Hevea rootstock clones development

Building-up new varietal type: a multi-faceted challenge

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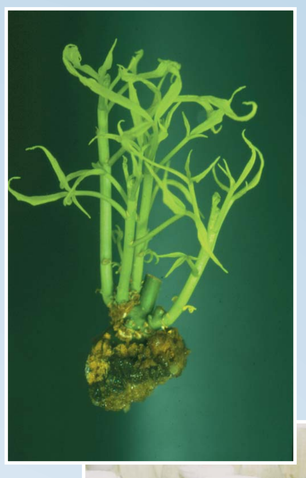
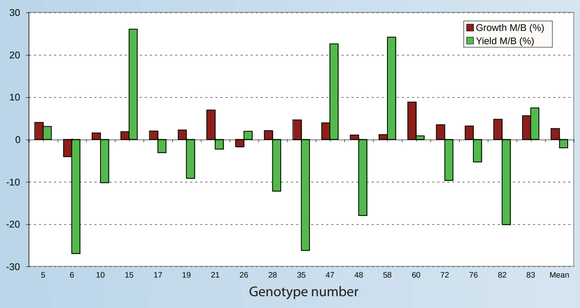
With rubber trees occupying about 3.2 million hectares in Indonesia in 2006, the need for planting material from nurseries is rapidly increasing: more than 30 million plants for 2007. Nurseries can hardly manage to provide recommended seedling progenies as rootstocks. Propagation of clonal rootstocks through in vitro *microcuttings could be an alternative way. The development of rootstock clones is a multi-faceted challenge.*

Field trial: it was shown that in vitro plantlets had a well-developed taproot and lateral root system, with an architecture similar to that of plants obtained from seed.

Acclimatization success was more than 70%. From 1988 to 1993, about 50,000 plantlets were produced in the CIRAD laboratories and sent to partners in Africa for acclimatization and field trials.

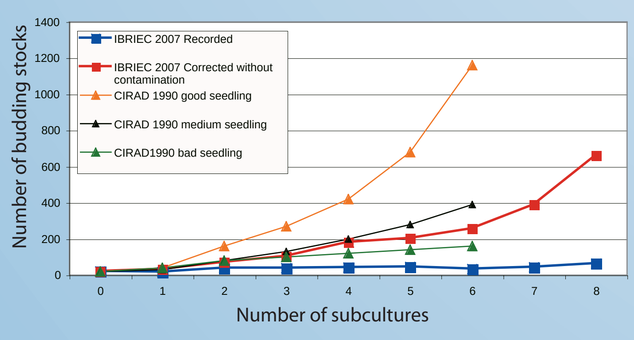


Microcutting from young seedlings. Multiplication phase with budding stocks: the multiplication rate varies from 1.3 to 2.3 per month, depending on genotype and culture age.



Field trial, Ivory Coast, 1989 - 1999. Relative growth and yield of microcutting trees (M) compared to budded trees (B) for 18 genotypes. In 1999, after 3 years of tapping, the girth of microcutting trees was significantly greater (67.7 ± 0.4 cm) than that of budded trees (66.0 ± 0.5 cm), and the yield data were identical for microcutting and budded trees, with 17.6 and 17.8 g/tapping/tree respectively. Note that the advantage (or disadvantage) of self-rooted trees is dependent on the genotype. For genotype 35, for instance, the growth of microcutting trees is 4% greater but the yield is 26% less than budded trees.

In Indonesia, primary cultures and multiplication phases were successfully implemented for 82 genotypes.



2007 data at IBRIEC compared to 1990 data at CIRAD: increase in budding stocks quantity over 6 subcultures during the multiplication phase. The blue line shows the actual recorded numbers at IBRIEC. The red line shows the efficiency of the multiplication phase without the detrimental effect of contamination.

In vitro Propagation

Achievement of the microcutting process - Cirad, France, 1980 -1993

Transfer of the technology : microcutting from seedlings in Indonesian laboratories

Assessment of the control of the process and the techninal yields (price of the plant)

Lobbying planters for this new varietal type

Start of the development of the rootstock clones

2006 — Feasability

2008 — Production Test Pilot

(2011) — Small scale Production

(2017) — Scale-up

Selection

Selection of 100 vigorous seedlings out of 43, 000 ones

Set-up field trials with clonal rootstocks (RT). Early selection of candidate RT clones

Data from agronomic field trials to support the quality of the new varietal type

Selection of the first rootstock clones

Rootstock/scion

Interaction - Biology of development - Agronomy - Cellular and molecular physiology

French Agricultural Research Centre for International Development

Design and production: CIRAD - June 2007