REPORT ON THE MISSION TO FELCRA/MALAYSIA
from 1st to 22nd March 1991

J.M. ESCHBACH IRCA/Agronomy
LIST OF PERSONS ENCOUNTERED

WORLD BANK

Phillipe BOYER : Sr. Tree Crop Specialist

F.E.L.C.R.A.

Kuala Lumpur
Director General: DATO MUSTAPHA JUMAN
Deputy Director General: ABD. WAHID AZAHARI
Planning: MOKTAR BIN AHMAD (Director)
TAN SAI ENG
Monitoring evaluation: ARIFF (Director)
TONG AH LOOI
Technical Services: NG BIAN HOO (Director)
Agricultural Advisory Service : KOK KAM SANG (Director)
ZAKARIA
RAZAK

Pahang
Ulu Jenut: MOH ZIN
SADNI

Perlis Kedah
KAMARUDIN - SHAHAROM - JUZILMAN
Ulu Pauh: SWAILI

Terengganu
AHMAD
Sungai Dura: ESA ISMAIL

Johor
TUAN HADJI DAHLAN
ZUMANI
MOHD HATTA
Bukit Pedoman: PARID BIN HJ. NASIR
BPI : AZLAN
BPII : MANO KUMAR
BPIII: AHMED SADIRO

R.R.I.M.

Dr. WAN RAHMAN, Deputy Director Biology Division
Dr. ISMAIL HASHIM, Exploitation Tapping
Dr. YEANG, Biotechno and Cell Biology.
SCOPE OF THE MISSION

The mission to FELCRA (Federal Land Consolidation and Rehabilitation Authority) was carried out from 1st to 22nd March 1991, at the request of the World Bank.

With a view to assessing hevea tapping techniques designed to reduce manpower requirements, the mission concentrated on defining methods of setting up and monitoring demonstration plots for tapping at reduced frequency compensated for by stimulation.

CURRENT TAPPING SITUATION AT FELCRA

Around 30,000 hectares are currently being tapped, out of a total of 80,000 hectares of hevea. On the various plantations we visited, we saw:

- average production levels (1,400 kg/ha),
- poor quality tapping (many wounds and excessive bark consumption, 30 to 35 cm/yr),
- retapping on inadequately regenerated bark (after 7 to 8 years),
- a lack of tappers (10 to 20% of tasks not tapped and trees opened 1 to 2 years late),
- a significant proportion of dry trees on certain plantations, especially in the North where the dry season is more marked.
- more or less overlapped clone distribution within the tapping tasks.

Tapping is mostly carried out in 1/2S d/2 6d/7, throughout the year when conditions permit. On one plantation, we saw d/1 tapping. A tapping task comprises 500 to 600 trees, but we saw up to 780 trees per task in some plantation assistants' record books (these were contract tappers, not settlers). The poor quality tapping can be explained by the total nonexistence of incentive bonuses. The rainguards (RRIM type) installed on some plantations are only effective in the first year; thereafter, they tear as the tree grows. The opening height varies from 1.40 m to 1.70 m and there seems to be no technical manual defining the norms to be followed for tapping or for any other hevea growing operations.

A tapper's salary amounts to:

$7/day ($8 in category 2 and $9 in category 1)  
+ $60/month - $15/day's absence  
+ $0.4/kg of additional rubber over 15 kg/day  
+ $0.15/kg of wet scrap.

The kg/tapper/day varies from 15 to 18 and tapping costs from 65 to 85% of production costs ($1/kg).
REDUCED TAPPING FREQUENCY

Switching to a reduced tapping frequency with stimulation therefore seems to be perfectly justified in the circumstances and should make it possible to:

- reduce tapper requirements
- reduce production costs
- slightly increase hevea yields by modifying the stimulation frequencies
- extend the economic lifespan of the trees by reducing bark consumption
- increase rubber production by introducing tapping in all areas at the appropriate time and tapping all the tasks regularly, made possible through the reduction in manpower requirements.

As soon as the powerful production stimulant, ETHREL, came on the scene in 1970, the trials conducted in West Africa led to this technique being extended throughout the hevea growing areas of Cameroon and the Ivory Coast by 1975. Since then, stimulated tapping in 1/2S d/3 6d/7 has easily proved its long-term effectiveness, even when applied as soon as trees are opened. Improvements to this technique are now leading to the introduction of 1/2S d/4 or d/5 tapping.

No long-term negative after-effects have been observed on production. Indeed, unlike what is practised elsewhere, the low dose stimulation used merely increases production slightly, rather than doubling yields, obtained by stimulated 1/2S d/2 tapping.

The reduction in the number of tappings per year leads to an increase in the area tapped by each tapper, hence manpower productivity rises, as shown in the following table.

<table>
<thead>
<tr>
<th>Tapping frequency</th>
<th>d/2</th>
<th>d/3</th>
<th>d/4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of tappings/yr (270 days/yr)</td>
<td>135</td>
<td>90</td>
<td>67</td>
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<tr>
<td>Bark consumption (cm/yr)</td>
<td>23</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td>Area tapped per tapper  (300 trees/ha, 600 trees/task)</td>
<td>4 ha</td>
<td>6 ha</td>
<td>8 ha</td>
</tr>
<tr>
<td>Number of tapper days/ha</td>
<td>68</td>
<td>45</td>
<td>34</td>
</tr>
<tr>
<td>kg/tapper/day (1,600 kg/ha)</td>
<td>24</td>
<td>36</td>
<td>48</td>
</tr>
</tbody>
</table>

A reduction is also seen in bark consumption, along with an increase in the productive lifespan of the heveas.
However, the complete effectiveness of this system is subject to several parameters:

- clone type (problem of clone mixtures)
- tree age
- tapping quality, and as a general rule, good supervision
- environmental conditions (soil fertility and rainfall distribution).

The choice of site for the demonstration plots and the choice of treatments to be compared were made after taking into account the various parameters, so as to cover all the possible situations likely to be encountered at FELCRA.

DEMONSTRATION PLOTS

We visited 14 plantations, certain of which had already been selected by FELCRA. 8 of the 14 plantations were chosen. A 9th site is to be chosen by FELCRA in the North (Annex).

The sites chosen are representative of a large proportion of the FELCRA plantations (geographical location, tree and clone age).

The treatments opted for were those applied at industrial level on plantations in West Africa. In the case of plots with regenerated bark, upward tapping was introduced to overcome the problems of poor bark regeneration and dry panels.

On opening, tapping in 1/2S d/2 will be compared to tapping in 1/2S d/3 stimulated 4 to 6 times per year and tapping in 1/2S d/4 stimulated 6 times per year.

On virgin bark, tapping in 1/2S d/2 will be compared to tapping in 1/2S d/3 stimulated 6 times per year and tapping in 1/2S d/4 stimulated 8 times per year.

On regenerated bark, tapping in 1/2S d/2 will be compared to tapping in 1/2S d/3 stimulated 10 times per year, in 1/2S d/4 stimulated 10 times per year and upward 1/4S tapping in d/3 or d/4 stimulated 10 to 12 times per year.

The detailed protocol describing the plots and how they are to be run is given in the annex. These demonstration plots were designed on the basis of a tapping task at a given frequency, with 3 or 4 replications, so as to ensure normal production monitoring (per tapping task) and a solid statistical design.

In addition to these demonstration plots, the BUKIT PEDOMAN III plantation (268 ha) will be opened in June 1991 in 1/2S d/3 6d/7 with 4 stimulations per year at 2.5% active ingredient; stimulation will be applied at a rate of 0.7 g of stimulant to the regenerated tapping panel just above the tapping cut. Given the crucial problem of manpower shortages, this plantation will be a pilot plantation.
LIAISON WITH RRIM

A meeting with RRIM was held on 21/03/90. It was attended by:
RRIM - WAN RAHMAN / ISMAIL HASHIM / YEANG; FELCRA - KOK KAM
SANG / ZAKARIA; IRCA-CIRAD - ESCHBACH

The purpose of the visit was to inform RRIM of the arrangements
made for choosing the number of demonstration plots, their
locations and the tapping frequencies adopted. RRIM declared
that it was perfectly satisfied to see FELCRA adopting
technology that had been recommended for the past few years, so
as to cope with manpower reductions. The choice of treatments
was not questioned. As to the question of whether two years
was long enough for the large-scale development of this
technique, it was pointed out that the results obtained in
Africa over the past 15 years were perfectly satisfactory.
RRIM renewed its support to FELCRA and is ready to provide
assistance in this operation. The production results will be
passed on to RRIM, at its request. The plots will be monitored
jointly by FELCRA and IRCA.

CONCLUSIONS

The operating conditions seen at FELCRA, the choice of
demonstration plots and the tapping frequencies adopted will
ensure a good probability of success of using this new
technology within a period of two years.

The protocols in the annex were explained and left with those
in charge of setting up and monitoring these blocks at FELCRA.
In view of the substantial heterogeneity seen in the field, the
different tapping frequencies can only be attributed to the
different tasks if certain data are made available beforehand.
It was decided that FELCRA would send me the following as soon
as possible:

- for trees at the time of opening: the total number of trees
  and number per hectare for each of the 12 tapping tasks.
- for trees already opened: production per tapping task over
  at least two or three months.
- meteorological data, so that the annual stimulations can be
  spaced properly.

There should be no prior statistical difference between the
treatments at the time the plots are set up.

FELCRA was also asked to check and complete the protocol for
each demonstration plot for:

- soil: series, category, description
- mean rainfall 1985-1990
- clones and their distribution
- background of the blocks
- panel diagrams
As soon as we receive details of how the different tapping tasks have been distributed in the field, along with the preliminary data, the statistical design for the different plots will be sent to FELCRA immediately. FELCRA should indicate each tapping task in the field by a coloured circle on each border tree corresponding to the treatment. The different treatments should start at the beginning of May.

Each day, production should be recorded on the daily production record sheet figuring in the protocol. The dry rubber weight obtained for each tapping task should then be noted down on the monthly production sheet. For better trial monitoring, a copy of the monthly production sheets for each demonstration plot should be sent to Paris for recording, cumulation and statistical calculation. A software package will be developed and demonstrated during the next mission.

The draft schedule for the operation is therefore as follows:

April 1991 : Dispatching of documents and completion of the protocols.
May 1991 : Setting up of the demonstration plots in the field, and check mission.
December 1991 : Second technical assistance mission, assessment of the initial results.
LIST OF SCHEMES VISITED

5 March Negeri Sembilan - Ulu Rokan
    - Temeris 2
6 March Pahang - Ulu Jenut
12 March Perlis - Teluk Yu
    - Insitu Kok
    - Bukit Sawak
    - Ulu Pauh 1 and 2
13 March Kedah - Bukit Tampoi 1 and 2
16 March Terengganu - Songai Dura
18 March Johor - Bukit Pedoman 1, 2 and 3.

LIST OF SCHEMES RETAINED

Negeri Sembilan - Ulu Rokan

Pahang - Ulu Jenut

Perlis - Ulu Pauh 1 and 2

Kedah - Bukit Tampoi 1 and 2

Johor - Bukit Pedoman 1 and 3.
    - Bukit Keremoliyang.
<table>
<thead>
<tr>
<th>Virgin bark</th>
<th>Regenerated bark</th>
<th>Clone</th>
<th>Opening Virgin bark</th>
</tr>
</thead>
<tbody>
<tr>
<td>RRIM 600</td>
<td>Mixed</td>
<td>1</td>
<td>BEAU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>ULU JENOT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>ROHAN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>BUKIT PEDOMAN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>BUKIT PEDOMAN</td>
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<tr>
<td></td>
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<td>6</td>
<td>BUKIT PEDOMAN</td>
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<td>7</td>
<td>BUKIT PEDOMAN</td>
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<td>8</td>
<td>BUKIT PEDOMAN</td>
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<tr>
<td></td>
<td></td>
<td>9</td>
<td>BUKIT PEDOMAN</td>
</tr>
</tbody>
</table>

**ULU SCHEME**

- **ULU BUKIT**
- **ULU BUKIT**
- **ULU BUKIT**

**ROKAN**

**JENUT PEDOMAN**

**III I**

<table>
<thead>
<tr>
<th>1/2S d/2 Non stimul.</th>
<th>1/2S d/3, 2.5%</th>
<th>4/y</th>
<th>2.5%</th>
<th>4/y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2S d/4, 2.5%</td>
<td>6/y</td>
<td>10/y</td>
<td>6/y</td>
<td>10/y</td>
</tr>
<tr>
<td>1/2S d/4, 5%</td>
<td>8/y</td>
<td>10/y</td>
<td>8/y</td>
<td>10/y</td>
</tr>
<tr>
<td>1/4 UP d/3, 5%</td>
<td>10/y</td>
<td>12/y</td>
<td>10/y</td>
<td>12/y</td>
</tr>
<tr>
<td>1/4 UP d/4, 5%</td>
<td>12/y</td>
<td>12/y</td>
<td>12/y</td>
<td>12/y</td>
</tr>
</tbody>
</table>

**1/4 UP**: quarter spiral, upward tapping

**1/2S**: half spiral

**d/2**: frequency of tapping

**d/3**, **d/3**, **d/4**: frequency of tapping

**2.5%**, **5%**: concentration of active ingredient of stimulant

ANNEXES

- Protocol of demonstration blocks n° 1 to 9
- Technical form on control of tapping quality
1. Objective

This demonstration plot aims to reduce the need of workers by reducing the frequency of tapping and using stimulation to maintain the level of yield per hectare obtained with classical S/2 d/2.

2. Localisations

State: KEDAH
Scheme: BENDANG DAN

3. Environmental conditions

* Soil Serie: Class:
  Description:

* Climate Rainfall (1986-1990) day (1857 - 90)

<table>
<thead>
<tr>
<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total mm</td>
<td>12</td>
<td>36</td>
<td>68</td>
<td>177</td>
<td>229</td>
<td>168</td>
<td>172</td>
<td>235</td>
<td>215</td>
<td>360</td>
<td>266</td>
<td>69</td>
</tr>
<tr>
<td>Number of days</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>13</td>
<td>14</td>
<td>9</td>
</tr>
</tbody>
</table>

4. History of demonstration plots

* Clones:

* Planting Year:
  Method:
  Budding:
  Stand/ha at planting:
  Planting distance:

* Opening Year: May 1991
  Height: 1,40 m
  Tapping: 1/2 S d/2
5. Treatments

4 treatments (1234) replicated 3 times (ABC) : 12 tasks of about 500 trees (1 treatment per task)

<table>
<thead>
<tr>
<th>Number</th>
<th>Colour</th>
<th>Tapping</th>
<th>Stimulation</th>
<th>Pannel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Green</td>
<td>1/2S d/2</td>
<td>No</td>
<td>BO-1</td>
</tr>
<tr>
<td>2</td>
<td>Black</td>
<td>1/2S d/3</td>
<td>ET 2.5%Pa 0.7(1) 4/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Yellow</td>
<td>1/2S d/3</td>
<td>ET 2.5%Pa 0.7(1) 6/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Red</td>
<td>1/2S d/4</td>
<td>ET 2.5%Pa 0.7(1) 6/y</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

Length of spiral : 1/2S on panel A at 1.40 m from the soil.

Frequency of tapping : d/2 6 d/7, d/3 6 d/7, d/4 6 d/7

Bark consumption : with 300 tapping days per year.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>mm/tapping</th>
<th>Number tapping</th>
<th>cm/month</th>
<th>cm/year</th>
<th>cm/6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>d/2</td>
<td>1.5</td>
<td>150</td>
<td>1.9</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>d/3</td>
<td>1.6</td>
<td>100</td>
<td>1.3</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>d/4</td>
<td>1.7</td>
<td>75</td>
<td>1.1</td>
<td>13</td>
<td>7</td>
</tr>
</tbody>
</table>

Half-yearly bark consumption guide had to be traced.

Depth of tapping : 1 to 1.5 mm to cambium.

Stimulation : ETHREL (Rhône-Poulenc) ready mix 5% a.i. (CEP) diluted to 2.5% with water or ready mix 2.5% (CEP).

Pannel application of 0.7 g of stimulant per tree on 1 cm of renewing bark just above the tapping cut. No lace removal.

Date of application excluding the wintering period. First stimulation after refoliation, then every two or four months. Not during the heavy raining season. Application two or three days before the tapping day.
6. Preliminary data

For the twelve tasks:

* Number of tappable trees and total trees.
* Girth of tappable tree (with three dots).

7. Controls

Yield Task yield is recorded at every tapping. Latex is weighed and the DRC of latex from each task is determined by metrolac method to obtain the weight of latex dry rubber. Cup lump of each task is weighed and a coefficient of 0.5 is applied to obtain the weight of cup lump dry rubber.

Girth One measurement at 1.70 m above the ground at the beginning of trial and at yearly intervals. All tappable trees are measured.

Stand per ha by task every six months: May and November
- total trees
- trees in tapping
- dry trees.

Annexes:
- Calendar of tapping days.
- Map of treatment repartition.
- Diagram of pannel.
**Calendar of tapping**

For demonstration plots number 1 to 4
12 tapping tasks from A1 to C4.

Replications must be tapped on different days: influence of climate and rainy days will be included in replications and not in treatments.

<table>
<thead>
<tr>
<th>Tapper</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>A1</td>
<td>C1</td>
<td>A2</td>
<td>A3</td>
<td>A4</td>
</tr>
<tr>
<td>Tuesday</td>
<td>B1</td>
<td>B2</td>
<td>B3</td>
<td>B4</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>A1</td>
<td>C2</td>
<td>C3</td>
<td>C4</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>B1</td>
<td>A2</td>
<td>A3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>A1</td>
<td>C3</td>
<td>B3</td>
<td></td>
<td>A4</td>
</tr>
<tr>
<td>Saturday</td>
<td>B1</td>
<td>C2</td>
<td>C3</td>
<td>B4</td>
<td></td>
</tr>
</tbody>
</table>

*On Monday, tapper "a" taps replication A of traitement 1
Tapper "b" taps replication C of traitement 1
On Tuesday tapper "a" taps replication B of traitement 1
With Friday tapping rest or in case of rainy day, treatments are shifted.*
### Daily yield recording

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Date</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name Tapper Number</th>
<th>PLOT</th>
<th>Latex</th>
<th>Cuplump</th>
<th>TOTAL dry rubber</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Fresh</td>
<td>DRC</td>
<td>Dry Fresh</td>
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<tr>
<td><strong>TOTAL</strong></td>
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</tbody>
</table>
## Monthly yield recording

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<thead>
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<th>Tr Re</th>
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<th>3</th>
<th>4</th>
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<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>A</td>
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<tr>
<td>1</td>
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</tr>
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<td>M</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
1. Objective

This demonstration plot aims to reduce the need of workers by reducing the frequency of tapping and using stimulation to maintain the level of yield per hectare obtained with classical S/2 d/2.

2. Localisations

State: NEGRI SEMBILAN  
Scheme: ULU ROKAN

3. Environmental conditions

* Soil Series: Rasak  
  Class:  
  Description: Clay, deep, well drained  
  Terrain: Undulating

* Climate: Rainfall (1985-1990)  
  Days (1986-1989)

<table>
<thead>
<tr>
<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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<td>Total mm</td>
<td>119</td>
<td>69</td>
<td>80</td>
<td>18</td>
<td>157</td>
<td>82</td>
<td>65</td>
<td>63</td>
<td>160</td>
<td>75</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>Number of days</td>
<td>12</td>
<td>6</td>
<td>17</td>
<td>17</td>
<td>18</td>
<td>10</td>
<td>7</td>
<td>13</td>
<td>14</td>
<td>12</td>
<td>15</td>
<td>12</td>
</tr>
</tbody>
</table>

4. History of demonstration plots

* Clones: RRIM 600 (70%) and GT 1 (30%)

* Planting Year: 1982  
  Method: Budded stump (polybag)  
  Budding: 1982  
  Stand/ha at planting: 456  
  Planting distance:

* Opening Year: May 1991  
  Height: 1.40 m
5. Treatments

4 treatments (1234) replicated 3 times (ABC) : 12 tasks of about 500 trees (1 treatment per task)

<table>
<thead>
<tr>
<th>Number</th>
<th>Colour</th>
<th>Tapping</th>
<th>Stimulation</th>
<th>Pannel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Green</td>
<td>1/2S d/2</td>
<td>No</td>
<td>BO-1</td>
</tr>
<tr>
<td>2</td>
<td>Black</td>
<td>1/2S d/3</td>
<td>ET 2.5%Pa 0.7(1) 4/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Yellow</td>
<td>1/2S d/3</td>
<td>ET 2.5%Pa 0.7(1) 6/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Red</td>
<td>1/2S d/4</td>
<td>ET 2.5%Pa 0.7(1) 6/y</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

Length of spiral : 1/2S on panel A at 1.40 m from the soil.

Frequency of tapping : d/2 6 d/7, d/3 6 d/7, d/4 6 d/7

Bark consumption : with 300 tapping days per year.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>mm/tapping</th>
<th>Number tapping</th>
<th>cm/month</th>
<th>cm/year</th>
<th>cm/6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>d/2</td>
<td>1.5</td>
<td>150</td>
<td>1.9</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>d/3</td>
<td>1.5</td>
<td>100</td>
<td>1.3</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>d/4</td>
<td>1.7</td>
<td>75</td>
<td>1.1</td>
<td>13</td>
<td>7</td>
</tr>
</tbody>
</table>

Half-yearly bark consumption guide had to be traced.

Depth of tapping : 1 to 1.5 mm to cambium.

Stimulation : ETHREL (Rhône-Poulenc) ready mix 5% a.i. (CEP) diluted to 2.5% with water or ready mix 2.5% (CEP).

Pannel application of 0.7 g of stimulant per tree on 1 cm of renewing bark just above the tapping cut. No lace removal.

Date of application excluding the wintering period. First stimulation after refoliation, then every two or four months. Not during the heavy raining season. Application two or three days before the tapping day.
6. Preliminary data

For the twelve tasks:

* Number of tappable trees and total trees.
* Girth of tappable tree (with three dots).

7. Controls

**Yield**  Task yield is recorded at every tapping. Latex is weighed and the DRC of latex from each task is determined by metrolac method to obtain the weight of latex dry rubber. Cup lump of each task is weighed and a coefficient of 0.5 is applied to obtain the weight of cup lump dry rubber.

**Girth**  One measurement at 1.70 m above the ground at the beginning of trial and at yearly intervals. All tappable trees are measured.

**Stand per ha** by task every six months: May and November
- total trees
- trees in tapping
- dry trees.

**Annexes:**
- Calendar of tapping days.
- Map of treatment repartition.
- Diagram of pannel.
Soil Unit.
Rasak series.

Soil Characteristics.
Clay; deep; on undulating to hilly terrain; well drained.
1. Objective

This demonstration plot aims to reduce the need of workers by reducing the frequency of tapping and using stimulation to maintain the level of yield per hectare obtained with classical S/2 d/2.

2. Localisations

State: PAHANG

Scheme: ULU JENUT

3. Environmental conditions

* Soil Serie: Batu Lapan
  Class: Description: Clay-loam top-soil, clay sub-soil, laterites met 50 - 100 cm depth
  Terrain: Rolling

* Climate Rainfall (1985-1990)

<table>
<thead>
<tr>
<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total mm</td>
<td>150</td>
<td>76</td>
<td>154</td>
<td>156</td>
<td>171</td>
<td>153</td>
<td>114</td>
<td>140</td>
<td>192</td>
<td>98</td>
<td>96</td>
<td>81</td>
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<tr>
<td>Number of days</td>
<td>12</td>
<td>7</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>9</td>
<td>11</td>
<td>13</td>
<td>13</td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

4. History of demonstration plots

* Clones: RRIM 600 (50%), GT 1 (15%) and others (5%)

* Planting Year: 1984
  Method: Budded stump (polybag)
  Budding: 1984
  Stand/ha at planting: 450
  Planting distance: 9.14 x 2.13 m

* Opening Year: May 1991
  Height: 1.40 m
5. Treatments

4 treatments (1234) replicated 3 times (ABC) : 12 tasks of about 500 trees (1 treatment per task)

<table>
<thead>
<tr>
<th>Number</th>
<th>Colour</th>
<th>Tapping</th>
<th>Stimulation</th>
<th>Pannel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Green</td>
<td>1/2S d/2</td>
<td>No</td>
<td>BO-1</td>
</tr>
<tr>
<td>2</td>
<td>Black</td>
<td>1/2S d/3</td>
<td>ET 2.5%Pa 0.7(1) 4/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Yellow</td>
<td>1/2S d/3</td>
<td>ET 2.5%Pa 0.7(1) 6/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Red</td>
<td>1/2S d/4</td>
<td>ET 2.5%Pa 0.7(1) 6/y</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

Length of spiral : 1/2S on panel A at 1,40 m from the soil.

Frequency of tapping : d/2 d/7, d/3 d/7, d/4 d/7

Bark consumption : with 300 tapping days per year.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>mm/tapping</th>
<th>Number tapping</th>
<th>cm/month</th>
<th>cm/year</th>
<th>cm/6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>d/2</td>
<td>1.5</td>
<td>150</td>
<td>1.9</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>d/3</td>
<td>1.6</td>
<td>100</td>
<td>1.3</td>
<td>16</td>
<td>8</td>
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<td>d/4</td>
<td>1.7</td>
<td>75</td>
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</tr>
</tbody>
</table>

Half-yearly bark consumption guide had to be traced.

Depth of tapping : 1 to 1,5 mm to cambium.

Stimulation : ETHREL (Rhône-Poulenc) ready mix 5% a.i. (CEP) diluted to 2.5% with water or ready mix 2.5% (CEP).

Pannel application of 0,7 g of stimulant per tree on 1 cm of renewing bark just above the tapping cut. No lace removal.

Date of application excluding the wintering period. First stimulation after refoliation, then every two or four months. Not during the heavy raining season. Application two or three days before the tapping day.
6. Preliminary data

For the twelve tasks:

* Number of tappable trees and total trees.
* Girth of tappable tree (with three dots).

7. Controls

Yield Task yield is recorded at every tapping. Latex is weighed and the DRC of latex from each task is determined by metrolac method to obtain the weight of latex dry rubber. Cup lump of each task is weighed and a coefficient of 0.5 is applied to obtain the weight of cup lump dry rubber.

Girth One measurement at 1.70 m above the ground at the beginning of trial and at yearly intervals. All tappable trees are measured.

Stand per ha by task every six months: May and November
- total trees
- trees in tapping
- dry trees.

Annexes:
- Calendar of tapping days.
- Map of treatment repartition.
- Diagram of panel.
SOIL MAPPING UNIT
A : Chat Series
B : Batu Lapan Series
C : Chert and Mudstone
D : Padang Besar Series

SOIL CHARACTERISTICS
clay loam top-soil; clay sub-soil; deep; Rolling terrain; well drained; slightly eroded.
clay loam top-soil; clay sub-soil; moderately deep; laterites met between 50 to 100 cm depth; Rolling terrain; slightly eroded.
clay loam top-soil; clay sub-soil; shallow; laterites met within 50 cm depth; Rolling terrain; slightly eroded.
1. Objective

This demonstration plot aims to reduce the need of workers by reducing the frequency of tapping and using stimulation to maintain the level of yield per hectare obtained with classical S/2 d/2.

2. Localisations

State: JOHOR  
Scheme: BUKIT PEDOMAN III

3. Environmental conditions

* Soil Serie: Kuala Brang  
  Description: 
  Terrain: Hilly

* Climate Rainfall (1985-1990):

<table>
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<tr>
<th>Month</th>
<th>1</th>
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<th>4</th>
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<th>7</th>
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<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
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</thead>
<tbody>
<tr>
<td>Total mm</td>
<td>332</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

4. History of demonstration plots

* Clones: RRIM 600 (50%), GT 1 (45%) and others (5%)

* Planting Year: 1984
  Method: Budded stump (polybag)
  Budding: 1984
  Stand/ha at planting: 450
  Planting distance: 9.14 x 2.13 m

* Opening Year: May 1991
  Height: 1.40 m
5. Treatments

4 treatments (1234) replicated 3 times (ABC) : 12 tasks of about 500 trees (1 treatment per task)

<table>
<thead>
<tr>
<th>Number</th>
<th>Colour</th>
<th>Tapping</th>
<th>Stimulation</th>
<th>Pannel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Green</td>
<td>1/2S d/2</td>
<td>No</td>
<td>BO-1</td>
</tr>
<tr>
<td>2</td>
<td>Black</td>
<td>1/2S d/3</td>
<td>ET 2.5%Pa 0.7(1) 4/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Yellow</td>
<td>1/2S d/3</td>
<td>ET 2.5%Pa 0.7(1) 6/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Red</td>
<td>1/2S d/4</td>
<td>ET 2.5%Pa 0.7(1) 6/y</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

Length of spiral : 1/2S on panel A at 1.40 m from the soil.

Frequency of tapping : d/2 6 d/7, d/3 6 d/7, d/4 6 d/7

Bark consumption : with 300 tapping days per year.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>mm/tapping</th>
<th>Number tapping</th>
<th>cm/month</th>
<th>cm/year</th>
<th>cm/6 months</th>
</tr>
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<tbody>
<tr>
<td>d/2</td>
<td>1.5</td>
<td>150</td>
<td>1.9</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>d/3</td>
<td>1.6</td>
<td>100</td>
<td>1.3</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>d/4</td>
<td>1.7</td>
<td>75</td>
<td>1.1</td>
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<td>7</td>
</tr>
</tbody>
</table>

Half-yearly bark consumption guide had to be traced.

Depth of tapping : 1 to 1.5 mm to cambium.

Stimulation : ETHREL (Rhône-Poulenc) ready mix 5% a.i. (CEP) diluted to 2.5% with water or ready mix 2.5% (CEP).

Pannel application of 0.7 g of stimulant per tree on 1 cm of renewing bark just above the tapping cut. No lace removal.

Date of application excluding the wintering period. First stimulation after refoliation, then every two or four months. Not during the heavy raining season. Application two or three days before the tapping day.
6. Preliminary data

For the twelve tasks:

* Number of tappable trees and total trees.
* Girth of tappable tree (with three dots).

7. Controls

**Yield**  Task yield is recorded at every tapping. Latex is weighed and the DRC of latex from each task is determined by metrolac method to obtain the weight of latex dry rubber. Cup lump of each task is weighed and a coefficient of 0.5 is applied to obtain the weight of cup lump dry rubber.

**Girth**  One measurement at 1.70 m above the ground at the beginning of trial and at yearly intervals. All tappable trees are measured.

**Stand per ha** by task every six months: May and November
- total trees
- trees in tapping
- dry trees.

**Annexes:**
- Calendar of tapping days.
- Map of treatment repartition.
- Diagram of pannel.
Soil Mapping Unit

B - Padang Besar/Datu Lapan Association
D - Kuala Brang/Bunong Association
E - Pohot/Kush Association

Soil Characteristic

Clay; shallow/moderately deep; rolling to hilly terrain; moderately well drained; severely eroded.

Sandy clay to clay; moderately deep to deep; hilly to steep terrain; moderately well drained; severely eroded.

Clay; moderately deep/shallow; hilly to steep terrain.
Protocol
Demonstration Plot No. 5

1. Objective

This demonstration plot aims to reduce the need of workers by reducing the frequency of tapping and using stimulation to maintain the level of yield per hectare obtained with classical S/2 d/2.

2. Localisations

State: JOHOR
Scheme: BUKIT PEDOMAN I

3. Environmental conditions

* Soil Series: Kuala Brang, Bungur
  Description:
  Terrain: Hilly

* Climate
  Rainfall (1985-1990) mm
  Days (1976-78)

<table>
<thead>
<tr>
<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total mm</td>
<td>332</td>
<td>83</td>
<td>193</td>
<td>134</td>
<td>126</td>
<td>110</td>
<td>149</td>
<td>153</td>
<td>164</td>
<td>195</td>
<td>393</td>
<td>476</td>
</tr>
<tr>
<td>Number of days</td>
<td>15</td>
<td>7</td>
<td>13</td>
<td>14</td>
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<td>15</td>
<td>14</td>
<td>13</td>
<td>15</td>
<td>18</td>
<td>18</td>
<td>24</td>
</tr>
</tbody>
</table>

4. History of demonstration plots

* Clones: GT 1 (80%), RRIM 600 and PR 261 (20%)

* Planting
  Year: 10/1977
  Method: Seed at stakes
  Budding:
  Stand/ha at planting: 448
    actual: 282
  Planting distance: 9.14 x 2.44 m

* Opening
  Year: 7/1986
  Height: 1.10 m, pannel B 1.70 m on 1/1990
  Tapping: 1/2S d/2 6d/7
5. Treatments

3 treatments (123) replicated 4 times (ABCD): 12 tasks of about 500 trees (1 treatment per task)

<table>
<thead>
<tr>
<th>Number</th>
<th>Colour</th>
<th>Tapping</th>
<th>Stimulation</th>
<th>Pannel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Green</td>
<td>1/2S d/2</td>
<td>No</td>
<td>BO-2</td>
</tr>
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<td>2</td>
<td>Yellow</td>
<td>1/2S d/3</td>
<td>ET 2.5% Pa l(1) 6/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Red</td>
<td>1/2S d/4</td>
<td>ET 2.5% Pa l(1) 8/y</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

Length of spiral: 1/2S on panel B at ... m from the soil.

Frequency of tapping: d/2 6 d/7, d/3 6 d/7, d/4 6 d/7

Bark consumption: with 300 tapping days per year.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>mm/tapping</th>
<th>Number tapping</th>
<th>cm/month</th>
<th>cm/year</th>
<th>cm/6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>d/2</td>
<td>1.5</td>
<td>150</td>
<td>1.9</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>d/3</td>
<td>1.6</td>
<td>100</td>
<td>1.3</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>d/4</td>
<td>1.7</td>
<td>75</td>
<td>1.1</td>
<td>13</td>
<td>7</td>
</tr>
</tbody>
</table>

Half-yearly bark consumption guide had to be traced.

Depth of tapping: 1 to 1.5 mm to cambium.

Stimulation: ETHREL (Rhône-Poulenc) ready mix 5% a.i. (CEP) diluted to 2.5% with water or ready mix 2.5% (CEP).

Pannel application of 1.0 g of stimulant per tree on 1 cm of renewing bark just above the tapping cut. No lace removal.

Date of application excluding the wintering period. First stimulation after refoliation, then every one or two months. Not during the heavy raining season. Application two or three days before the tapping day.

<table>
<thead>
<tr>
<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
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<tbody>
<tr>
<td>6/y</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>8/y</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. **Preliminary data**

For the twelve tasks:

* Number of tappable trees and total trees.
* Girth of tappable tree (with three dots).
* Yield of the last two or three months.

7. **Controls**

**Yield** Task yield is recorded at every tapping. Latex is weighed and the DRC of latex from each task is determined by metrolac method to obtain the weight of latex dry rubber. Cup lump of each task is weighed and a coefficient of 0.5 is applied to obtain the weight of cup lump dry rubber.

**Girth** One measurement at 1.70 m above the ground at the beginning of trial and at yearly intervals.

All tappable trees are measured.

**Stand per ha** by task every six months: May and November

- total trees
- trees in tapping
- dry trees.

**Annexes**:
- Calendar of tapping days.
- Map of treatment repartition.
- Diagram of panel.
Calendar of tapping

For demonstration plots number 5
12 tapping tasks from A1 to D3.

Replications must be tapped on different days: influence of climate and rainy days will be included in replications and not in treatments.

<table>
<thead>
<tr>
<th>Tapper</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>A1</td>
<td>Cl</td>
<td>A2</td>
<td>C2</td>
<td>A3</td>
</tr>
<tr>
<td>Tuesday</td>
<td>B1</td>
<td>D1</td>
<td>B2</td>
<td>D2</td>
<td>B3</td>
</tr>
<tr>
<td>Wednesday</td>
<td>A1</td>
<td>Cl</td>
<td></td>
<td></td>
<td>C3</td>
</tr>
<tr>
<td>Thursday</td>
<td>B1</td>
<td>D1</td>
<td></td>
<td></td>
<td>D3</td>
</tr>
<tr>
<td>Friday</td>
<td>A1</td>
<td>Cl</td>
<td>A2</td>
<td>C2</td>
<td>A3</td>
</tr>
<tr>
<td>Saturday</td>
<td>B1</td>
<td>D1</td>
<td>B2</td>
<td>D2</td>
<td>B3</td>
</tr>
<tr>
<td>Sunday</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>A1</td>
<td>Cl</td>
<td>A2</td>
<td>C2</td>
<td>C3</td>
</tr>
<tr>
<td>Tuesday</td>
<td>B1</td>
<td>D1</td>
<td>B2</td>
<td>D2</td>
<td>D3</td>
</tr>
<tr>
<td>Wednesday</td>
<td>A1</td>
<td>Cl</td>
<td></td>
<td></td>
<td>A3</td>
</tr>
<tr>
<td>Thursday</td>
<td>B1</td>
<td>D1</td>
<td></td>
<td></td>
<td>B3</td>
</tr>
<tr>
<td>Friday</td>
<td>A1</td>
<td>Cl</td>
<td>A2</td>
<td>C2</td>
<td>C3</td>
</tr>
<tr>
<td>Saturday</td>
<td>B1</td>
<td>D1</td>
<td>B2</td>
<td>D2</td>
<td>D3</td>
</tr>
</tbody>
</table>

On Monday, tapper "a" taps replication A of traitement 1
Tapper "b" taps replication C of traitement 1
On Tuesday, tapper "a" taps replication B of traitement 1

With Friday tapping rest or in case of rainy day, treatments are shifted.
Protocol
Demonstration Plot No. 6

1. Objective

This demonstration plot aims to reduce the need of workers by reducing the frequency of tapping and using stimulation to maintain the level of yield per hectare obtained with classical S/2 d/2.

2. Localisations

State: PERLIS
Scheme: ULU PAUH I and II

3. Environmental conditions

* Soil Serie: Jitra
  Class: 
  Description: Fine sandy clay loam, shallow, moderately drained
  Terrain: Undulating


<table>
<thead>
<tr>
<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total mm</td>
<td>22</td>
<td>23</td>
<td>(109)</td>
<td>147</td>
<td>149</td>
<td>132</td>
<td>159</td>
<td>208</td>
<td>218</td>
<td>336</td>
<td>222</td>
<td>70</td>
</tr>
<tr>
<td>Number of days</td>
<td>8</td>
<td>8</td>
<td>13</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>13</td>
<td>80</td>
<td>19</td>
<td>15</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

4. History of demonstration plots

* Clones: RRIM 600 (100%)

* Planting Year: 1970
  Method: Seed at site
  Budding: 1970
  Stand/ha at planting: 398
  Planting distance: 3.14 x 3.74 m

* Opening Year: 1979
  Height: 1.40 m, panel C 1.60 m on 1/1989
  Tapping: 1/2S d/2 6d/7
5. Treatments

4 treatments (1234) replicated 3 times (ABC): 12 tasks of about 500 trees (1 treatment per task)

<table>
<thead>
<tr>
<th>Number</th>
<th>Colour</th>
<th>Tapping</th>
<th>Stimulation</th>
<th>Pannel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Green</td>
<td>1/2S d/2</td>
<td>No</td>
<td>BI-1,2</td>
</tr>
<tr>
<td>2</td>
<td>Yellow</td>
<td>1/2S d/3</td>
<td>ET 2.5% Pa 1(1) 10/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Red</td>
<td>1/2S d/4</td>
<td>ET 2.5% Pa 1(1) 10/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Blue</td>
<td>1/4S/d/3</td>
<td>ET 5.0% Pa 1(1) 10/y</td>
<td>HO-1</td>
</tr>
</tbody>
</table>

Length of spiral: 1/2S on panel C or D at ... m from the soil and 1/4S upward tapping at ...m.

Frequency of tapping: d/2 6 d/7, d/3 6 d/7, d/4 6 d/7

Bark consumption: with 300 tapping days per year.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>mm/tapping</th>
<th>Number tapping</th>
<th>cm/month</th>
<th>cm/year</th>
<th>cm/6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>d/2</td>
<td>1.5</td>
<td>150</td>
<td>1.9</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>d/3</td>
<td>1.6</td>
<td>100</td>
<td>1.3</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>d/4</td>
<td>1.7</td>
<td>75</td>
<td>1.1</td>
<td>13</td>
<td>7</td>
</tr>
</tbody>
</table>

Half-yearly bark consumption guide had to be traced for downward and upward tapping cuts.

Depth of tapping: 1 to 1.5 mm to cambium.

Stimulation: ETHREL (Rhône-Poulenc) ready mix 5% a.i. (CEP) for upward tapping and diluted to 2.5% with water or ready mix 2.5% for downward tapping.

Pannel application of 1.0 g of stimulant per tree on 1 cm of renewing bark just below (1/4S) or above (1/2S) the tapping cut. No lace removal.

Date of application excluding the wintering period. First stimulation after refoliation, then every one months. Not during the heavy raining season. Application two or three days before the tapping day.
6. Preliminary data

For the twelve tasks:

* Number of tappable trees and total trees.
* Girth of tappable tree (with three dots).
* Yield of the last two or three months.

7. Controls

**Yield**  Task yield is recorded at every tapping. Latex is weighed and the DRC of latex from each task is determined by metrolac method to obtain the weight of latex dry rubber. Cup lump of each task is weighed and a coefficient of 0.5 is applied to obtain the weight of cup lump dry rubber.

**Girth**  One measurement at 1.70 m above the ground at the beginning of trial and at yearly intervals.

All tappable trees are measured.

**Stand per ha** by task every six months: May and November
- total trees
- trees in tapping
- dry trees.

**Annexes:**
- Calendar of tapping days.
- Map of treatment repartition.
- Diagram of pannel.
Calendar of tapping

For demonstration plots number 6 and 7
12 tapping tasks from Al to C4.

Replications must be tapped on different days: influence of climate and rainy days will be included in replications and not in treatments.

<table>
<thead>
<tr>
<th>Tapper</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Al</td>
<td>C1</td>
<td>A2</td>
<td>A3</td>
<td>A4</td>
</tr>
<tr>
<td>Tuesday</td>
<td>Bl</td>
<td>B2</td>
<td>B3</td>
<td>B4</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>Al</td>
<td>C1</td>
<td>C2</td>
<td>C3</td>
<td>C4</td>
</tr>
<tr>
<td>Thursday</td>
<td>Bl</td>
<td>A2</td>
<td></td>
<td>A4</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>Al</td>
<td>C1</td>
<td>B2</td>
<td>A3</td>
<td>B4</td>
</tr>
<tr>
<td>Saturday</td>
<td>Bl</td>
<td>C2</td>
<td>B3</td>
<td>C4</td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Monday: Tapper "a" taps replication A of traitement 1
Tapper "b" taps replication C of traitement 1

Friday tapping rest or in case of rainy day, treatments are shifted.
Protocol
Demonstration Plot No. 7

1. Objective

This demonstration plot aims to reduce the need of workers by reducing the frequency of tapping and using stimulation to maintain the level of yield per hectare obtained with classical S/2 d/2.

2. Localisations

State: KEDAH Scheme: BUKIT TAMPOI I

3. Environmental conditions

* Soil Serie: Jitra Class:
Description: Fine sandy clay, shallow, laterite layer as hard pan.
Terrain: Undulating

* Climate Rainfall (1985-1990):

<table>
<thead>
<tr>
<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total mm</td>
<td>6</td>
<td>57</td>
<td>105</td>
<td>245</td>
<td>192</td>
<td>100</td>
<td>160</td>
<td>176</td>
<td>276</td>
<td>321</td>
<td>212</td>
<td>73</td>
</tr>
<tr>
<td>Number of days</td>
<td>2</td>
<td>3</td>
<td>7</td>
<td>11</td>
<td>13</td>
<td>8</td>
<td>8</td>
<td>11</td>
<td>16</td>
<td>17</td>
<td>12</td>
<td>5</td>
</tr>
</tbody>
</table>

4. History of demonstration plots

* Clones: GT 1 (60%), RRIM 600 (20%) and PB 5/51 (20%).

* Planting Year: 1972
  Method: Seed at stakes
  Budding: 1973
  Stand/ha at planting: 447
  Planting distance: 9.14 x 2.44

* Opening Year: 7/1981
  Height: pannel C 1.40 m
  Tapping: 1/2S d/2 6d/7
5. Treatments

4 treatments (1234) replicated 3 times (ABC): 12 tasks of about 500 trees (1 treatment per task)

<table>
<thead>
<tr>
<th>Number</th>
<th>Colour</th>
<th>Tapping</th>
<th>Stimulation</th>
<th>Pannel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Green</td>
<td>1/2S d/2</td>
<td>No</td>
<td>BI-1,2</td>
</tr>
<tr>
<td>2</td>
<td>Yellow</td>
<td>1/2S d/3</td>
<td>ET 2.5% Pa 1(1) 10/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Red</td>
<td>1/2S d/4</td>
<td>ET 2.5% Pa 1(1) 10/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Blue</td>
<td>1/4S d/3</td>
<td>ET 5.0% Pa 1(1) 10/y</td>
<td>HO-1</td>
</tr>
</tbody>
</table>

Length of spiral: 1/2S on panel C or D at ... m from the soil and 1/4S upward tapping at ... m.

Frequency of tapping: d/2 6 d/7, d/3 6 d/7, d/4 6 d/7

Bark consumption: with 300 tapping days per year.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>mm/tapping</th>
<th>Number tapping</th>
<th>cm/month</th>
<th>cm/year</th>
<th>cm/6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>d/2</td>
<td>1.5</td>
<td>150</td>
<td>1.9</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>d/3</td>
<td>1.6</td>
<td>100</td>
<td>1.3</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>d/4</td>
<td>1.7</td>
<td>75</td>
<td>1.1</td>
<td>13</td>
<td>7</td>
</tr>
</tbody>
</table>

Half-yearly bark consumption guide had to be traced for downward and upward tapping cuts.

Depth of tapping: 1 to 1.5 mm to cambium.

Stimulation: ETHREL (Rhône-Poulenc) ready mix 5% a.i.(CEP) for upward tapping (1/4S) and diluted to 2.5% with water or ready mix 2.5% for downward tapping (1/2S).

Pannel application of 1.0 g of stimulant per tree on 1 cm of renewing bark just below (1/4S) or above (1/2S) the tapping cut. No lace removal.

Date of application excluding the wintering period. First stimulation after refoliation, then every one months. Not during the heavy raining season. Application two or three days before the tapping day.

<table>
<thead>
<tr>
<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/y</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. Preliminary data

For the twelve tasks:

* Number of tappable trees and total trees.
* Girth of tappable tree (with three dots).
* Yield of the last two or three months.

7. Controls

Yield  Task yield is recorded at every tapping. Latex is weighed and the DRC of latex from each task is determined by metrolac method to obtain the weight of latex dry rubber. Cup lump of each task is weighed and a coefficient of 0.5 is applied to obtain the weight of cup lump dry rubber.

Girth  One measurement at 1.70 m above the ground at the beginning of trial and at yearly intervals.

All tappable trees are measured.

Stand per ha by task every six months: May and November
- total trees
- trees in tapping
- dry trees.

Annexes:
- Calendar of tapping days.
- Map of treatment repartition.
- Diagram of pannel.
Protocol
Demonstration Plot No. 3

1. Objective

This demonstration plot aims to reduce the need of workers by reducing the frequency of tapping and using stimulation to maintain the level of yield per hectare obtained with classical S/2 d/2.

2. Localisations

State: KEDAH  
Scheme: BUKIT TAMPOI II

3. Environmental conditions

- **Soil Serie**: Jitra  
  **Class**:  
  **Description**: Fine sandy clay, shallow, laterite layer as hard pan.  
  **Terrain**: Undulating, flat.

- **Climate Rainfall (1985-1990):**

<table>
<thead>
<tr>
<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total mm</td>
<td>6</td>
<td>57</td>
<td>105</td>
<td>245</td>
<td>192</td>
<td>100</td>
<td>160</td>
<td>176</td>
<td>276</td>
<td>321</td>
<td>212</td>
<td>73</td>
</tr>
<tr>
<td>Number of days</td>
<td>2</td>
<td>3</td>
<td>7</td>
<td>11</td>
<td>13</td>
<td>8</td>
<td>8</td>
<td>11</td>
<td>16</td>
<td>17</td>
<td>12</td>
<td>5</td>
</tr>
</tbody>
</table>

4. History of demonstration plots

- **Clones**: GT 1 (100%).

- **Planting Year**: 1974  
  **Method**: Seed at stakes  
  **Budding**: 1975  
  **Stand/ha at planting**: 447  
  **Planting distance**: 9.14 x 2.44

- **Opening Year**: 4/1983  
  **Height**: pannel C 1.60 m  
  **Tapping**: 1/2S d/2 6d/7
5. Treatments

5 treatments (12345) replicated 3 times (ABC): 15 tasks of about 500 trees (1 treatment per task)

<table>
<thead>
<tr>
<th>Number</th>
<th>Colour</th>
<th>Tapping</th>
<th>Stimulation</th>
<th>Pannel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Green</td>
<td>1/2S d/2</td>
<td>No</td>
<td>BI-1,2</td>
</tr>
<tr>
<td>2</td>
<td>Yellow</td>
<td>1/2S d/3</td>
<td>ET 2.5% Pa 1(1) 10/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Red</td>
<td>1/2S d/4</td>
<td>ET 2.5% Pa 1(1) 10/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Blue</td>
<td>1/4S d/3</td>
<td>ET 5.0% Pa 1(1) 10/y</td>
<td>HO-1</td>
</tr>
<tr>
<td>5</td>
<td>Black</td>
<td>1/4S d/4</td>
<td>ET 5.0% Pa 1(1) 12/y</td>
<td>HO-1</td>
</tr>
</tbody>
</table>

Length of spiral: 1/2S on panel C at ... m from the soil and 1/4S upward tapping at ...m.

Frequency of tapping: d/2 6 d/7, d/3 6 d/7, d/4 6 d/7

Bark consumption: with 300 tapping days per year.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>mm/tapping</th>
<th>Number tapping</th>
<th>cm/month</th>
<th>cm/year</th>
<th>cm/6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>d/2</td>
<td>1.5</td>
<td>150</td>
<td>1.9</td>
<td>23</td>
<td>12</td>
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<tr>
<td>d/3</td>
<td>1.6</td>
<td>100</td>
<td>1.3</td>
<td>16</td>
<td>8</td>
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<tr>
<td>d/4</td>
<td>1.7</td>
<td>75</td>
<td>1.1</td>
<td>13</td>
<td>7</td>
</tr>
</tbody>
</table>

Half-yearly bark consumption guide had to be traced for downward and upward tapping cuts.

Depth of tapping: 1 to 1.5 mm to cambium.

Stimulation: ETHREL (Rhône-Poulenc) ready mix 5% a.i. (CEP) for upward tapping (1/4S) and diluted to 2.5% with water or ready mix 2.5% for downward tapping (1/2S).

Pannel application of 1.0 g of stimulant per tree on 1 cm of renewing bark just below (1/4S) or above (1/2S) the tapping cut. No lace removal.

Date of application excluding the wintering period. First stimulation after refoliation, then every one months. Not during the heavy raining season. Application two or three days before the tapping day.
6. Preliminary data

For the twelve tasks:

* Number of tappable trees and total trees.
* Girth of tappable tree (with three dots).
* Yield of the last two or three months.

7. Controls

**Yield** Task yield is recorded at every tapping. Latex is weighed and the DRC of latex from each task is determined by metrolac method to obtain the weight of latex dry rubber. Cup lump of each task is weighed and a coefficient of 0.5 is applied to obtain the weight of cup lump dry rubber.

**Girth** One measurement at 1.70 m above the ground at the beginning of trial and at yearly intervals. All tappable trees are measured.

**Stand per ha** by task every six months: May and November
- total trees
- trees in tapping
- dry trees.

**Annexes:**
- Calendar of tapping days.
- Map of treatment repartition.
- Diagram of pannel.
Calendar of tapping

For demonstration plots number 8
15 tapping tasks from A1 to C5.

Replications must be tapped on different days: influence of climate and rainy days will be included in replications and not in treatments.

<table>
<thead>
<tr>
<th></th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>A1</td>
<td>C1</td>
<td>A2</td>
<td>A3</td>
<td>A4</td>
<td>A5</td>
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<td>B1</td>
<td>B2</td>
<td>B3</td>
<td>B4</td>
<td>B5</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>A1</td>
<td>C1</td>
<td>C2</td>
<td>C3</td>
<td>C4</td>
<td>C5</td>
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<td>Thursday</td>
<td>a1</td>
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</tr>
<tr>
<td>Friday</td>
<td>A1</td>
<td>C1</td>
<td>B2</td>
<td>A3</td>
<td>B4</td>
<td>A5</td>
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<td>B1</td>
<td>C2</td>
<td>B3</td>
<td>C4</td>
<td>B5</td>
<td></td>
</tr>
</tbody>
</table>

On Monday, tapper "a" taps replication A of traitement 1
Tapper "b" taps replication C of traitement 1
On Tuesday tapper "a" taps replication B of traitement 1

With Friday tapping rest or in case of rainy day, treatments are shifted.
1. Objective

This demonstration plot aims to reduce the need of workers by reducing the frequency of tapping and using stimulation to maintain the level of yield per hectare obtained with classical S/2 d/2.

2. Localisations

State: JOHOR  Scheme: BUKIT KEREMOIYANG

3. Environmental conditions

* Soil Series: **Batu**  Class:
  Description: Fine sandy clay, shallow, laterite layer as hard pan.
  Terrain: Undulating


<table>
<thead>
<tr>
<th>Month</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
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</thead>
<tbody>
<tr>
<td>Total mm</td>
<td>815</td>
<td>84</td>
<td>820</td>
<td>139</td>
<td>166</td>
<td>142</td>
<td>157</td>
<td>163</td>
<td>201</td>
<td>168</td>
<td>295</td>
<td>164</td>
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<tr>
<td>Number of days</td>
<td>13</td>
<td>6</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

4. History of demonstration plots

* Clones: RRIM 600 (100%)

* Planting Year: 5/1/1972
  Method: Polybag Budded Stem
  Budding: 1972
  Stand/ha at planting: 338
  Planting distance: 5.14 x 2.34 mm

* Opening Year: 5/1/1980
  Height: 1.40 mm
  Tapping: 1/85 d/2 6/17
5. Treatments

4 treatments (1234) replicated 3 times (ABC) : 12 tasks of about 500 trees (1 treatment per task)

<table>
<thead>
<tr>
<th>Number</th>
<th>Colour</th>
<th>Tapping</th>
<th>Stimulation</th>
<th>Pannel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Green</td>
<td>1/2S d/2</td>
<td>No</td>
<td>BI-1,2</td>
</tr>
<tr>
<td>2</td>
<td>Red</td>
<td>1/2S d/4</td>
<td>ET 2.5% Pa 1(1) 10/y</td>
<td>&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>1/4S/d/3</td>
<td>ET 5.0% Pa 1(1) 10/y</td>
<td>HO-1</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>1/4S/d/4</td>
<td>ET 5.0% Pa 1(1) 12/y</td>
<td>HO-1</td>
</tr>
</tbody>
</table>

Length of spiral : 1/2S on panel C or D at ... m from the soil and 1/4S upward tapping at ... m.

Frequency of tapping : d/2 6 d/7, d/3 6 d/7, d/4 6 d/7

Bark consumption : with 300 tapping days per year.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>mm/tapping</th>
<th>Number tapping</th>
<th>cm/month</th>
<th>cm/year</th>
<th>cm/6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>d/2</td>
<td>1.5</td>
<td>150</td>
<td>1.9</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>d/3</td>
<td>1.6</td>
<td>100</td>
<td>1.3</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>d/4</td>
<td>1.7</td>
<td>75</td>
<td>1.1</td>
<td>13</td>
<td>7</td>
</tr>
</tbody>
</table>

Half-yearly bark consumption guide had to be traced for downward and upward tapping cuts.

Depth of tapping : 1 to 1,5 mm to cambium.

Stimulation : ETHREL (Rhône-Poulenc) ready mix 5% a.i.(CEP) for upward tapping (1/4S) and diluted to 2.5% with water or ready mix 2.5% for downward tapping (1/2S).

Pannel application of 1.0 g of stimulant per tree on 1 cm of renewing bark just below (1/4S) or above (1/2S) the tapping cut. No lace removal.

Date of application excluding the wintering period. First stimulation after refoliation, then every one months. Not during the heavy raining season. Application two or three days before the tapping day.
6. **Preliminary data**

For the twelve tasks:

* Number of tappable trees and total trees.
* Girth of tappable tree (with three dots).
* Yield of the last two or three months.

7. **Controls**

**Yield** Task yield is recorded at every tapping. Latex is weighed and the DRC of latex from each task is determined by metrolac method to obtain the weight of latex dry rubber. Cup lump of each task is weighed and a coefficient of 0.5 is applied to obtain the weight of cup lump dry rubber.

**Girth** One measurement at 1.70 m above the ground at the beginning of trial and at yearly intervals. All tappable trees are measured.

**Stand per ha** by task every six months: May and November

- total trees
- trees in tapping
- dry trees.

**Annexes:**

- Calendar of tapping days.
- Map of treatment repartition.
- Diagram of pannel.
Calendar of tapping

For demonstration plots number 9
12 tapping tasks from A1 to C4.

Replications must be tapped on different days: influence of climate and rainy days will be included in replications and not in treatments.

<table>
<thead>
<tr>
<th>Tapper</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>A1</td>
<td>C1</td>
<td>A2</td>
<td>A3</td>
<td>A4</td>
</tr>
<tr>
<td>Tuesday</td>
<td>B1</td>
<td>B2</td>
<td>B3</td>
<td>B4</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>A1</td>
<td>C1</td>
<td>C2</td>
<td>C3</td>
<td>C4</td>
</tr>
<tr>
<td>Thursday</td>
<td>B1</td>
<td></td>
<td>A3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>A1</td>
<td>C1</td>
<td>A2</td>
<td>B3</td>
<td>A4</td>
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<tr>
<td>Saturday</td>
<td>B1</td>
<td>B2</td>
<td>C3</td>
<td>B4</td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>A1</td>
<td>C1</td>
<td>C2</td>
<td>A3</td>
<td>C4</td>
</tr>
<tr>
<td>Tuesday</td>
<td>B1</td>
<td></td>
<td></td>
<td>B3</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>A1</td>
<td>C1</td>
<td>A2</td>
<td>C3</td>
<td>A4</td>
</tr>
<tr>
<td>Thursday</td>
<td>B1</td>
<td>B2</td>
<td>A3</td>
<td>B4</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>A1</td>
<td>C1</td>
<td>C2</td>
<td>B3</td>
<td>C4</td>
</tr>
<tr>
<td>Saturday</td>
<td>B1</td>
<td></td>
<td></td>
<td>C3</td>
<td></td>
</tr>
</tbody>
</table>

On Monday, tapper "a" taps replication A of traitement 1
Tapper "b" taps replication C of traitement 1
On Tuesday tapper "a" taps replication B of traitement 1
With Friday tapping rest or in case of rainy day, treatments are shifted.
As the yield and quality of output from rubber plantations depends on tapping quality, regular checks are always necessary.

In practical terms, bonuses given to the tapper according to tapping quality are the only incentive for good tapping. They must be incentive enough to motivate the tapper as well as the head of team.

Once a month each tapping task is quality controlled, by checking 5 trees per task chosen at random.

For each quality controlled tree the maximum potential mark is 50 points (corresponding to a "perfect" quality). according to the quality of tapping as checked on the tree, the tapper receives a mark, which determines the bonus:

For example: a mark of 35 points, if the unit is 2 M$, will give a Bonus of $35 \times 2 = 70$ M$.

The marking system can be divided up as follows:

- 15 points for wounds
- 15 points for tapping depth
- 10 points for bark consumption
- 5 points for slope
- 5 points for cleanliness

1. WOUNDS

Wounds can cause bark dryness, help disease enter the tree, and cause scarring patches which makes the future tapping difficult. Each team leader should mark the tapping wounds with a chalk sign on the panel.

a) There will be no penalty:
   - if the wounds are superficial (less than 1 cm length) and if they have been cured.
   - or if the wounds were made by accident.
b) There will be a penalty:
   - if the wounds are more than 1 cm deep:
     penalty = \(-1\) point per cm.
   - if the wounds were repeated and not corrected (i.e. if the tapper did
     not tap outwards after wounding the tree) penalty = \(-1\) point.
   - for each wound which has not been properly cured:
     penalty = \(-1\) point per not cured wound
     (for curing the wounds, the tapper should always have a small box of
     curing fat).

   then the total penalty shall be multiplied by the length of the wounds
   and by the number of wounds (no. of cms).

   on the contrary: if the wound has been cured, and if the tapper has
   corrected his fault by tapping outwards, then the penalty will be
   divided by 2.

2. TAPPING DEPTH

   The tapping depth should be measured as follows:

   - with a screwdriver or a sygmat,
   - by three measurements per tree: one in the high part of the tapping
     cut, one in the middle, one in the low part of the cut.

   The ideal tapping depth should be 1 mm away from the cambium. It must
   not be less than 0.5 mm, and not more than 1.5 mm away from the cambium.

   The penalty system is as follows:

   * depth between 0 and 0.5 mm \(\longrightarrow\) wound (see 1).
   * between 1.5 and 2 mm \(\longrightarrow\) penalty = \(-1\) point/measurement
   * between 2 and 3 mm \(\longrightarrow\) penalty = \(-2\) points/measurement
   * more than 3 mm \(\longrightarrow\) penalty = \(-4\) points/measurement

3. BARK CONSUMPTION

   The bark consumption should be evaluated by using painting dots. Each
   year, at defoliation, 3 dots should be painted on the place where the new cut
   will start as a guide for the measurement of yearly consumption. Then
   measurements can be made on three spots: in the high part, in the middle and
   in the low part of the cut.
The following consumptions can be allowed:

- opening of the tree: 10 mm
- Re-opening (after resting): 5 mm
- tapping:
  - 1.2 to 1.3 mm with d/2 6d/7
  - 1.3 to 1.5 mm with d/3 6d/7
  - 1.5 to 1.7 mm with d/4
  - 1.8 to 2 mm with d/6
  - 1.8 to 2 mm with upwards tapping

For example, after n days of tapping, with d/3 6d/7, and after a re-opening, the consumption should be:

\[ c = 5 + (n \times 1.4) \text{ mm} \]

With the usual d/3 6d/7 tapping, the annual bark consumption should be under 15 cm.
With d/4, it should be under 13 cm
With d/6, under 10 cm
With upwards tapping, it should be under 20 cm.

- If the consumption is too low, then the production is too low (some of the latex vessels remain obstructed). If the consumption is too high, panels may not be exploited properly.
- To allow a good consumption, some guiding marks should be painted or traced on the tree, to help the tapper.
- The penalty system should be as follow:
  - penalty = -1 point for each extra mm (per year)
  - penalty = -1 point for each mm less than usual (per year)

4. SLOPE

The slope is not measured, it is estimated by looking at the trees, if the tracing is made properly, then the slope should be: 30 to 33° for downwards tapping, 42 to 45° for upwards tapping.

If the slope is too horizontal, some latex might flow outside and be lost, whereas if the slope is too vertical, bark consumption might increase.

The penalty system for incorrect slope could be as follows (according to the severity of incorrect slope):

- minus point for incorrect slope at the high part or the low part of the cut.
- 2 points or 3 points for incorrect slope at the middle part of the cut.
<table>
<thead>
<tr>
<th>Date</th>
<th>Matricule Number</th>
<th>Parcel Number</th>
<th>Localization</th>
<th>Clone and date of planting:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### ANNEX - Example of a Control Sheet

<table>
<thead>
<tr>
<th>Tree Number</th>
<th>Length (cm)</th>
<th>Not cured</th>
<th>Wounds (15)</th>
<th>depth (15) (mm)</th>
<th>Consumption (10) (mm)</th>
<th>Slope (5)</th>
<th>Cleanliness (5)</th>
<th>Tapping cut</th>
<th>Panel</th>
<th>Furnishing</th>
<th>Polybag</th>
<th>POINTS</th>
<th>Lost latex</th>
<th>omitted trees (15)</th>
<th>Assiduity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-</td>
<td>NS</td>
<td>1</td>
<td>1,5</td>
<td>1,5, 2,0</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
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<td>1,5</td>
<td>NS</td>
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</tr>
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<table>
<thead>
<tr>
<th>Date</th>
<th>Matricule Number</th>
<th>Parcel Number</th>
<th>Localization</th>
<th>Clone and date of planting:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Maximum marks

<table>
<thead>
<tr>
<th>Bonus for tapping</th>
<th>Bonus for assiduity</th>
<th>Bonus for care of panels</th>
<th>Bonus for stimulation</th>
<th>Others</th>
<th>Total of bonuses</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 x 5 x 50 = 750</td>
<td>:</td>
<td>:</td>
<td>:</td>
<td>:</td>
<td>:</td>
</tr>
</tbody>
</table>

### Total of penalties

<table>
<thead>
<tr>
<th>Points for tapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
</tbody>
</table>