Genotype by Environment Interaction of Some Lowland Rice (Oryza *Sativa* L) Varieties across Diverse Rice Growing Zones in Nigeria Using AMMI and GGE Biplot Models

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ABSTRACT

The quest for plant breeders to develop varieties that could be seen as stable across multi-environment cannot be overemphasized. Genotype by environment interaction and stability performance was investigated for grain yield of thirteen rice genotypes across six environments. The experiment was aimed at determining stable genotypes across different rice growing zones in Nigeria. The trial was laid out in a randomized complete block design with three replications across all the test environments. The experiments were conducted at the research stations of National Cereals Research institute Badeggi (Warri, Ibadan and Brinin-kebbi) and two Agricultural Development Project experimental site (Enugu and Abakaliki). The results indicated that there was significant difference at $p \leq 0.05$ for all traits measured for genotype, environment and genotype by environment interaction except for 1000 grain weight and panicle count. Additive Main effect and Multiplicative Interaction (AMMI) analysis showed that Interaction principal component axis 1 (IPCA1) and IPCA2 account for 83.2% and 11.9% of the total variation explained by genotype by environment sum of square respectively. Using AMMI stability value (ASV) and Yield stability index, genotype ART 1005-21-1-1-B (G9) showed to be the most stable. AMMI bipot identified G9 as the most stable genotype whereas, GGE biplot identified genotype ART 1002-10-1-1-1-B (G1) as the ideal genotype in the tested environment.
Keywords: Environment interaction, genotype, panicle count, Yield stability index