

QUANTITATIVE GENETICS OF HYBRID POPULATIONS OF *EUCALYPTUS NITENS* X  
*EUCALYPTUS GLOBULUS*: GENETIC PARAMETERS AND IMPLICATIONS FOR  
BREEDING STRATEGIES

Luis Ibarra<sup>1,2</sup>, Juan José Acosta<sup>1</sup>, Claudio Balocchi<sup>2</sup>, Christian De Veer<sup>2</sup>, Gary Hodge<sup>1</sup>

<sup>1</sup>Camcore, Department of Forestry and Environmental Resources, North Carolina State University, Raleigh, NC; <sup>2</sup>Division of Genetic Improvement, Bioforest Arauco, Coronel, Chile

Interspecific hybridization in forestry is used to produce genotypes with intermediate characteristics between two parents. Often, for particular traits, hybrids can exhibit superiority over an intermediate phenotype (mid-parent heterosis) or may perform better than either parent (high-parent heterosis). In Chile, forest plantations are established mainly with *Pinus radiata*, *Eucalyptus nitens* and *E. globulus*. Interspecific hybrids between *E. nitens* x *E. globulus* were developed by Arauco Bioforest with the goal of capturing specific traits from each parental species: growth rate and cold resistance from *E. nitens* and wood properties from *E. globulus*. Field tests of *E. nitens* x *E. globulus* were distributed in two geographic zones: Arauco (12 tests) and Valdivia (15 tests). Arauco zone is located in the central part of the country and is the best area for growing *E. globulus* due to absence of frost events. Valdivia zone is in the south of the country, being the best area for *E. nitens*, with a high precipitation and some frost events. The hybrid population is composed of clones from 28 full-sib families, being the result of crossing 12 *E. nitens* females and 8 *E. globulus* males. Progeny from each of these families were vegetatively propagated and tested on each growth zone, with a total of 1214 clones developed. The main objectives of this research are 1) to compare if hybrids perform better than the pure species in both geographic zones, 2) to develop and test statistical models to estimate genetic parameters for hybrid breeding populations for growth and wood properties. Broad-sense heritability values for volume were moderate (Valdivia: 0.51, Arauco: 0.54). Results indicate that *E. nitens* parents have a stronger effect on hybrid growth performance than *E. globulus* parents. Additionally, no Genotype-Environment interaction was found within each geographic zone ( $r_{Bg}$  0.91 in Valdivia, 0.92 in Arauco).