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THE ROLE OF BUDWOOD NURSERY ON THE QUALITY OF THE BUDDED PLANTS

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Budwood nurseries seem to receive the least attention and care in estates. This may be due to lack of knowledge, *i.e* effect of poor quality budwood on the performance of the scion and/or the long time taken to express the negative results.

The objective of this report is to emphasise the fact that the condition of budwood nurseries, *i.e.* the quality of budwood, is as important as any other factor which contributes to the growth or the quality of budded plants. In fact, it is the grafted bud that originates from the budwood nursery which will eventually grow in to the clonal tree. One of the main problems in budwood nurseries is mixing up of clones and this has been discussed earlier (Seneviratne *et.al.*, 1999). Even if the authenticity is preserved, if the growth condition of the budwood plants is sub standard or poor, it will certainly affect the quality of the resulting budded plants.

Rubber being a woody perennial tree gains maturity with the age. This is a slow process of accumulation of factors and in most of the cases cannot be seen happening. Maturation has often been defined as the development process inducing changes in morphological and physiological characteristics leading to the reproductive phase. Once the trees have gain a certain degree of maturity some morphological characteristics of the mature phase are shown. Characteristics of the different growth phases are rather common to most plant species, and some of the characteristics of rubber in particular are shown in Table1.

Table 1. *Characteristics of Hevea related to juvenile and mature phases*

Juvenile phase	Mature phase
No flowering	Annual flowering
Leaf retention	Wintering every year
High growth rate	Reduced growth rate
High root regeneration capacity	Reduced or total lack of rooting ability

Generally, from the seed up to 4-5 years of age is considered as juvenile and trees above 6-7 years are considered as mature. Also, it is evident that juvenile and mature phases exist in both seedlings as well as buddings. Other than the characteristics given in Table 2, there can be many more characteristics related to the different growth phases of the plants. Angle of the branches to the central stem, colour of the young shoots *etc.* are some of these characteristic.

However, as far as rubber plantations are concerned, the most important characteristic is the growth rate, since a certain growth stage needs to be achieved for the plantation to reach productive phase. This required growth stage or the girth can be achieved soon, if the growth rate of the plants is higher. Further, a higher girth will lead to increased yields. High or faster growth rate is characteristic of juvenile phase (Table 1).

Grafted plants, with no chance given for reversal to juvenile phase for a long number of years, will be in the mature phase. Bud patches removed from such mature plants will also be mature. However, when they are grafted to a juvenile root stock and closer to the root system certain amount of reversing or rejuvenation occurs in the scion resulting a delay in the transition phase. Budded plants of clonal origin should have short juvenile periods with compared to seedling plants.

As for rubber, there are certain other plant species, in which the juvenile characteristic are preferred by the grower due to various benefits. Therefore, attempts have always been made to retain the juvenility in such plants and also reverse the mature phase back to juvenile phase. Hard pruning of the trees is one such technique. Severe pruning results in the stimulations of lateral buds and shoots with enhanced rooting in some plant species. This technique is used in budwood nurseries to a certain extent. Plants should be pollarded every year whether the budwood is used or not (Advisory Circular; 1996/02: Budwood Nurseries). This helps budwood plants to stay in their juvenile phase even at 10 years of age and this is evident by no flowering or wintering during this period..

Further, the terminal and peripheral parts of a tree (Chronologically the youngest ones) are ontogenetically the most mature ones. As the distance between shoot tips and root system increases with growth, the juvenile condition of the meristem gradually disappears. Stimulating the growth of shoots from more juvenile regions of the stem *i.e.* close to the base of the tree is another method of obtaining juvenile tissues from mature plants. This is also partially practiced in budwood nurseries but in order to obtain a higher number of shoots a frame is maintained and because of this practice after every harvest the harvesting point moves away from the base of the tree. However, as stated earlier when the trees are pollarded every year, the maturing process get reversed enabling the trees to retain in the juvenile phase.

Another very important factor with regard to budwood nurseries is the life span which is 10 years . Such a long life span is possible with regular pollarding, together with the adoption of recommended agronomic practices. Though the plants entering into mature phase is not a single on-off event, and also the morphological characteristics such as flowering are not seen, plants may have accumulated a certain degrees of maturity with age. Therefore, as it is currently recommended budwood should not be used from plants more than 10 years old (Advisory Circular, 1996/02: Budwood Nurseries)

It is a known secret that sometimes buds are harvested from mature trees when there is a shortage of budwood for bud grafting programmes. As stated earlier with continuous growth trees get mature. If the plants in the budwood nursery are in

the mature phase or the buds are harvested from mature field grown trees, then the characteristics stated under mature phase in Table 1 are likely to be transferred to budded plants, when grafted on to seedling rootstocks. This will expedite the process of maturation and plants will start to exhibit mature characteristics such as wintering (Fig. 1), flowering and slow growth. The slow growth rate will prolong the immature period as it is the girth that determines tappability. In addition to the long immature phase another frequent problem is that, when young trees undergo wintering process, unlike in large mature trees, new shoots sprout on the main shoot forming knots on the trunk which may interfere with tapping and also further reducing the girthing of the tree.

Fig. 1 Two yers old RRIC 100 clearing showing early wintering and branch formation from the base of the tree

REFERENCES

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