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GENETIC POTENTIAL OF TROPICAL MAIZE POPULATION UFVM200(HS)C3

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RESUMO

The recurrent selection is a successfully breeding scheme used by breeders for increasing favorable alleles of quantitative traits at broad-based populations targeting the development of new varieties. The maize population UFVM200(HS)C3 was developed at Universidade Federal de Viçosa and have been improved through three cycles of recurrent selection. Our objectives were to: i) estimate genetic parameters in the maize population UFVM200(HS)C3, ii) estimate the genetic correlations between evaluated traits and, iii) predict the genetic gains by recombining the selected progenies. For this, 200 S₁ progenies of population UFVM200(HS)C3 were evaluated across two locals, at Viçosa and Coimbra (MG), during 2021/2022 season. In both locals, the trial was laid out in an alpha-lattice incomplete design with two replications. Each plot was a single 4 m row, with rows spaced 0.80 m apart. We evaluated five traits: days to pollen (DTP) and to silking (DTS), plant height (PH, cm), ear height (EH, cm), and grain yield (GY, kg ha⁻¹). A mixed model approach was used to estimate variance components, and genetic gains of the 20 progenies for recombining was predicted based on GY *per se* and multiple traits using a selection index. FAI-BLUP index was used to select superior progenies based on an ideotype design. Selection was carried out to reduce flowering time (DTS) and increase GY, and selection was performed based on each local and across locals. The genetic correlation between traits was estimated. Our results showed that there was large phenotypic variation for all traits at each location and across locations. Variance components due to progenies were highly significant ($P < 0.01$) based on the likelihood ratio test for all traits at each local and across locals. Variance components due to progenies x locals were not significant for all traits. The estimates of broad-sense heritability were high and ranged from 0.57 (EH) to 0.80 (DTP). The genetic correlations between GY and flowering traits were positive, which is not suitable for selection of high-yielding and earlier progenies. EH and PH were highly positive correlated with GY. Hence, the selection based on GY *per se* increased GY by 13.37%, and PH and EH by 1.78% and 2.66%, respectively, with no change for flowering time. In contrast, the selection based on index values across local's that included GY and DTS reduced days to flowering (-1.49%) and increased GY by almost 10%, with no changes in plant height. We concluded that there is genetic variability in the maize population

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UFVM200(HS)C3 and, also, the selection based on index values across locals is the best breeding strategy to improve UFVM200(HS)C3 for increasing yield and reducing cycle.

PALAVRAS-CHAVE: Zea mays L, recurrent selection, selection index

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