Efficiency of circulant diallels via mixed models in the selection of papaya genotypes resistant to foliar fungal diseases

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ABSTRACT. Diallel crossing methods provide information regarding the performance of genitors between themselves and their hybrid combinations. However, with a large number of parents, the number of hybrid combinations that can be obtained and evaluated become limited. One option regarding the number of parents involved is the adoption of circulant diallels. However, information is lacking regarding diallel analysis using mixed models. This study aimed to evaluate the efficacy of the method of linear mixed models to estimate, for variable resistance to foliar fungal diseases, components of general and specific combining ability in a circulant table with different s values. Subsequently, 50 diallels were simulated for each s value, and the correlations and estimates of the combining abilities of the different diallel

combinations were analyzed. The circulant diallel method using mixed modeling was effective in the classification of genitors regarding their combining abilities relative to the complete diallels. The numbers of crosses in which each genitor(s) will compose the circulant diallel and the estimated heritability affect the combining ability estimates. With three crosses per parent, it is possible to obtain good concordance (correlation above 0.8) between the combining ability estimates.

Key words: *Carica papaya*; Diallel cross; Combining ability; Quantitative genetics