Detection of QTLs associated with growth, latex production and quality for the development of Marker assisted selection (Hevea brasiliensis)

Ratchanee Rattanawong1, Kanlaya Prapan1, Napawan Lekawipat1, Kannikar Teerawattanasuk1, Poonpipope Kasemsap2, Frédéric Bonfils3, Christine Char3, Elodie Delpuech*, Marc Seguin3, and Andre Clement-Demange3

1 Rubber Research Institute of Thailand, Department of Agriculture, Thailand.
2 Department of Horticulture, Faculty of Agriculture, Kasetsart University, Bangkok, Thailand.
3 Cirad, Umr1096-Dap (Development and Plant Improvement) France.

ABSTRACT

The objective of this study was to analyse the genetic determinism of the traits of interest for rubber tree breeding through QTL mapping approach: growth, latex production and rubber quality. The plant material consisted of 196 progenies derived from the F1 family RRIM600 x PB217. A genetic linkage map was built for this family with 229 SSR markers (microsatellites) and 198 AFLP markers. Phenotyping was carried out over a 6-year period on a field trial of 5 hectares, with around 2400 trees measured individually. Unexpected results were obtained with the identification of 1 QTL with major effects for each of the 2 traits, growth and latex production. The 2 parents, RRIM600 and PB217 bring a favourable allele at these 2 main QTLs. This result proved that, even in the genetic pool of elite varieties (Wickham clones), a significant genetic progress is still possible in rubber tree breeding, and that it can be monitored using marker aided selection. A second interesting result is the identification of pleiotropy of at least one major QTL, with effects on traits such as latex production and rubber quality.