Sea Island Cotton Breeding Program
BARBADOS

Annual Report
1994 - 1995

Name : Jacques LANÇON
Function :
Department : CIRAD-CA

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Photo 1. Graeme Hall Research Station : view of the laboratories.

Photo 2. GP 25 is a reselection in Montserrat Sea Island (*MSI*), the variety commercially grown in Barbados.

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SUMMARY

✗ the 1994-95 commercial crop was exceptionally good with a 1,6 t/ha average yield. But this production, of about 145 tons, was excedentary for a very narrow WISICA market.

✗ 1994-95 breeding program included :
14 crosses between MSI and V135 or other germplasm introduced from CIRAD.
30 elite single plants which could be selected from 2 crosses, MSI x VH8-4602 and MSI 4210 x V135 (30) 46.
4 promising progenies originated from 3 crosses, MSI x VH10-4416, MSI-IRCT x VH10-4415 and MSI x V135 (30) 46.
in the Advanced Variety Trial (AVT), the lines issued from MSI x V135 and MSI x BDSVO could be identified for their good lint quality but no definite conclusion could be drawn in the absence of agronomical evaluation

✗ the 1995-96 breeding program includes 5 crosses, 7 F1, 10 F2 populations, 218 F3 progenies, 2 Preliminary Variety Trials (PVT) comparing 22 entries to the check MSI at 2 locations and 1 AVT, comparing 8 entries to the check MSI at 2 locations. Only 1 PVT at Graeme Hall will provide datas reliable enough to estimate productivity potentials.

✗ recommendations for improving the efficiency of the breeding program are made in the fields of seed quality (both research and commercial), breeding methodology and productivity testing.

✗ it is concluded from a test carried out between MARD's and CIRAD's laboratories that the results of MARD's lab are accurate enough to be used for screening the breeding material. However, when it comes to evaluate the final selections or the commercial crop, further adjustments are needed in order to obtain more standard results.

✗ for being beneficial to both partners, this project deserves being extended.

PROGRAM

tue 05 dec :	San José - Miami -Barbados
wed 06 dec :	Graeme Hall station, breeding field, laboratory of technology
thu 07 dec :	breeding field, ginning plant, Gemswick trial, commercial fields
fri 08 dec :	laboratory of technology
sat 09 dec :	results of 94-95 year crop, report
sun 10 dec :	report, lunch with Dr Wickham and family
mon 11 dec :	Graeme Hall, Dr Smith, Dr Small
tue 12 dec :	Barbados - Miami - Paris
wed 13 dec :	Paris - Nice

MEETINGS

✓ Mr **Peter Bell** (breeder), Dr **Orville Wickham** (head of cotton research)
✓ Mrs **Shirley Kellman** and Mr **Elon Atkins** (fibre technologists)
✓ Mr **Ron Boyce** (ginning plant)
✓ Dr **Winston Small** (Deputy Chief Agricultural Officer), Dr **Lionel Smith** (Chief Agricultural Officer)

THANKS

✓ to Mr **Guy Pauly**, who initiated and conducted this project successfully and who helped me to get in touch with Dr **Orville Wickham**, Head of Barbados Cotton Research Program.
✓ to Dr **Orville Wickham** and to Mr **Peter Bell** for their hospitality and for making themselves available during this mission
✓ to Dr **Winston Small** and Dr **Lionel Smith** for their greeting in the name of the Ministry of Agricultural Research and Development (MARD)
✓ to Mr **Philippe Cujo** for his support in the name of the French Ministry of Foreign Affairs (MAE), "Délégation Régionale à la Coopération dans les Caraïbes, Bélize et les Guyanes"

FOREWORDS

Within the framework of the French Technical Cooperation Program financed by the French Ministry of Foreign Affairs through the Regional Representation for scientific and Technical Cooperation for the Caribbean (based in the Dominian Republic), two missions have been conducted by CIRAD-CA during the Crop year 1994-95 (May 21-26 by Mr G. Pauly and December 5-12 by Dr J. Lançon) to lend assistance to the cotton breeding program of the Ministry of Agriculture (MARD) of Barbados.
As in the previous years, the main objectives of these missions were, as follows :

✓ to back up the efforts of the MARD in developing its Sea Island genetic improvement program which is being carried out according to the CIRAD-CA model as proposed in G. Pauly's June 1990 report
✓ to follow the implementation of the experimentation program as proposed for crop year 1994-95 and the related activities (evaluation of the different experiments at the field level, coordination of field activities with the persons in charge of the project, etc.)

- *Origin of the Sea Island cotton* -

(after Hutchinson and Manning, 1945 ; Pauly, 1991)

G. Barbadense was first introduced from the Bahamas to Georgia and South Carolina (USA) in 1785 where it was bred for length and fineness. Being grown close to the ocean or in islands, this type of cotton was called Sea Island (SI). The widespreading of a wilt due to anthracnosis in the production area of the United States made the crop to decrease until Rivers could find some new lines resistant to the disease.

In the 18th century, seeds of the Sea Island material were send to the West Indies where programs of genetic conservation and improvement started under the supervision of the Empire Cotton Growing Corporation. It gave birth to three main groups of varieties known as *Superfine 46* (**V135**, **SI Fuzzy** and **Red SI**), top quality cotton bred by Stirling and Harland, *Rivers* (Stirling Rivers and St Vincent Rivers) and *Montserrat Sea Island* or **MSI**, considered as the most productive, bred by Robson and Harland.

Other varieties, of minor importance although formerly grown, are now included in the *American* Sea Island germplasm, namely American Rivers (Bleak Hall, Sea Brook and Gaddies), Puerto Rico Regular, Westberry and Andrews.
At last, seeds of SI were also sent to Russia, Fidji and India : they came back as Russian SI, Fidji SI and Sind SI.

✓ to evaluate the behaviour of the new genetic material in the field and conduct single plant selection in the F2 populations.

✓ to analyse the results and define the work program for crop year 1995-96

The 1994-95 results were available shortly before the beginning of the next crop year. Therefore, G. Pauly was not able to propose a complete experimentation program on time and choices were made by Dr O. Wickham and Mr P. Bell.
Thus, this annual report outlines the main results of the breeding program implemented in 1994-95. It also presents the 1995-96 actual work program, in reference to the one which would have been proposed if results had been made available earlier.
At last, this report deals with a test conducted in the new MARD fibre testing laboratory in collaboration with CIRAD TECOT reference laboratory.

INTRODUCTION

The Sea Island cotton falls under the *Gossypium barbadense* species and is usually refered to as "long staple", highly valued in the production of fine and high quality cotton goods. The original genetic stock was obtained in South Carolina (USA) in the 1780's from the selection of annual and early cotton types in the perennial *G. Barbadense*. It was then introduced in the West Indies where its production remained concentrated after being replaced in the United States by Upland cotton.
Although traditionnally grown in several Caribbean islands, today the crop covers only 400 acres in Barbados of which 150 are planted on private farms and 250 on two estates (BAMC private and BADMC governmental). Few fields are also occasionnally planted in Antigua and Nevis islands.

The Sea Island cotton is characterized by its annual growing habit with a long crop cycle of 6 to 7 months. Under optimal growing conditions, the plants are generally tall (1,5 to 2 m high), with few or no vegetative branches and rather small, stormproof type, bolls. This germplasm is highly susceptible to bacterial blight (*Xanthomonas campestris malvacearum*). Its yield potential is limited to 1,5 to 2,5 t/ha, with a lint recovery varying between 20 and 33%, depending on the lines. The quality of the fiber is unique, marked by its extreme length (40mm), silkness, strength and fineness on a micronaire basis. Its worldwide recognition allows its commercialization under the trademark "West Indian Sea Island Cotton" (Wisica).

The variety grown commercially is known as **MSI** (Montserrat Sea Island), yielding about 1t/ha on average. Its characteristics fall in the general description given above, with a ginning percentage of about 30%, fiber length varying from 38 to 44 mm, UR uniformity inferior to 45%, FMT1 maturity between 50 and 60%,

Table 1.- Acreage planted.

	1993-94	1994-95	1995-96
Private growers	148,5	202,0	decrease
BAMC	71,5	433,0	decrease
BADMC	160,5	94,5	decrease
MADR	17,5	17,5	=
TOTAL	*398,0*	*747,0*	*decrease*

BAMC : Barbados agricultural management company (run by Booker Tate)
BADMC : Barbados agricultural development and marketing corporation (governmental)
MADR : Ministry of agriculture, development and research

Table 2.-Production datas.

	1993-94	1994-95
Production (thousand lbs)	349	1 077
Yield (lbs/ac)	877	1 442
Ginning out-turn	31,6	30,5
Lint production (th lbs)	110	325

standard fineness averaging 220 or 240 mtex and Stelometer strength approaching 40 g/tex. It is easily due to produce immature fibers under non optimal growing conditions. Its boll weight ranges from 3 to 3,5 g, seed index from 12 to 14 g/100 and lint index from 5,5 to 6,3 g/100.

The crop is grown at a planting density of about 12.000 hills (5'6" x 8") per acre (or 30.000 per ha). In the region, usual pests are known to be the semi-looper *Alabama argillacea*, the army worm *Spodoptera eridania* + sp., the pink bollworm, *Pectinophora gossypiella*, *Heliothis zea* + *virescens*, and, to a lesser extent, the white fly *Bemisia tabaci*, *Aphis gossypiella* and mirids.

COMMERCIAL CROP

Due to favourable weather conditions, 1994-95 crop year was one of the most ever producing (table 1 and table 2). Yields reached nearly 1500 lbs/ac of seed cotton (1.6 ton/ha) with an average lint recovery of 30.5%. Unfortunately, out of about 600 bales of lint, only 300 were purchased by contractors and half of the crop remained stored. As a consequence, the acreage planted in 1995-96 has probably been reduced by half.

ON-GOING BREEDING ACTIVITIES

1 Sea Island cotton germplasm collection
2 Crosses
3 Multiplication of F1 populations
4 Multiplication of F2 populations with single plant selection
5 Evaluation of F3 progenies
6 Preliminary variety trial
7 Regional or advanced variety trial
8 Seed multiplication

Photo 3. Sea Island cotton plant showing typical leaf shape and flower colour.

Photo 4. Red Sea Island cotton plant : the flowers have been covered with selfing material bags, maintained closed by a string.

1994-95 CROP YEAR'S BREEDING PROGRAM** (after G. Pauly annual report) **AND RESULTS

1 **Program of crosses**

K 244 x MSI

K 247 x MSI

K 251 x MSI

K 267 x MSI

K 269 x MSI

K 244 x MSI-MS91/A

K 255 x MSI-MS91/A

K 276 x MSI-MS91/A

K 255 x [MSI x V135 (74) -91/44]

K 247 x [V135 (37) 11-Bulk 1 x SI-Jam]

MSI x V135-Bulk 1

MSI x V135-Bulk 2

MSI x V135 (74) 15

MSI x MSI-4208

nota : *K247 introduced from CIRAD-CA in 1993, large bracts (fiber much shorter but more mature fiber)*
K251 introduced from CIRAD-CA in 1993, white flowers (much shorter)
K267 introduced from CIRAD-CA in 1993, Okra leaf (inferior)
K269 introduced from CIRAD-CA in 1993 (productive ? similar to MSI but %F inferior)
MSI-MS91/A massal selection in MSI on agro-morphological characteristics
K255 introduced from CIRAD-CA in 1993 (%F inferior, shorter but more mature fiber)
K276 introduced from CIRAD-CA in 1993 (similar to MSI with a more creamy color)
V135 is an old variety previously grown and part of the genetic group Superfine 46

2 **Multiplication of F1 populations**

[MSI 4210 x V135 (30) 46] x SI-Jam

V135 (37) 11-Bulk 1 x SI-Jam

nota : *MSI 4210 is an old reselection of MSI*

3 **Multiplication of F2 populations with single plant selection**

MSI x VH8-4602

MSI 4210 x V135 (30) 46

MSI-Wisica x [MSI-IRCT x VH10-4415]

V135 (30) 46 x [MSI x VH10-4416]

nota : *VH. lines originate from a cross between MSI and V135*
MSI-IRCT shows characteristics equivalent to G. Hirsutum

The first two crosses **MSI x VH8-4602** and **MSI 4210 x V135 (30) 46** tend to produce plants with similar

Table 3.- F2 and F3 populations.

Crosses	Yield g/plt	%F	2,5% mm	50% mm	UR %	T1 g/tex	E1 %	IM	PM %	Hs mtex	Rd %	+b
F2 populations *(per plant basis)*												
MSI x VH8-4602	**311**	31,5	**41,1**	16,6	40,4			2,6	68,2			
best 13 plants	*399*	*31,9*	*42,7*	*18,4*	*43,1*			*2,9*	*72,3*			
MSI 4210 x V135 (30) 46	288	32,2	**41,1**	16,4	39,9			2,6	70,6			
best 17 plants	*386*	*31,8*	*41,5*	*17,0*	*41,0*			*2,7*	*76,3*			
MSI Wisica x (MSI-IRCT x VH10-4415)	193	**32,9**	34,4	16,1	**46,9**			**3,7**	**79,7**			
best 13 plants	*317*	***33,3***	*36,1*	*17,0*	***47,0***			***3,7***	***80,9***			
V135 (30) 46 x (MSI x VH10-4416)	173	31,4	40,8	**17,1**	41,9			2,4	60,2			
F3 populations *(per plot)*												
Check	1304	32,4	39,1	18,2	46,6	27,5	5,3	3,0	59,1	223	72,2	10,3
MSI x VH10-4416	2264	29,8	39,1	**18,4**	**47,0**	**28,4**	5,3	3,0	57,9	227	**73,1**	10,1
MSI-IRCT x VH10-4415	**2491**	**32,8**	35,0	16,2	46,4	24,7	**6,4**	4,1	**70,1**	239	71,5	10,4
MSI x V135 (30) 46	2204	28,7	**40,8**	17,5	43,0	**28,4**	4,9	2,8	53,8	232	70,4	10,1

nota : due to the lack of standards for calibration, one should substract about 15% from the maturity figures indicated in this table.

characteristics (table 3) : good productivity (on a per plant basis), good length (41 mm), medium ginning out-turn (32%), uniformity (40%) and maturity (about 55%). 13 plants could be identified as superior in the first cross and 17 in the second *i.e.* respectively :

94/11, 94/15, 94/16, 94/18, 94/19, 94/23, 94/27, 94/28, 94/32, 94/35, 94/36, 94/37 and **94/70**.

94/92, 94/93, 94/95, 94/96, 94/97, 94/98, 94/100, 94/101, 94/104, 94/108, 94/109, 94/115, 94/121, 94/133, 94/140, 94/148 and **94/149**.

In fact, more F2 plants were actually harvested and sown, producing, for each cross, 41 and 64 F3 lines.

MSI-Wisica x [MSI-IRCT x VH10-4415] does not differ much from **(MSI-IRCT x VH10-4415)** as far as length or lint recovery are concerned. Average lines of this cross exhibit good maturity (65%) and, of course being short, good uniformity (45%). Nevertheless very few plants should be selected, mostly on their habit, for back-crossing to more typical Sea Island types. These could be :

94/229, 94/232, 94/235, 94/251, 94/253, 94/261, 94/265, 94/266, 94/270, 94/273, 94/275, 94/277 and **94/279**.

Here again, more F3 lines were planted, to reach a total number of 74.

At last, **V135 (30) 46 x [MSI x VH10-4416]** does not show any breeding potential, as compared with the preceeding crosses. From the available results, no single plant should be selected.
However, 41 F3 lines will be evaluated during next growing season.

4 **Evaluation of F3 progenies**

12 progenies **MSI x VH10-4416**
37 progenies **MSI-IRCT x VH10-4415**
11 progenies **MSI x V135 (30) 46**

When compared to the check (table3) :
MSI x VH10-4416 improves strength but it is inferior in lint recovery and maturity. The **93/12** line could be further evaluated. The others can be discarded as they do not show any breeding potential.

MSI-IRCT x VH10-4415 improves productivity, fiber elongation and maturity whereas it looks very short in length and strength. Two lines could be used as genitors for improving productivity and ginning out-turn, *i.e.* **93/40** and **93/74**. The others can be discarded as they do not show any breeding potential.

MSI x V135 (30) 46 is superior to **MSI** for fiber length and strength although inferior for ginning out-turn, fiber uniformity, maturity and color. Only one line is worth keeping for fibre quality improvement *i.e.* **93/106**. The

Table 4.- Preliminary variety trial.

Lines	Yield lbs/ac	%F	2,5% mm	50% mm	UR %	T1 g/tex	E1 %	IM	PM %	Hs mtex	Rd %	+b
MSI	n.a	31,6	40,5	19,6	48,3	28,2	5,1	2,9	58,3	220	70,8	9,7
MSI x SIW 91-12 B92	1637	34,3	38,8	19,8	**51,2**	29,3	5,1	2,9	61,5	201	**74,5**	**9,1**
MSI x SIW 91-24 S92	1283	**34,8**	38,4	19,2	49,9	28,7	5,6	3,2	**67,5**	**194**	72,2	10,5
MSI x PSI 91-28 B92	1823	33,1	38,4	18,2	47,3	26,0	**5,7**	3,0	56,9	237	69,5	11,0
MSI x PSI 91-24 S92	946	31,6	40,8	20,4	50,0	28,5	5,4	3,1	60,4	225	72,7	9,4
MSI x PSI 91-43 S92	1441	31,4	38,6	18,5	47,9	**29,8**	5,3	3,0	63,8	197	70,7	10,9
MSI x V135 91-44 B92	1124	29,9	**41,1**	**21,0**	51,0	29,0	4,9	2,9	59,5	212	72,3	9,4
MSI x V135 91-49 B92	1193	30,2	41,0	20,8	50,7	29,1	4,6	2,9	62,1	198	72,3	9,8
MSI x BDSVO 91-47 S92	1722	31,4	40,4	20,0	49,5	29,1	5,4	2,8	55,9	224	73,5	9,3

nota : due to missing plots and in the absence of check, statistical analysis were not conducted
technological datas provided by CIRAD laboratory at Montpellier

Table 5.- Advanced variety trial.

Lines	Yield lbs/ac	%F	2,5% mm	50% mm	UR %	T1 g/tex	E1 %	IM	PM %	Hs mtex	Rd %	+b
MSI	595	28,6	40,0	18,1	45,3	28,9	5,0	2,5	45,4	263	68,7	10,1
MSI x SIW 91-8	1339	**37,7**	35,5	18,3	**51,5**	27,5	**6,0**	3,1	**68,0**	**184**	69,3	10,7
MSI x PSI 91-7	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
MSI x PSI 91-15	851	31,2	38,8	17,6	45,5	27,3	5,1	2,6	47,4	261	68,8	11,0
MSI x PSI 91-28	680	29,2	39,1	18,2	46,4	29,0	4,1	3,0	57,5	234	67,5	10,8
MSI x V135 91-25	735	28,8	**42,2**	18,2	43,1	30,1	4,5	2,4	47,0	238	69,4	10,0
MSI x V135 91-44	927	30,9	40,3	18,7	46,5	**31,3**	4,5	2,4	48,9	225	71,2	9,8
MSI x BDSVO 91-17	655	27,7	41,2	18,9	45,8	26,8	5,3	2,5	49,6	232	**73,5**	**8,8**
MSI x BDSVO 91-47	1339	28,3	40,7	**19,0**	46,7	26,8	5,3	2,8	59,1	205	67,6	10,0

nota : due to very heterogenous stands, no statistical analysis could be done on yield
technological datas provided by CIRAD laboratory at Montpellier

others can be discarded as they do not show any breeding potential.

6 **Preliminary variety trial**

evaluation of F5 progenies, reconduction of the 1993-94 trial (F4)

MSI as a check

MSI x SIW : 2 lines **91/12 B92** and **91/25 S92**, of the bushy type, productive, higher %F but shorter fiber, finer and more mature

MSI x PSI : 3 lines **91/28 B92** , **91/24 S92** and **91/43 S92**, tall and upright plants, productive but with generally shorter fiber

MSI x V135 : 2 lines **91/44 B92** and **91/49 B92**. They are tall bushy plants, productive, excellent quality but %F inferior

MSI x BDSVO : 1 line **91/47 S92** showing upright plants, productive, lower %F

The results of 1994-95 trial (table 4) show that :

MSI x SIW improves %F, uniformity, maturity and fineness and color but its fiber is much shorter.

MSI x PSI has a good productivity except **91-24**, but its fiber quality looks inferior.

MSI x V135 lines seem less productive, with inferior lint recovery, but superior length, uniformity and strength.

MSI x BDSVO is productive, it shows a better color but its lint is comparable to that of **MSI**.

None of these lines looks susceptible to go beyond **MSI** standards. Productivity and agronomic comportment should certainly be better evaluated but we can already say that the first two crosses are not matching **MSI** as far as fibre characteristics are concerned.

7 **Advanced variety trial**

reconduction of the 1993-94 trial

MSI as a check

(MSI x SIW) -91/8 (productive but shorter)

(MSI x PSI) -91/7 (productive but inferior quality), **-91-15** (productive) et **-91-28** (mature)

(MSI x V135) -91/25 and **-91/44** (productive, excellent quality but %F inferior)

(MSI x BDSVO) -91/17 (equivalent) and **-91/47** (shorter)

The results of 1994-95 trial (table 5) show that :

MSI x SIW improves %F and most of the fiber characteristics including uniformity, elongation, maturity and fineness but it produces much shorter fiber. This line could be used as a parent.

MSI x PSI does not bring any major improvement, except line **91/28** which confirms being more mature.

MSI x V135 improves length and strength, although uniformity looks inferior.

MSI x BDSVO improves length and, for line **91-17**, color but %F and strength look inferior.

Although the lines issued from the last two crosses display better performances when compared to the check, **MSI**, no definite conclusion can be drawn in the absence of accurate productivity results.

8 **Seed multiplication program (MSI)**

Breeder's seed by selfing a few lines

Foundation seed on an isolated plot at Graeme Hall Station

Registered seed : 28 acres at Lowthers and Orange Hill and 5 acres at Graeme Hall Station

Certified seed : no

Table 6.- Number of bolls to pick for planting a known length of row at a given stand.

stand (hills/ac)	*spacing (inches)*	Length to be sown (in m) 1	5	10	15	20	25	30
4756	*20" x 66"*	0,5	2,3	4,6	6,8	9,1	11,4	13,7
9511	*10" x 66"*	0,9	4,6	9,1	13,7	18,3	22,8	27,4
11889	*8" x 66"*	1,1	5,7	11,4	17,1	22,8	28,5	34,2
15852	*6" x 66"*	1,5	7,6	15,2	22,8	30,4	38,1	45,7
19023	*5" x 66"*	1,8	9,1	18,3	27,4	36,5	45,7	54,8
23778	*4" x 66"*	2,3	11,4	22,8	34,2	45,7	57,1	68,5
95114	*1" x 66"*	9,1	45,7	91,3	137,0	182,7	228,3	274,0

WORK PROGRAM IMPLEMENTED IN 1995-96 CROP YEAR

General comments

The breeding program of the current crop year consists of :

✗ the **breeding operations** as such. They are located at Graeme Hall Research Station, where all the breeding work is carried out *i.e.* collections, selfings, crosses and single plant selection

✗ the **variety trials** (AVT and PVT#1 and PVT#2) which has been settled at two different locations, namely Graeme Hall and Gemswick

At Graeme Hall, the breeding plot is situated on the hill, in a flat land where the soil looks deep and fertile. Sowing was done by hand on ridges 5' 6" (approx 1,65 m) apart. The crop density varies from 4500 in collection, F1 and F2 to 10500 hills per acre in F3, PVT and AVT *i.e.* between 4500 and 21000 plants per acre.
From what can be seen at the begining of the flowering stage, the general appearance of the crop is good. However, several mismanagements must be pointed out in order to keep going for high research standards :

. the ridges are not always parallel to each other and spacing between rows may then vary (**sowing method**)

. poor germination of seeds can be noticed in the collection trial (**storage** ?)

. PVT and both AVT were almost completely distroyed by uncautious herbicide spraying (responsabilisation or **supervision**)

. the amount of selfing does not appear to be very high. Moreover, it looks quite variable among the lines (**manpower** availability and organisation ?)

These points will be further developed in our conclusion.

Each boll of the MSI variety contains about 20 to 25 seeds (approx. 30% less than what is generally observed in Upland cotton). It is then possible to estimate the number of bolls which have to be picked for planting an experimental plot at a given density : *e.g.* at least 5 (4,6) bolls must be selfed for planting a 10 m row plot at a 20" x 66" spacing (see opposite table).

Photo 5. Sea Island cotton plant with its canopy.

Photo 6. Sea Island cotton : the leaves have been removed to show the general architecture of the plant, with numerous branches, most being fruiting ones and high node of fructification.

1 Collection

Objective : to maintain the Sea Island germplasm and the main genotypes which can be useful for the genetical improvement of MSI

Experimental design : each genotype is planted on a 10 m row plot, at a 5'6" x 20" spacing (11735 hills/ha or 4750 hills/ac). Thinning at one plant per hill. All lines are selfed in order to get as many pure seeds as possible.

Entries :

k1 : **K244**
k2 : **K245**
k3 : **K246**
k4 : **K247**
k5 : **K251**
k6 : **K253**
k7 : **K255**
k8 : **K256**
k9 : **K258**
k10 : **K263**
k11 : **K267**
k12 : **K268**
k13 : **K269**
k14 : **K270**
k15 : **K276**
k16 : **K277**

GP1 : **MSI**
GP2 : **MSI-MS91-A**
GP3 : **MSI-MS91-B**
GP4 : **V135 (37) 11-Bulk 1**
GP5 : **V135 (37) 11-Bulk 2**
GP6 : **V135 (74) 15-Bulk 1**
GP7 : **RSI Bulk 1**
GP8 : **RSI Bulk 2**
GP9 : **PSI Bulk 1**
GP10 : **PSI Bulk 2**
GP11 : **SIW Bulk 1**
GP12 : **SIW Bulk 2**
GP13 : **RSI x V135 - Bulk 1**
GP14 : **RSI x V135 - Bulk 2**
GP15 : **BDSVO Bulk "naked seed"**
GP16 : **BDSVO Bulk "fuzzy seed"**
GP17 : **Sea Brook**
GP18 : **MSI-IRCT**
GP19 : **MSI Antigua**

GP20 : **SI-MSI Barbados**
GP21 : **SI-MSI WISICA**
GP22 : **V135 (30) -46**
GP23 : **V135 (37) -11**
GP24 : **MSI 4208**
GP25 : **MSI 4210**
GP26 : **VH8 4602**
GP27 : **VH8 4620**
GP28 : **VH8 4621**
GP29 : **VH8 4623**
GP30 : **VH10 4415**
GP31 : **VH10 4416**
GP32 : **VH10 4419**
GP33 : **SI Jam**
GP34 : **SI Barbados**
GP35 : **RSI**
GP36 : **V135 Type 18**
GP37 : **HSP x HYFI-gless**

Implementation : several entries, especially among those introduced in 1993, did not germinate at all *i.e.* **K244, K246, K253, K256, K258, K263, K268, K269, K270** as well as **RSI x V135 - Bulk 1** (GP13). Germination problems seem to have also occured with **SIW Bulk 1** (GP11), **VH8 4602** (GP26), **SI Barbados** (GP34), **RSI** (GP35), **V135 Type 18** (GP36) and **HSP x HYFI-gless** (GP37).

2 Program of crosses

Objective : to increase the genetic variability within Sea Island material and, ultimately, to be able to select new SI lines, higher yielding and easier to pick.

Experimental design : each parent is planted on a 10 m row plot, at a 5'6" x 20" spacing (11735 hills/ha or 4750 hills/ac). Thinning at one plant per hill. Female lines are emasculated and pollinated by male lines.

Entries :

[(MSI-IRCT x VH10-4415)-93/24] x [(MSI x V135(30)46)-93/80]

[(MSI-IRCT x VH10-4415)-93/76] x [(MSI x V135(30)46)-93/81]

[(MSI-IRCT x VH10-4415)-93/78] x [(MSI x V135(30)46)-93/86]

[(MSI-IRCT x VH10-4415)-93/24] x [(MSI x V135)-91/25]

[(MSI-IRCT x VH10-4415)-93/60] x [(MSI x V135(30)46)-93/88]

Implementation : good stand at flowering

3 Multiplication of F1 populations

Objective : to increase the genetic variability within Sea Island material and, ultimately, to be able to select new SI lines, higher yielding and easier to pick.

Experimental design : each cross is planted on a 10 m row plot, at a 5'6" x 20" spacing (11735 hills/ha or 4750 hills/ac). Thinning at one plant per hill. All lines are selfed in order to get as many F2 seeds as possible.

Entries :

K 255 x MSI-MS91/A

K 255 x [MSI x V135 (74) -91/44]

K 276 x MSI-MS91/A

K 247 x [V135 (37) 11-Bulk 1 x SI-Jam]

K267 x MSI

K244 x MSI

K244 x MSI-MS91A

Implementation : good stand at flowering

4 Multiplication of F2 populations with single plant selection

Objective : to increase the genetic variability within Sea Island material and, ultimately, to be able to select new SI lines, higher yielding and easier to pick.

Experimental design : each cross is planted on a 10 m row plot, at a 5'6" x 20" spacing (11735 hills/ha or 4750 hills/ac). No check. Thinning at one plant per hill. All lines are supposed to be selfed in order to get as many F3 seeds as possible.

Entries :

K 247 x MSI

K 251 x MSI

K 267 x MSI

K 269 x MSI

MSI x V135 Bulk 1

MSI x V135 Bulk 2

MSI x V135 (74) 15

MSI x MSI-4208

[MSI 4210 x V135 (30) 46] x SI Jam

V135 (37) 11- Bulk 1 x SI Jam

Implementation : good stand at flowering

5 **Evaluation of F3 progenies**

Objective : to select new SI lines, higher yielding and easier to pick.

Experimental design : each progeny is planted on a 10 m row plot, at a 5'6" x 9" spacing (26 100 hills/ha or 10 550 hills/ac). Thinning at one plant per hill. One MSI check is planted in alternance with 10 F3 progenies. No selfing.

Entries :

35 progenies of **MSI x VH8-4602**

38 progenies of **MSI 4210 x V135 (30) 46**

39 progenies of **MSI-Wisica x [MSI-IRCT x VH10-4415]**

22 progenies of **V135 (30) 46 x [MSI x VH10-4416]**

Implementation : good stand at flowering

5' **Evaluation of F3 progenies as potential germplasm**

Objective : to select SI lines with one or more traits which could be useful in a breeding program.

Experimental design : each progeny is planted on a 10 m row plot, at a 5'6" x 9" spacing (26 100 hills/ha or 10 550 hills/ac). Thinning at one plant per hill. One MSI check is planted in alternance with 10 F3 progenies. No selfing.

Entries :

6 progenies of **MSI x VH8-4602**

26 progenies of **MSI 4210 x V135 (30) 46**

33 progenies of **MSI-Wisica x [MSI-IRCT x VH10-4415]**

19 progenies of **V135 (30) 46 x [MSI x VH10-4416]**

Implementation : good stand at flowering

6 **Preliminary variety trial #1**

Objective : to evaluate F5 progenies already tested as F4 in the 1993-94 trial.

Experimental design : balanced lattice 3 x 3 with 4 replications and including a check MSI. Each plot consists of 3 rows 10 m long, planted at a 5'6" x 9" spacing (26 100 hills/ha or 10 550 hills/ac). Thinning at one plant per hill. Two locations : Graeme Hall and Gemswick. Evaluation of boll weight, yield of seed cotton, lint recovery and lint quality.

Entries :

MSI as a check

MSI x SIW : **91/12** and **91/24**, bushy type, productive, higher %F but shorter fiber, finer and more mature

MSI x PSI : **91/24** , **91/28** and **91/43**, tall and upright plants, productive but with generally shorter fiber

MSI x V135 : **91/44** and **91/49**, tall bushy plants, productive, excellent quality but %F inferior

MSI x BDSVO : **91/47**, upright plants, productive, lower %F

Implementation : this trial shows a very poor stand, probably due to uncautious spray of herbicide (Round'up).

6' Preliminary variety trial #2

Objective : to evaluate the most promising F4 progenies identified in the 1994-95 progeny plots.

Experimental design : randomized blocks with 4 replications and including 14 entries + a check MSI. Each plot consists of 3 rows 10 m long, planted at a 5'6" x 9" spacing (26 100 hills/ha or 10 550 hills/ac). Thinning at one plant per hill. Two locations : Graeme Hall and Gemswick. Evaluation of boll weight, yield of seed cotton, lint recovery and lint quality.

Entries :

MSI as a check

MSI x VH10-4416 : **93/3, 93/7, 93/11** and **93/16**

MSI-IRCT x VH10-4415 : **93/27, 93/28, 93/53, 93/57, 93/60, 93/63** and **93/80**

MSI x V135 (30) 46 : **93/96**, **93/106** and **93/109**

Implementation : this trial looks better off and it will probably give outstanding results. Unfortunately, three interesting lines have not been sawn, probably due to the lack of seed *i.e.* **93/12, 93/40** and **93/74**.

7 Advanced variety trial

Objective : to evaluate the most promising lines from 1993-94 PVT. It is a replication of 1994-95 AVT trial.

Experimental design : randomized blocks with 5 replications and including 8 entries + a check MSI. Each plot consists of 4 rows 10 m long, planted at a 5'6" x 9" spacing (26 100 hills/ha or 10 550 hills/ac). Thinning at one plant per hill. Two locations : Graeme Hall and Gemswick. Evaluation of boll weight, yield of seed cotton, lint recovery and lint quality.

Entries : reconduction of the 1993-94 trial

MSI as a check

(MSI x SIW) -91/8 (productive but shorter)

(MSI x PSI) -91/7 (productive but inferior quality), **91-15** (productive) et **91-28** (mature)

(MSI x V135) -91/25 and **91/44** (productive, excellent quality but %F inferior)

(MSI x BDSVO) -91/17 (equivalent) and **91/47** (shorter)

Implementation : this trial shows a very poor stand, probably due to uncautious spray of herbicide (Round'up).

8 Seed multiplication program (MSI)

Breeder's seed : no

Foundation seed : no

Registered seed : no

Certified seed : no

9 **Mutation treatment experiment**

Objective : to evaluate M2 lines, derived from individual M1 plants grown in the 1994-95 season, for morphologically desirable traits.

Experimental design : 1 row plot, 5 m long per progeny, planted at a 5'6" x 20" spacing (11735 hills/ha or 4750 hills/ac). Thinning at one plant per hill. No selfing. One MSI check every 10 rows of M2 plants. Visual evaluation, lint recovery and lint quality.

Entries : M2 of MSI treated with different doses of γ radiation (140, 160, 180, 200 and 220 Gy)

implementation : at flowering, stand is uneven but the remaining plants look good.

RECOMMENDATIONS FOR THE BREEDING PROGRAM

Poor quality of the seeds : this may be caused by several factors, including crop environment. In the field, poor quality may be the consequence of excessive rainfalls at maturing or harvesting time. These are rather unpredictable factors although they may be partially controled with adequate planting date and site selection. Storage conditions can also affect drastically the seed viability : at Graeme Hall, storage facilities do exist with air conditionner and drier. Adequate measures to prevent the seeds from excessive deterioration can then be proposed as follows : all the seeds kept for some time should be conditionned carefully *i.e.* either acid delinted or chemically treated against pests, free of any mecanical or pest damage, in well sealed plastic or paper bags.

✓ if **delinting** is to be used : seeds should not remain for more than a few minuts in the acid (concentrated acid is generally used in the proportion of 1 kg acid for 10 kg of fuzzy seeds rating 10% fuzz, but, of course, the amount of acid has to be adjusted according to the quantity of fuzz attached to the seed). One has to make sure that the seeds have been thoroughly rinsed with clear water before allowed to dry (any trace of acidity can easily be detected by tasting). When delinting small lots, it is necessary to eliminate flotters. After delinting dried seeds damaged either by insects or during ginning are to be discarded.

✓ if the seeds have to be stored **fuzzy** : this state is less convenient for the detection of damaged seeds. Nevertheless, one has to make sure that any seed attacked by a pest is discarded in order to protect the entire lot from contamination. All seeds kept for some time must be powdered with adequate insecticide.

In any case, seed lots should be packed in sealed plastic or clean paper bags, labelled with the name of the seed lot and date of harvest. As humidity in the atmosphere of the seed environment may be a very deteriorating factor, plastic bags or containers must be prefered.
It must also be reminded that seeds can be maintained in good conditions and for a long time in the cold room of CIRAD. I then recommend that a sample of the most representative lines of the SI germplasm be secured in Montpellier.

Filing of research datas : at present, elementary datas are collected on individual sheets of paper and kept in files. This practice is justified when, as it is the case now, datas can also be stored in a computer and results exploited straight away. However, for easier exploitation of the datas in the future, I strongly recommend using a single book to keep all necessary records relevant to a given crop year *e.g.* : project outlines, field layout, weather datas, on-going observations on lines or trials, production, ginning and lint quality datas, selections made in the breeding material and conclusions.

Reducing the amount of breeding work : if the results of 1995-96 experiments confirm that the breeding work is not conducted with optimum efficiency because of manpower problems, it may be concluded also that the amount of work could be reduced. This could be obtained 1) by designing smaller variety trials, 2) by discarding more breeding material and 3) by early evaluation (F3) of crosses.

Early evaluation of the breeding material : screening crosses can be effectively done at the F3 generation. At this stage, one has to take the final decision of discarding the entire descendance of a cross or let the selection to go on : less material should be tested in replicated blocks (at least 2) and under commercial planting density.

Productivity testing : every trial which has been designed for this purpose must be carried out under normal *i.e.* commercial conditions especially as far as planting density is concerned.

Failure of variety tests : this stage stands, of course, as a key in the breeding process. Creating new genetic material is of little use when it cannot be evaluated in commercial conditions. Moreover, as breeding goes on, lines accumulate and useless breeding material tend to overcome the useful one with a tremendous decline in the breeding work efficiency. To avoid costly delays, the breeding program has to receive more careful attention. At ***each*** cultural operation, a person in charge must stand in the field to lead the work and to make sure that every intervening person does his part cautiously enough. Responsabilisation of the workers is also likeable as the future of Sea Island cotton may greatly depend upon the efficiency of the breeding work which is now being carried out. Obviously and more generally speaking, every critical operation, like harvesting, weighing, ginning, sampling, delinting *etc.* must be also done under the ***closest*** supervision.

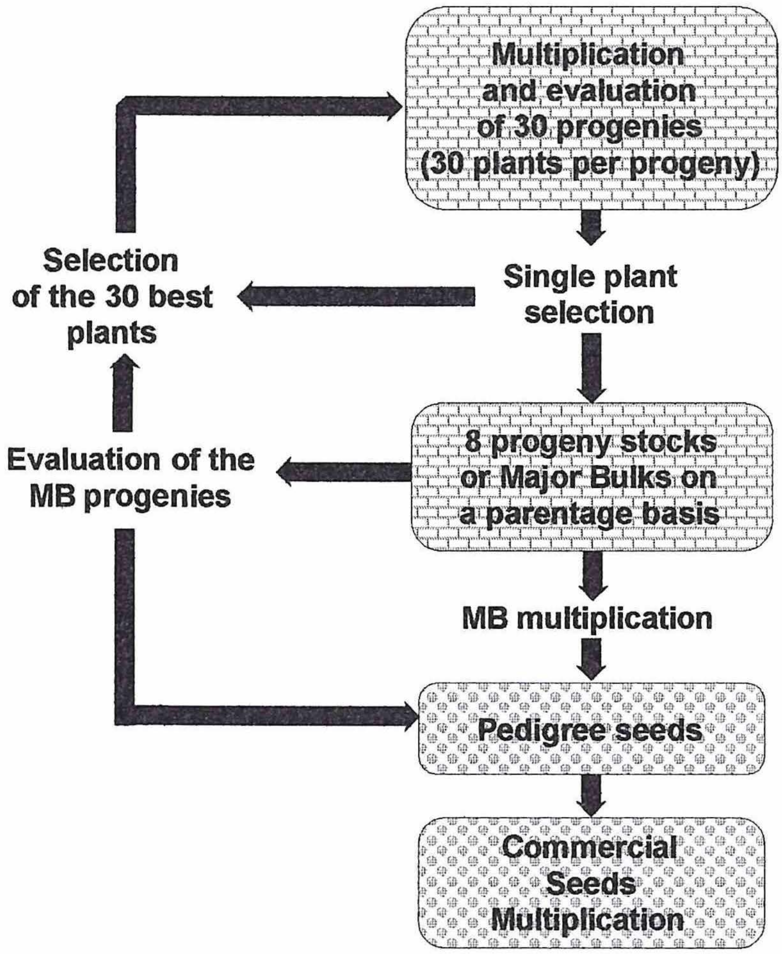

Fig. 1 Montserrat Sea Island maintenance scheme as used in Antigua *(after G. Pauly, 1991)*

Quality tests on commercial planting seeds (stage 1) : commercial planting seeds have to be tested in order to prevent lots with poor germination from being delivered to the farmers. Now, each bag produced is tested three times from harvest to planting at two monthes interval.
When planting seeds are produced by several growers, in different locations, it is highly advisable to identify each lot of seed produced by 1) its geographical origin and, if necessary, 2) the date of harvest. This would help in grouping the planting seed bags by lots of homogenous origin. Once defined, these lots can be sampled by picking a small amount of seeds from each bag. With this procedure, one germination test out of 10 bags of seeds would provide a clear indication of the seed quality as variability between bags and within lots is expected to be much lower than variability between lots. Defective lots could then be very accurately identified and removed.

TOWARDS A SIMPLIFIED BREEDING PROGRAM ? (Reflexions)

These ideas are meant to open a debate on the optimization of the cotton breeding scheme as ample discussion is needed before actual proposals can be put forward.

The original objectives proposed by G. Pauly (1991) for the cotton breeding program are still relevant : improving the crop productivity while maintening its top quality. Now, when considering the importance of marketing aspects and how it is difficult to get accurate results from variety trials, it seems that, to become more efficient, the breeding procedures must put the stress on the most heritable characters *i.e.* morphological traits, quality and ginning percentage. Thus, yield potential increase can be approached through the selection of a plant shape rather than through the selection of accurately measured more productive lines and reduction of picking costs could be obtained while looking for easier harvesting of bigger and more open bolls : these characteristics can easily be detected at the nursery level.
At present, breeding activities as such (including crossing and selfing) cover about 30% of the total area devoted to the program against 70% for the evaluation trials. The method used tend to give an utmost importance to the evaluation of yield potential but it does not aim at creating and detecting very transgressive genotypes.

A scheme based upon intercrossing and open-pollination would help to increase variability. Line or variety tests could be simplified to one on-station trial with few entries (5 at most) and, if necessary, a regional network with only 2 entries including a check **MSI**. While dedicating more room to the breeding part of the program, this procedure would also improve the accuracy of the trials, including a better evaluation of the yield potential of the tested lines.
Practically, 2 different selection schemes could be implemented :

✗ a scheme designed for the maintenance of the commercial cultivar (**MSI** at present). According to the

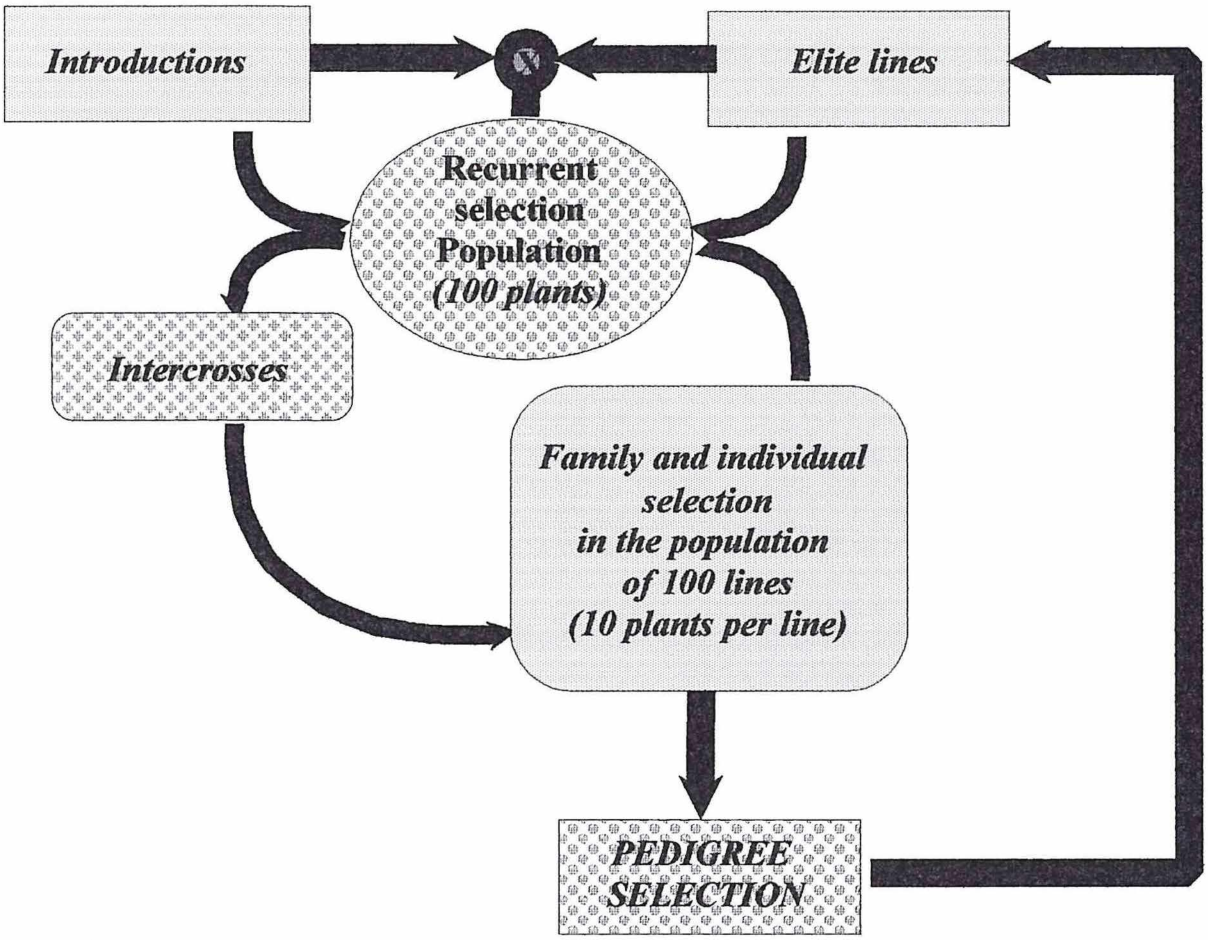

Fig. 2 Recurrent selection scheme as proposed for the varietal improvement of Sea Island Cotton

means devoted to the project, the Antigua method (fig 1), which has proved to be successful in maintening **MSI** for more than 60 years, could be relevant if the fiber quality can be taken into account. If the cost of such a program is thought to be too high, then original stock must be maintained by alternance of selfing and storage in cool and dry atmosphere as recommended formerly

✗ a second scheme designed for favouring the creation and maintenance of variability within the SI germplasm. When considering :

1) that most quality parameters to improve are polygenic and heritable, 2) that they are numerous, 3) that a great number of them have never been taken into account previously, and 4) that the means devoted to the program are limited,

the recurrent selection method looks particularly well fitted to the purpose, with alternate phases of intercrossing, selfing or natural inbreeding and selection (fig 2).

Owing to a decreased number of entries in trials and to the increase of the surface devoted to plant breeding as such, the productive breeding work could represent as much as 70% of the total area.
Of course, recurrent selection could be conducted under an open-pollination regime provided that all the genetic material used be part of the **Sea Island** germplasm. *G. hirsutum* germplasm or genotypes with inferior characteristics should then be introduced in isolated plots, remote from the breeding plot.

Table 7.- Characteristics of the standards used for calibration *(3 standards).*

Characteristic	Range of variation
2,5% Span length	from 28 mm to 33 mm
50% Span length	from 13 mm to 15 mm
PM%	from 70 % to 80 %
H	from 160 mtex to 220 mtex

COMPARISON BETWEEN MARD and CIRAD FIBRE TESTING LABORATORIES

Introduction

Barbados MARD's fibre testing laboratory has been installed in 1995 within Barbados National Standards Institute (BNSI) facilities. It became operational after Mrs S. Kellman completed some training at the TECOT laboratory of CIRAD, Montpellier, at the beginning of 1995.

This lab divides in two rooms equiped with air conditionner and drier :

1- the first room is aimed at conditioning the samples, while

2- the second one shelves the instruments *i.e.* a blender, a Fibrograph 530, a Maturimeter FMT3 and a Stelometer.

Supervised by the Head of the Cotton Research Program, the laboratory is run by Mrs S. Kellman and her assistant, who is due to attend further training at CIRAD, Montpellier, in the field of routine maintenance of the instruments.

Test procedure

Barbados MARD's laboratory is part of the CIRAD network. As such, it receives and analyses samples prepared by the TECOT laboratory for a round test. This procedure helps each lab to check on the accuracy of its own results in comparison with the ones obtained by the other labs.

In addition, a special test has been carried out with 68 fibre samples prepared from seed cotton harvested in the variety trials (17) and in the F3 progeny trial (51). After ginning, the fibre obtained was divided into two lots of about 70 g each, one analysed by MARD in Barbados, which run standard tests, and the other by TECOT in Montpellier, which run both standard and HVI tests.

When I stayed in Barbados, MARD's laboratory had already received calibration standards provided by TECOT (table 7). As a consequence, 10 samples out of the previous 68 could be re-analysed, using these standards.

Results of each laboratory are compared by means of correlation and average deviation between labs.

Test results

From the results obtained by both labs, three types of comparison can be made : classical MARD *vs* classical or HVI CIRAD and classical CIRAD *vs* HVI CIRAD. They are summarized in tables and also presented

Table 8.- Test results between standard MARD and CIRAD ***(68 samples).***

MARD	CIRAD	Correl. coef.	Comment
2,5% Span length	2,5% Span length	0,93	Barbados reads a little shorter (0,9mm)
50% Span length	50% Span length	0,71	poor correlation, Barbados reads shorter (1mm)
UR%	UR%	0,71	poor correlation
T1	T1	0,86	medium correlation, Barbados reads slightly higher (0,2)
E1	E1	0,71	poor correlation, Barbados reads slightly higher (0,3)
IM	IM	0,97	excellent correlation, same level of reading
PM%	PM%	0,89	medium correlation but Barbados reads very high (15)
H	H	0,97	good correlation but Barbados reads very low (-25)

Table 9.- Test results using standards for calibration ***(10 samples).***

MARD	CIRAD	Correl. coef.	Average deviation
2,5% Span length	2,5% Span length	0.96 → 0.98	from -1.8 mm to -0.9 mm
50% Span length	50% Span length	0.84 → 0.94	from -1.7 mm to -1.5 mm
UR%	UR%	0.83 → 0.77	from -2.2 % to -2.8 %
PM%	PM%	0.93 → 0.93	from +13.8 % to +2.4 %
H	H	0.98 → 0.98	from -24.3 mtex to -8.9 mtex

as graphs.

Standard MARD *vs* standard CIRAD :

Fibrograph 630 : MARD's laboratory obtains high correlations with TECOT's (table 8). However, it seems to read a little short, especially for the longest fibers, which could be underestimated by approx 1,5 mm. Using standards does not modify the trend although differences appear to be a little smaller (table 9). The same comments apply to 50% SL. As a consequence, uniformity, estimated from UR%, is also grossly underestimated. The general accuracy of the results could be improved if standards were read twice by the Fibrograph : first as standards for calibration and then as trivial samples. There might be a slight difference between expected and actual readings and, in this case, a correction factor should be worked out as :

$$\frac{\sum_{stand} theoritical}{\sum_{stand} actual}$$

On the other hand, one has to point out that available calibrating standards are only covering a range of length which goes from 28 to 33 mm for 2,5% SL and from 13 to 15 mm for 50% SL. These standards could well be unadequate for measuring accurately extra long cottons.

Stelometer 1/8" : correlations between labs are medium but correct as for resistance (table 8). The results obtained with elongation are not as good but they are not expected to be easily improvable.
Using available standards will slightly improve the accuracy while fully appropriate standards are not available on the market.

FMT3 : correlations (table 8) are very high for micronaire as well as for maturity (PM) and fineness (H). However, the levels read for PM and H seem respectively much too high (+15%) and much too low (-25). When using standards (table 9), FMT1 as a reference and the corresponding correcting formulas, the average deviations with TECOT laboratory decrease to +2 and -9, these being much more acceptable.
Note that FMT1 method for expressing the maturity of the fibre has been prefered by TECOT because :

1) it provides percentage of maturity (PM%) estimates which never exceed 100%, and
2) its estimates are more closely related to the results obtained with the AFIS system.

In order to get more understandable results for the breeder, it is advised to choose one system (FMT1 or FMT3) and stick to it. The choice will mainly depend on the computing facilities, which must be used in the case of FMT1. Nevertheless, if FMT3 is prefered, one has to bear in mind that the PM% corresponding values are

Table 10.- Tests results between standard MARD and HVI CIRAD ***(68 samples).***

MARD standard	CIRAD HVI	Correl. coef.	Comment
2,5% Span length	UHML	0,95	Barbados reads higher than Montpellier
UR%	UI%	-0,01	no correlation
T1	STP8	0,84	medium correlation

Table 11.- Tests results between standard CIRAD and HVI CIRAD ***(68 samples).***

CIRAD standard	CIRAD HVI	Correl. coef.	Comment
2,5% Span length	UHML	0,98	Standard fibrograph reads longer than HVI
UR%	UI%	0,24	weak correlation
T1	STP8	0,89	medium correlation, HVI provides higher readings
E1	Elo	0,75	medium correlation, HVI flattens variability

much higher and often go beyond 100%.

As a conclusion, results obtained from MARD's lab match a sufficient level of accuracy to be used in the cotton breeding program. However, when it comes to describe exactly new lines'potential or to determine the characteristics of the commercial crop, the datas provided by the laboratory must be made comparable with other labs results. If widespread methods are not used, correspondance keys have to be provided to facilitate readings. Standards for extra-long fibre may be helpful for calibrating more accurately the machines. They could be prepared with **MSI** in sufficient quantity for one or two years work, in collaboration with TECOT's lab. This could be initiated with Mr Elon Atkins visit to CIRAD.

Classical MARD *vs* HVI CIRAD (table 10) :

Length and uniformity : there is a good correlation between classical MARD 2,5% Span Length (SL) and HVI CIRAD Upper High Mean Length (UHML) although MARD reads a little longer, especially at the upper levels of length. However, there is no correlation between lint uniformities estimated by both instruments.

Resistance : the correlation between MARD Stelometer readings and HVI CIRAD STP8 is almost equivalent to that obtained when both laboratories use Stelometer. As expected, the average level is much higher for STP8.

Classical CIRAD *vs* HVI CIRAD (table 11) :

All correlations are close to those obtained with MARD's laboratory. They are a little stronger especially for uniformity (0,24 against -0,01).

UHML HVI reads shorter than classical Fibrograph and it provides a very poor estimate of the actual uniformity of the lint. On the other hand, STP8 HVI reads much higher than classical Stelometer (about 30% more at classical 20 g/tex and 40% more at classical 32 g/tex). The fibre elongation estimated with HVI is superior to the one estimated with Stelometer, above all at low levels. Moreover, the range of variations obtained with HVI is narrow, which is not as good for breeding purposes.

Conclusion

At last, it is advised to draw conclusions of this first year of working experience :

1 the time required for operating the various instruments being known as well as manpower availability,

2 it is then possible to evaluate how many analysis of each kind could be run in a normal year and,

3 taking into account external constraints linked for example to the cotton crop calendar, it is also possible to evaluate the quotas to be fixed by the laboratory for each of its most important fields of activity *i.e.* cotton breeding, cotton technology research and commercial crop follow-up.

This work could be initiated when Mr Elon Atkins will visit TECOT of CIRAD or else during the next visit of a TECOT expert to Barbados.

GINNING PLANT AT CCII

All the cotton picked in Barbados is ginned and baled at the (former) CCII plant.

A battery of 6 roller equiped ginning machines (Platt model 1975, approx 4 ft wide) are sufficient to operate the 500 to 600 bales crop, on a 40 hours/week work basis.

These gins are settled on a stage (approx. 2m high). The machines are fed by hand with seed cotton :

. the lint falls on the wooden floor from where it is carried by hand to the presses (3) installed at a short distance and ground level

. the seeds fall underneath the ginning machines into a pipe which drive them to a conveyor belt at ground level. Seeds are then collected in a pitch from where they are brought up by an endless screw and poured directly in bags through a hopper or mechanically delinted by a saw gin when they are meant for planting.

GENERAL CONCLUSION

Thanks to the agreement signed with the French Ministry of foreign Affairs, the assistance to the Barbados Cotton Breeding Program has been going on successfully for almost 4 years now.

For both partners, MARD and CIRAD, the prolongation of this operation is justified and worthwile :

- ✗ for CIRAD, this operation provides a scope for exploring a new field of research, with extra-long staple and *G. barbadense* species breeding : agronomical constraints are original and the reputation of Sea Island cotton is worldwide.

- ✗ for MARD, Barbados being a small country with limited research potential, this project brings in outside expertise (discussions, advises *etc.*) and it helps in developing opportunities for scientifical exchanges or training (in and off site) through the CIRAD network in relation either to cotton breeding (methods, genetic material) or to fibre testing.

This expertise should then be renewed and even strengthened so that Barbados Cotton Research can benefit of the full CIRAD network environment, including workshops attendance, short trainings and documentation.

ANNEX 1

DETAILED RESULTS OF 1994-95 BREEDING PROGRAM

F3 lines (1994-95 results)

	SCot g/plot	%F	2,5 mm	50 mm	UR %	T1 g/tex	E1 %	IM	PM %	Hs mtex	RD %	+b
Check												
MSI	951	31.1	40.3	19.1	47.5	29.1	5.5	2.9	56.4	231	72.8	10.7
MSI	920	30.8	37.7	17.5	46.3	28.0	5.5	2.8	55.9	224	70.8	10.8
MSI	1453	32.3	38.1	17.9	47.0	27.1	5.2	3.0	59.9	219	73.1	10.6
MSI	1973	33.1	40.4	19.0	47.1	27.2	5.1	3.1	60.4	225	73.6	9.9
MSI	1222	34.9	38.9	17.6	45.2	26.3	5.2	3.2	63.1	218	70.9	9.3
average	*1304*	*32.4*	*39.1*	*18.2*	*46.6*	*27.5*	*5.3*	*3.0*	*59.1*	*223*	*72.2*	*10.3*
MSI x VH10-4416												
4416 93/1	1582	27.8										
4416 93/2	1872	26.8										
4416 93/3	2488	30.3	39.2	18.8	47.9	27.3	5.2	3.0	58.7	226	73.5	10.1
4416 93/7	2342	30.6	39.1	18.2	46.5	28.0	5.1	2.9	53.5	251	71.6	10.7
4416 93/8	2325	30.6	38.3	17.5	45.5	27.7	5.3	3.1	60.4	225	72.8	10.2
4416 93/9	1974	29.1										
4416 93/11	3656	30.9	39.2	18.8	47.9	28.0	5.3	2.8	55.3	228	74.2	10.1
4416 93/12	2160	28.8	39.3	18.6	47.2	31.0	5.1	3.1	62.2	215	74.9	9.7
4416 93/13	1612	28.8										
4416 93/14	1728	30.0	38.8	17.8	45.9	27.9	5.6	2.8	57.2	217	73.0	9.9
4416 93/16	2090	28.7	39.8	19.1	47.9	28.9	5.4	3.0	58.1	230	71.5	10.1
4416 93/18	1686	29.2										
average	*2126*	*29.3*	*39.1*	*18.4*	*47.0*	*28.4*	*5.3*	*3.0*	*57.9*	227	*73.1*	*10.1*
deviation to check	***822***	*-3.1*	*0.0*	***0.2***	***0.4***	***0.9***	*-0.0*	*-0.0*	*-1.2*	*4*	***0.8***	*-0.1*
MSI-IRCT x VH10-4415												
4415 93/20	2823	29.6										
4415 93/21	2422	28.4										
4415 93/22	2553	31.1	34.3	16.0	46.7	25.3	6.4	4.5	79.8	211	72.0	10.1
4415 93/23	2299	29.5										
4415 93/24	2135	32.0	33.0	16.4	49.7	23.4	6.6	4.7	80.9	218	74.0	10.2
4415 93/27	3412	32.0	36.6	16.2	44.2	26.8	5.3	3.2	60.2	235	71.4	10.5
4415 93/28	2479	30.2	36.7	16.9	46.0	26.9	5.2	3.5	66.0	226	72.6	10.4
4415 93/30	2744	33.6	34.1	16.1	47.1	22.6	6.7	4.4	71.2	256	73.2	10.8
4415 93/31	1646	34.1	33.9	16.0	47.1	23.7	7.1	4.8	76.6	250	72.1	10.7
4415 93/37	1455	32.7	36.1	15.7	43.4	24.0	5.4	3.5	67.1	219	69.4	10.0
4415 93/38	2335	36.6	35.6	16.1	45.2	23.3	5.9	3.8	63.1	270	68.9	10.3
4415 93/39	2093	34.6	32.8	15.9	48.3	23.9	6.5	4.5	72.6	254	69.4	10.9
4415 93/40	2883	33.3	35.2	15.7	44.6	25.3	5.6	3.8	69.7	227	72.8	10.5
4415 93/41	2990	34.6	33.3	16.0	47.9	23.2	7.3	3.7	63.6	258	71.5	10.4
4415 93/45	2141	33.3	33.8	15.8	46.8	26.0	6.7	3.6	68.5	219	72.3	11.2
4415 93/46	1896	32.6	35.4	16.6	46.9	27.1	6.3	4.2	73.4	228	70.5	10.8
4415 93/47	2807	33.8	30.6	14.5	47.6	22.4	7.4	4.9	79.3	240	71.9	10.6
4415 93/50	1897	29.8										
4415 93/51	1176	30.1	34.8	15.0	42.9	24.4	6.4	3.1	60.4	225	69.3	10.1
4415 93/52	2261	29.3										
4415 93/53	3333	33.3	36.6	16.0	43.8	23.9	5.7	3.2	60.2	235	71.5	10.0
4415 93/54	2555	34.4	34.9	16.2	46.4	27.6	6.3	4.2	73.9	225	72.7	10.6
4415 93/57	1985	30.8	37.5	17.3	46.1	26.6	7.0	3.5	63.2	243	72.0	10.0
4415 93/60	2723	31.9	38.4	17.2	44.7	24.2	6.1	4.3	78.8	204	73.5	10.4
4415 93/61	2168	32.7	36.1	16.3	45.3	25.8	6.1	4.3	70.3	254	72.4	10.4
4415 93/62	2556	34.1	33.5	15.7	46.8	23.3	6.6	4.5	74.9	239	67.2	10.7
4415 93/63	2801	31.1	37.0	17.8	48.1	24.0	7.2	4.0	72.7	217	73.1	9.5

F3 lines (1994-95 results)

	SCot g/plot	%F	2,5 mm	50 mm	UR %	T1 g/tex	E1 %	IM	PM %	Hs mtex	RD %	+b
4415 93/66	2504	35.0	33.7	16.0	47.4	22.4	7.6	4.5	70.3	270	72.2	10.3
4415 93/67	2838	32.5	35.1	16.0	45.7	24.3	6.1	4.0	62.3	286	69.4	10.1
4415 93/68	2089	33.7	37.2	16.5	44.5	24.4	6.0	3.7	65.7	244	69.6	10.1
4415 93/69	2294	31.4	34.3	16.2	47.1	25.9	6.3	4.0	70.6	229	73.6	10.3
4415 93/73	3250	33.0	34.5	16.6	48.1	26.1	6.7	4.7	77.1	240	71.9	11.3
4415 93/74	2685	35.7	35.8	17.2	47.9	25.7	6.5	4.3	73.7	233	73.1	10.0
4415 93/76	4264	36.1	34.0	16.2	47.7	21.7	6.6	4.3	66.2	283	70.5	9.7
4415 93/78	2953	34.4	34.7	16.6	47.9	26.2	5.8	4.2	70.8	243	70.8	10.1
average	*2491*	*32.8*	*35.0*	*16.2*	*46.4*	*24.7*	*6.4*	*4.1*	*70.1*	*239*	*71.5*	*10.4*
deviation to check	***1187***	***0.4***	*-4.1*	*-2.0*	*-0.2*	*-2.9*	***1.1***	*1.1*	***11.0***	*16*	*-0.7*	*0.1*

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	SCot g/plot	%F	2,5 mm	50 mm	UR %	T1 g/tex	E1 %	IM	PM %	Hs mtex	RD %	+b
V135 46 93/80	1898	29.0	42.5	19.0	44.7	29.8	5.2	2.8	54.7	232	69.3	10.8
V135 46 93/81	2137	29.0	40.9	16.5	40.3	29.1	5.0	2.3	41.2	269	64.0	10.3
V135 46 93/86	1682	27.3	42.4	18.0	42.4	29.7	5.0	2.5	50.3	228	69.7	10.1
V135 46 93/88	2501	28.5	40.8	17.5	42.8	30.0	4.8	2.5	52.9	211	73.3	9.8
V135 46 93/93	1542	25.5										
V135 46 93/96	3385	28.5	40.3	17.2	42.7	27.8	4.8	2.5	49.6	232	69.1	9.5
V135 46 93/101	2450	29.1	41.5	17.5	42.5	26.6	4.8	2.5	47.8	245	72.3	9.5
V135 46 93/104	1757	30.3	39.5	17.4	44.1	27.8	5.2	3.1	62.2	215	72.4	10.8
V135 46 93/105	1560	25.7										
V135 46 93/106	2963	32.2	40.1	17.6	43.8	27.9	4.6	3.3	62.9	227	69.6	9.4
V135 46 93/109	2367	31.0	39.1	17.1	43.6	27.1	4.9	3.3	62.4	231	73.8	10.4
average	*2204*	*28.7*	*40.8*	*17.5*	*43.0*	*28.4*	*4.9*	*2.8*	*53.8*	*232*	*70.4*	*10.1*
deviation to check	***900***	*-3.7*	***1.7***	*-0.7*	*-3.6*	***0.9***	*-0.4*	*-0.2*	*-5.4*	*9*	*-1.9*	*-0.2*

Souches F2 choisies au champ et en final (1994-95 results)

	SCot g/plot	%F	2,5 mm	50.0 mm	UR %	T1 g/tex	E1 %	IM	PM %
MSI x VH8-4602									
1	208	31.8	42.0	17.0	40.5			2.3	59.5
2	224	35.4	39.5	17.0	43.0			2.8	66.7
3	81	34.2	38.2	16.5	43.2			2.3	60.0
4	264	28.8	38.3	15.4	40.2			2.5	71.3
5	123	30.6	41.9	16.6	39.6			2.7	65.0
6	254	30.9	38.6	16.1	41.7			2.7	63.1
7	163	32.1	40.4	15.7	38.9			2.4	59.0
8	312	33.5	40.0	15.2	38.0				
9	283	32.8	41.1	16.7	40.6				
10	490	29.8	44.6	18.1	40.6			2.5	69.0
12	497	31.1	43.0	18.6	43.3			2.6	65.0
13	325	30.7	43.7	17.1	39.1			2.6	66.1
14	313	29.9	44.2	17.5	39.6			2.5	64.3
17	458	32.1	42.6	17.3	40.6			2.8	62.0
20	274	29.9	46.6	20.0	42.9			2.8	77.0
21	352	28.6	42.3	17.0	40.2			2.6	65.2
22	360	30.2	42.6	18.0	42.3			2.9	71.3
24	381	32.3	40.7	16.7	41.0			2.7	63.3
25	442	30.8	42.6	15.8	37.1			3.2	77.4
26	194	32.7	40.4	16.4	40.6			2.8	71.0
29	599	28.7	39.4	14.2	36.0			2.7	70.2
30	411	30.3	43.0	16.2	37.7				73.1
31	560	30.0	42.1	17.5	41.6			2.5	65.0
33	391	33.3	39.3	16.1	41.0			2.4	60.4
34	440	31.9	40.8	15.8	38.7			2.4	64.2
38	331	29.4	45.7	17.3	37.9			2.4	70.4
39	292	32.4	41.4	16.2	39.1			2.4	62.1
40	211	30.4	43.2	17.6	40.7			2.7	68.2
41	168	35.2	33.3	15.6	46.8			3.0	75.0
42	195	33.7	33.1	14.3	43.2			3.2	79.0
43	160	33.2	37.0	15.1	40.8			2.4	64.7
44	159	28.5	35.4	16.2	45.8			3.2	81.3
45	151	34.9	40.2	15.2	37.8			2.3	60.1
46									
47	467	31.3	40.9	15.3	37.4			2.7	71.3
48	283	30.7	40.9	16.0	39.1			2.6	71.3
49	266	30.7	42.0	17.1	40.7			2.6	73.2
50	236	30.6	39.6	16.7	42.2			2.5	66.2
51	157	28.3	42.9	16.2	37.8			2.2	61.4
52	250	30.5	42.8	16.5	38.6			2.5	71.0
53	257	30.2	39.5	15.4	39.0			2.5	63.0
54	129	30.7	40.2	15.9	39.6			2.4	64.3
55	255	32.6	39.9	15.1	37.8			2.4	69.0
56	263	32.0	39.0	14.9	38.2			2.5	69.4
57	310	32.3	40.8	15.9	39.0			2.4	65.0
58	154	32.3	39.8	15.4	38.7			2.3	68.0
59	274	33.1	42.6	16.5	38.7			2.4	71.3
60	417	34.4	39.3	15.4	39.2			2.4	62.4
61	220	30.2	41.3	16.2	39.2			2.4	63.3
62	450	31.1	41.2	16.4	39.8			2.4	62.0

Souches F2 choisies au champ et en final (1994-95 results)

	SCot g/plot	%F	2,5 mm	50.0 mm	UR %	T1 g/tex	E1 %	IM	PM %
63	406	32.1	40.5	15.3	37.8			2.2	60.1
64	431	32.8	40.6	16.0	39.4			2.3	64.0
65	348	28.9	39.8	15.5	38.9			2.5	69.2
66	173	32.6	40.5	15.7	38.8			2.4	63.3
67	296	27.9	41.8	15.3	36.6			2.1	58.3
68	211	32.8	40.4	15.9	39.4			2.6	72.5
69	244	30.3	41.8	16.1	38.5			2.5	67.3
71	205	32.7	42.2	17.8	42.2			2.8	77.0
72	394	31.4	38.9	14.4	37.0			2.3	61.1
73	308	34.3	39.4	15.5	39.3			2.8	77.3
74	396	29.0	41.7	16.0	38.4			2.2	65.3
75	201	30.6	41.1	18.3	44.5			2.8	82.0
76	328	29.7	42.8	17.0	39.7			2.4	67.0
77	190	33.3	39.7	16.5	41.6			2.7	71.5
78	160	28.5	41.0	14.6	35.6			2.3	63.7
79	320	32.7	39.5	16.2	41.0			2.3	59.2
N° choisis									
11	591	31.6	41.2	17.2	41.7			2.9	69.3
15	373	33.8	41.6	18.4	44.2			2.9	68.3
16	556	33.9	40.6	17.6	43.3			2.8	68.5
18	287	31.8	44.7	20.1	45.0			3.0	74.4
19	461	31.2	43.3	19.0	43.9			2.8	69.0
23	458	30.4	42.5	17.7	41.6			3.1	77.0
27	382	33.6	42.8	19.5	45.6			3.4	79.0
28	296	31.4	43.2	18.2	42.1			3.1	75.5
32	438	31.0	43.7	19.0	43.5			2.9	73.1
35	300	32.0	43.4	19.2	44.2			2.6	73.4
36	350	31.9	44.0	19.3	43.9			2.6	67.4
37	310	30.8	42.6	17.7	41.5			2.7	75.2
70	381	31.4	41.0	16.5	40.2			2.6	70.0
moyenne	***311***	***31.5***	***41.1***	***16.6***	***40.4***			***2.6***	***68.2***
plts choisis	***399***	***31.9***	***42.7***	***18.4***	***43.1***			***2.9***	***72.3***

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80	182	35.1	39.9	15.9	39.8			2.6	76.8
81	221	30.5	39.1	15.7	40.2			2.6	73.2
82	311	29.0	42.3	17.0	40.2				
83	304	31.0	38.9	15.9	40.9			2.3	67.2
84	228	28.5	41.4	16.3	39.4			2.1	64.3
85	314	31.8	39.8	15.8	39.7			2.6	70.2
86	367	30.4	41.1	16.4	39.9			2.3	64.5
87	310	31.3	42.5	16.8	39.5			2.5	68.5
88	232	33.8	41.1	15.8	38.4			2.7	76.1
89	250	33.0	40.8	17.3	42.4			2.6	74.1
90	379	32.5	38.5	15.3	39.7			2.9	77.1
91	413	28.4	42.7	17.0	39.8			2.4	72.5
94	246	34.6	39.2	16.2	41.3			2.6	70.5
99	185	33.2	42.1	16.4	39.0			2.4	73.3
102	245	28.6	43.6	16.9	38.8			2.5	75.0
103	333	27.7	42.2	16.1	38.2			2.5	78.2
105	222	31.4	42.9	17.7	41.3			2.5	72.3

Souches F2 choisies au champ et en final (1994-95 results)

	SCot g/plot	%F	2,5 mm	50.0 mm	UR %	T1 g/tex	E1 %	IM	PM %
106	475	28.4	42.2	17.1	40.5				
107	170	31.0	40.8	15.7	38.5			2.5	75.4
110	425	29.6	41.5	16.1	38.8			2.6	77.0
111	276	27.2	42.8	16.4	38.3			2.6	76.4
112	320	30.3	42.6	16.7	39.2			2.4	73.1
113	354	30.4	39.5	15.1	38.2			2.4	70.1
114	248	32.2	40.7	17.6	43.2			2.8	79.0
116	205	34.0	38.0	15.6	41.1			2.5	71.2
117	240	34.4	42.5	17.5	41.2			2.8	75.5
118	202	34.2	40.6	17.2	42.4			2.6	73.4
119	289	31.1	40.0	16.8	42.0			2.5	72.2
120	168	35.4	41.2	16.5	40.0			2.8	69.3
122	262	31.1	41.0	16.3	39.8			2.6	66.3
123	368	33.2	40.6	17.1	42.1			2.5	62.3
124	222	33.2	40.3	15.7	39.0			2.7	69.4
125	101	33.2	41.0	16.2	39.5			2.2	63.8
126	291	30.9	40.3	17.1	42.4			2.8	68.0
127	366	32.0	40.7	15.4	37.8			2.4	63.3
128	302	34.9	40.7	15.0	36.9			2.7	62.7
129	372	31.7	40.9	15.9	38.9			2.5	65.1
130	297								
131	377	34.2	38.9	14.9	38.3			2.6	62.2
132	313	29.6	41.7	16.8	40.3			2.4	63.4
134	495	31.7	41.3	15.7	38.0			2.5	64.3
135	294	34.2	39.0	15.3	39.2			2.8	66.5
136									
137	257	33.2	39.7	16.2	40.8			2.8	75.1
138	170	31.8	42.5	16.4	38.6			2.5	65.4
139	197	33.6	41.4	16.4	39.6			2.3	62.7
141	208	36.0	39.4	15.2	38.6			2.3	59.2
142	230	31.4	40.9	15.1	36.9			2.4	63.1
143	185	31.1	39.5	14.4	36.5			2.4	64.2
144	165	34.9	41.3	15.2	36.8			2.5	64.1
145	195	35.2	39.2	15.6	39.8			2.4	60.1
146	256	32.7	40.9	15.8	38.6			2.4	61.4
147	230	31.8	39.7	16.4	41.3			2.4	67.3
150	291	35.1	40.5	16.0	39.5			2.4	62.4
151	154	35.1	42.2	15.3	36.3			2.5	69.1
152	92	36.0	40.1	15.4	38.4			2.5	66.1
153	176	33.9	41.6	17.2	41.3			2.7	75.4
154	142	35.7	42.7	17.2	40.3			2.4	64.6
155	181	35.5	40.8	16.1	39.5			2.3	64.6
156	158	30.8	41.6	16.1	38.7			2.6	73.1
157	143	35.5	40.7	16.3	40.0			2.8	69.3
158	224	33.6	40.5	16.8	41.5			2.5	68.1
159	125	31.0	44.0	16.9	38.4			2.5	68.1
160	348	28.0	41.6	15.7	37.7			2.4	72.5
161	465	31.2	41.9	17.0	40.6			2.8	67.3
N° choisis									
92	265	31.7	43.0	16.8	39.1			2.5	77.0
93	507	33.0	40.5	18.1	44.7			3.0	80.4

Souches F2 choisies au champ et en final (1994-95 results)

	SCot g/plot	%F	2,5 mm	50.0 mm	UR %	T1 g/tex	E1 %	IM	PM %
95	315	31.2	40.8	16.2	39.7			2.6	77.1
96	516	31.0	41.6	16.9	40.6			2.7	76.1
97	328	32.5	40.1	15.9	39.7			3.0	80.0
98	453	32.4	40.8	16.1	39.5			2.8	80.2
100	408	33.3	41.2	17.9	43.4			3.0	86.3
101	505	31.4	41.5	16.6	40.0			2.6	76.4
104	578	31.4	40.9	17.2	42.1			2.7	71.4
108	417	32.5	41.9	18.1	43.2			2.7	79.0
109	361	31.1	41.7	16.5	39.6			2.5	73.4
115	420	30.7	41.1	16.8	40.9			2.8	86.2
121	348	31.5	40.8	16.3	40.0			2.7	70.0
133	300	30.8	43.8	19.0	43.4			2.5	68.7
140	272	31.1	42.1	17.2	40.9			2.7	71.5
148	278	32.6	42.0	16.8	40.0			2.9	72.7
149	296	32.6	42.2	16.8	39.8			2.7	70.0
moyenne	***288***	***32.2***	***41.1***	***16.4***	***39.9***			***2.6***	***70.6***
plts choisis	***386***	***31.8***	***41.5***	***17.0***	***41.0***			***2.7***	***76.3***

MSI WISICA x (MSI-IRCT x VH10-4415)

162	271	36.9	36.0	18.0	50.0			3.1	74.2
163	183	35.4	35.8	15.6	43.6			3.4	79.1
164	101	32.6	33.3	14.6	43.8			2.8	64.4
165	105	31.0	34.9	15.9	45.6			3.7	76.0
166	90	31.1	34.8	16.2	46.6			3.7	82.3
167	145	33.7	36.4	14.9	40.9			3.2	74.5
168	238	33.7	34.7	15.5	44.7			3.5	75.4
169	98	30.1	36.9	14.3	38.8			3.0	67.0
170	155	33.7	34.1	17.4	51.0			3.7	80.3
171	155	34.4	30.7	16.0	52.1			3.4	72.1
172	129	31.9	37.0	14.8	40.0			3.0	65.2
173	79	29.9	33.2	15.8	47.6			3.8	87.2
174	90	28.1	32.6	15.3	46.9			3.4	78.2
175	109	27.4	34.9	16.3	46.7			3.2	81.1
176	39	32.6						4.0	89.0
177	119	30.7	35.2	16.9	48.0			3.7	84.0
178	158	32.1	34.4	14.2	41.3			3.2	75.2
179	95	30.3	33.1	16.5	49.8			3.6	84.0
180	248	32.4	34.2	16.4	48.0			4.0	87.3
181	156	31.2	33.7	16.0	47.5			4.0	84.7
182	203	32.4	32.3	14.0	43.3			3.8	80.1
183	60	32.4	33.6	14.8	44.0			3.5	71.3
184	276	32.7	32.0	15.6	48.8			4.3	86.3
185	259	31.0	35.2	16.7	47.4			3.0	75.1
186	49	31.3	32.0	14.6	45.6			3.7	80.1
187	247	33.7	33.2	16.4	49.4			4.6	84.1
188	356	31.3	34.0	15.7	46.2			3.7	80.2
189	189	32.1	32.8	16.0	48.8			3.0	71.0
190	105	30.5	35.0	13.7	39.1			3.1	68.3
191	162	31.9	32.5	15.7	48.3			4.0	86.1
192	136	32.0	34.1	15.6	45.7			3.6	80.2

Souches F2 choisies au champ et en final (1994-95 results)

	SCot g/plot	%F	2,5 mm	50.0 mm	UR %	T1 g/tex	E1 %	IM	PM %
193	88	30.6	36.2	16.9	46.7			3.5	76.1
194	124	31.8	33.3	16.0	48.0			4.3	86.2
195	99	30.1	33.4	14.4	43.1			4.0	79.2
196	114	31.1	36.1	18.1	50.1			3.9	82.0
197	147	33.8	35.7	16.7	46.8			3.6	80.2
198	200	28.5	32.5	16.4	50.5			4.6	87.1
199	130	32.8	34.2	16.2	47.4			3.8	77.4
200	119	31.5	33.6	15.7	46.7			4.1	85.5
201	138	32.8	35.5	14.2	40.0			3.0	66.2
202	76	31.6	33.0	15.2	46.1			4.2	84.1
203	69	30.0	34.3	15.8	46.1			4.0	80.1
204	57	31.6	34.6	15.9	46.0			3.2	74.2
205	109	29.5	29.0	12.9	44.5			4.1	76.4
206	75	30.2	33.8	14.9	44.1			3.4	70.0
207	46	31.0						4.0	77.4
208	55	31.8	30.6	13.2	43.1			3.4	71.2
209									
210	142	33.0	34.6	14.7	42.5			3.0	65.6
211	106	35.4	34.7	16.0	46.1			3.5	83.3
212	111	35.7	34.4	16.3	47.4			4.0	78.2
213	266	32.1	32.2	15.8	49.1			4.1	80.1
214	141	32.1	34.4	16.9	49.1			3.6	72.1
215	203	33.8	32.3	15.0	46.4			3.3	74.0
216	132	32.0	33.6	15.4	45.8			3.7	76.3
217	324	33.0	32.5	14.9	45.8			3.6	76.4
218	93	33.0	28.7	14.3	49.8			3.3	66.1
219	210	35.5	32.1	15.8	49.2			4.4	77.4
220	204	35.0	35.2	15.3	43.5			3.0	74.4
221	240	34.7	30.5	16.6	54.4			5.0	88.5
222	240	34.7	37.9	16.2	42.7			3.0	62.2
223	147	32.3	31.1	15.6	50.2			3.8	80.0
224	146	32.2	35.8	16.9	47.2			3.9	85.3
225	230	34.8	35.4	15.6	44.1			3.8	76.4
226	276	36.1	34.3	14.9	43.4			3.4	70.1
227	60	32.3						3.6	77.2
228	301	34.8	30.9	15.8	51.1			4.6	88.3
230	151	34.9	37.1	17.6	47.4			3.5	76.1
231	194	34.5	34.3	16.3	47.5			4.0	75.4
233	93	32.9	38.3	18.8	49.1			4.2	81.5
234									
236	188	35.6	33.2	15.6	47.0			4.0	81.5
237	226	36.7	36.5	16.2	44.4			3.8	83.2
238	125	35.8	38.0	18.7	49.2			3.9	83.3
239	104	31.4	37.0	17.2	46.5			3.6	82.5
240	171	33.5	31.9	13.6	42.6			3.4	72.4
241	243	34.7	34.2	16.8	49.1			4.5	92.2
242									
243	240	35.3	34.8	16.1	46.3			3.8	83.3
244	202	34.5	34.9	16.4	47.0			4.0	84.4
245	240	35.3	33.6	16.4	48.8			4.3	89.3
246	222	33.9	33.6	17.3	51.5			3.8	83.3
247	155	34.3	32.3	16.4	50.8			3.8	80.0

Souches F2 choisies au champ et en final (1994-95 results)

	SCot g/plot	%F	2,5 mm	50.0 mm	UR %	T1 g/tex	E1 %	IM	PM %
248	186	32.4	38.7	18.3	47.3			3.5	83.1
249	264	33.8	32.0	15.8	49.4			4.3	82.1
250	121	33.0	34.5	17.5	50.7			4.0	87.1
252	224	32.3	34.1	16.3	47.8			3.4	79.0
254	246	33.4	33.6	16.1	47.9			3.7	86.4
255	341	32.3	35.4	16.8	47.5			3.9	87.1
256	196	33.3	39.0	17.7	45.4			3.7	85.2
257	217	34.0	33.8	16.9	50.0			3.7	82.4
258	215	33.8	34.4	15.1	43.9			3.0	70.0
259	262	33.0	33.2	16.1	48.5			3.5	82.5
260	90	27.9	33.8	13.9	41.1			3.0	74.4
262	271								
263									
264	412	34.3	32.9	16.3	49.5			4.1	88.4
267	184	34.9	34.1	16.0	46.9			3.5	82.1
268	345	32.6	33.7	15.4	45.7			3.9	83.1
269	320	32.5	33.8	16.6	49.1			4.3	86.9
271	235	33.5	35.8	15.5	43.3			3.4	77.4
272	376	32.0	34.7	17.4	50.1			4.4	87.2
274	151	34.6	36.2	17.3	47.8			3.0	73.3
276	240	35.2	35.4	17.4	49.2			3.8	81.5
278	299	32.5	34.0	18.7	55.0			4.3	90.3
280	181	34.7	32.8	16.5	50.3			4.6	87.5
281	248	34.7	35.9	17.1	47.6			4.2	85.2
282	275	34.8	34.7	17.6	50.7			4.0	88.6
N° choisis									
229	308	34.8	35.8	15.4	43.0			3.9	79.0
232	267	35.3	35.0	16.0	45.7			4.0	85.4
235	307	31.4	38.3	19.5	50.9			3.8	83.1
251	270	34.1	36.2	16.6	45.9			3.5	79.1
253	272	34.0	36.7	15.6	42.5			3.0	74.3
261	261	32.5	36.2	16.5	45.6			3.2	78.1
265	359	33.4	35.4	17.0	48.0			3.5	75.2
266	434	32.9	36.2	17.2	47.5			3.6	77.1
270	309	32.5	35.9	17.6	49.0			3.7	83.4
273	352	32.6	35.0	16.9	48.3			4.3	82.2
275	415	34.1	36.5	18.7	51.2			4.0	84.1
277	271	32.2	36.6	16.8	45.9			3.5	81.1
279	296	32.8	35.8	17.0	47.5			4.4	89.4
moyenne	***193***	***32.9***	***34.4***	***16.1***	***46.9***			***3.7***	***79.7***
plts choisis	***317***	***33.3***	***36.1***	***17.0***	***47.0***			***3.7***	***80.9***

V135 (30) 46 x (MSI x VH10-4416)

283	160	32.1	40.2	18.0	44.8			2.9	73.1
284	128	28.2	40.3	19.4	48.1			2.5	70.3
285	212	28.8	41.9	17.1	40.8			2.4	60.2
286	192	27.2	39.8	18.4	46.2			2.3	54.4
287	202	30.1	41.8	19.0	45.5			2.8	75.5
288	114	34.1	40.8	18.9	46.3			2.3	60.4
289	187	29.1	39.4	16.1	40.9			2.6	66.2
290	195	26.9	37.6	15.9	42.3			2.2	59.1

Souches F2 choisies au champ et en final (1994-95 results)

	SCot g/plot	%F	2,5 mm	50.0 mm	UR %	T1 g/tex	E1 %	IM	PM %
291	224	27.0	43.4	18.7	43.1			2.4	64.5
292	163	28.8	44.3	20.7	46.7			2.1	56.0
293	131	31.8	42.4	19.5	46.0			2.5	65.5
294	79	31.7						2.6	69.5
295	172	31.8	42.5	19.5	45.9			2.5	59.0
296									
297	189	28.1	41.7	18.8	45.1			2.4	67.1
298	218	28.1	41.2	19.8	48.1			2.7	70.1
299	106	32.3	40.2	18.0	44.8			2.4	65.2
300	468	30.9	41.9	19.1	45.6			3.3	80.0
301	131	31.1	39.1	16.6	42.5			2.3	56.2
302	241	30.0	41.5	18.3	44.1			2.6	71.1
303	75	31.0						2.3	61.5
304	154	30.1	41.6	16.0	38.5			2.6	71.4
305	145	30.4	41.5	17.3	41.7			2.2	61.4
306	206	33.1	41.2	16.3	39.6			2.4	60.3
307	255	33.7	40.0	18.2	45.5			2.1	50.1
308	132	29.6	40.9	16.2	39.6			2.2	61.1
309	166	32.2	38.3	16.0	41.8			2.3	56.5
310	258	31.3	41.0	17.6	42.9			2.4	60.5
311	139	28.7	45.0	18.8	41.8			2.4	67.1
312	216	30.9	41.6	17.8	42.8			2.3	61.2
313	291	27.5	38.7	18.5	47.8			2.7	72.5
314	64	34.5						2.5	60.0
315	227	31.9	41.3	17.8	43.1			2.9	69.4
316	70	32.2						2.5	59.1
317	339	29.1	42.2	17.3	41.0			2.3	52.4
318	91	29.4	42.3	15.9	37.6			2.1	49.4
319	178	29.3	42.6	16.7	39.2			2.8	71.4
320	77	34.5						2.5	61.2
321	102	33.3	39.6	15.2	38.4			2.2	50.2
322	172	30.7	38.4	15.5	40.4			2.4	55.3
323	253	29.8	44.0	17.3	39.3			2.4	70.2
324	157	32.9	41.7	16.7	40.0			2.4	55.1
325	125	34.9	41.3	15.1	36.6			2.3	55.3
326	137	34.4	40.3	15.2	37.7			2.2	51.1
327	128	31.2	40.8	15.8	38.7				
328	109	35.0	42.2	17.2	40.8			2.2	52.5
329	117	35.9	39.3	15.2	38.7			2.6	59.0
330	208	33.1	40.1	17.4	43.4			2.4	63.3
331	220	34.0	41.6	15.8	38.0			2.5	62.3
332	103	30.9	39.1	16.5	42.2			2.2	51.3
333	135	33.6	40.1	16.4	40.9			2.4	60.2
334	132	29.7	37.9	15.4	40.6			2.3	54.3
335	199	29.8	40.4	16.4	40.6			2.1	49.2
336	264	32.6	41.2	18.0	43.7			2.9	68.1
337	235	32.0	41.5	16.2	39.0			2.3	52.4
338	203	33.0	39.5	16.2	41.0			2.4	55.4
339	209	34.4	38.2	16.0	41.9			2.3	51.4
340	395	31.6	41.2	16.4	39.8			2.3	51.0
341	116		44.8	16.9	37.7			2.1	52.1
342	89	31.5	40.2	15.0	37.3			2.4	58.3

Souches F2 choisies au champ et en final (1994-95 results)

	SCot g/plot	%F	2,5 mm	50.0 mm	UR %	T1 g/tex	E1 %	IM	PM %
343	98	32.9	40.5	17.0	42.0			2.3	51.3
344			41.1	16.9	41.1			2.6	56.3
345	300	30.3	42.0	15.8	37.6			2.4	61.4
346	158	33.1	41.0	15.4	37.6			2.2	52.0
347	240	32.9	38.1	15.8	41.5			2.4	55.0
348	53	32.2							
349	180	32.9	41.6	16.5	39.7			2.1	51.4
350	212	30.3	41.3	17.0	41.2			2.3	62.0
351	148	33.8	40.5	16.6	41.0			2.2	51.5
352	171	33.9	36.9	15.8	42.8			2.4	55.5
353	134	31.4	39.4	16.3	41.4			2.6	65.4
354	175	34.3	39.3	15.9	40.5			2.1	50.5
355	118	33.8	40.8	17.2	42.2			2.4	64.2
356	59	33.4						2.3	54.0
357	149	29.5	39.0	17.2	44.1			2.4	62.1
358	166	28.4	38.6	18.6	48.2			2.6	72.0
moyenne	***172***	***31.4***	***40.8***	***17.1***	***41.9***			***2.4***	***60.2***

ANNEX 2

REMINDER FOR THE BREEDING PROGRAM

Table 12.- Recording selfed bolls set (example for the collection).

Cross		December 1995			January 1996	
	6	13	20	27	3	10
K1						
K2						
etc.						

note :
self pollinated, well formed and insect damage free bolls only must be recorded as successful

REMINDER OF ACTIVITIES TO BE IMPLEMENTED IN THE BREEDING PROGRAM

(after G. Pauly)

General recommendations

* All field operations related with land preparation must tend to homogenize the land
* When sowing on ridges, make sure they are straight and parallel. However, when there is no excessive drainage problem, planting on flat ground must be prefered, using a rope to get regular interspacing.
* It is preferable to identify each row with a label numbered from 1 to *n*. At present, full genetical names are indicated on the labels.
* The use of cloth bags has already improved selfing but closer supervision should also greatly increase the efficiency of all breeding operations
* Seed cotton should be harvested dry, clean and insect damage free.
* For harvesting and storage purposes, paper bags are prefered to plastic ones.
* Each harvest bag must be identified correctly with :

1 the name of the experiment

2 the plot number (or the name of the genetic material)

3 the harvest number

* If storage facilities are available, the seed cotton can be weighed on a *per* plot or *per* plant basis. The different harvests of the same plot (or plant in the F2 generation) must be gathered according to their plot or plant number and the seed cotton mixed thoroughly to homogenize.
* However, if storage facilities are <u>not</u> available, the seed cotton collected from each plot (or plant) has to be weighed after each picking and then collected in a single bag on a *per* plot (or plant) basis.
* Small samples (*e.g.* single plants) have to be ginned on the MARD gin whereas AVT or PVT may be processed on the CCII gins if adequate care, in term of supervision, is provided.

Collection

* the selfing activity in the collection must be reduced to the maintenance purpose (25 good bolls *per* line)
* at weekly intervals, records of self-pollinated bolls in each plot, as shown below, would help to orientate breeding efforts (table 12)
* only selfed bolls must be harvested, on a *per* line basis
* gin the selfed bolls on a *per* line basis
* no data to be recorded

Table 13.- Recording crossed bolls set (example).

Cross	December 1995				January 1996	
	6	13	20	27	3	10
[(MSI-IRCT x VH10-4415)-93/24] x [(MSI x V135(30)46)-93/80]						
[(MSI-IRCT x VH10-4415)-93/76] x [(MSI x V135(30)46)-93/81]						
etc.						

note :
cross pollinated, well formed and insect damage free bolls only must be recorded as successful

Table 14.- Recording bolls set (example for F1 population).

Cross	December 1995				January 1996	
	6	13	20	27	3	10
K 255 x MSI-MS91/A						
K 255 x [MSI x V135 (74) -91/44]						
etc.						

note :
self pollinated, well formed and insect damage free bolls only must be recorded as successful

Program of crosses

* crossing has to go on until sufficient (25 to 50) hybrid bolls are obtained
* at weekly intervals, records of successfully cross-pollinated bolls in each plot, as shown below, would help to orientate breeding efforts (table 13).
* hybrid bolls must be picked on a *per* cross basis
* the seed cotton of the hybrid bolls will be ginned on a *per* cross basis
* no ginning data to be collected
* after ginning, store the seeds in the cold room

Multiplication of the F1 populations

* selfing in the F1 lines must provide as much selfed bolls as possible for each population
* at weekly intervals, records of self-pollinated bolls in each plot, as shown below, would help to decide on which origin the stress has to be put on (table 14).
* harvest only the selfed bolls on a *per* cross basis
* gin the selfed bolls on a *per* cross basis

F2 populations

* although selfing has not been carried out in the present crop year, it should be done as often as possible :
    - ✘ high level of selfing activity must be maintained in the F2 populations, in order to obtain a maximum of selfed bolls (ideally 4 to 5 *per* selected plant) for each population.
    - ✘ at weekly intervals, records of self-pollinated bolls in each plot, as shown in previous tables, would help to orientate breeding efforts
* single plant selection must be based upon production potential and shape. In order to end up with about 100 F3 lines, 300 to 500 single plants (30 to 50 *per* F2 population) should be selected in the field.
* each selected plant must be tagged from 1 to *n*
* record for each population the numbers used to identify the single plants chosen *e.g.* :

pop MSI-WISICA x (MSI-IRCT x VH10-4413)	plants	#1	to #105
pop MSIx VH8-4602	plants	#106	to #213
etc.			

* each selected plant is harvested in a separate bag identified by the plant number (and harvest number if several pickings are needed)

Table 15.- Recording ginning datas (example for single plants).

Plant #	Total Seed Cotton	Weight of fibre	Weight of seed	% Fibre
1				
2				
3				
etc.				

note :
% fibre is obtained by dividing the weight of fibre by the weight of seed cotton (multiplied by 100)
when ginning is correctly operated, the sum seed + fibre should be almost identical to the weight of total seed cotton

Table 16.- Recording harvest and ginning datas (example for variety trials).

Plot #	Nb hills	Total Seed Cotton	Weight of fibre	Weight of seed	% Fibre
101					
102					
103					
etc.					

note :
% fibre is obtained by dividing the weight of fibre by the weight of seed cotton (multiplied by 100)
nb hills for number of hills per plot, whatever the number of plants per hill

* ginning activity :

1 gather all the bags filled with seed cotton harvested on the same selected plant

2 mix the total harvest and weigh it

3 gin the seed cotton (still on a *per* plant basis), weigh the fibre and the seeds obtained and calculate the %fibre for each plant

4 keep the fibre and the seeds of each plant until the final choice has been made

5 to record the ginning datas, the following table can be used (table 15)

<u>F3 progenies</u>

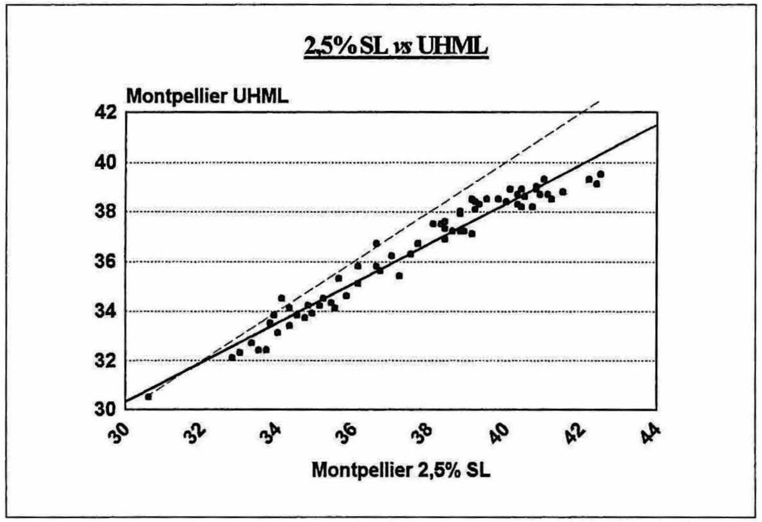
* this experiment will be harvested on a *per* progeny basis. Each bag should be well identified by the name of the line (use F3-C1, F3-C2 *etc.* to identify the check lines)
* before weighing, the harvest bags are ranked according to the line code (mix the different harvests of each line)
* total seed cotton harvested is weighed and then ginned on a *per* progeny basis
* the fibre and the seeds are weighed to determine the %F
* the lint is kept for fibre analysis while the seeds are stored in the cold room
* record all ginning datas in a table (such as the one above)

<u>Variety trials (preliminary and advanced)</u>

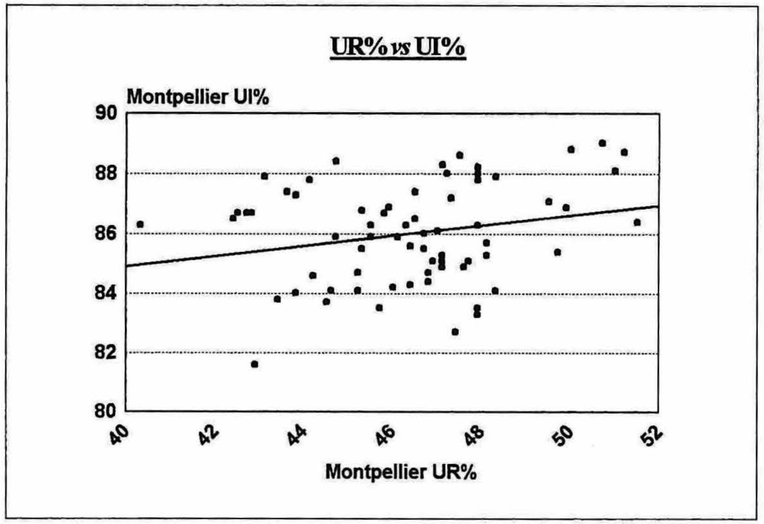
* only the central row is harvested for experimental purpose
* each harvest bag should be correctly identified with plot # and harvest #
* after all pickings have been completed, the different harvests must be mixed plot by plot
* the total seed cotton is then weighed and ginned on a *per* plot basis
* ginning datas are recorded in a similar table as the one shown below
* in many cases, yield differences are due to plant stand differences. In consequence, it is recommended to record the number of plants <u>or hills</u> *per* plot at harvest for better understanding of the variety trials results (table 16)
* after ginning, some lint (at least 30 g) must be sampled for laboratory testing. To ensure sufficient representativness, it is recommended the sample be constituted of many small pinches instead of just one handful.
* while waiting for the final decision, the seeds are stored clearly identified paper bags in the cold room.

ANNEX 3

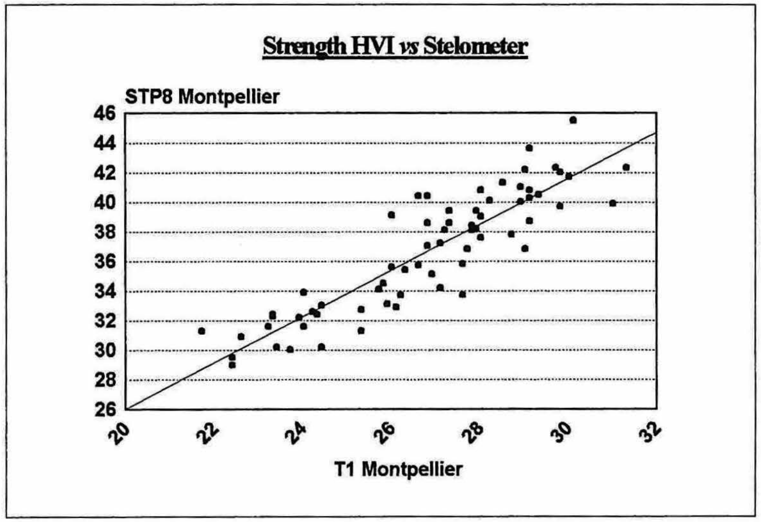
LAB TESTS RESULTS



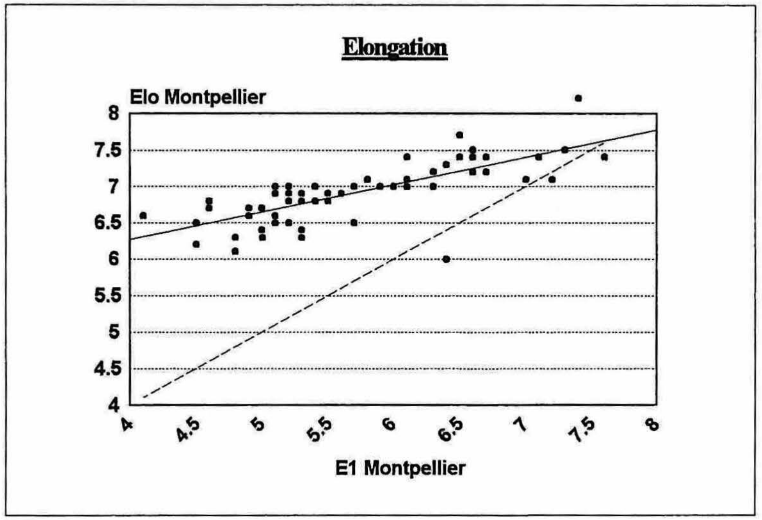
2,5% SL vs UHML
Montpellier UHML
42
40
38
36
34
32
30
30
32
34
36
38
40
42
44
Montpellier 2,5% SL



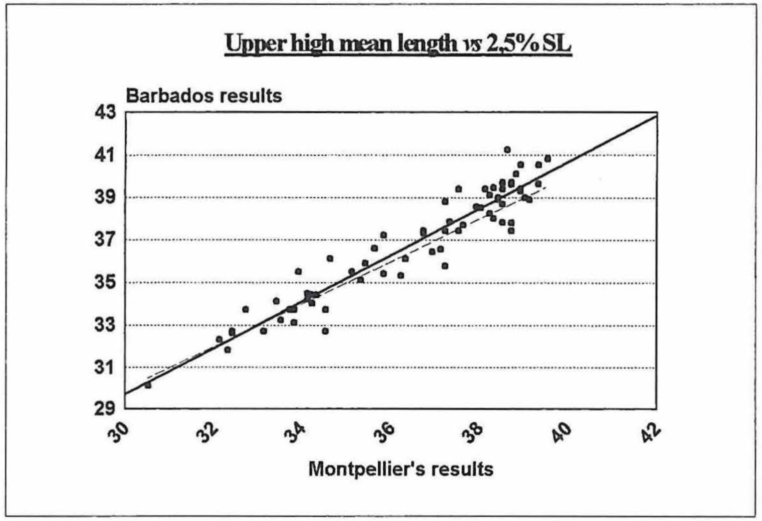
UR% vs UI%
Montpellier UI%
90
88
86
84
82
80
40
42
44
46
48
50
52
Montpellier UR%

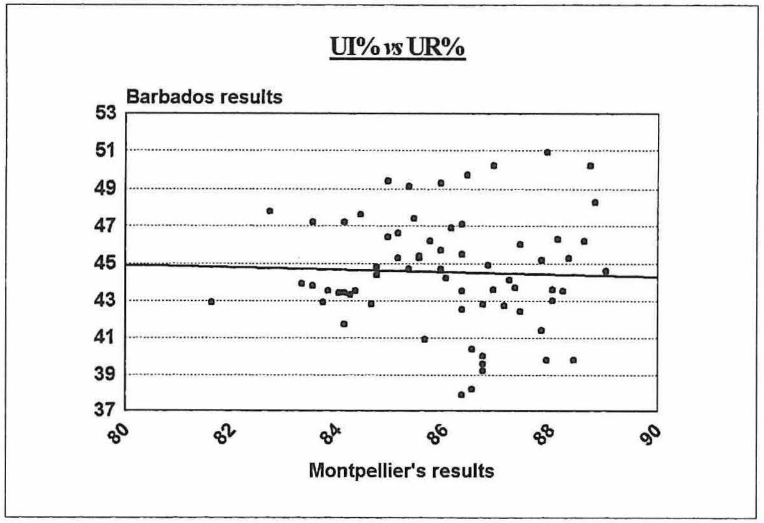


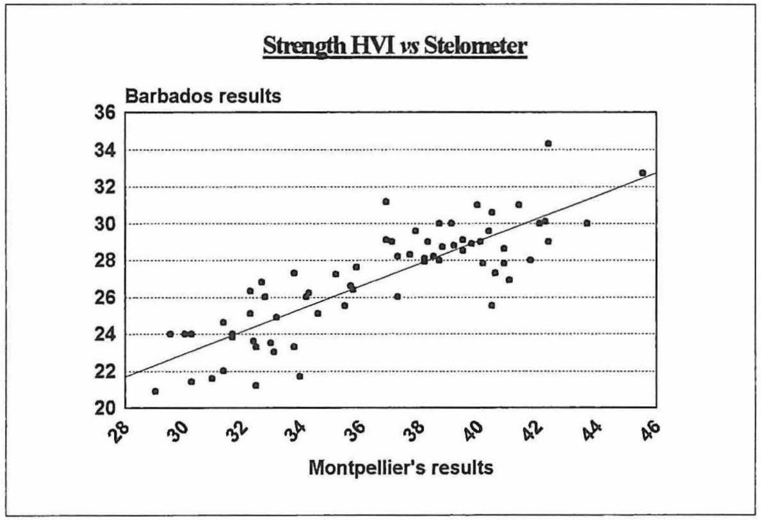
Strength HVI vs Stelometer
STP8 Montpellier
46
44
42
40
38
36
34
32
30
28
26
20
22
24
26
28
30
32
T1 Montpellier

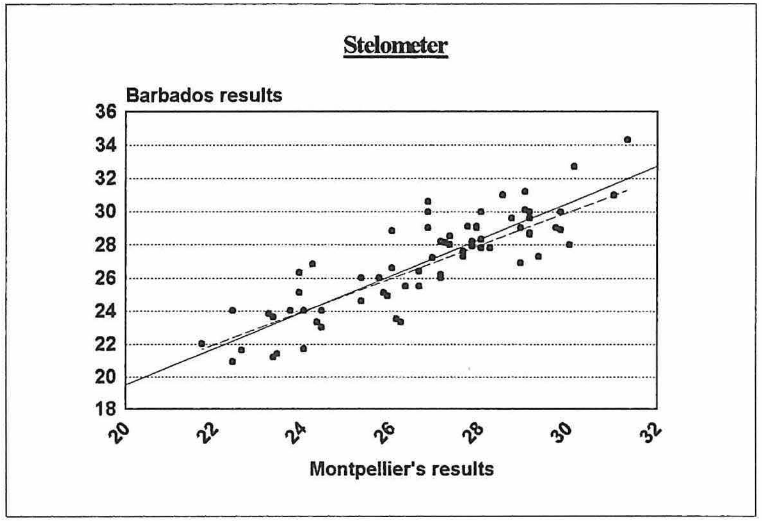


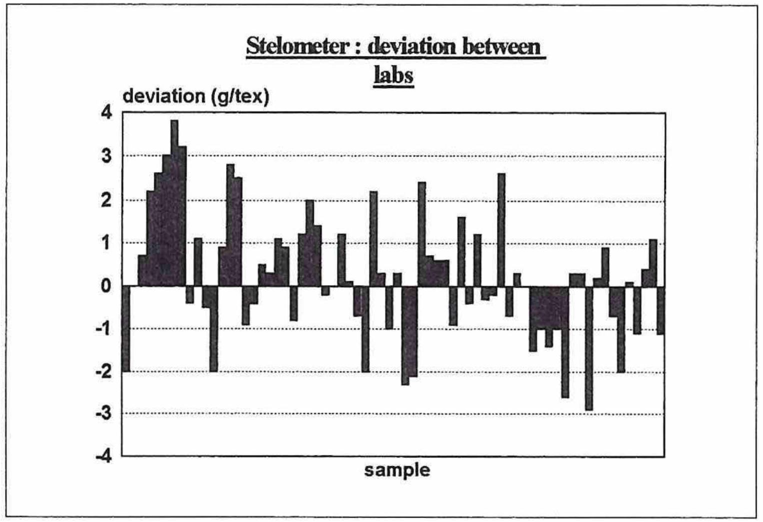
Elongation
Elo Montpellier
8
7.5
7
6.5
6
5.5
5
4.5
4
4
4.5
5
5.5
6
6.5
7
7.5
8
E1 Montpellier

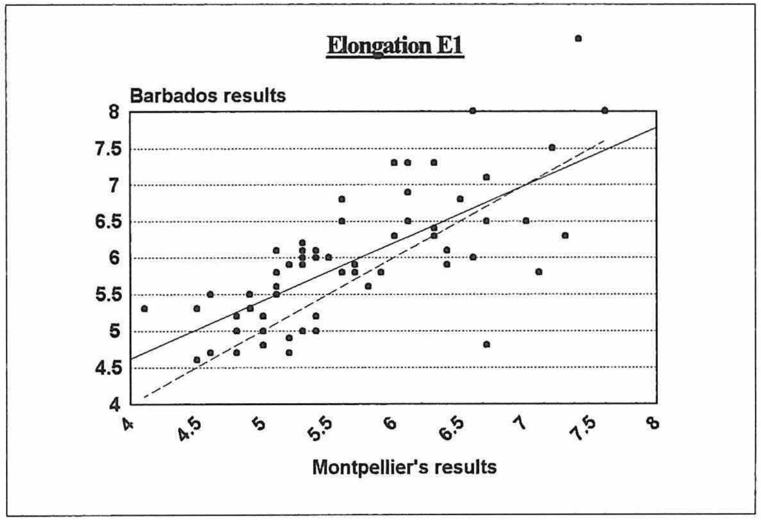

Upper high mean length vs 2,5% SL
Barbados results
43
41
39
37
35
33
31
29
30
32
34
36
38
40
42
Montpellier's results

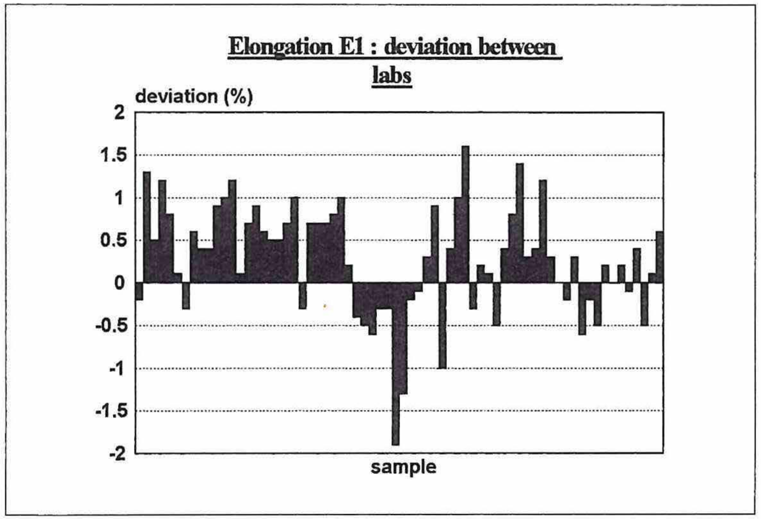

UI% vs UR%
Barbados results
53
51
49
47
45
43
41
39
37
80
82
84
86
88
90
Montpellier's results

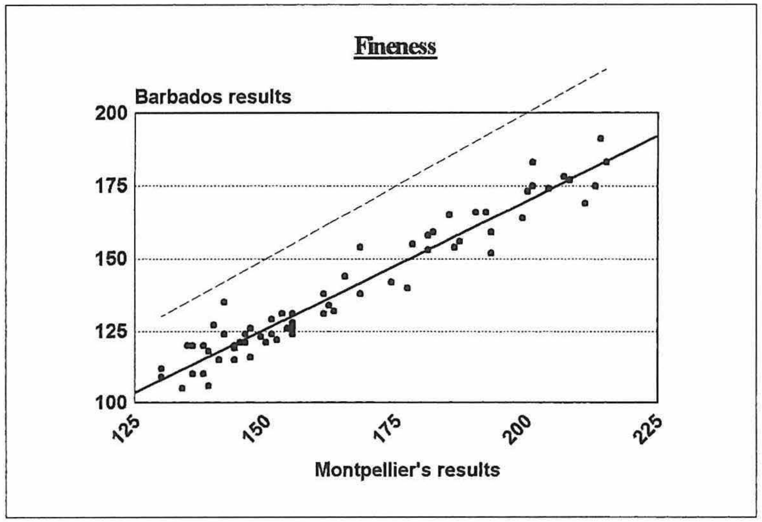

Strength HVI vs Stelometer
Barbados results
36
34
32
30
28
26
24
22
20
28
30
32
34
36
38
40
42
44
46
Montpellier's results

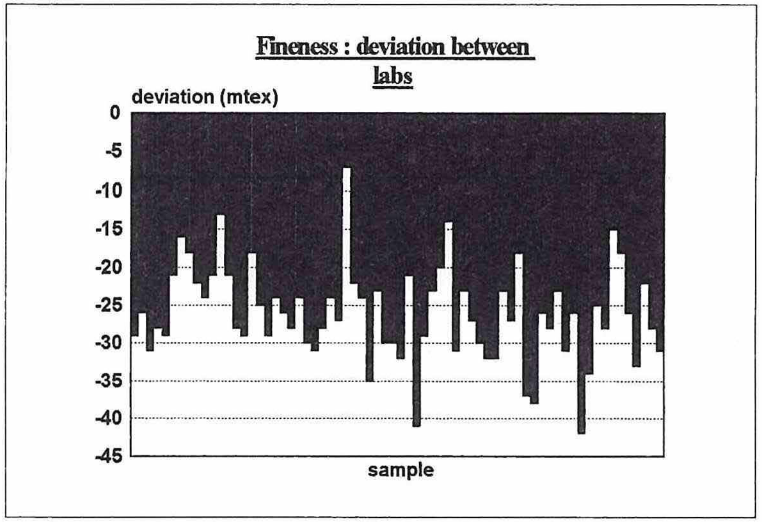

Stelometer
Barbados results
36
34
32
30
28
26
24
22
20
18
20
22
24
26
28
30
32
Montpellier's results

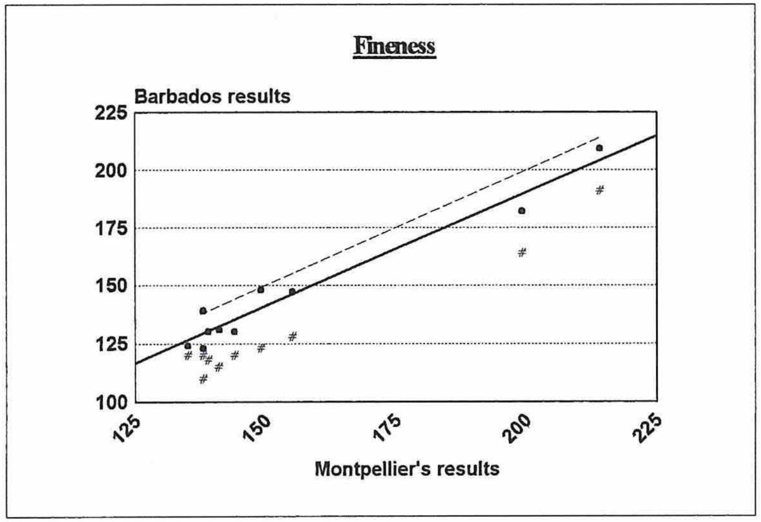

Stelometer : deviation between labs
deviation (g/tex)
4
3
2
1
0
-1
-2
-3
-4
sample

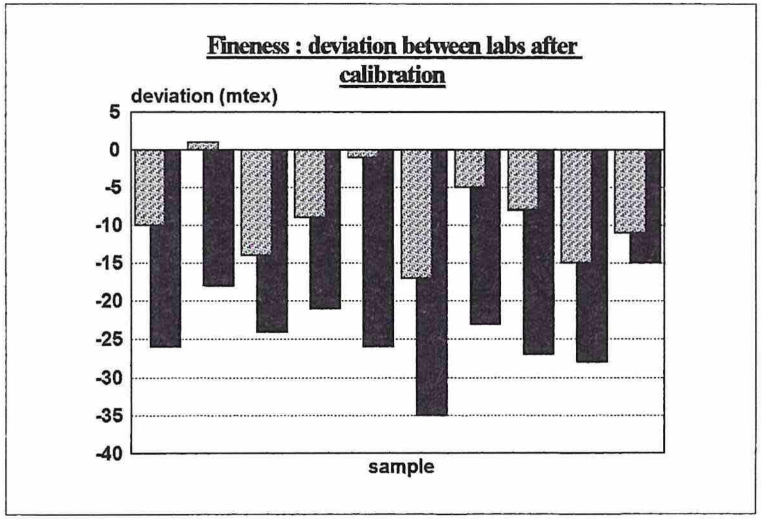

Elongation E1
Barbados results
8
7.5
7
6.5
6
5.5
5
4.5
4
4
4.5
5
5.5
6
6.5
7
7.5
8
Montpellier's results

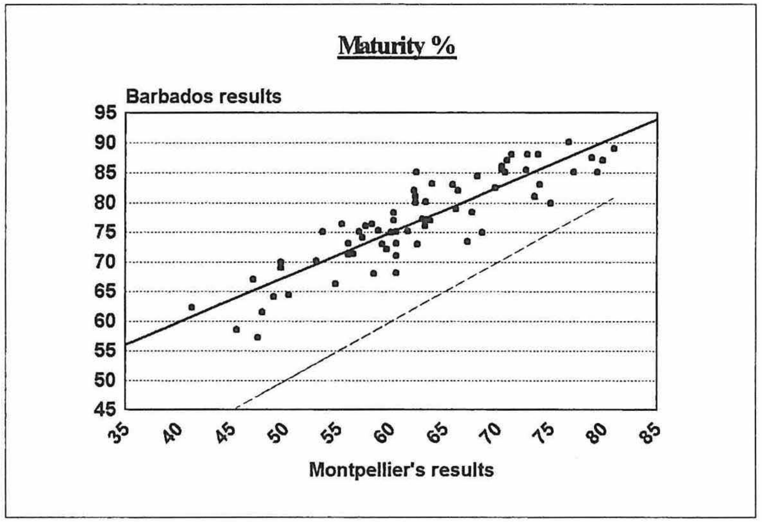

Elongation E1 : deviation between labs
deviation (%)
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
sample

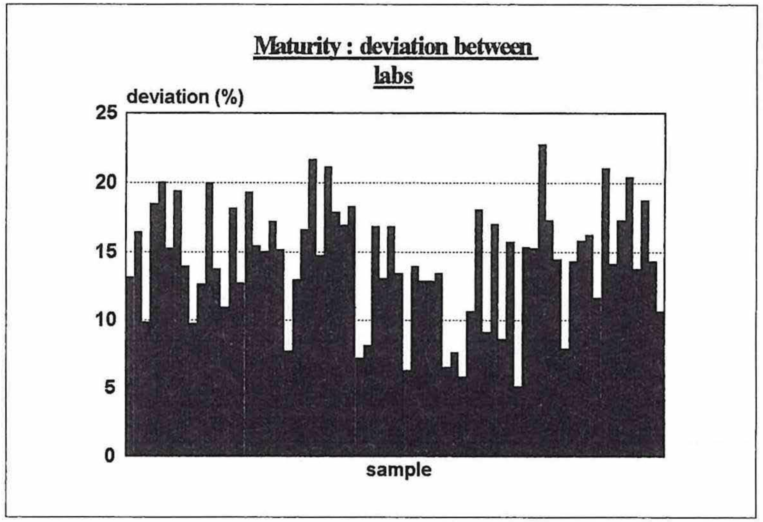

Fineness
Barbados results
200
175
150
125
100
125
150
175
200
225
Montpellier's results

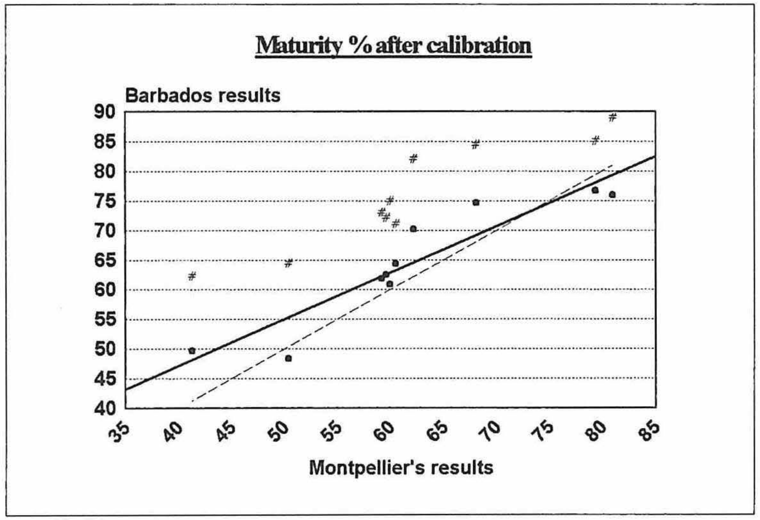

Fineness : deviation between labs
deviation (mtex)
0
-5
-10
-15
-20
-25
-30
-35
-40
-45
sample

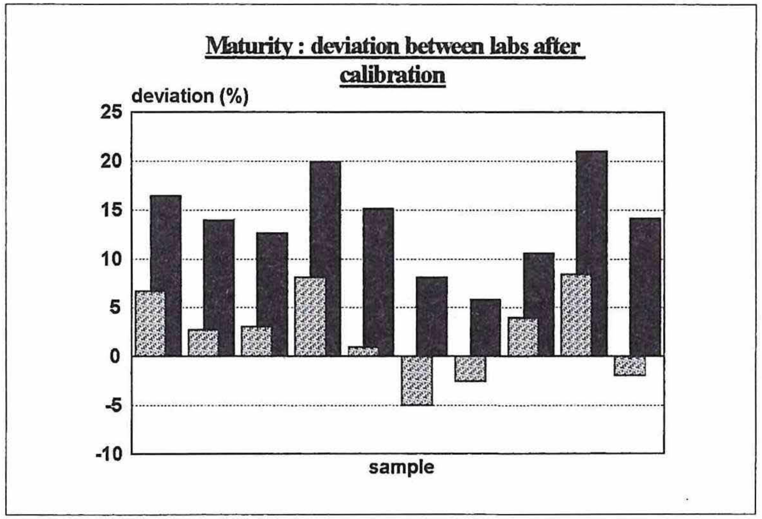

Fineness
Barbados results
225
200
175
150
125
100
125
150
175
200
225
Montpellier's results

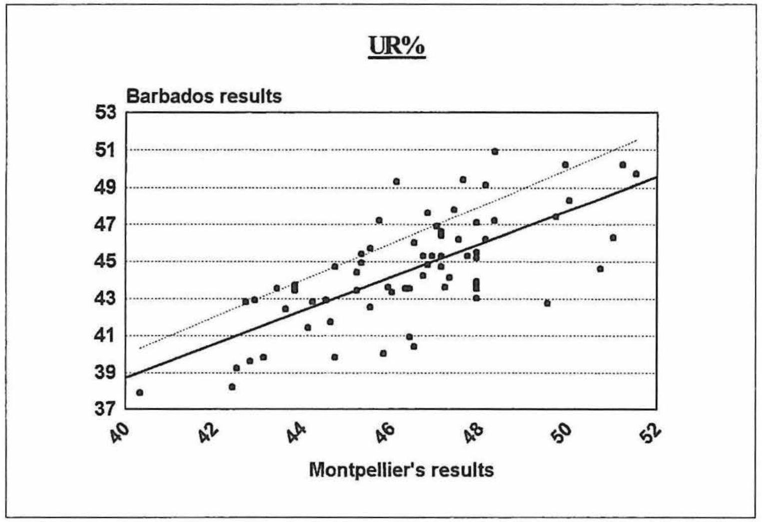

Fineness : deviation between labs after calibration
deviation (mtex)
5
0
-5
-10
-15
-20
-25
-30
-35
-40
sample

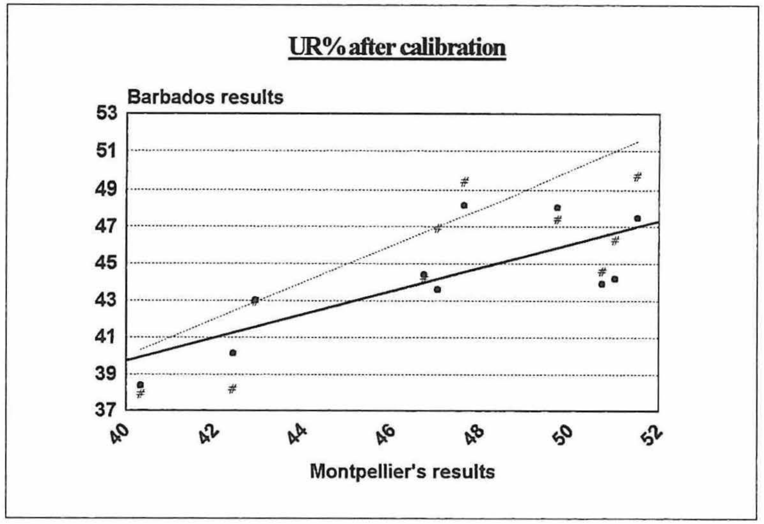

Maturity %
Barbados results
95
90
85
80
75
70
65
60
55
50
45
35
40
45
50
55
60
65
70
75
80
85
Montpellier's results

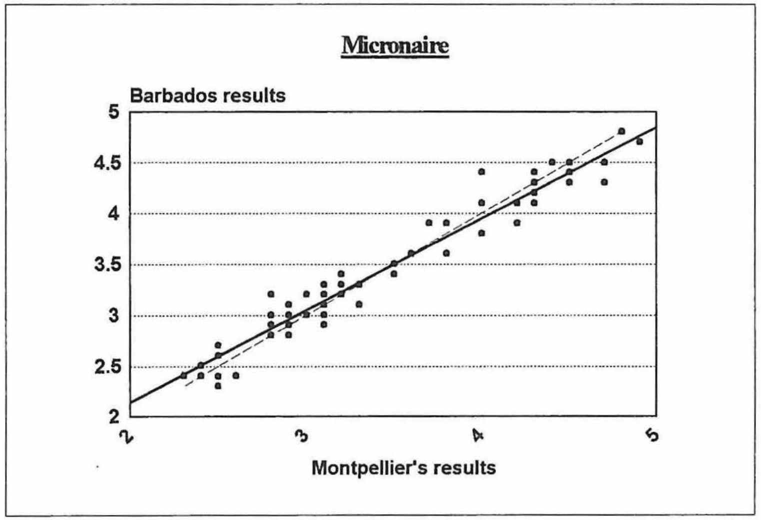

Maturity : deviation between labs
deviation (%)
25
20
15
10
5
0
sample

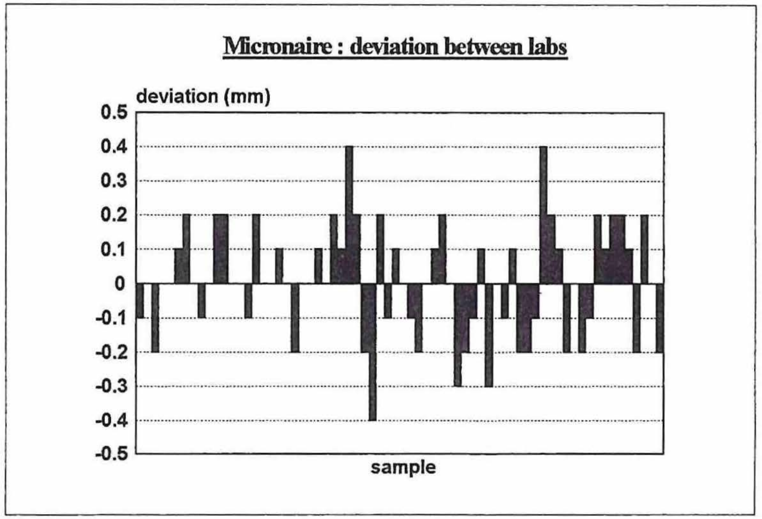

Maturity % after calibration
Barbados results
90
85
80
75
70
65
60
55
50
45
40
35
40
45
50
55
60
65
70
75
80
85
Montpellier's results

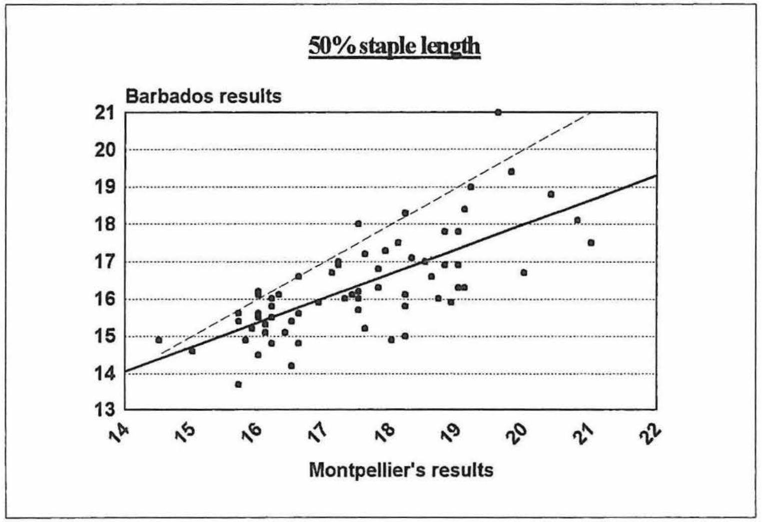

Maturity : deviation between labs after calibration
deviation (%)
25
20
15
10
5
0
-5
-10
sample

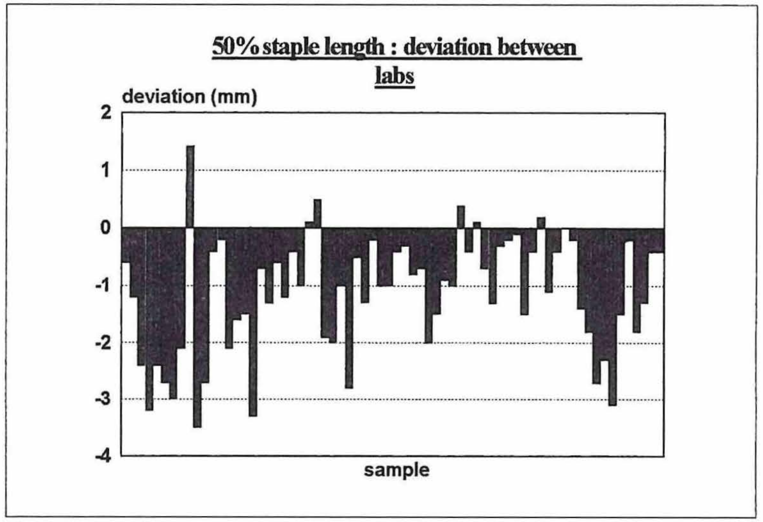

UR%
Barbados results
53
51
49
47
45
43
41
39
37
40
42
44
46
48
50
52
Montpellier's results

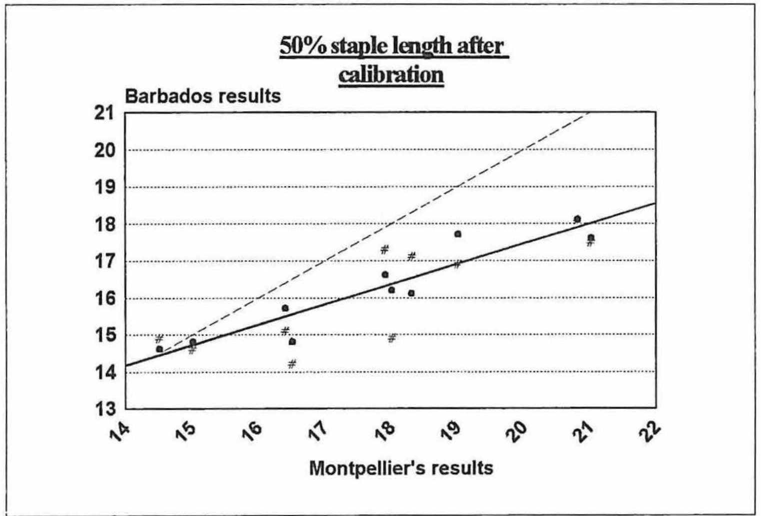

UR% after calibration
Barbados results
53
51
49
47
45
43
41
39
37
40
42
44
46
48
50
52
Montpellier's results

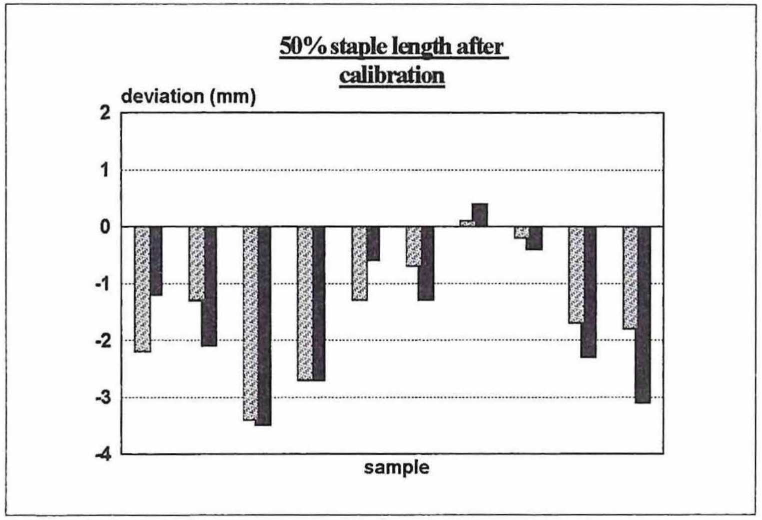

Micronaire
Barbados results
5
4.5
4
3.5
3
2.5
2
2
3
4
5
Montpellier's results

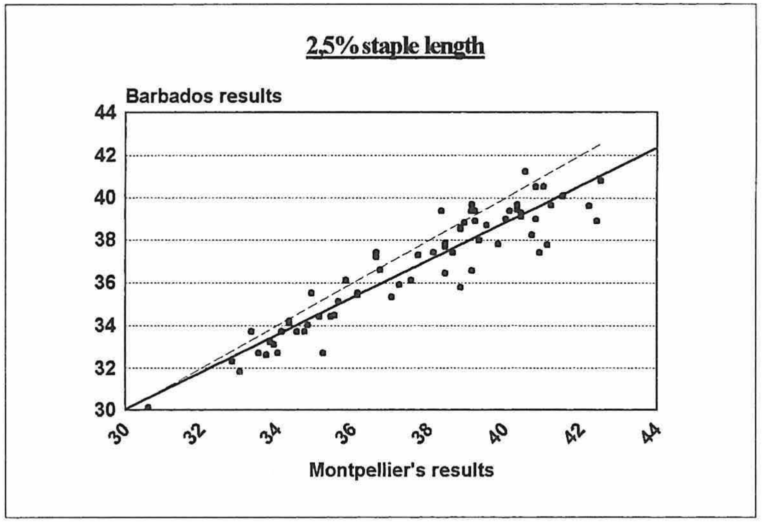

Micronaire : deviation between labs
deviation (mm)
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
sample

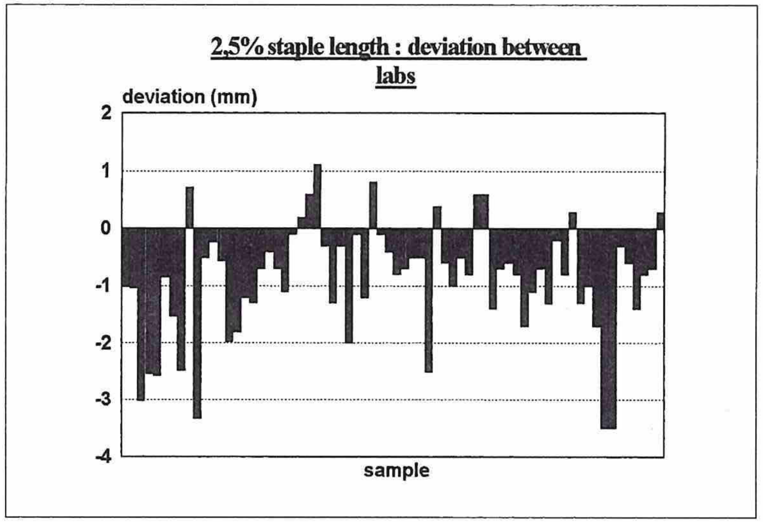

50% staple length
Barbados results
21
20
19
18
17
16
15
14
13
14
15
16
17
18
19
20
21
22
Montpellier's results

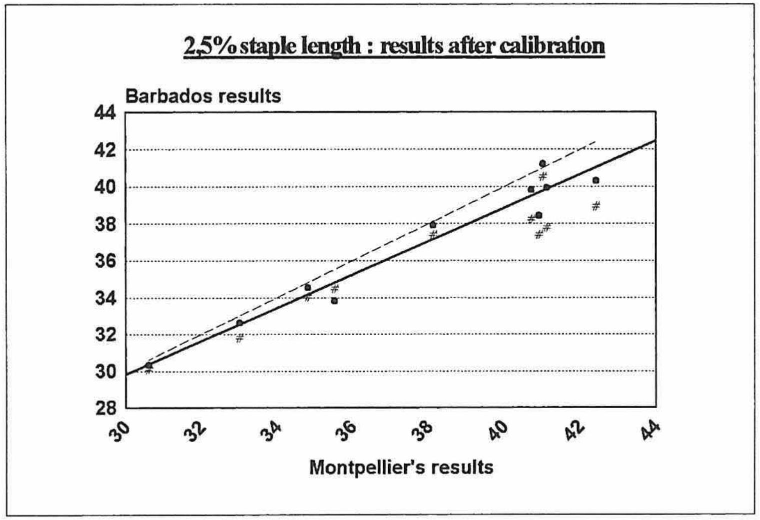

50% staple length : deviation between labs
deviation (mm)
2
1
0
-1
-2
-3
-4
sample

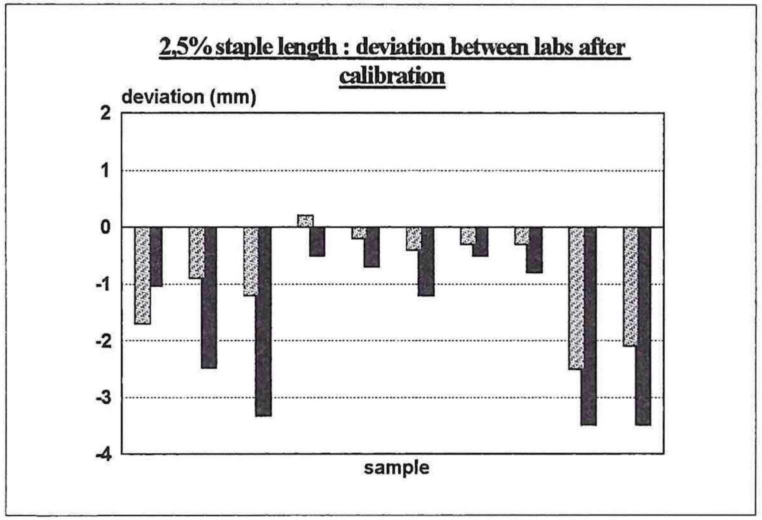

50% staple length after calibration
Barbados results
21
20
19
18
17
16
15
14
13
14
15
16
17
18
19
20
21
22
Montpellier's results


50% staple length after calibration
deviation (mm)
2
1
0
-1
-2
-3
-4
sample


2,5% staple length
Barbados results
44
42
40
38
36
34
32
30
30
32
34
36
38
40
42
44
Montpellier's results


2,5% staple length : deviation between labs
deviation (mm)
2
1
0
-1
-2
-3
-4
sample


2,5% staple length : results after calibration
Barbados results
44
42
40
38
36
34
32
30
28
30
32
34
36
38
40
42
44
Montpellier's results


2,5% staple length : deviation between labs after calibration
deviation (mm)
2
1
0
-1
-2
-3
-4
sample

ANNEX 4

COPY
OF A LETTER
BY J.P. GOURLOT

(TECOT CIRAD)

Cc : J. Lançon

No. 1078/JPG/HG November 2, 1995

To : Miss Shirley KELLMANN
Ministry of Agriculture and Rural Development
P.O. BOX 505 - Graeme Hall
Christ Church
BARBADOS, West Indies

CIRAD

Centre de coopération internationale en recherche agronomique pour le développement

Département des cultures annuelles CIRAD-CA

Laboratoire de technologie cotonnière

Dear Miss Shirley Kellman,

Hello from everybody here.

We have just finished the classic determinations on the samples you already tested in Barbados.

* Mrs Véronique Fallet did these analysis on. Fibrographe 530 and Stelometer. Calibration and multiplicative corrections were made with ICCS cottons : I 26, C37, and E4.

Number of readings : 4 combs for Fibrograph and 4 breaks for Stelometer.

* Previous results on the same samples were made by Mrs Michèle Vialle with our HVI ZUS 910 B and our FMT 3.

Calibration of HVI was made with HVICC, and multiplicative corrections on FMT3 were made with B26, C37, I26 ICCS cottons.

Number of readings on HVI was 10, and 2 measures per sample for FMT 3.

* Looking at the results, we are very satisfied by our cooperation. Your results sound very good :

Correlation matrix : Barbades / Cirad :

Fibrographe 630 / Fibrographe 530 :

SL 50 % :	0.71
SL 2.5 % :	0.94
UR % :	0.71

When we have a look to the results and figures, we may suggest some disagreements between you and us : you read a value and we read shorter or longer. Perhaps is it due to the sampling which has been done. Can you explain us how it has been done ? Is it :

2477, avenue du Val de Montferrand
BP 5035
34032 Montpellier Cedex 1
France
téléphone : 67 61 58 00
télécopie : 67 61 56 67
télex : 480 762 F

EPIC-SIRET 331 596 270 00040
APE 731 Z

- a great mass of cotton has been mixed, and small pinches have been taken in it to compose 2 samples, 1 for us and 1 for you,

- a great mass without mixing, and pinches have been taken in it to compose 2 samples, 1 for us and 1 for you,

- or, a great mass without mixing, and two 50 grams samples have been taken in one pool, 1 for us and 1 for you,

- else ?

- who has done this sampling ?

What kind of ICCS standards did you use ?
What kind of correction did you use : additive, multiplicative, regression ?
Is there an internal or external check of this apparatus ?

If you have any suggestion, please let us know.

You may know that, in a certain manner, the normal correlation for SL 50 % is around 0.80. So we just want to understand and check this little problem.

Stelometer :

We do not have your results. In one of your fax, you said us that these results will come in a few moments. We wait for them to compare our two labs.

FMT 3 :

IM : 0.97
MR : 0.88
PM : 0.88
H : 0.97
Hs : 0.62

This last value is not anormal, because HS is the ratio of 2 variables which have an "inside-variability". 0.62 is the value we obtained when we compared FMT 3 to FMT 1 data.

Other values are very good.

Some questions :

Your results look like ours before calculating correction factor when we compared FMT 3 to FMT 1. You read much more mature than we do, and finer than we do in Montpellier. So is it possible to have these informations :

- how did you calibrate the instrument ?

- did you analyse some standards as sample to calculate a correction factor to correct the results ? What are the ICCS used ?

The problem is to know who is right in this comparison, because there is no reference method. But, we have decided to take our FMT1 as a reference method, whose results are not far away from the results we obtain with AFIS calibrated by image analysis. So we will do the same in comparing our laboratories.

Conclusion :

Sampling has a really great importance when we project to compare results of 2 laboratories with independant samples coming from a same source. We must know how it has been made before suggesting some possible cause explaining why results are sometimes different.

You are doing a really good job in your lab, since results giving good correlations between the 2 labs. There is a little trouble with FMT3 concerning levels of measurements, but your answers to my questions will explain these differences.

We now wait for your stelometer results to compare them with ours.

As I said to you during your stay in Montpellier, it is really important to indicate, with the results, how you did obtain them. Thus, if you have to compare results in a few years, it will be possible to compare things which can be compared and not the others. If you have a micro-computer, I will propose you a new data bank we are installing in Montpellier, to store all the informations concerning all the analysis. Perhaps I will come in Barbados in 1996. If you want I will show you how it runs, and will install it for you (Gratis).

Few weeks ago, I proposed a date for the training for another person of Barbados. Do you know if it has been agreed or not ?

Thank you for this interesting study.

We are always here to help you in dealing all the problems of your laboratory if you need it.

Best regards.

Jean-Paul GOURLOT