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## Genomic selection in *Eucalyptus globulus* as an assisted selection tool for growth rate and disease resistance

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The adoption of genomic selection (GS) in forest tree breeding allows shortening breeding cycles, increasing selection intensity, and improving the accuracy of breeding values, which translate into increased genetic gains. Therefore, the objective of this work was to design a breeding strategy incorporating GS in the *Eucalyptus globulus* improvement plan of the INIA. Using the single step genomic selection (ssGBLUP) methodology, a multi-trait model of GS was developed considering different ages of evaluation (14 and 21 months), and combination of growth traits (total height and DBH) and heteroblasty (proportion of adult foliage). The model was tested through the predictive capacity (estimated through intra-population cross-validation), the prediction bias (estimated as the regression coefficient between the reference breeding values and those predicted by the model), and the comparison between the rankings of breeding values from the conventional ABLUP and the ssGBLUP (as the proportion of common individuals in the top 10%). The heritabilities in the strict sense for all traits were high, ranging from 0.51 to 0.72. The predictive abilities of the different cross-validations by site and by trait were high, varying from 0.72 to 0.92. The model tends to slightly underestimate DBH and the proportion of adult foliage at some sites and overestimate them at others (bias between 0.88 and 1.19), and overestimate total height in all sites (bias between 0.51 and 0.68). The proportion of common individuals in the top 10% by conventional selection and GS is high for all traits (0.76 - 0.86). These results suggest that the incorporation of GS in the improvement plan of *E. globulus* would be efficient. It is proposed to include GS in two stages of the breeding cycle: the selection of the best parents for controlled mating, increasing the selection intensity, and the selection of individuals in the nursery, reducing the stage of field evaluation of the selected clones. This strategy will markedly reduce the selection cycle, allowing commercial clones to be obtained in half the time compared to conventional selection.

**Keywords:** genomic selection, breeding strategy, multitrait, predictive ability, *Eucalyptus globulus*

