Bulletin of the Rubber Research Institute of Sri Lanka, (2000) **42**, 38-48

BUDWOOD NURSERIES IN SRI LANKA: CONDITION OF THE NURSERIES IN THE ESTATE SECTOR

P Seneviratne, A Nugawela, U S Weerakoon, M N de Alwis and L Zoysa

INTRODUCTION

Budwood Nurseries of recommended clones are maintained in most of the rubber estates managed by Plantation Companies. In addition Rubber Development Department has four large nurseries namely Walikadamulla, Egaloya, Karapincha and Meerigama to cater the small holder sector. A large number of private commercial nurseries are also available but all these nurseries consist only of clones RRIC 100, 102 and 121. All these private commercial nurseries are inspected by officers of the Plant Science Department, of RRISL and a report is submitted to the RDD. Based on the recommendations of the report the RDD issues a permit to harvest or sell budwood. Budwood nurseries in estates too are inspected, on their request mainly for authenticity. But however, the present condition with regard to clonal composition and also agromanagement conditions are not satisfactory. In order to revise the guidelines and practices to upgrade the condition of budwood nurseries, a survey was conducted and results are discussed in this report.

MATERIALS AND METHODS

The plantation companies and estates used for the survey are shown in the Table 1.

Table 1. *The plantation companies and estates used for the survey*

	Plantation Company & Managing Agent	***Estate***
1	Agalawatta Plantation Ltd. (Mackwoods Plantation (Pvt.) Ltd.)	Ambetanne, Clyde, Culloden, Doloswela, Kiribathgala, Kiriwanaketiya, Mohomadi, Niriella+Niriwatta, Noragala, Peenkanda, Pimbura, Watapotha
2	Balangoda Plantations Ltd Stassen Exports Ltd.	Galatura, Mahawale, Millawitiya, Mutuwagala, Palmgarden, Rambukkanda, Wewila
3	Bogawantalawa Plantations Ltd. Metropolitan Agencies (Pvt.) Ltd.	Anhettigama, Densworth, Eila, Illuktanne, Keppitigala, Mahaoya, Maliboda, Miyanawita, Muwankande, Nottinghill , Pitiyakande, Reucastle, Sapumalkande, Udabage, Udapola, Woodend
4	Elkaduwa Plantations Ltd Metropolitan Management	Hapugaspitiya, Millawana, Nalanda

5	Elpitiya Plantation Ltd. Carsons Agro Services Ltd.	Bentota, Divituraí, Elpitjya, Gulugahakanda+Nagoda, Igalkanda, Ketandola, Lelwala, Mapalagama+Talgaswala
6	Hapugastanne Plantations Ltd. Finlay Plantation Management Ltd	Bibile, Hapugastanne, Hatherleigh, Lellopitiya, Madampe
7	Horana Plantations Ltd. Ceyexxe Plantations Ltd.	Dumbara, Frocester, Halwatura, Hillstream, Kobowela, Mirishena, Neuchatel
8	Kahawatta Plantation Ltd. Estate Management Services (Pvt.) Ltd. (Pickle Pakers Ltd.)	Ekerella, Houpe, Hunuwela, Opatha, Pelmadulla, Poranuwa, Rilhena, Wellandura
9	Kegalla Plantations Ltd., RPK Management Services (Pvt.) Ltd.	Ambadeniya, Atale, Eadella, Etana, Golinda, Golinda, Golinda, Hathbewa, Higgoda, Madeniya, Newlands, Pallegama, Parambe, Udapola, Weniwella, Yataderiya
10	Kelani Valley Plantations Ltd. Dipped Products Ltd.	Dewalakande, Ederapolla, Ganepalla, Ganepalla, Halgolla, Kalupahana, Kelani, Kiriporuwa, Kitulgala, Lavant, Panawatte, Polatagama, Urumiwela, We-Oya
11	Kotagala Plantation Ltd. George steuarts Management Services (Pvt) Ltd.	Arappolakanda, Dalkeith, Eduragala, Geekiyanakanda, Hagalla, Millewa, Padukka, Payagala, Perth, Rayigam, Sorana, Usk Valley, Vogan, Hedigalla
12	Malwatte Valley Plantations Ltd. Magpek Colombo Land Plantation Mgmt. (Pvt.)Ltd.	Chesterford, Erract, Glenesk, Moralioya, Ruwanwella, Sunnycroft, Talduwa, Vincit
13	Maturata Plantation Ltd. Crop Management Services Ltd.	Andapana, Didddenipotha, Wilpita
14	Namunukula Plantation Ltd. Bartleet Plantation Services (Pvt) Ltd.	Akuressa, Citrus, Eladuwa, Ellakanda, Ellakanda, Hallala, Hulandawa, Miriswatta, Monrovia, Pallegoda, Pelawatte, Pilagoda Valley, Sirikandura, Tannehena, Walpita, Yatadola
15	Pussella Plantations Ltd. Free Lanka Management Co. (Pvt.) Ltd.	Ayr, Durampitiya, Eheliyagoda, Elston, Halpe+Hewagam, Keragala, Pambegama, Penrith, Pussella, Salawa, Siriniwasa, Sunderland
16	Siyambalanduwa Plantations Ltd	Kumarawatta, Moneragala
17	Talawakele Plantations Ltd. Haleys Plantation Services Ltd.	Indola, Moragalla, Pitiyagoda, Walahanduwa
18	Udapussalawa Plantations Ltd. Bartleet house	Yatawatta
19	Watawala Plantation Ltd., (Lankem Plantation Services Ltd.) Estate Management Services (Pvt.) Ltd.	Homadola, Nakiadeniya, Stoksland, Talangaha, Galabode

Information such as the clones, number of plants per clone, year of planting, budwood nurseries to be established for year 1999 and 2000 were gathered from each estate by sending a questionnaire in October 1998. However, the information received on existing nurseries were not in accordance with the reports that RRI had for the estates after inspecting those nurseries in July-August same year. Therefore, two officers inspected all the estates, which had not been visited during 1998, in order to verify the information given in survey reports.

RESULTS

Present condition of nurseries

Authenticity

Mixing up of clones is a major problem and in general RRISL recommendations are not adopted to secure the authenticity. For instance, each plant should have a colour band 15 cm above the graft union and this is hardly practiced. Though each clone should be planted separately, demarcated with a few strands of galvanized wire and given a separate access, there were 2-3 clones planted very close to each other and some times on the same bed.

Name boards were not available or what was given on the board was incorrect *i.e.* the clone and the number of points. Presence of withdrawn clones was also observed and a certain percentage of seedlings were also present among the clonal plants.

Location

Majority of the nurseries were established in acceptable locations as far as sun light, soil, *etc.* are concerned, but some nurseries were close to mature clearings or had hedges with large trees. A certain percentages of nurseries are located in very remote corners of the estate where access is very difficult and are not easily seen by the Superintendents unless purposely visited.

Quality of budwood

Presence of over mature budwood was observed in a large number of nurseries.

Age of the nurseries

Number of plants in each age group from 0-32 years is shown in figure 1.

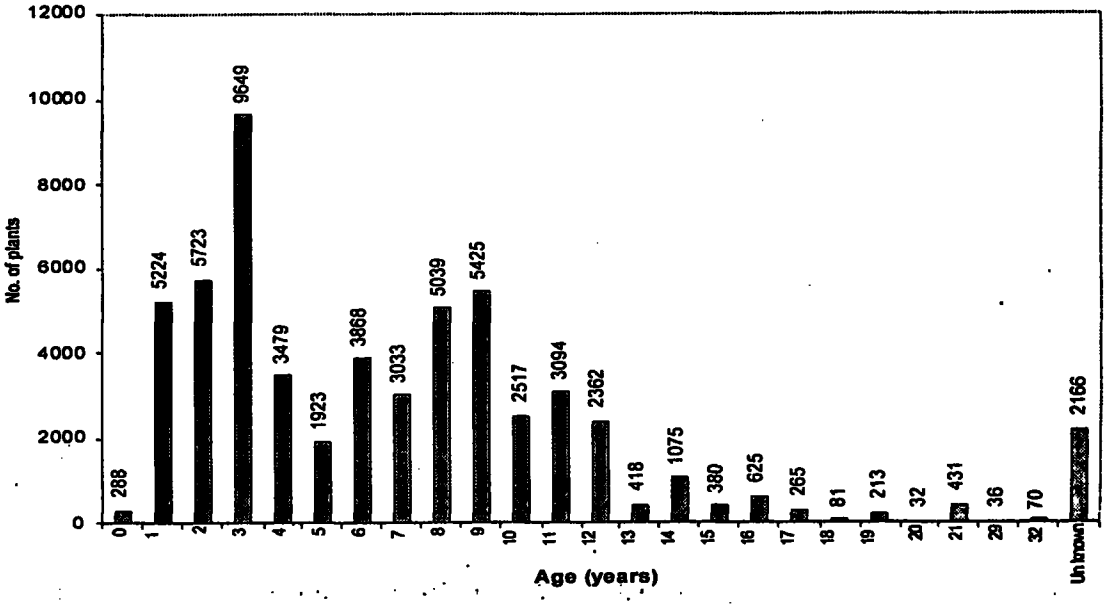

Fig. 1. Age and the number of plants for all clones. Results for 132 estates

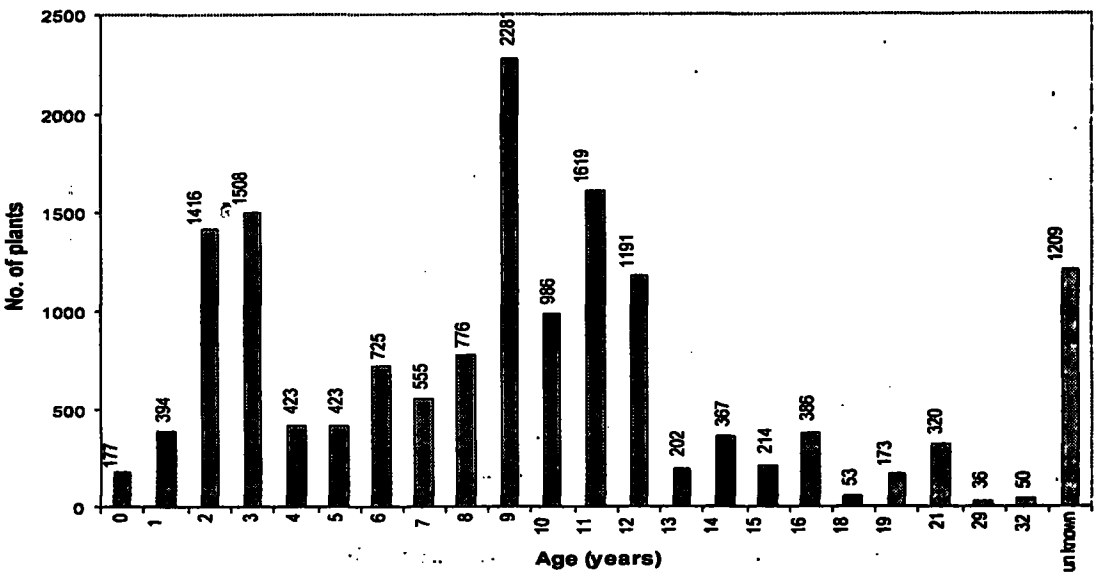

Fig. 1a. Age distribution of RRIC 100 in all estate

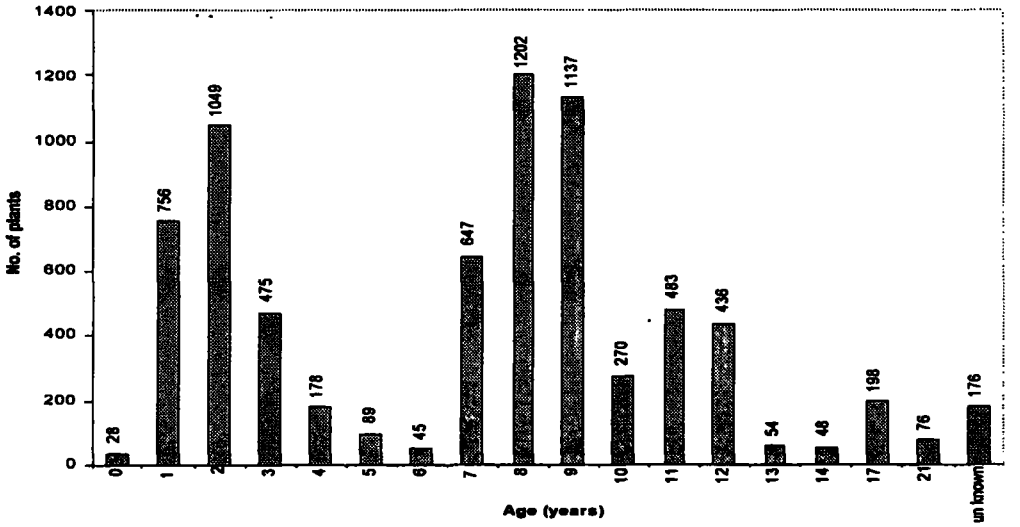

Fig. 1b. Age distribution of RRIC 102 in all estates

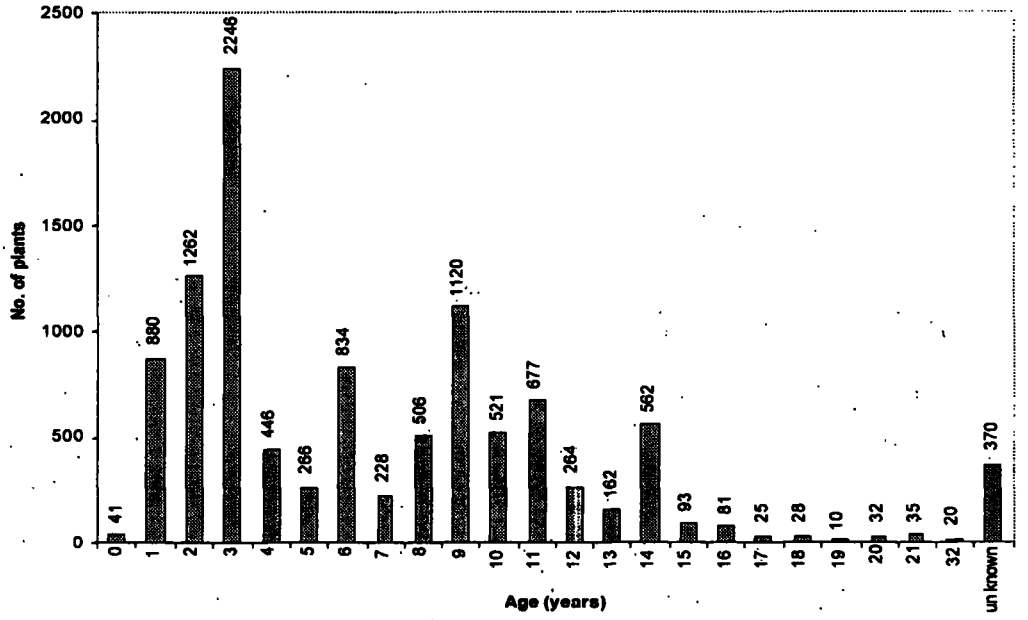

Fig. 1c. Age distribution of RRIC 121 in all estates

As shown in Fig.1, 15.8% of plants are overaged and the age is not known of 3.7% another of the population. Almost all of these are also overaged. Age distribution for RRIC 100, 102 and 121 separately are shown in Figures 1a,b and c. As it can be seen in Fig. 1a, the

percentage of overaged RRIC 100 plants is as high as 29.7% and in a further 7.8% of the plants the age is unknown. Therefore, altogether 37.5%, which accounts to 5806 plants are overaged. As the total number of overaged and unknown plants is 11268 this amount is 51.6% of the total population. In RRIC 102 and 121 the percentages of overaged + unknown plants are 19.9% and 21.9% and the number of plants are 1469 and 2354 respectively. Therefore, 85.3% of the overaged and unknown population is of clones RRIC 100, 102 & 121.

New nurseries established in each year for the past 10 years and the clones are shown in Fig. 2. Figure 2 shows that group 1 clones have been established every year in large numbers but those in other groups have been planted only in small numbers.

Data given in Figure 2 are for all estates. When the data for individual estates and individual clones are concerned, the three clones RRIC 100, RRIC 102 & RRIC 121 have been established almost every year.

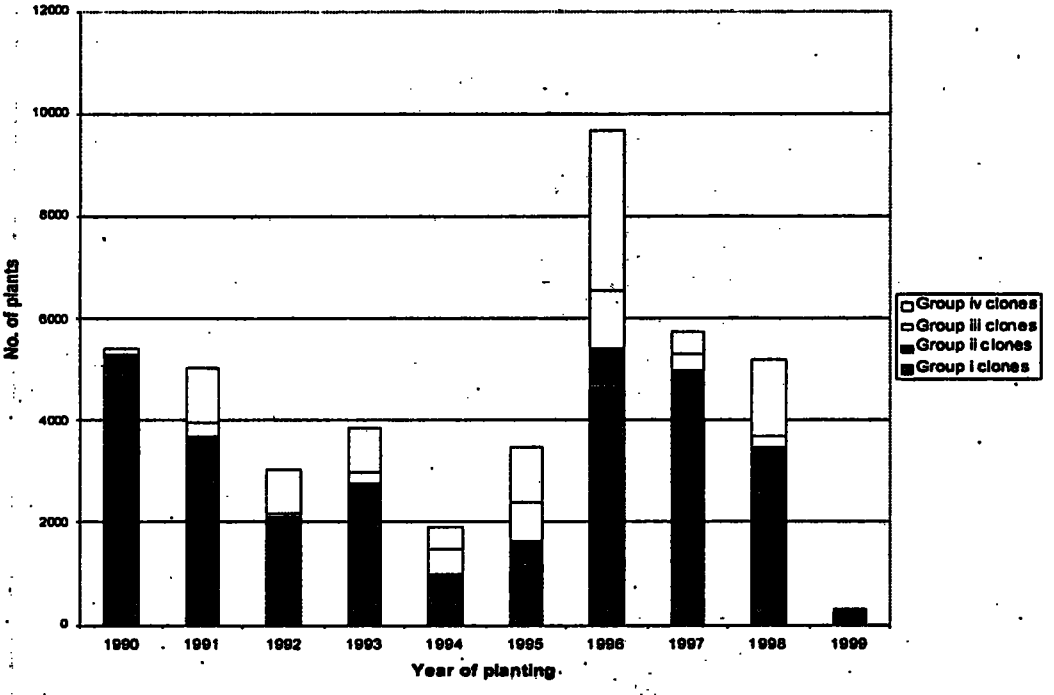

Fig. 2. Number of points of budwood established for the last 10 years

Harvesting

Harvesting and maintaining the frame were satisfactory in most of the estates except in a few instances.

Agromanagement

Proper adoption of agromanagement practices such as weeding, Manuaring, spraying for diseases etc are not practiced in most of the cases.

Amount of budwood

The total number of plants in all estates is 57416. This can supply 2870800 bud patches assuming 5 meters per plant and 10 buds per meter.

At the rate of 600 plants per hectare (including 10% extra) this amount of budwood is sufficient to produce budded plants for 4785 Ha annually.

Estate records

Although data were gathered by sending a questionnaire, most of the nurseries were inspected again as the data provided did not match with the records available at RRI after inspecting the same nurseries in the previous year.

The number of plants given by the estates and the actual number of plants in nurseries, determined after inspecting, are given in Figure 3 for all Estates. The difference in the number of points was 12%. But the percentage of plants with wrong labels was much higher.

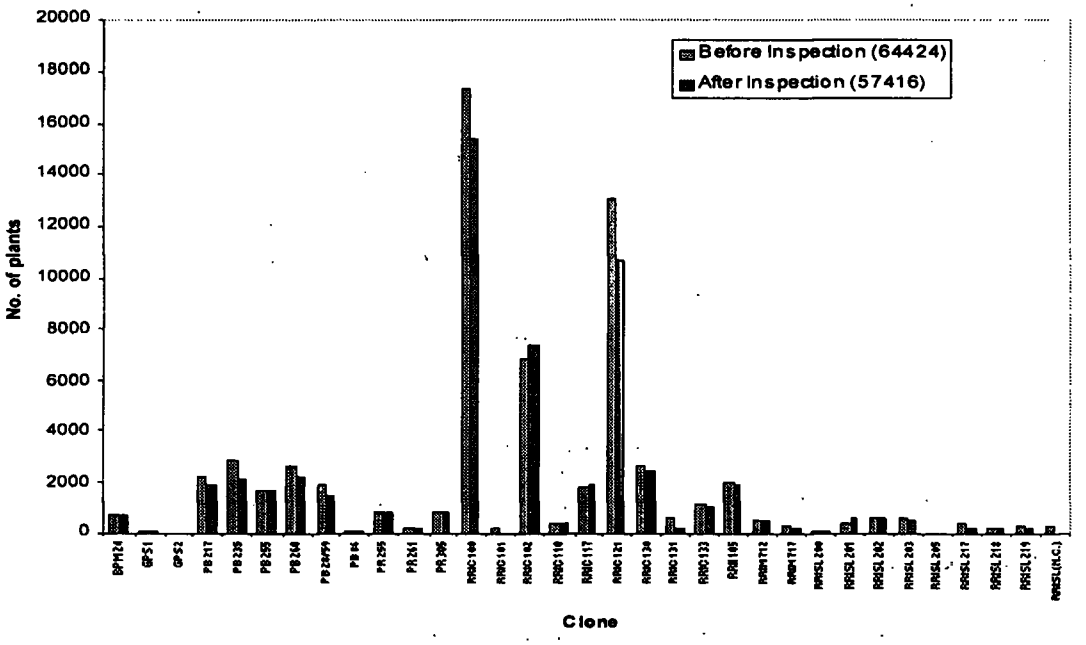

Fig. 3. Number of plants according to the estate records and actual number of plants

Clonal composition

The clones and the number of points available in budwood nurseries of estates are shown in Figure 4a.

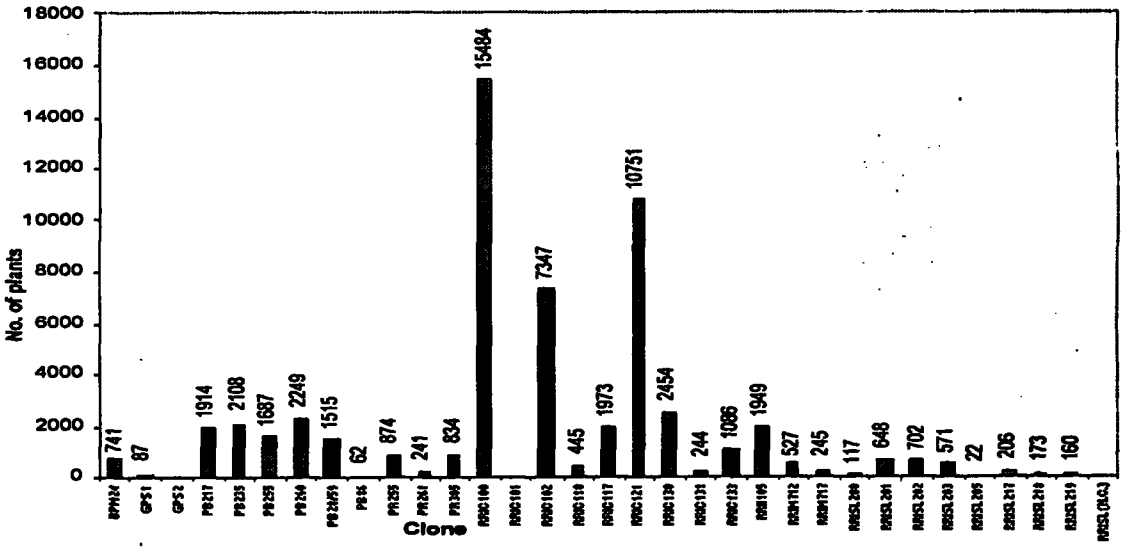

Fig. 4a. The clones and the number of points available in budwood nurseries

Out of 132 estates 4 estates had no budwood nurseries and 24 estates *i.e.* 18% had only RRIC.100,102 and 121. Number of estates having group 1 clones only was 7. The percentage of each clone for 132 estates are given in figure 4b.

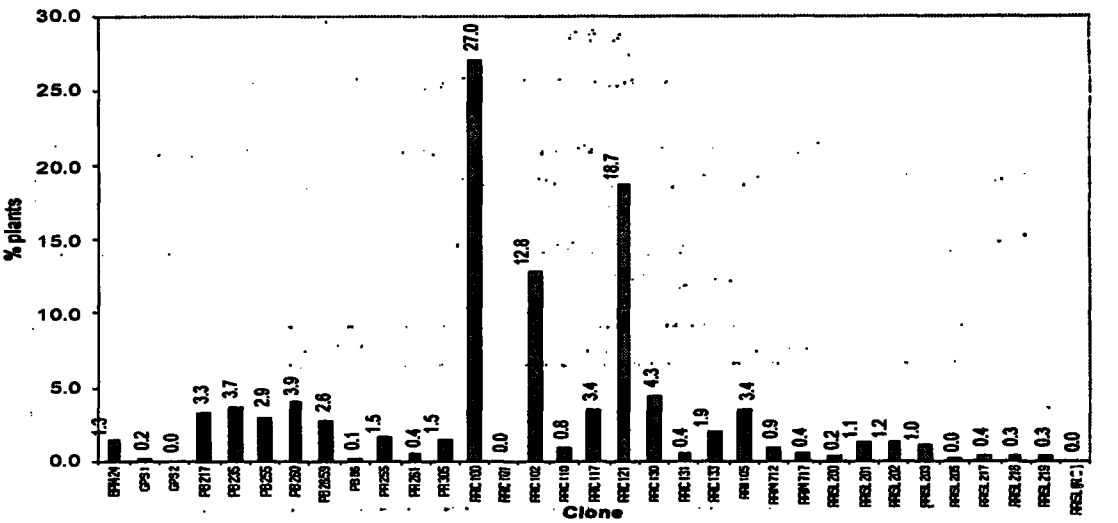

Fig. 4b. The percentage of each clone in all 132 estates

As shown in figure 4a and b more than 25% of the total stand is of clone RRIC 100. Also percentage of RRIC 121 and 102 are 18.7 and 12.8 respectively. Therefore, 58.5% of the total stand in budwood nurseries are RRIC 100, 102 and 121. About 2.2% of plants were of withdrawn clones.

Total number of plants for different groups are shown in figure 5.

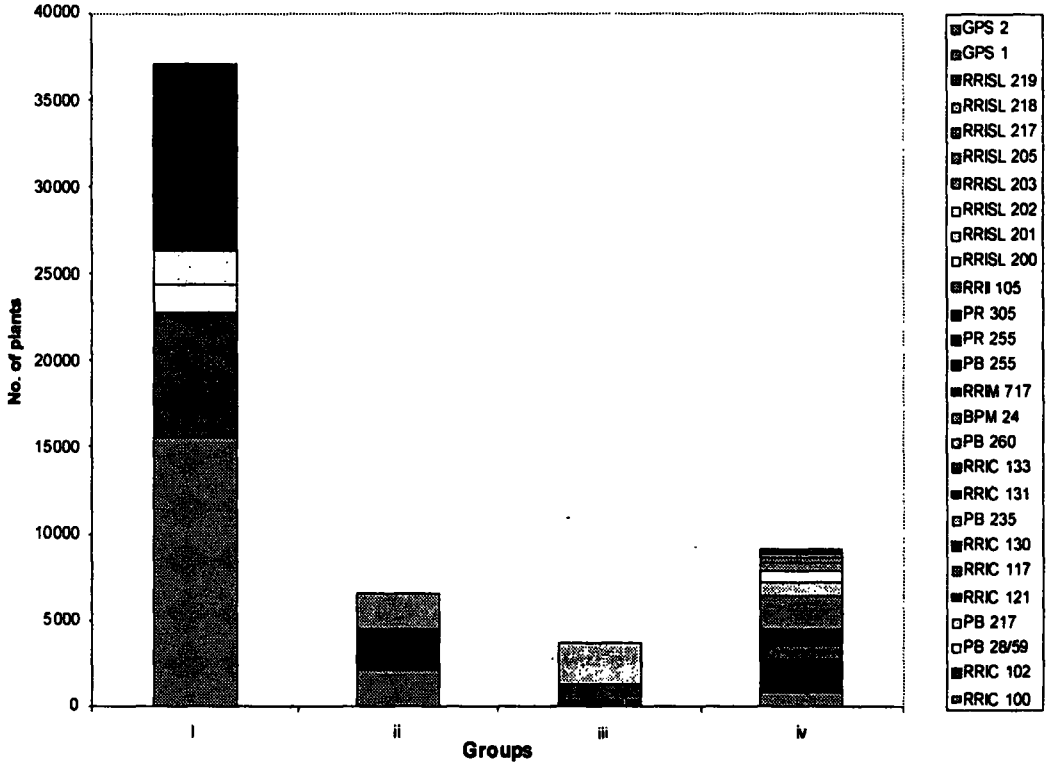

Fig. 5. Total number of plants for four groups

The number of clones, percentages of plants and mean percentage per clone in group i, ii, iii and iv are given in Table 2.

Table 2. *The number of clones percentage of plants and the mean percentage per clone for the four groups*

Group	No. of clones	Percentage of plants	Percentage per clone
i	5	66	13.2
ii	3	12	4
iii	3	6	2
iv	15	15.5	1

DISCUSSION AND CONCLUSION

As reported under results the present condition of budwood nurseries is not satisfactory. This is further evident by the growth condition of the immature clearings in estate.

As far as the authenticity is concerned, pure budwood nurseries were very rare and the main reason for this situation seems to be lack of knowledge and negligence. The clonal composition in budwood nurseries will directly correlate to clonal composition in clearings. When a high yielding clone is mixed with a low yielding clone or seedlings, the productivity will be affected. Further, if one of the clones in a mixed clearing get surrended to a deadly leaf disease this will result in poor stand. Both these will be long term.

One reason for poor condition of budwood nurseries could be their location. Other than their closeness to mature clearings and large trees which will affect the growth, located in inaccessible corners of estates results in a neglected state. It may be a good practice to establish budwood nurseries close to the estate office or bungalows.

Presence of overaged budwood was also observed. The effect of using overaged budwood may be similar to the that of using budwood from overaged nurseries.

Out of the total population, 15.8% and 3.7% are of overaged and unknown plants respectively. These two account to 10773 plants. This is a considerable number of plants and there is no guarantee that budwood is not harvested from these plants. Some years back the recommended life span of budwood nurseries was 7 years. Having considered the expenditure that will incur at re-establishing new nurseries, the age distribution of existing nurseries and rejuvenation from pollarding this was increased up to 10 years and it was clearly stated that this period is allowed with yearly pollarding and with all agromanagement practices adopted fully.

In rubber, the juvenile phase lasts for about 5-6 years and then the trees enter the mature phase characteristic of flowering and wintering. The growth rate too is low in the mature phase when compared to that of the juvenile phase. However, in budwood nurseries since the plants are pollarded every year (the recommended practice) they will not enter the mature phase, after 5-6 years of age. This is evident by the absence of flowering or wintering observed in budwood nurseries. But, as maturation is a slow process of accumulation of certain changes within the plants, after 9-10 years, trees can be in the mature phase though they do not show flowering or wintering. Therefore, it is always advisable to avoid using budwood from overaged plants since the slow growth rate will lengthen the immature phase of the resulting plants.

It appears that there seems to be no policy in adopting when selecting clones or the number of points from each clone for the establishment of budwood nurseries. The calculated annual replanting hectorage is below 2000 ha. To plant this area the budwood requirement is around 20,000 points (assuming, 10 buds per meter, 5 meter per plant and 550 plants per hectare). Nearly three times of this

is available at the moment. For some individual estates this gap between the requirement and availability is very large. In fact the number of points and the clones of budwood nurseries should cater the replanting programme of the estate. But this doesn't seem to be taken into consideration.

Another main shortcoming observed in this regard in the records maintained on Estates. In some cases records were for too distant from the reality. Maintaining proper records is very important for better management.

As far as clonal composition is concerned it is not at all satisfactory. Out of 26 recommend clones , 27% is of RRIC 100 which is too high. Similarly, RRIC 121 and 100 have 18.7% and 12.8 making the total for 3 clones 58.5%. If this situation is represented in plantations too, immediate attention and remedial measures are needed to rectify this situation. Our attempt to correct the clonal composition on individual estates was not very successful as we didn't get the requested information such as the replanting programme and the current clonal compositions. However, it is always worth considering the current clonal composition and the replanting programme to decide on the number of points and the clones to be established in budwood nurseries. When the nursery is too large, the maintenance cost will be high and budwood will be wasted and on the other hand when the nursery is too small, use of poor quality budwood is inevitable to fulfill the budgrafting requirements.