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# IMPROVEMENTS IN TOTAL PRODUCTION AND PRODUCTIVITY IN THE RUBBER PLANTATIONS

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The total production in a plantation is determined by its total mature extent and the productivity. Inorder to ensure highest production both mature extent and productivity has to be at optimal levels. Highest possible production should be achieved to minimise the cost of production.

The Rubber Research Institute recommends a 30 year replanting cycle for Rubber. If this is correctly adhered to an Estate at a given time will have 16.5% and 83.5% of its extent as immature and mature rubber respectively. Nevertheless, in the majority of the Plantation Companies the mature extent is much less than 83.5% (Table 1). This situation can be rectified by prolonging the tapping cycle in existing clearings and also by reducing the immature period.

The productivity levels achieved by some Plantation Companies are also given in Table 1. These figures and the national productivity levels (Table 2) indicate that in our Plantations there is room for improving the productivity levels. Some reasons for low productivity in our Plantations are a) use of poor yielding clones b) poor and less vigorous stands c) incorrect tapping policies and d) crop losses due to interference of rain and tapper shortage.

1. **Clones**

   Out of the total revenue extent in our Plantations more than 50% is of clone PB 86. This is due to extensive planting of this clone in the past. Even to-day, though there are about 30 clones in the recommendation list RRIC 100 and 121 are planted extensively (Fig. 1). This situation has to be rectified by planting a mixture of high yielding clones.

2. **Complete and vigorous stand**

   Through correct nursery practices quality, vigorously growing planting material has to be selected. Adoption of correct planting techniques, and infilling weak and dead plants are equally important to achieve a complete and a vigours stand. Timely weeding, manuring, removal of off-shoots and branch induction are needed to achieve the potential growth levels (Table 3). In such clearings the yield potential will be very high (Table 3).

3. **Tapping policies**

   To harvest the potential yield of a clearing correct tapping policies have to be adopted. This will ensure high yields through out the 24 year tapping cycle resulting in enhanced tapper productivity and low cost of production.

3.1 **Tappable tree**: A tree is tappable once a girth of 50 cm is reached at a height of 120 cm from the heights point of the union.

3.2 **Tappable clearing** : Tapping can be commenced in a new clearing when 60% of the trees have reached a tappable girth.

3.3 **Marking of tapping cut** : In a tappable clearing, trees with a girth of 45 cm or more could be marked and tapped.

3.4 **Commencing of tapping**: The period May to September, *i.e.* Monsoonal rains with incidence of phytopthora should be avoided for commencement of tapping. The months November, December will be suitable for this.

3.5 **Guide lines**: Each year, guide-lines should be drawn to facilitate technically correct tapping, *i.e.* correct length, depth, angle and to control rate of bark consumption, *i.e.* 8" and 5.5" for d/2 and d/3 tapping respectively.

3.6 **Tapping systems and panels**: Tapping systems to be used depends on the clone (Table 4). The panels to be tapped during each year in the tapping cycle is given in Table 5. It is very important that the bark consumption is controlled in order to adhere to the 24 year tapping cycle.

**3.7 Crop losses**

3.7.1 **Rain interference**:- The number of tapping days possible per annum, at company level are given in Table 6. The lost tapping days results in about 30% loss in crop. This also reduces the income levels of tappers, who are daily wage earners. Rainguards could be successfully implemented in plantations to overcome this situation. The number of additional tapping days needed to cover the cost of a rainguard depends on a) cost of a rainguard b) yield potential of trees and c) rubber prices and cost of production (Table 7). There is evidence that about 70 tapping days per annum could be recovered by the use of rainguards (Table 8).

3.7.2 **Tapper shortage** – It is becoming evident that sufficient tappers are not available to adopt ½ S d/2 system. Therefore, estates are facing the problems of vacant tapping blocks even after employing unskilled tappers. Both vacant blocks and use of unskilled tappers will lead to a crop loss (Table 9). This problem could be partly overcome by using low frequency tapping systems with yield stimulation (Table 10).

Table 1. *Mature extents and productivity levels in some Plantation Companies (Year 1997)*

| Plantation Company | | YPH | Mature Extent (%) |
|---|---|---|---|
| A | *Mean* | *779* | *76.7* |
| | Min | 598 | 62.0 |
| | Max | 905 | 93.3 |
| B | *Mean* | *870* | *78.0* |
| | Min | 746 | 26.4 |
| | Max | 960 | 96.1 |
| C | *Mean* | *1157* | *64.3* |
| | Min | 1017 | 52.9 |
| | Max | 1425 | 85.7 |
| D | *Mean* | *738* | *81.1* |
| | Min | 586 | 70.0 |
| | Max | 898 | 96.2 |
| E | *Mean* | *895* | *65.2* |
| | Min | 731 | 19.1 |
| | Max | 1167 | 92.2 |
| F | *Mean* | *910* | *77.8* |
| | Min | 834 | 62.9 |
| | Max | 1048 | 85.5 |
| G | *Mean* | *816* | *77.5* |
| | Min | 485 | 67.1 |
| | Max | 1173 | 85.1 |
| H | *Mean* | *985* | *84.0* |
| | Min | 540 | 75.0 |
| | Max | 1315 | 93.6 |
| I | *Mean* | *666* | *81.0* |
| | Min | 573 | 62.0 |
| | Max | 900 | 91.1 |
| J | *Mean* | *834* | *74.0* |
| | Min | 662 | 65.4 |
| | Max | 1010 | 80.2 |
| K | *Mean* | *881* | *66.4* |
| | Min | 742 | 6.6 |
| | Max | 1201 | 89.4 |
| L | *Mean* | *884* | *51.4* |
| | Min | 854 | 8.5 |
| | Max | 923 | 87.4 |
| M | *Mean* | *1032* | *81.7* |
| | Min | 777 | 74.2 |
| | Max | 1229 | 91.8 |

Table 2. *Productivity levels in some major rubber growing countries*

| Country | Production (1000 MT) | Total Area (1000 Ha.) | Mature Area* (1000 Ha.) | YPH |
|---|---|---|---|---|
| Thailand | 2205.7 | 1966 | 1477 | 1496 |
| India | 591 | 533 | 399.7 | 1477 |
| Vietnam | 219 | 275 | 26.2 | 1061 |
| Philippines | 64 | 88 | 66 | 968 |
| China | 450 | 618 | 463.5 | 971 |
| *Sri Lanka* | *96* | *163* | *122.2* | *783* |
| Malaysia | 886 | 1635 | 1226.2 | 723 |
| Indonesia | 1740 | 3516 | 2637 | 660 |

*75% of Total Area

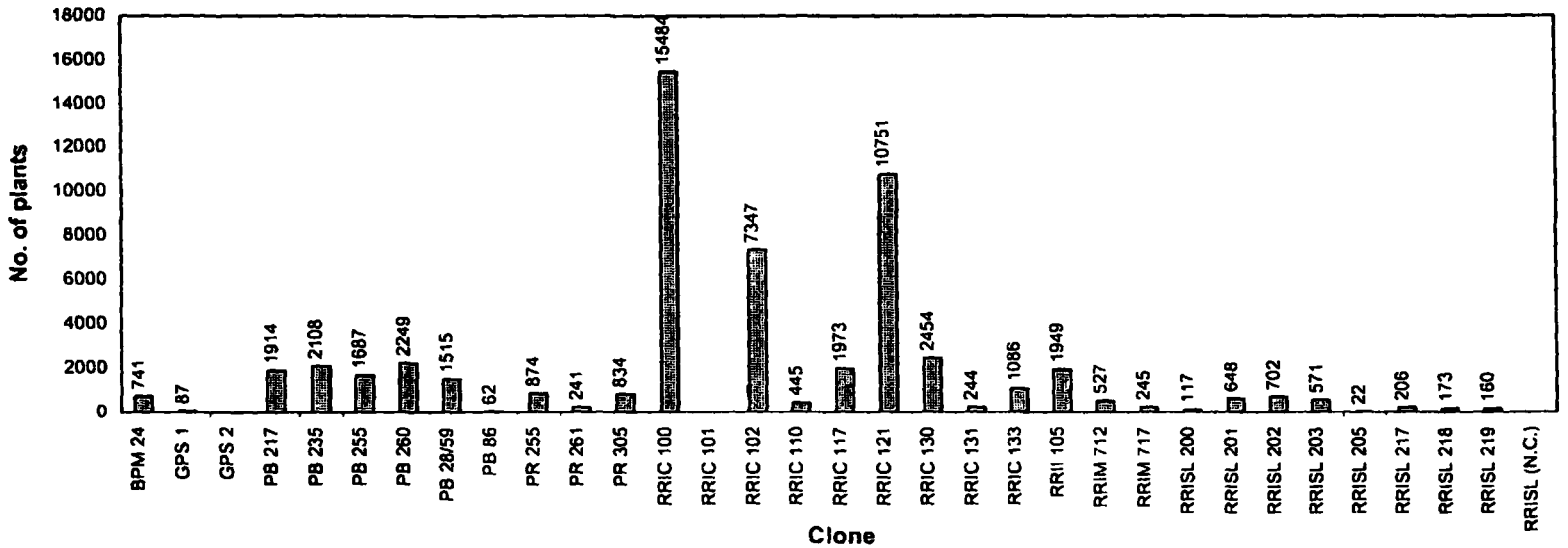



Fig. 1. Clonal composition of the budwood nurseries in plantation sector

Table 3. *The potential growth of novel clones*

| Year | Girth class (cm) & % | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-4.9 | 5-9.9 | 10-14.9 | 15-19.9 | 20-24.9 | 25-29.9 | 30-34.9 | 35-39.9 | 40-44.9 | 45-49.9 | Above 50 | Stand/ Ha. |
| 1 | 25 | 75 | | | | | | | | | 50 | 500 |
| 2 | | | 25 | 75 | | | | | | | | 500 |
| 3 | | | | | 25 | 75 | | | | | | 500 |
| 4 | | | | | | | 25 | 75 | | | | |
| 5 | | | | | | | | | 25 | 75 | | |
| 6 | | | | | | | | | | 25 | 75 | |

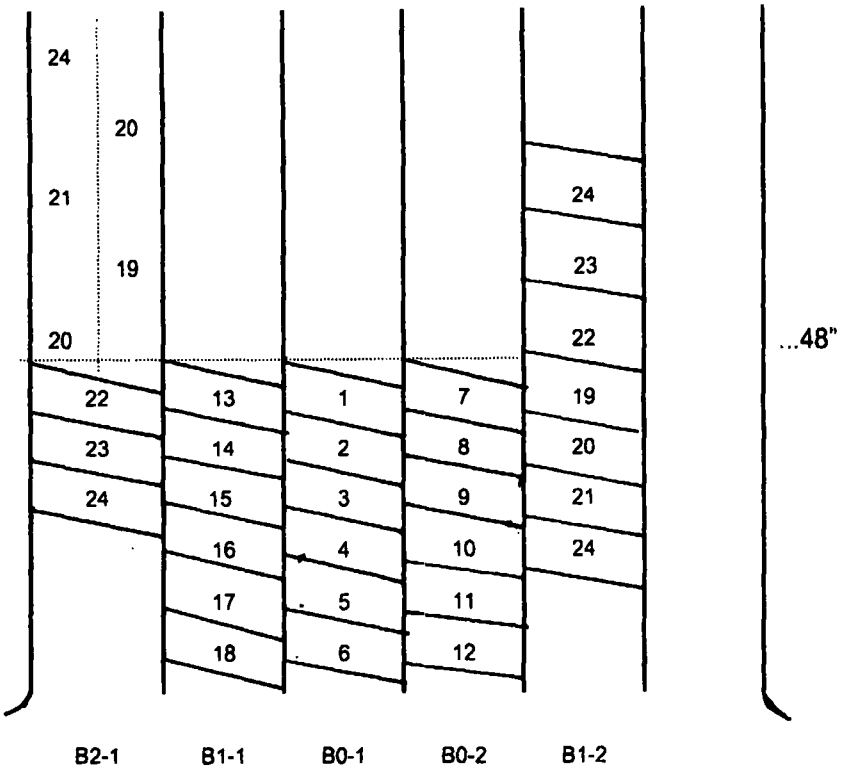
(Girth at 48", measured each year)

| **Yield potential in good clearings** | **Assumptions:** |
|---|---|
| 300 x 50 g/t/t = 15 kg tapper/task/tapping<br>15 x 1.5 x 140 = 3150 kg YPH<br>COP Rs.50.00/kg ⇨ Rs. 25.00/kg. | 1.Tappable stand 450<br>2.Tapping days 140 |

Table 4. *The tapping systems recommended for different clones*

| Clones | Period (years) and Tapping Systems | | |
|---|---|---|---|
| | ½ S d/3 | ½ S d/2 | Intensification |
| 1. PB 86 | - | 18 | 6 |
| 2. RRIC 100,102,117,121 | 1 | 17 | 6 |
| 3. RRIC 130,131,133 | 3 | 15 | 6 |
| 4. PB 28/59, 217,235 | 18 | - | 6 |

Table 5. *Tapping panels and systems for each year in the 24 year tapping cycle*




| Year | Tapping systems |
|---|---|
| 1 | ½ S d/3 |
| 2-18 | ½ S d/2 |
| 19-21 | ¼ S(↑) + ½ S(↓) d/2 |
| 22-23 | ½ S(↑) + ½ S(↓) d/2 |
| 23 | 4 x ½S (↑↓)d/2 |

Table 6. *Tapping days recorded in different Plantation Companies (year 1997)*

| Company | NT | LT | WO | RT | NO |
|---|---|---|---|---|---|
| Kahawatta | 209 | 71 | 8 | 17 | 76 |
| Horana | 204 | 55 | 13 | 21 | 91 |
| Maturata | 228 | 54 | 27 | 16 | 74 |
| Kotagala | 213 | 62 | 13 | 27 | 80 |
| Kegalle | 223 | 37 | 26 | 30 | 81 |
| Agalawatta | 213 | 61 | 5 | 35 | 84 |
| Balangoda | 198 | 65 | 5 | 27 | 96 |
| Bogawantalawa | 212 | 64 | 12 | 34 | 76 |
| Elkaduwa | 284 | - | - | 6 | 75 |
| Elpitiya | 207 | 48 | 6 | 29 | 108 |
| Hapugastenna | 215 | 54 | 18 | 28 | 73 |
| Kelani Valley | 218 | 62 | 23 | 30 | 74 |
| Malwatta Valley | 218 | 62 | 23 | 30 | 74 |
| Pussellawa | 199 | 79 | 22 | 20 | 69 |
| Talawakelle | 254 | 35 | - | - | 76 |
| Namunukula | 225 | 63 | - | 34 | 74 |

Table 7. *Economics of using rainguards*

| | |
|---|---|
| NSA/Kg | = Rs.55 |
| Tapping + Maintenance Cost/Kg | = Rs.(18.00+9.00) |
| Profit/Kg | = Rs.(55-27) |
| | = Rs.28.00 |
| Cost of Apron type RG/Tree | = (1000/28 x8)g |
| | = 286 g |
| Additional t/days to harvest 286 g | |
| If g/t/t = 25; 286/25 | = 11 days |
| If g/t/t = 35; 286/35 | = 8 days |

Factors Determining Profitability

- NSA
- Tapping and Manufacture Costs
- Cost of RG
- Yield
- Wet Days

Table 8. *Tapping days with an without rainguards*

| Tapping days | Rainguards | |
|---|---|---|
| | with | without |
| Normal | 316 | 234 |
| Late | 11 | 50 |
| No | 38 | 81 |
| Crop lost (days) | 42 | 94 |
| Crop lost (%) | 12 | 26 |

Table 9. *Crop loss due to tapper shortage*

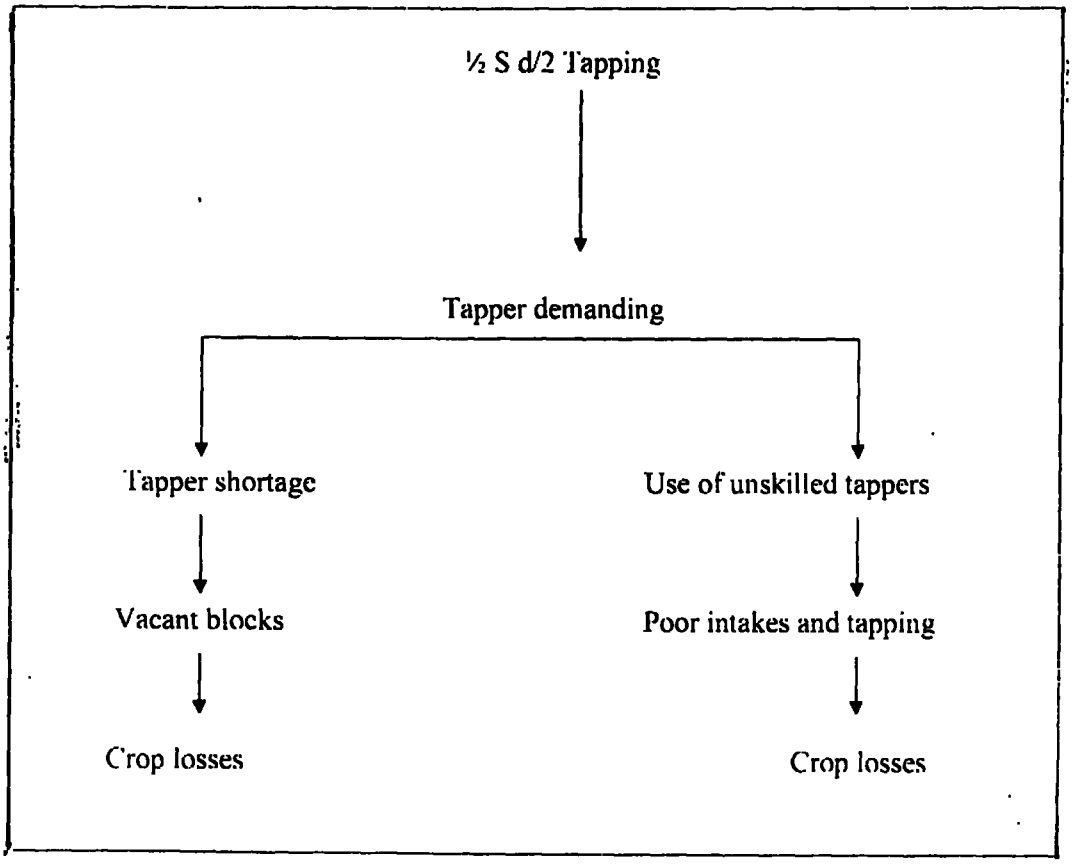


Table 10 . *Recommendations on low frequency tapping*

**d/3 System of tapping**

- ½ S d/3 + E (2.5% ET, Ba 1.6 (2.5) 4/Y)
- Each Tapper - 3 blocks (300 x 3 = 900 trees)
- Ethrel Concentration - 2.5% (5% Ethrel + equal volume warm water)
- Method - Bark application
- Amount/tree - 1.6g (1.5ml)
- Frequency - 4/year
- Application No — Month of Stimulation

| | |
|---|---|
| 1 | Late December/January |
| 2 | June |
| 3 | Late July/August |
| 4 | November |

Age of Clearing - from 2nd year of tapping

Clones - all clones except those recommended for d/3 tapping