Biotechnology for rubber improvement in a context of climate change and social concerns

Pascal Montoro

CIRAD, UMR AGAP, F-34398 Montpellier, France
AGAP, Univ Montpellier, CIRAD, INRA, Montpellier SupAgro, Montpellier, France
pascal.montoro@cirad.fr

Abstract.

Hevea brasiliensis is the main source of natural rubber accounting for 42% of the worldwide rubber consumption. The long-term breeding and the loss of *Hevea* genetic diversity hamper the rapid adaptation of this perennial crop especially in an emergency context to deal with climate change. The biotechnology can be considered to accelerate the genetic progress. The use of molecular genetic markers is helpful to establish representative germplasm core-collection [1], which is the source of alleles for breeding programme. De novo sequencing of the *Hevea* genome based on new sequencing technologies facilitates molecular genetics, molecular breeding and functional biology studies thanks to the launching of *Hevea* genome hubs [2-4]. Omic technologies have rapidly led to a comprehensive analysis of several rubber biological and metabolic processes such as laticifer differentiation, Tapping Panel Dryness or redox metabolism [5-7]. Although functional analysis of candidate genes in transgenic rubber trees is effective [8-10], public concern about genetically modified organisms has restricted any application what reaffirm the interest of molecular breeding. Finally, the development of microcutting and somatic embryogenesis techniques was slowed down because rubber is recalcitrant to in vitro culture. However, several commercial initiatives are underway in China and Europe for self-rooted material. This offers promising prospects for the initiation of breeding programme on rootstock clones tolerant to water stress. Taken together, biotechnology can participate to the rubber improvement, but political issues must be rapidly taken to meet a climate-smart natural rubber production.