MEAN PERFORMANCE AND STABILITY OF UFV'S MAIZE SINGLE-CROSSES HYBRIDS ACROSS TROPICAL ENVIRONMENTS IN BRAZIL

XIII International Symposium on Genetics and Breeding, 13ª edição, de 25/10/2022 a 27/10/2022
ISBN dos Anais: 978-65-5465-014-4

DESTRO; Vidomar [1], REIS; Helber Moreira dos [2], CRUZ; Camylla Engelender Oliveira [3], REZENDE; Wemerson Mendonça [4], LUZ; Luiz Silva [5], DELIMA; Rodrigo Oliveira [6]

RESUMO

The genotype-by-environment interaction (GEI) is a challenging phenomenon for breeders and agronomists. It consists of a differential performance of the same genotype in distinct environments. As distinct environments, we understand different locations, crop management, crop season, and a range of biotic and abiotic stresses. To select the best genotypes, we used a quantitative genotypic stability measure called WAASB (***W****eighted* ***A****verage of* ***A****bsolute* ***S****cores from the singular value decomposition of the matrix of* ***B****LUPs for the GEI effects generated by a linear mixed model*) and the performance of each genotype. The WAASBY index combines these two measures to select superior genotypes. Thus, our objective was to compare and select the best genotypes in terms of stability and performance for grain yield (GY, kg ha^{-1}). We performed seven trials in tropical regions of Brazil; three in the summer season (S1, S2, and S3), three in the winter season (W1, W2, and W3), and one in the summer season under low-N stress (SN). The trials were in square lattice design (7x7), in two replications, with 49 hybrids: 44 experimental single crosses, and five checks (20A38VIP3, P3898, DKB390PRO3, AS1868PRO3, and VA42B). Each polt consisted of two rows of four or five meters each. Row spacing and other crop practices were done according to each local recommendation. Grain Yield (GY, kg ha^{-1}) was obtained by harvest, weighing, and grain moisture correction to 14.5% of the whole plot. Estimation of variance components and prediction of breeding values were obtained using the REML/BLUP procedure. The WAASBY index was implemented for a simultaneous selection for stability and performance and we set the weights of WAASB (stability index) and Y (performance index) as 40 and 60, respectively. The LRT indicated highly significant effects ($p<0.001$) for genotype, GEI, and block. In individual analyses, genotype's effects showed significance ($p<0.01$) in all environments and block's effect in two environments (~28.6%; $p<0.05$). Proximally 27.3% of the phenotypic variance was due to genotype's effect, 21.6% to GEI's effect, and 7.7% to block's effect. The overall mean was 7,395 kg ha^{-1}. The lowest and the highest phenotypic values observed were 581 kg ha^{-1} (90V2003 in W3) and 14,847 kg ha^{-1} (AS1868PRO3 in S1). The lowest and the highest BLUP values were 5,092 kg ha^{-1} (91V2003) and 10,359 kg ha^{-1} (92V2183). Environment's means ranged from 3841.9 kg ha^{-1} (W1) to

[1] Universidade Federal de Viçosa, vidomar.filho@ufv.br
[2] Universidade Federal de Viçosa, helber.reis@ufv.br
[3] Universidade Federal de Viçosa, camylla.cruz@ufv.br
[4] Universidade Federal de Viçosa, wemerson.rezende@ufv.br
[5] Universidade Federal de Viçosa, luiz.luz@ufv.br
[6] Universidade Federal de Viçosa, rodrigoodelima@ufv.br

10,877 kg ha^{-1} (S1). The ten best genotypes according to WAASBY were: 92V2183, 92V2144, AS1868PRO3, 93V2193, P3898, 93V2084, 93V2016, 92V2153, 93V2052 e 92V2033. Also, the hybrids 92V2183, 92V2144, AS1868PRO3, P3898, and 92V2033 were in the ten bigger BLUPs. The 92V2183 was in the top ten of all environments, being top two in five of them (~71%). We conclude that was possible to identify stable and productive hybrids with comparable or better performance than checks hybrids. Based on the WAASBY index, the experimental single cross 92V2183 was the best genotype in terms of stability and performance.

PALAVRAS-CHAVE: adaptability, WAASB, genotype-environment interaction, Zea mays

[1] Universidade Federal de Viçosa, vidomar.filho@ufv.br
[2] Universidade Federal de Viçosa, helber.reis@ufv.br
[3] Universidade Federal de Viçosa, camylla.cruz@ufv.br
[4] Universidade Federal de Viçosa, wemerson.rezende@ufv.br
[5] Universidade Federal de Viçosa, luiz.luz@ufv.br
[6] Universidade Federal de Viçosa, rodrigoodelima@ufv.br