

# HEVEA DISEASE RESISTANCE BREEDING-1. JUVENILE GROWTH AND YIELD PERFORMANCE OF SEGREGATING POPULATIONS

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Breeding for natural disease resistance is a viable eco-friendly and long-term strategy for sustainable integrated disease management in *Hevea*. Many clones and germplasm accessions show variable levels of resistance. Being a repository of resistance genes acquired from its parents *viz.* *Hevea benthamiana* and AVROS 363, clone Fx 516 was used for hybridization with high-yielding but susceptible RRII clones to recover high-yielding recombinants with enhanced resistance. In addition, open pollinated half-sibs of Fx 516 were also collected and evaluated to rapidly recover high-yielders with disease tolerance. Another high-yielding Wickham x Amazonian hybrid (HP 90/21) was also used in the breeding programme. In the first phase, the above segregating population comprising of hybrids and half-sibs were evaluated for juvenile growth and yield. Wide range of growth and yield performance among the hybrids and half-sibs was recorded. Highest range in yield was exhibited by progenies from RRII 414 x Fx 516 ( $6-212 \text{ g t}^{-1} \text{ 5t}^{-1}$ ). Specifically, cross combination of RRII 414 x Fx 516 yielded a selection with very high juvenile yield ( $212 \text{ g t}^{-1} \text{ 5t}^{-1}$ ) followed by those of RRII 430 x Fx 516 ( $158 \text{ g t}^{-1} \text{ 5t}^{-1}$ ), RRII 414 x HP 90/21 ( $152 \text{ g t}^{-1} \text{ 5t}^{-1}$ ) and RRII 429 x Fx 516 ( $111 \text{ g t}^{-1} \text{ 5t}^{-1}$ ). Similarly, the top selection from half-sib family of disease resistant clone Fx 516 possessed very high-yield ( $172 \text{ g t}^{-1} \text{ 5t}^{-1}$ ). A large number of selections which are vigorous and very high-yielding has been identified offering wide scope for further screening for disease-resistance and large-scale evaluation for high-yield with potential for commercial deployment to enable sustainable rubber cultivation.

**Key words:** *Hevea*, Disease resistance breeding, Juvenile growth , Juvenile yield

## INTRODUCTION

*Hevea brasiliensis* (the Para rubber tree; family, Euphorbiaceae;  $2n=36$ ) is native to the Amazon forests of Brazil and is the major global source of natural rubber. Abnormal leaf fall (ALF) and shoot rot caused by *Phytophthora* spp., pink disease by *Corticium salmonicolor*, leaf infection by *Corynespora cassiicola*, and powdery-mildew by *Oidium* sp. are the major devastating fungal diseases

capable of significantly reducing yield of rubber leading to severe economic losses up to 40 per cent (Jacob, 1997; Narayanan and Mydin, 2012). In severe cases, pink and shoot rot lead to complete drying of young plants considerably reducing stand density. South American Leaf Blight (SALB) caused by *Pseudocercospora ulei* (= *Microcyclus ulei*) is a devastating fungal disease which almost wiped out rubber plantations in Brazil