COMPARISON OF GENOTYPE X ENVIRONMENT INTERACTION OF CLONAL AND POLYCLONAL GRAPEVINE SELECTED MATERIALS

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Abstract:

Context and purpose of the study - Conserving and exploring the intra-varietal diversity of ancient varieties is essential to foster their use in the future, preserving the traditions and history of ancient growing regions and their wines. The conservation of representative samples of ancient varieties and the utilization of intra-varietal variability through polyclonal selection are advisable strategies to save and promote the cultivation of each variety, respectively. These processes allow perform several types of polyclonal selection according to different criteria over time, to face the demands of producers, consumers, and climate changes; and to ensure a stable behaviour of the variety among the environments where it is grown. The objective of this study is to demonstrate the higher flexibility of selection criteria and precision associated with the genetic gains of polyclonal selection as well as its higher stability in different environments.

Material and methods - Linear mixed models were fitted to the data of yield and important quality traits of the must obtained in several multi-environmental field trials established according to randomized complete blocks and resolvable row-column designs. Some methodologies for the comparison between clonal and polyclonal selections are used. Particularly, methods to evaluate and demonstrate the more stable behaviour of the polyclonal material over environments are considered, using a measure based on the variance of the values of the empirical best linear unbiased predictors (EBLUPs) of G×E interaction effects of the polyclonal group across environments and biplots for the interpretation of genotype by environment (G×E) interaction.

Results - The results showed the higher precision of the genetic gains of the polyclonal selected group. When compared to individual clones, the lower sensitivity to G×E interaction of the polyclonal material was always observed. The polyclonal selection of ancient grapevine varieties showed to be a powerful tool to face current and future challenges of viticulture.

Keywords: intra-varietal diversity, grapevine conservation, polyclonal selection