



Concentration Area: Plant breeding

Performance and yield stability of tropical maize hybrids under multiple-stress environments

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The occurrence of genotypes by environment interaction (G×E) influences the expression of maize traits during its crop cycle. The development and selection of maize hybrids targeting low fertility and lowland environments have been used as an important strategy to improve its yield under stress-prone environments. Thus, our objective was to quantify the genotypes by environment interaction and assess the adaptability and yield stability of tropical maize hybrids under multiple-stress environments. We evaluated a set of 196 tropical maize hybrids in the Southeast of Minas Gerais using a 14×14 square lattice design with two replications. Plots were 4 m long, with one row spaced 0.80 m apart. Trials were carried under lowland, low nitrogen, and favorable conditions (high N and medium-land) environments during the 2018/19 and 2019/20 seasons. We conducted individual and combined variances analysis and to estimate adaptability and yield stability parameters we used the mixed models approach. Maize hybrids were selected based on the harmonic mean relative performance of genetic values (HMRPGV). There were significant differences among the hybrids ($p < 0.01$), environments, and hybrid × environment interaction. Yield mean values ranged from 4,727 to 9,463 kg ha⁻¹. The maize hybrids showed reductions of 15% and 40% at lowland and low N conditions compared to favorable conditions. The hybrids VML083/VML124, VML084/VML165, and VML083/VML090 showed the greatest adaptability and yield stability under unfavorable environments (low N and lowland). Whereas the hybrids BM709PRO2, VML083/VML165, and VML016/VML124 showed the greatest adaptability and yield stability to favorable environments. We concluded that BM709PRO2 and VML083/VML165 hybrids are recommended to high N and medium-land environments whereas VML083/VML124, VML083/VML090, and VML084/VML165 are recommended to lowland and low N environments.

Keywords: *Zea mays* L.; G×E interaction; lowland; low N