

## AGRONOMIC RESEARCHES OF IRCA IN EXPLOITATION

By

(P. GENER—C. J. DU PLESSIX)

(*Institute de Recherches sur le Caoutchouc en Afrique*)

Firstly, we will recall the two objectives of research studies carried out on exploitation method by IRCA.

The first objective is of an economical nature: to find the best balance between the annual production per ha. and the daily production of the tapper.

The second objective is of a physiological nature (in order to preserve the production potential of the trees for as long a time as possible): to find the best balance between growth and production.

The system used in Ivory Coast regardless of the clone, namely full spiral twice a week, with a rest period varying according to the age of the trees, should be reconsidered in the light of the current results on growth, on rest periods and on the saccharose contents of the latex, which according to J. TUPY, express the availability, in assimilates.

We must specify that the conditions of sun exposure (whose effects on production are assumed), differ between the rubber producing countries where full spiral is generally used (Vietnam, Cambodia, annual average of sun exposure recorded by IRCC=2820 h) and Ivory Coast (annual average of sun exposure recorded by ORSTOM in 1956—1972 = 1722 h).

Besides, experiments in Ivory Coast have shown the need for a well-timed rest period in the course of the year which results in a better or identical production during the first years, in comparison with the classical rest period during defoliation and a superior rate of growth.

TABLE 1

YIELD AND GROWTH ON GT 1.  
(FIRST FOUR YR OF TAPPING)

Rest period	February March	April May	June July	August Sept.	October Nov.	No Rest
Average yield in g/tree/tapping	38.9	39.3	38.6	39.4	39.3	34.3
Girth increase on 4 years	7.2	7.9	9.7	8.2	8.1	6.8

The current results of the use of stimulation effects can answer the two problems, reducing the tapping intensity :

In valorizing full spiral, reducing the tapping number in the course of the year (D/4 D/5 D/5—D/7.....) or introducing cyclical rest period, or in well-defined rest period or still in varying the time between two tappings (D/2 D/5).

In reducing the cut length ( $3/4$  S, S/2, S/3.....) to preserve the economic life of the trees. The Malaysian research workers were the first to work in this way, showing that for a same tapping intensity the stimulation responses are the best with short cut length.

#### EXPERIMENTAL

Two types of trials are used, which are complementary. "Tree-plot design" method, very practical, allows to compare a very important number of tapping systems, but has the inconvenience which is the growth interference, after a few years, which could appear between the nearest trees. For that, we use "tree-plot design" like "orientation trial" to keep a few treatments carried out by agronomic trial of greater size and for a long time.

In this way "orientation trial" were settled on the following clones :

GT 1	in May	1971
PB 5/51	in July	1972
PR 107	in January	1973.

and in July 1972, after the first result of the GT 1 "orientation trial" was settled an agronomic experiment (6 ha, 25), on GT 1.

The stimulant was applied in vertical strips 50 cm length around the trunk under the cut according to the cut length. A constant surface was stimulated for all treatment: 200 cm<sup>2</sup>.

Ethrel is the stimulant used at a low concentration 2.5% of CEP mixed up with oil palm oil.

#### RESULTS

*Orientation trial on GT 1—(first year of tapping 1971-72, twelve months tapping)*

We give the results of the 4 best tapping systems in the experiment, and the control.

TABLE 2  
GROWTH AND YIELD ON GT 1 IN FIRST YEAR OF TAPPING.

Treatment	Yield		Girth increase		Saccharose	
	g/tree total cumulated	in % of control	in cm	in % of control	mg/ml	in % of control
S, D/4 D/5 D/5 1.20 m + 2 stimulations	3356	109	1.5	115	0.68	103
S, D/7 0.60m + 3 stimulations	2236	73	2.1	162	1.83	277
$3/4$ S, D/3 D/4 1.20m + 2 stimulations	3119	102	2.0	154	0.97	147
S/2, D/3 D/4 1.20m + 3 stimulations	2549	83	2.7	208	1.74	264
S, D/3 D/4 (control)	3069	100	1.3	100	0.66	100

These results show, the effect of the reduction of cut length on growth and on the other hand the GT 1 adaptation to the full spiral tapping system.

The S/4 that we also study showed a poor yield (70% of control) with a very high girth increase (223% of control) and a saccharose rate very important (391% of control).

2nd year of tapping (1972-73)—(8 months of tapping).

At the end of the second year of tapping, we observed an evolution on the results on growth and yield.

TABLE 3

GROWTH AND YIELD ON GT 1 (SECOND YEAR OF TAPPING)

Treatment	Yield		Girth increase	
	g/tree total cumulated	in % of control	71-73 cm	in % of control
S, D/4 D/5 D/5 1.20m + 2 stimulations	3297	121	2.0	87
S, D/7 0.60m + stimulations	2975	109	2.2	96
3/4 S, D/3 D/4 1,20m + 4 stimulations	3159	116	3.7	161
S/2, D/3 D/4 1.20m + 4 stimulations	2978	110	4.8	209
S, D/3 D/4 control	2721	100	2.3	100

The table 3 shows :

that reduce spiral 3/4 S or S/2 have a better girth increase than the control, particularly S/2.

that yield of reduce cut length compensated by stimulation are better than the control.

We see here, that yield and growth are closely bound to the tapping system. According to the tapping system, good production can be obtained with also a good growth.

*Agronomic trial on GT 1 : first year of tapping*

The four more interesting treatments considered above, have been settled in an agronomic trial besides, one treatment S/2, D/3 D/4 with panel changing was introduced the results of production are the following :

TABLE 4  
YIELD ON GT 1 (8 MONTHS) FIRST YEAR OF TAPPING

Treatment	Yield		kg/tapped/day in % S, D/3 D/4
	g/tree total cumulated	in % of control	
S/2, D/3 D/4 1.20m 3 stimulations	1476	79	93
S/2, D/4 D/3 1.20m 3 stimulations alternated	1562	83	98
S, D/4 D/5 D/5 1.20m 2 stimulations	1949	104	132
S, D/7 1.20m 4 stimulations	1836	98	187
3/4 S, D/3 D/4 1.20m 2 stimulations	2131	113	123
S, D/3 D/4 control	1879	100	100

Although the number of the trees per plot are very high (450-500 trees by treatment) the result on production show variation in the "orientation trial". This confirms the value of the method. Girth increase measurement are not made yet, they will be made one year after the beginning of the trial. Production per day per tapper stays the best on full spiral tapping system.

*Orientation trial on PB 5/51 first year of tapping*

After the first year of tapping, results on yield and growth are different to results on GT 1. Stimulation response is directly linked to the cut length reduction: the best cumulated production is reached with S/2 and S/3. Nevertheless, we observe in spite of the cut length decrease, that stimulation has an effect on the growth.

TABLE 5

YIELD AND GROWTH ON PB 5/51 FIRST YEAR OF TAPPING

Treatment	Yield		Girth increase	
	g/tree/total cumulated	in % of control	in cm	% of control
S, D/7 0.60m 4 stimulations	1231	73	0.9	100
3/4 S, D/3 D/4 No stimulated 1.20m	1392	82	1.4	156
S/2, D/3 D/4 4 stimulations	1745	103	0.8	89
S/2, D/2 D/2 D/3 No stimulated	1536	91	2.3	255
S/2, D/3 D/4 alternated 4 stimulations	1894	112	1.4	156
S/3, D/2 D/2 D/3 4 stimulations	2168	128	0.8	89
S, D/3 D/4	1691	100	0.9	100

## CONCLUSIONS

These trials obviously show :

The close relation between tapping systems, growth and yield.

With an adapted tapping system, it is possible to obtain at the same time a good yield and a good growth.

The possibility to reduce the tapping cost, owing to the reduction of tapping intensity compensated by stimulant application.

On the other hand, as the Malaysia research workers have already shown, the interest to adapt the tapping system to each clone.

It is too early to assent what will be the best policy but it can be indicated as likely the possibility to recommend for industrial practice tapping system on young trees like S/2, D/3 D/3 stimulated 3 or 4 times per year and may be with shorter cut in the future.