W288

Early Environmental Conditions Determine The Genetic Architecture Of Growth Traits Of Eucalyptus Grown In Congo

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The genetic architecture of growth traits has been widely studied in forest trees. QTL studies have highlighted the presence of both stable and unstable genomic regions accounting for biomass production with respect to tree age and genetic background, but results remain scarce regarding the interplay between QTL and the environment.

In this study, our main objective was to carry out QTL analysis for growth related traits with emphasis on GxE. To this end, the same family of *Eucalyptus urophylla* x *E. grandis* hybrids (but different genotypes) was planted in 1993 and 1997 in the Republic of Congo. Two parental maps were constructed for each trial with common markers and were found highly syntenic as expected. We followed cumulative growth (and growth increment at regular frequency) from the seedling stage to age 5. Age-age correlations for total growth in the two trials were very strong [0.8; 0.99] whereas age-age correlations for growth increment were more variable [-0.1; 0.75]. The fluctuations of correlation observed for growth increment were related to climatic changes between the dry and rainy seasons.

Between trials, few common QTLs were detected for total growth or for growth. Nevertheless, QTL for traits related to wood quality and WUE were found to be stable across trials, suggesting a strong environmental effect on the genetic architecture of growth. Within trials, QTL analysis revealed stable regions across different ages for total growth, while specific regions for growth increment were detected in both trials. These results reveal that even if genotypes were found to respond differently to environmental constraints (growth increment) genotype rankings based on total growth were very well conserved. This result suggests that the early responses of genotypes to environmental constraints determine the ranking for the entire growth period and by consequence the genetic architecture of total growth at both juvenile and mature stages.