

EVALUATION OF MAIZE HYBRID IN MULTI-LOCATIONAL TRIAL USING GGE BIPLLOT AND AMMI MODEL

Nasrin JAHAN¹*, Md. Sarowar HOSSAIN², Md. Saleh UDDIN³, Md. Ashrafal ALAM⁴, Md. Rashedul ISLAM⁵, Quazi Maruf AHMED¹, Mst. Fatima KHATUN¹, Mohammad Golam HOSSAIN¹, Abu Nayem Md. Sajedul KARIM¹, Nishat JAHAN¹, Nizam Uddin AHMED⁶, Rojina AKTER⁷, Sherity HASNA⁵

¹ Plant Genetic Resources Centre, Bangladesh Agricultural Research Institute (BARI), Gazipur-1701, Bangladesh

² Department of genetics and plant breeding, Sher-e-Bangla Agricultural University, Dhaka-1207, Bangladesh

³ Regional Pulse Research Centre, Bangladesh Agricultural Research Institute (BARI), Madaripur-7900, Bangladesh

⁴ Spices Research Centre, Bangladesh Agricultural Research Institute (BARI), Bogura-5810, Bangladesh

⁵ Regional Agricultural Research Station, Bangladesh Agricultural Research Institute (BARI), Barishal-8211, Bangladesh

⁶ Hill Agricultural Research Station, Bangladesh Agricultural Research Institute (BARI), Raikhali, Rangamati-4531, Bangladesh

⁷ Tuber Crops Research Centre, Bangladesh Agricultural Research Institute (BARI), Gazipur-1701, Bangladesh

*Corresponding author: nasrin.jahan83@gmail.com

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ABSTRACT

This study was executed to assess the twenty-one single cross maize hybrids with three local checks (BHM-12, BHM-13 and BHM-14) in five locations of Bangladesh for its adaptability and stability and also to study the genotypes and environment interaction. Yield data of twenty-four maize hybrids was analyzed through the additive main effects and multiplicative interaction (AMMI) and GGE biplot methods. Considering the grain yield, $b_i \sim 1$ and $S^2d_i \sim 0$ value, it was observed that G10 and G16 were the higher yielding and suitable across the environments. On the other hand, G20 and G14 were higher yielding but were responsive to favorable environments. Among the five locations, the environment of Hathazari was the poorest, whereas Barishal and Dinajpur were the most favorable environments for maize production. When hybrids were compared with ideal genotypes, it was observed that G14, G16, G10, and G20 were closed to the ideal genotypes so that they can be more desirable than other tested hybrids. The AMMI biplot indicated that G24, G16, G13, G17 and G14 were positioned adjacent to the biplot's origin which indicated their stability in performance across environments. Finally, stability analysis with the help of GGE and AMMI statistics identified two hybrids G14 and G16 that could be used as reference for future crop improvement program.

Keywords: AMMI Model, environment, GGE biplot, maize, stability

INTRODUCTION

Maize (*Zea mays* L.) is a crop of utmost importance for having its versatile uses along with wider adaptability and stands second position after rice in Bangladesh. Maize is one of the prime staples crops for the nutrition of the world's population. Maize produces 1,170 million metric tons grain by covering more than 180 million hectares of land in all over the world (Ahmed et al., 2020). It is one of

the leading productive C₄ plant with higher response of photosynthesis and it has the eminent potential for production of carbohydrate in unit area/day. Shiferaw et al. (2011) reported that animal feed industries utilized about 70% of total maize production and intensified growth of population of this sector will set off the need of meat and eggs as a protein source which eventually stimulated the production of maize. Maize is also exploited in the food industry as sweeteners and food additives, which is a