REPORT ON
THIRTEEN CMB RUBBER CLONES WITH RESPECT TO SOUTH AMERICAN LEAF BLIGHT (SALB)

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1. OBJECTIVE

To observe and examine the status of 13 CMB rubber clones introduced from Brazil to France and Ghana with respect to South American leaf blight (SALB) and other exotic diseases.

2. BACKGROUND

2.1 The rubber clones

The research co-operation between the Manufacture Française des Pneumatiques Michelin (MFPM) and Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) had identified 13 potential rubber clones. These organisations are interested to extend the research co-operation to other research institutions in Asia specifically to conduct and evaluate the performance of these clones. MFPM and CIRAD are willing to supply the clones to the interested institutions.

The 13 rubber clones (Table 1) had been evaluated for their latex yield potential and resistance to SALB. These clones showed good yield potential and resistance to SALB (Franck Rivano, '*International network on SALB resistant clones*' presented at the CFC/IRRDB/CIRAD SALB Workshop, Bahia, Brazil, 2007). The rubber plants had been transferred to France in December 2005. The plants are being grown under quarantine in a glasshouse at CIRAD, in Montpellier, France.

TABLE 1. THE 13 SELECTED RUBBER CLONES AND THEIR CHARACTERISTICS

Clone	Parents
CD 1174	Avros 1581 x MDF 315
CDC 312	Avros 308 x MDX 40
CDC 56	MDX 91 x RRIM 614
FDR 4575	FDR 18 x FX 3032
FDR 5240	Harbel 68 x TU42-525
FDR 5283	Harbel 68 x Tu42-525
FDR 5597	Harbel 68 x TU42-525
FDR 5665	Harbel 62 x MDX 25
FDR 5788	Harbel 8 x MDF ?
FDR 5802	Harbel 67 x CD 47
MDX 607	Avros 1581 x Madre Dios
MDX 624	Avros 1581 x Madre Dios
PMB 1	-

2.2 Important Rubber Diseases Exotic to Asia and Africa

There are several pests and diseases in Brazil which are absent in Asia and Africa. Among the diseases, the most serious disease of quarantine importance is SALB caused by *Microcyclus ulei*. SALB is the main factor limiting rubber cultivation in Central and South America. Serious regional efforts are taken to ensure that SALB does not establish in Asia and African countries. The other exotic diseases of lesser economic importance are black crust (*Phyllachora huberi*) and Thanatephorus leaf disease (*Thanathephorus cucumeris*). Even though, Thanatephorus leaf disease was reported on rubber in Nigeria, Thailand and Sri Lanka, its occurrence was mild and was restricted to a limited period and time. The other diseases present in Brazil are Phytophthora leaf wither, Phytophthora black stripe and Colletotrichum leaf fall. These diseases are also present in most rubber growing countries in Asia and Africa.

The important insect pests of rubber plants in Brazil of economic importance are “mosca de renda” (white moth) *Leptopharsa heveae* and the caterpillar *Erynnis ello*. These insects are absent in Asia and Africa.

2.3 Quarantine Treatment

2.3.1 *Requirement*

In Malaysia and most rubber growing countries in the Asia and Pacific Region, the importation of rubber planting materials is being regulated. Such importation is subjected to strict quarantine treatment. In the case of importation of planting materials such as budwood and stumps, the materials are introduced after they are cultivated under quarantine condition for many months in an intermediate country which is free of SALB. The planting materials are permitted to be introduced into Malaysia only after they are certified free of quarantine pests and diseases.

2.3.2 *Quarantine treatments before importation to France.*

The 13 clones (CD1174, CDC 312, CDC 56, FDR 4575, FDR 5240, FDR 5283, FDR 5597, FDR 5665, FDR 5788, FDR 5802, MDX 607, MDX 624, PMB 1) were subjected to the following quarantine treatments in the country of origin (Brazil) and the importing country i.e. France:.

2.3.2.1 *Country of origin*

The planting material (budded stumps) prepared at the Edouard Michelin Plantation (EMP) in Itiquara, Matto Grosso, Brazil were given the following treatment:

- Immersed for 10 minutes in solutions of fungicide Manzate 800 (a.i. mancozeb), at a concentration of 6 g/l.
- Treated with insecticide Confidor 700 GRDA (a.i. imidacloprid), at a concentration of 1 ml/l.
- Treated with miticide Danitol (a.i. fenpropathrin) at a concentration of 3 ml/litre.

The budded stumps were wrapped in paper, packed and air freighted to France accompanied with quarantine certificate issued by the Brazilian authorities.

2.3.2.2 *In France*

On arrival in France, the following treatments were given:

- The packaging materials were destroyed;
- The budded stumps were soaked for 10 to 15 minutes in a solution of Dithane M45 (10g/l), Benlate (2g/l) and Daconil (5 g/l) and solutions of the insecticides Decis 25 (1 ml/l), Danitol (a.i. fenpropathrin), at a concentration of 3 ml/litre;
- The budded stumps were planted in pots and placed in a glasshouse.
- The plants were further treated weekly with Dithane M45 (10g/l), Benlate (2g/l) and Daconil (5 g/l)) for a period of three months, after which once a month;
- The plants were being inspected for occurrence of pests and diseases.
- Some of the plants were grown for 2 months under conditions suitable for *Microcyclus ulei* (24°C and HR 90-95%) to see whether the SALB disease developed. In addition, the leaves were sampled and observed microscopically to detect for SALB.

3. INSPECTION OF PLANTS AT MONTPELLIER, FRANCE

3.1 Date of observation

The plants were inspected on 26 March 2005. Dr Franck Rivano of CIRAD was in attendance.

3.2 Quarantine facility

The plants are being grown in plastic containers and placed in an environmentally controlled glasshouse.

3.3 The Plants/Clones Available

The clones, the number of plants and the length of budwood available as at the date are indicated in Table 2. There were 13 clones and a total of 113 plants.

Table 2. The 13 CMB Rubber Clones at CIRAD Montpellier

Clones	No of Plants	Length of budstick (m)
CDC 56	8	10.1
CDC 312	9	14.1
CD 1174	5	5.1
FDR 4575	11	10.5
FDR 5240	7	8.15
FDR 5283	2	1.3
FDR 5597	6	6.0
FDR 5665	12	16.2
FDR 5788	5	8.9
FDR 5802	3	2.4

MDX 607	15	11.8
MDX 624	16	17,2
PMB 1	14	15,7

3.4 Disease inspection

Generally the plants were growing well reaching a height of 2-3 m. The young and mature leaves were examined. The leaves of different ages were free of South American leaf blight (SALB). There were also no signs of infection by the other *Hevea* diseases. There was no symptom of *E. ello* and mosca branca.

Some leaves on some plants showed signs of tip dieback which may be caused by moisture stress.

4 OBSERVATION OF RUBBER PLANTS IN GHANA

4.1 Date of visit

The visit was made by Dr Ismail Hashim and Dr Franck Rivano on 28 March 2008. Mr. Said Difle, Field Technical Manager, of the Ghana Rubber Estate Limited (GREL) was in attendance.

4.2 The Quarantine Nursery

Twelve CMB clones were transferred from CIRAD, Montpellier, France to Ghana in September 2007. The budwood was harvested from the plants being quarantined for more than a year in the glasshouse at Montpellier. Budding was carried out in a special nursery established in the compound of a GREL's employee house situated 30 km away from the nearest cultivated rubber. The nursery was fenced and a special staff was assigned to take care of the nursery.

The CMB clones were planted in rows i.e. one row per clone. The CMB clones were surrounded by a guard row of clone Gt 1 to act as trap-clone. Gt 1 is very susceptible to *M. ulei* and many other *Hevea* diseases.

4.3 The Plants/Clones Available

Due to poor budding success only few plants of the CMB clones were available. The number of plants available is shown in Table 3.

Table 3. The 13 CMB Rubber Clones at Takoradi

Clones	No of Plants
CDC 56	3
CDC 312	3
CD 1174	2
FDR 4575	1
FDR 5240	2

FDR 5597	2
FDR 5665	2
FDR 5788	4
FDR 5802	1
MDX 607	3
MDX 624	5
PMB 1	3
TOTAL	**31**

4.3 Disease

The plants were inspected for the presence of diseases and special attention was given to SALB. The young and mature leaves were free of SALB and other exotic pests and diseases. On rare occasion, few spots of Colletotrichum leaf disease were detected on some clones and especially on Gt 1. The leaves were also examined under a binocular microscope in the laboratory of GREL. Colletotrichum leaf disease is a common local rubber disease in Ghana.

5. CONCLUSION

After inspecting mature and young leaves and shoots, it is concluded that the CMB rubber plants planted both in the glasshouse at CIRAD glasshouse at Montpellier, France and the plants at the nursery at Takoradi, Ghana were free of SALB and other exotic *Hevea* foliar diseases.

6. ACKNOELEDGEMENT

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