Bulletin of the Rubber Research Institute of Sri Lanka, (1999) 40, 39-44

EFFECTIVE AND EFFICIENT EXPLOITATION OF HIGHER VIRGIN PANELS IN *HEVEA BRASILIENSIS* MUELL. ARG.

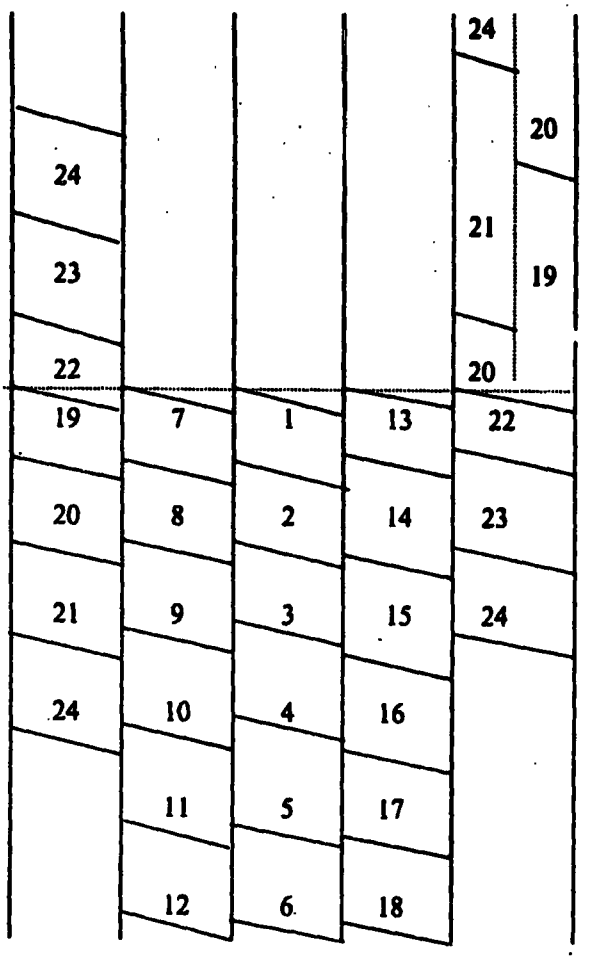
A Nugawela and R P Karunasena

INTRODUCTION

Hevea brasiliensis is economically important primarily because of its latex. Latex is harvested from the tree by tapping the bark of the tree systematically. Tapping systems are aimed at obtaining highest yields with lowest cost and with no adverse effect to the tree. The tapping system recommended for the widely planted clones in Sri Lanka are described in Figure 1 (Advisory Circular, 1994/05).

Accordingly, the higher panels are exploited after the tapping of panels B0-1, B0-2 and B1-1, *i.e.* 18 years of tapping. Similarly, in India the higher panels are exploited after 18 years of tapping in the base panels (Rubber and its Cultivation).

To harvest economical yields from renewed base panels sufficient time should be given for renewal, *i.e.* ca. 12 years. Therefore, each of the base panels B0-1 and B0-2 should be tapped for atleast 6 years. Nevertheless, in most plantations both B0-1 and B0-2 are consumed in a lesser period of time, *i.e.* 7-10 years. Therefore, sufficient time is not allowed for renewal of base panels, *i.e.* B1-1 and B1-2, before they are tapped. To avoid tapping of such partly renewed base panels some plantations resort to tapping of higher panels (HO) once panels B0-1 and B0-2 are tapped. Further, some plantations tap B1-1 commencing above the initial height of opening *i.e.* higher virgin panels, with same objective. The effect of such systems on the yield is not well understood and therefore needs to be investigated.



Year of Tapping	Tapping System	Tapping Panel
1	½ S d/3	(B0 - 1)
2-18	½ S d/2	(B0-1); (B0-2); (B1-1)
19-21	½ S (↓) + ¼ S(↑) d/2	(B1-2) and H0-1, H0-2
22-23	½ S (↓) + ½ S(↑) d/2	(B2-1) and H0-3
24	4 x ½ S (↑↓) d/2	(B2-1); (B1-2); H0-1;H0-2; H0-3

Fig. 1. The tapping panels and area to be tapped in each panel in different years of the tapping cycle

MATERIALS AND METHODS

Experimental area

The study was confined to Kalutara District. The following mature clearings in which tapping of panel B0-2 was completed were selected for the study.

1. PB 86, 1977 Replanting, Lagos Division, Payagala Estate.
2. PB 86, 1976 Replanting, Kalupahana Division, Perth Estate.

In both clearings above tapping had been commenced during the latter part of 1983. The tapping of both base panels have been completed in 1993. Therefore, the time given for bark renewal is ca. 10 years in both clearings selected.

Experimental design

From each clearing above, two tapping blocks tapped by same tapper were selected. Sixty trees were selected randomly from each tapping block for the study. The following treatments were introduced randomly in each tapping block, selecting twelve trees per treatment.

Treatment 1- Tapping panel B1-1 downwards, commencing at original height of opening (Fig.1 a).
Treatment 2 - Tapping of virgin bark downwards, commencing 15 cm above panel B1-1 (Fig.1 b).
Treatment 3 - Upward tapping of higher virgin panels above panel B1-1 (Fig.1 c).
Treatment 4 - Downward tapping of higher virgin panels using a ladder (Fig. 1d).
Treatment 5 - Puncture tapping of higher virgin bark [2.5%ET, Ga 1.6 (0.5) (m) (Fig.1 e).

In treatment 5, once puncture tapping is completed on the entire circumference, treatment 3 (T_6) and 4 (T_7) were introduced selecting equal number of trees per treatment.

Data collection

A test tapping was done each month and the mean yield, *i.e.* gramms per tree per tapping (g/t/t), was calculated for each treatment. Further, the rate of bark consumption was monitored during the first two years of the trial.

RESULTS

Tapping of virgin bark downwards, commencing 15 cm above panel B1-1

The mean yield, *i.e.* gramms per tree per tapping (g/t/t) from the 15 cm virgin bark area above the original height of opening, *i.e.* T_2 and the mean yields from treatments T1 and T3 for the same period of time are given in Table 1.

Table 1. *The mean yield (g/t/t) from the 15 cm virgin bark area in T_2 and from treatments T_1 and T_3 for the corresponding period from panels B1-1 and B1-2*

Panel	Replicate	Treatment and mean yield (g/t/t)		
		T_1	T_2	T_3
B1-1	1	37.9	35.3	41.1
	2	33.0	19.0	28.9
	3	39.3	29.2	50.4
	4	38.7	29.8	47.2
B1-2	1	32.9	36.3	43.3
	2	50.4	29.0	31.1
	3	30.9	27.5	48.5
	4	26.0	26.0	34.5
	Mean	35.1	29.7	39.4
		(118)	(100)	(133)

The yield, *i.e.* g/t/t is significantly low in Treatment 2.

Yields from lower renewed and higher virgin panels

Highest mean yields are given when panel B1-1 is tapped downwards (T_1) (Table 2). Nevertheless, the mean yield from panel B1-1 is less when tapped downwards commencing 15cm above the original height of opening (T_2). The higher virgin panels when tapped upwards (T_3), give relatively high yields in the initial year or so, but the yield declines in subsequent years. Yields are relatively less when higher panels are puncture tapped (T_5).

Table 2. *Mean yield from different tapping treatments tested during different periods of tapping*

Period of Tapping	Treatment and mean yields (g/t/t)				
	T_1	T_2	T_3	T_4	T_5
9 - 93 to 12-93	42.4	28.9	46.9	37.0	17.2
1-94 to 12-94	39.8	34.1	36.5	34.0	28.3
1-95 to 12-95	46.3	36.9	35.2	36.5	39.0
1-96 to 12-96	45.7	36.6	32.5	31.6	29.6
Mean	43.6	34.1	37.8	34.8	28.5

The panels were changed over in T_1, T_2, T_3 and T_4 from January 1997. Data from January 1997 to December 1998 after the panel change over is given in Table 3. The treatment differences are similar to that observed prior to panel change-over. Higher virgin panels, previously puncture tapped does not show a decline in yield when tapped conventionally (Table 3).

Table 3. *Mean yield, after changing over of panels and introducing T_6 and T_7.*

Time Period	Treatment and mean yields (g/t/t)					
	T_1	T_2	T_3	T_4	T_6	T_7
1-97 to 12-97	35.2	31.1	38.3	33.0	42.8	30.9
1-98 to 12-98	33.2	30.5	31.0	31.5	36.0	30.9
Mean	34.2	30.8	36.5	32.8	39.4	30.9

DISCUSSION

As mentioned earlier, the panel B1-1 is tapped ca. 15cm above the original height of opening in some Plantations to give more time for renewal of base panels. Nevertheless, there is evidence to show that when this area of bark is tapped downwards rather than upwards there is a decline in yield by ca. 33% (Table 1). Due to this the possible yield loss from a single panel of a tree and from a hectare is ca. 1.17 kg and 410 kg of dry rubber respectively. For both panels, *i.e.* B1-1 and B1-2 the yield loss will be twice as this (Table 4).

Table 4. *The possible yield losses by tapping virgin bark above panels B1-1 and B1-2 downwards*

	T_2	T_3	Variance
Mean g/t/t	29.7	39.4	9.7
No. tappings	120	120	-
Total crop/tree(kg)	3.56	4.73	1.17
Crop/Hectare (kg)	1246	1656	410

Assumptions: 1. 15 cm bark = 120 tappings
2. Stand = 350/ha.

Further, the additional time given for bark renewal by commencing to tap 15 cm above the original height of opening (T_2) has not improved the yield from renewed base panels. Infact, a decline in yield is observed (Table 2).

The yields from partly renewed base panels (T_2) and from the higher virgin panels when tapped upwards (T_3), downwards (T_4) and puncture tapped (T_5) are given in Table 2. The B1-1 panel was tapped out during the period of September 1993 to December 1996, *i.e.* 40 months. For this period the g/t/t is highest when panel B1-1 is tapped downwards. Among the three systems tested to tap the higher virgin panels, upward tapping (T_3) gave the height g/t/t (Tables 2 & 3). The treatment differences were similar after changing over of the panels, *i.e.* tapping B1-2 and the other virgin bark panel. Therefore, it is apparent that the mean g/t/t of poorly renewed base panels, B1-1 and B1-2, though renewed for 10 years only, are higher than that of higher virgin panels.

The higher virgin panels when tapped upwards are expected to yield better due to the maturity of bark, *i.e.* 24 years and larger drainage area. Anyhow, this trend is observed only during the initial year of tapping. This may be due to the difficulty of technically correct tapping, *i.e.* length depth and angle of the cut and latex wastage, with the increase in the height of the cut.

The yield from higher virgin panels is less when tapped downwards than when tapped upwards. This is possible due to lesser drainage area with downward tapping of higher virgin panels. This is further proved with the gradual decline in yield in this treatment (Tables 2 and 3). With the lowering of the cut, the drainage area declines. Even in higher virgin panels, yields from puncture tapping with stimulation is less than that from conventional tapping. Puncture tapped bark when exploited through conventional tapping, does not show a decline in yield.