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IRCA  
Department "RUBBER" of CIRAD.



**Acquisition of HEVEA material derived from Colombian SCHULTES collections**

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**organised by RRIM**

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CIRAD



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INTRODUCTION.

The relevance of increasing the genetic pool of Hevea to carry out plant material improvement programmes and build up permanent collections has been widely discussed and is not to be demonstrated any more.

In 1977, I.R.R.D.B. organized a mission conducted by Mr. de Padirac as to contact the scientific and administrative authorities of seven countries in the Amazonian basin and organize collectings of plant material. Colombia was involved and the existence of collections built up by Dr. Evans Schultes was reported. Schultes stresses the significance of this material in a letter sent to IRRDB :

"It would be imprudent now that germplasm banks of Hevea are being established not to get material from Colombia and Bolivia".

In the final recommendations of its communication on "Hevea genetic resources", IBPGR indicates how urgent it is to inquire on the spot about the survival of Schultes collections. Their importance has been evoked in every IRRDB breeders meeting.

In 1985, as part of the bilateral cooperation agreements between France and Colombia, IRCA was authorized by the Colombian Government to transfer plant material to Martinique, with the logistic support of INCORA which is an Research and Development Organization for Hevea growing in Colombia.

1. PLANT MATERIAL COLLECTED IN COLOMBIA.

1.1. Investigation on the collection sites.

About 1941, the Colombian Government decided to develop hevea growing. The assistance of the "Department of Agriculture" of the United States was therefore resorted to. A team was formed, led by the botanist Evans Schultes and comprising Dr. Hans Sorensen and the Colombian Isidoro Cabrera (now in charge of a Botany Department in the University of Del Valle), particularly entrusted with development.

In that context, several botanical reconnaissances and prospectations of native rubber plants were carried out. An important programme for the creation of material collections was established. Collectings of seeds and graft wood were performed (refer to previous map).

Several localities were selected to receive this material :

- . In Acandi : 100 hectares were planted. Around 20 still existed in 1950. Later, the plantation was given up then destroyed.
- . In Aparto : 50 hectares were programmed, but only 35 were planted. They disappeared quite quickly.
- . In Rio Grande : There remain no signs of the plantations established.
- . In Chogorodo, near Turbo : a collection comprising about a hundred clones was established. Later, it provided plant material to form other collections. Unfortunately, it was destroyed these last few years.

Two collections still exist today : CALIMA and PALMIRA.

1.2. CALIMA collection.

It is located on the agri-forest farm of Bajo-Calima, near Buenaventura, on the right bank of the river Calima.

Apart from a small plantation established in the 1970's with easily detectable clones from the Far-East, which is not interesting as regards the supply of typically Colombian material, there remain two sites :

. Site 1 :

An experimental "estate" of about 10 hectares, consisting of seedlings derived from seeds from Leticia (Amazonas), collected by the Schultes mission (Sources : P. Manguy, History of the hevea plantations in Colombia, 1983, personal communication).

The trees are in very good condition, and tapped, although intermittently.

. Site 2 :

A plantation of around 600 trees that would have been constituted with the Chigorodo collection, which has disappeared now. These trees are crown-grafted and one crown of the species benthamiana is found.

This plantation would have been achieved thanks to the initiative of Mr. Victor Manuel Patinio, now in charge of a department of the Ministry of Agriculture.

1.3. PALMIRA collection.

This collection is located on the ICA experimental station in Palmira.

It comprises two sites :

. Site 3 :

It included 400 crown-grafted adult trees. This plantation has never been tapped, but it has been carefully maintained and the presence of a fairly solid fence incites to think that precautions have been taken to protect a collection measuring a certain value.

According to Mr. Cabrera, this collection would have been achieved with material derived from Chigorodo.

The large morphological variability in the observable crowns is due to the presence of several species : *Hevea brasiliensis*, *Hevea benthamiana*, *Hevea nitida* et *Hevea pauciflora*.

. Site 4 :

It included around 200 adult seedlings planted without swathing. It would have been a nursery before, achieved with seeds harvested during collectings organized in the Colombian forest.

1.4. Plant material collected.

1.4.1. In the CALIMA site.

Owing to quite a considerable natural regeneration, it was possible to collect young hevea seedlings derived from free crosses. Seeds were collected thanks to a slight seeding. These collectings have been done as to cover as much as possible the whole plantation. Because of high branches and advanced defoliation, it was problematic to collect graft wood capable of travelling well, in spite of twenty individuals which have particularly been noticed for their yield and morphological characteristics.

The following table sums up the plant material collected in Calima :

Table 1 : Plant material collected in Calima

Material	Origin	Amount	Identification
Seedlings	Site 1	45 x 20 seedlings	No. 1 to 45*
Seedlings	Site 2	6 x 15 seedlings	No. 1A to 6A*
Seeds	Site 1	around 300	No. 1
Graft wood	derived from Site 1	20 clones	No. 1 to 20
Seedlings of H. benthamiana	Site 2	4 seedlings	H. benthamiana

\* The figures correspond to the rows.

1.4.2. In the PALMIRA site.

Owing to the absence of seed germination, no young seedlings could be collected.

Seeds have been collected on both sites. Graft wood has been taken from trees of the first site, according to its accessibility (bark detachment).

The following table sums up the plant material collected in Palmira :

Table 2 : Plant material collected in Palmira

Material	Origin	Amount	Identification
Seeds	Site 3	about 150	No. 2
Seeds	Site 4	" 300	No. 3
Small seeds*	Site 4	" 200	No. 4
Grafting wood	Site 3	17 clones	No. 1P to 17P

\* These are probably not derived from the species brasiliensis.

2. TRANSFER OF THE COLLECTION TO MARTINIQUE.

2.1. Objectives and organization.

The transfer took place in Martinique from January 27th to February 5th, 1985. This island has been selected as a reception and quarantine station because of the absence of specific hevea leaf diseases. Also, its delocalization as compared to Guadeloupe, which is reserved for IRRDB plant quarantines, will allow accidental introductions of diseases in the IRRDB collection to be avoided.

The transfer occurred thanks to the support of IRFA<sup>\*</sup>, which put at IRCA disposal a nursery and an area of wood garden achieved in 1984 on its plantation in Rivière Lezarde. Four members of the IRCA personnel have been invited to the grafting.

2.2. Execution.

- January 31st : The plant material was received.
- February 1st  
and 2nd : Grafting was achieved at the rate of 10  
grafts per clone on average.
- February 4th : Seeds were planted for germination purposes.  
Seedlings were transplanted in polyethylene  
bags.

Insecticide and fungicide applications started as soon as the plant material was planted. They were done every 3 weeks.

Plants (seeds + seedlings) were transplanted from bag to soil in September 1985 in a plot near the wood gardens where grafting took place.

The following table shows the final results of these operations :

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\* Institut de Recherches sur les Fruits et Agrumes.

Table 3 : Plant material in Martinique

Material	Nb. introduced	Nb. surviving	
Clones site 1	20 clones	14 clones	
Clones site 2	17 "	10 "	
Material	Nb. introduced	Nb. surviving in nursery	Nb. transplanted
Seedlings Site 1	900	650	236 x 2
Seedlings Site 2	90	88	44 x 2
Seedlings H. benthamiana	5	4	4
Seeds Site 1	300	55	51
" Site 2	150	10	9
" Site 3	300	30	28
" Site 4	200	8	8

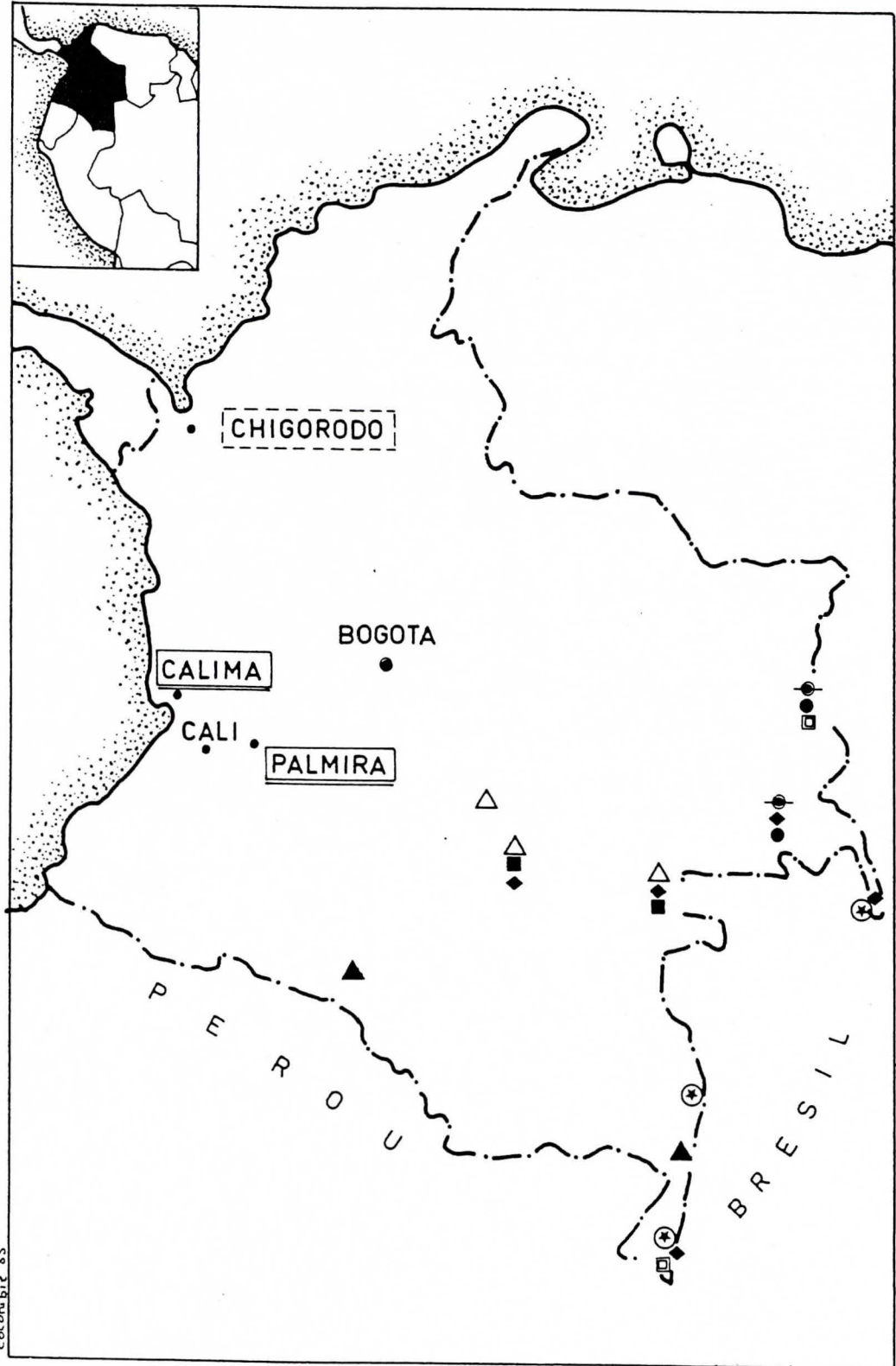
24 clones did survive to the transfer (i.e. 64 % success). In September 85, the plants already reached the requested size for possible transfer.

The pourcentages of surviving plants from young seedlings are rather satisfying. For the series 1 and 2, each plot is occupied by 2 plants.

The percentages of seeds germination are quite low (near 10 %). These bad results could be explained by the fact that the collect period in Colombia did not coincide with the seeding one.

Nevertheless, about one hundred plants from these seeds have been transplanted.





colombia 65

- ◆ H. guianensis
- H. microphylla
- ◐ H. rigidifolia
- ◑ H. brasiliensis
- H. nitida
- △ H. viridis
- ▲ H. benthamiana
- ⊛ H. pauciflora

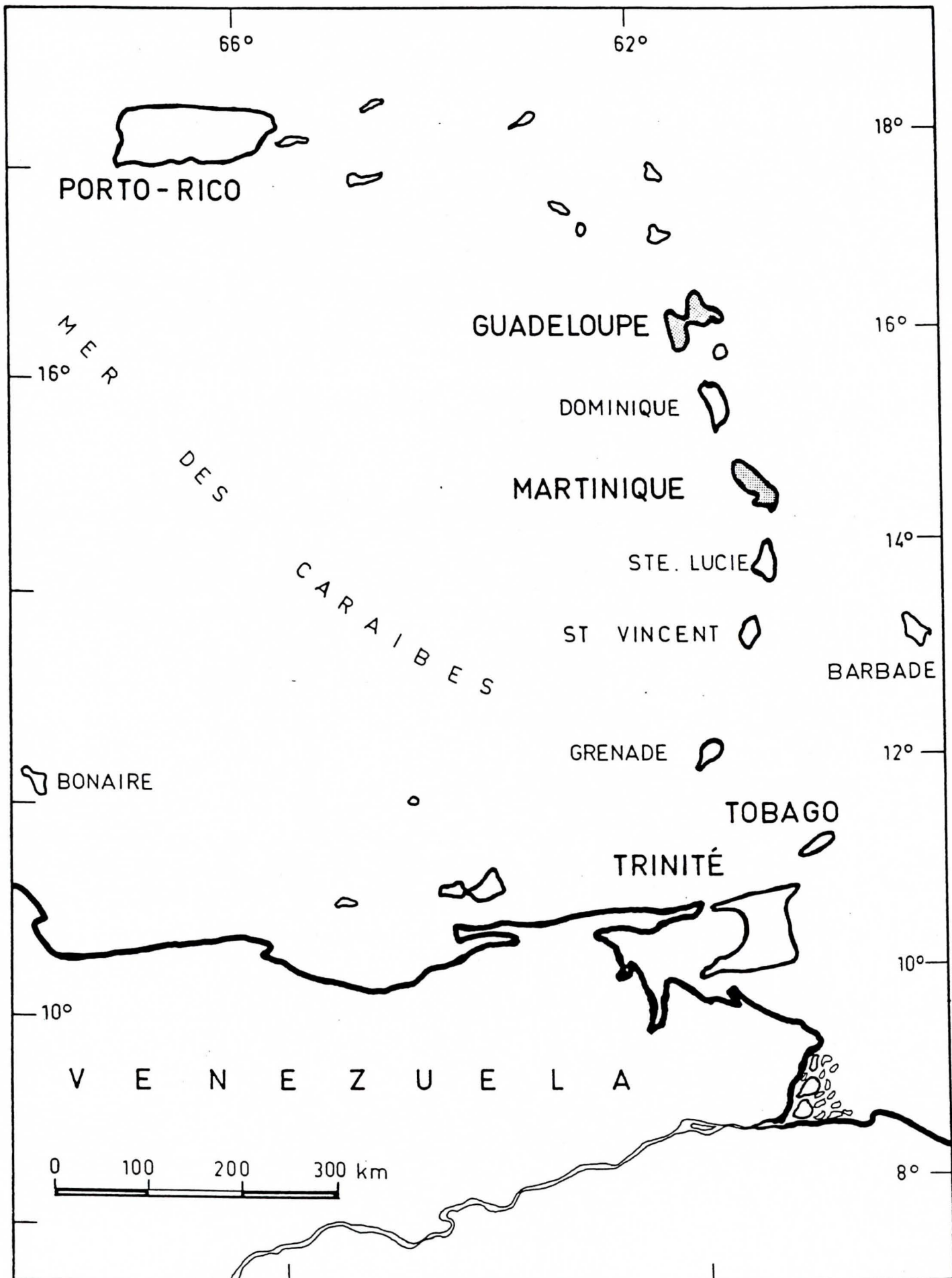
Map 1 : Collecting localisations by SCHULTES' team of various species of Hevea brasiliensis.



Collection de PALMIRA



Collection de CALIMA



MARTINIQUE

14°55

Mgne  
△ PELÉE  
1397

STATION IRFA  
RIVIÈRE LÉZARDE

FORT  
DE FRANCE

AÉROPORT

14°35

0 5 10 km

61°05

60°55

