

GENESALB: Genetic analysis of resistance to South American Leaf Blight – SALB (*Microcyclus ulei*) in rubber tree (*Hevea* spp.)



Photo: M. Seguin

Introduction

The South American Leaf Blight (SALB) caused by the Ascomycota *Microcyclus ulei* represents a threat to the natural rubber commodity chain and to the 30 million farmers from Southern countries depending on this activity for their living stability. The *Hevea* species cultivated for natural rubber (*Hevea brasiliensis*) is a tree native from the Amazonian basin which was domesticated some 150 years ago, in South East Asia, in SALB-free environment. Most of rubber plantations worldwide are constituted of domesticated varieties issued from rubber breeding programs conducted in SALB-free environment. All these varieties yielding good latex production are highly sensitive to SALB. CIRAD and Michelin have collaborated since 1992 on a program CMB (Cirad Michelin Brésil) aiming at the creation of new varieties, both high yielding and tolerant to SALB. The objective for this is both to allow rubber farming development in the American inter-tropical zone endemically affected by the disease, and to prevent the risk of accidental introduction of the pathogen in the actual Asian and African producing regions.

Objective of the project

The objective of the present project is to enforce and develop the research investment in molecular genetics of SALB tolerance initiated with the CMB project. It is proposed to combine complementary actions in genetic mapping and in candidate genes identification for speeding the characterization of genetics factors of natural resistance to SALB and ultimately setting a marker-aided selection program.



Defoliation due to *M. ulei* in Bahia
Photos M. Seguin

Material & Methods

Mapping populations: 300 to 500 F1 progenies from [Susceptible x Resistant] crosses involving 4 diversified sources (*Hevea* spp.) of complete or partial resistances: from *H. benthamiana*, *H. brasiliensis* from Brazil and *H. brasiliensis* from Peru

Resistance evaluation: 1- natural infestation in field trials in Bahia and in Mato-Grosso (Brazil); 2- controlled infestations of isolated strains of *M. ulei* in an inoculation chamber (Kourou, French Guiana)

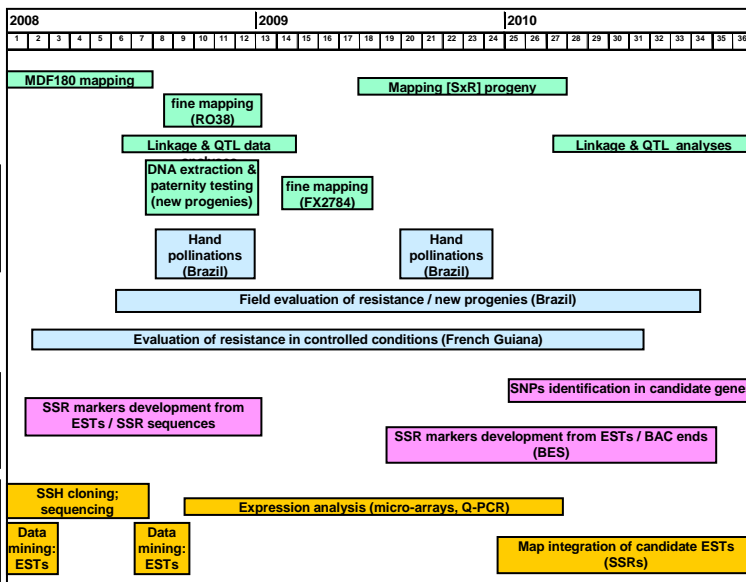
Reference genetic map: saturated map, pseudo-testcross mapping, 18 linkage groups, the 2 *Hevea* species involved are $2n=2x=36$; 880 loci, mainly RFLPs and AFLPs [4][Seguin et al. pers comm]; 2 major resistance loci and 12 QTLs previously mapped [1][2][3]

Available molecular resources: SSRs; AFLPs; Hevea BAC library [5][6]

Candidate genes identification and cloning: Resistant vs Susceptible SSH libraries at different times after controlled infestations

Candidate genes mapping: search for EST-SSRs, genomic SSR in flanking regions (BES, [5]) and SNPs

Work plan and activities



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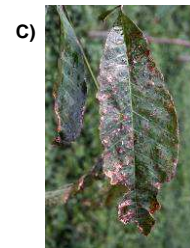
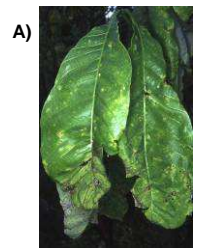
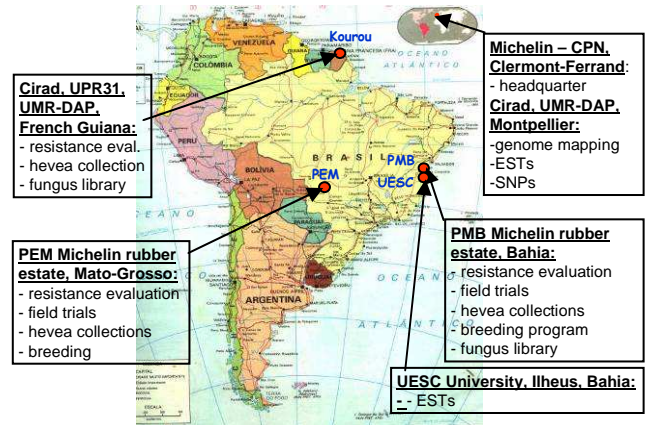
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M. ulei symptoms on *Hevea* adult leaves. A) necrosis, B) sporulating lesions, C) stromata (Photos M. Seguin)

References:

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Photo M. Seguin