA application combined with shading and drought stress markedly improved grain quality and aroma of BRRI dhan80 but affected grain yield in an inverse manner. In Chapter 3, a two- year pot experiment was conducted to assess the effects of various applications and sources of nitrogen (N) fertilizer on the yield and quality of fragrant rice. Here we used 1 rice variety (BRRI dhan70), nine (9) treatment combinations from three methods and source of nitrogen, designed with RCBD replicated three times. The results indicated that the application of N significantly influenced most of the studied parameters. The combined application of N as a foliar dose and soil application, along with ammonium nitrate and ammonium sulfate, showed improved results for various parameters of BRRI dhan70 compared to 100% soil application of N. In Chapter 4, a field experiment was conducted to evaluate the influence of harvesting time on aromatic rice performance. Here we used four rice varieties (BRRI dhan34, BRRI dhan70, BRRI dhan80, and Tulshimala) and three harvesting times [3, 4, and 5 weeks after flowering (WAF)], designed with RCBD replicated three times. Results revealed that the varying harvesting times markedly impact the yield, physiochemical characteristics, and aroma of aromatic rice varieties, with earlier harvesting beneficial for aroma retention in Tulshimala and BRRI Dhan80 and later harvesting for increased economic yield in BRRI dhan70 and BRRI dhan80. In Chapter 5, we conducted a field experiment to evaluate the impact of aromatic compound application on fragrant rice. Here we used four rice varieties (BRRI dhan34, BRRI dhan70, BRRI dhan80, and Tulshimala), four aromatic compounds (L- proline, α-ketoglutaric acid, γ-aminobutyric acid, and sodium selenite), designed with RCBD replicated three times. Results revealed the application of α-Ketoglutaric acid and sodium

selenite application improved water uptake ratio, amylose and amylopectin content, alkali spreading value, gel consistency, protein content, sensory aroma score, and kernel stickiness and tenderness of fragrant rice. Moreover, α- ketoglutaric acid application led to enhanced 2- acetyl-1-pyrroline content in Tulshimala and BRRI dhan34. In Chapter 6, we conducted a laboratory storage experiment to evaluate the performance of storage temperature and packaging materials on aromatic rice. Here we used two storage temperature (S_1 = Cold storage: 4°C ± 1°C and S_2 = At room temperature: 25 ± 2°C), three Packaging materials (P_1 - Vacuum plastic bags, P_2 - Polythene bags and P_3 - Jute gunny bags), two aromatic rice varieties (V_1 = BRRI dhan34 and V_2 = Tulshimala), designed with RCBD replicated 4 times. The result revealed that, $S_1P_1V_1$ treatment exhibited best performance on apparent amylose content, fat acidity and grain 2-AP of fragrant rice which was statistically similar to $S_1P_2V_1$; In contrast, $S_2P_3V_1$ and $S_2P_3V_2$ treatments showed the worst results.

Photos

Picture with Host Advisor in Bangladesh and Japan



Picture on day of Dissertation presentation and with the member of doctoral review meeting