

THE TREE-TO-TREE VARIATION IN RUBBER PLANTATIONS

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It is well known that rubber seeds are not used as a planting material merely because of the very high variation among the individuals with regard to growth vigour and yield, resulting in low productivity.

Budded plants on the other hand are much more uniform when compared to seedlings, but still show some variation which is a disadvantage and also affects the productivity of clearings. Though the variation cannot be eliminated totally even among budded plants yet it can be minimized by proper cultural practices. Variation is acceptable if it is advantageous, *i.e.* if a tree reaches the tappability sooner than the anticipated time. If it is otherwise, *i.e.* if the trees do not reach the tappable girth at the age that they should normally do, is a loss.

Variations that negatively affect the productivity of the plantation should therefore be eliminated as much as possible. This can be done during the young stages of the clearing, because the vigorous growers at their initial stage will continue to be vigorous during their life time. Though we cannot make plants that are inherently poor growers to be vigorous growers, but we can easily replace the poor growers during the early stages of the plantation *i.e.* before the 2nd year.

The growth of plants in 10 year old clearings of clones PB 86, RRIC 100 RRIC 121 and RRIC 130, as measured by tree girth is shown in Figure 1. The data gathered are from different clearings planted on the same year.

Fig. 1 indicates that some clones are better than others as far as the girth is concerned. The mean girth of a clearing largely depends also on the type or quality of the planting materials used, the agromanagement practices and also the microclimatic conditions. The clones such as RRIC 121 are vigorous and fast growing when compared to conventional clone PB 86. But if the above mentioned factors are unfavourable the clonal characteristics may not be fully expressed or seen.

The variation in girth expressed by the percentage of coefficient of variation of the same clearings is shown in Fig. 2.

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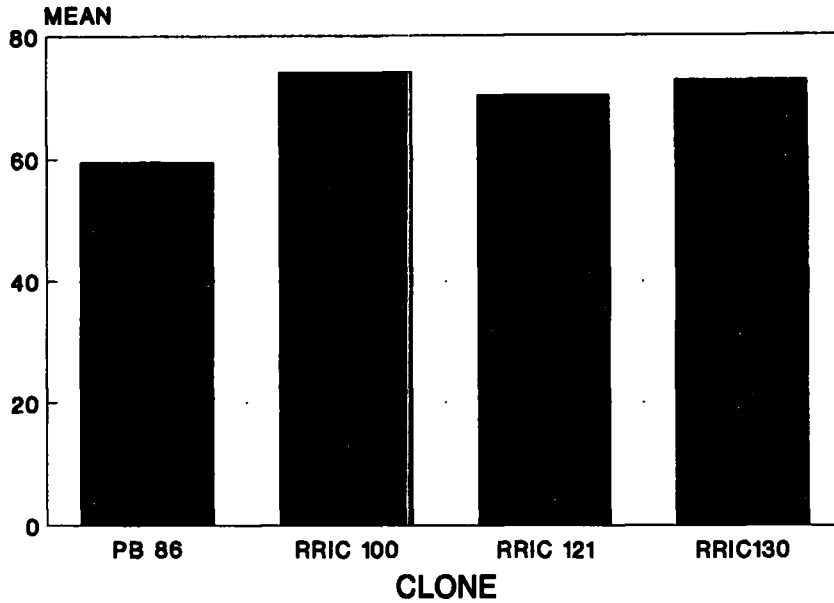


Fig. 1. Mean girth of 10 year old clearings of PB 86, RRIC 100, RRIC 121 and RRIC 130

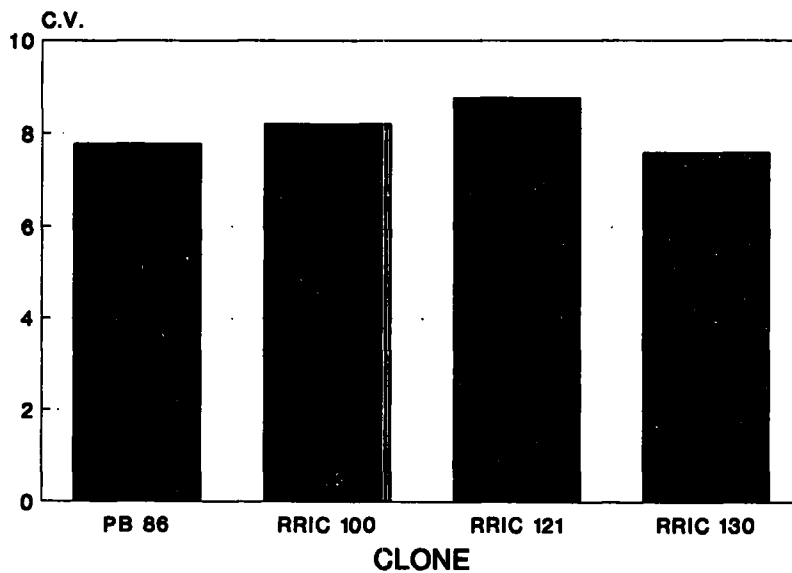


Fig. 2. Percentage coefficients of variation for 10 year old clearings of PB 86, RRIC 100, RRIC 121 and RRIC 130

The variation of girth of different clones suggests that at a given age more or less similar variation is present. But whether this variation is due to the presence of trees of which the girth is below or around the required minimum or due to the presence of trees of which the girth is much higher than the mean decides how the existing variation will affect the productivity of the clearing. In other words, if a clearing consist of trees of which the girth is higher than the average it will contribute to increase the variation while it will also contribute to increase the productivity.

The coefficient of variation for different aged clearings of RRIC 100 and RRIC 121 are shown in Fig. 3.

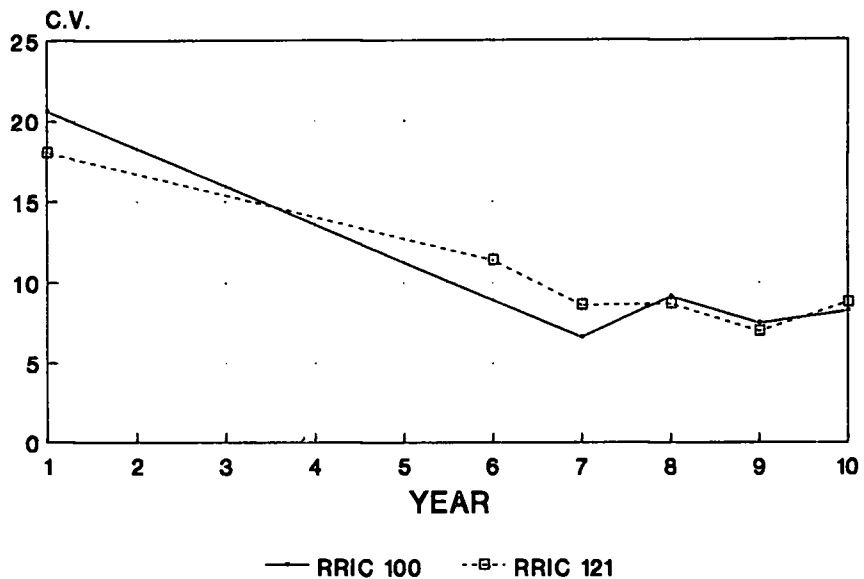
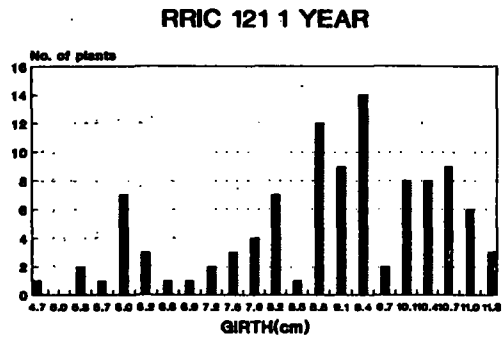


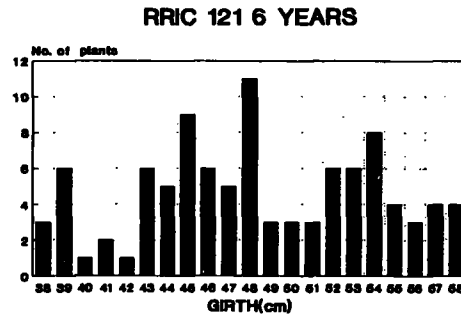
Fig. 3. Percentage coefficient of variation for different aged clearings of RRIC 100 and RRIC 121

The highest variation is seen in 1 year old clearings of both clones. However, after 7-8 years the variation is less and remains more or less the same. The fluctuation in coefficient of variation is mainly due the fact that data were collected from different clearings of the same clone, where the planting materials, agromangement etc are not uniform.

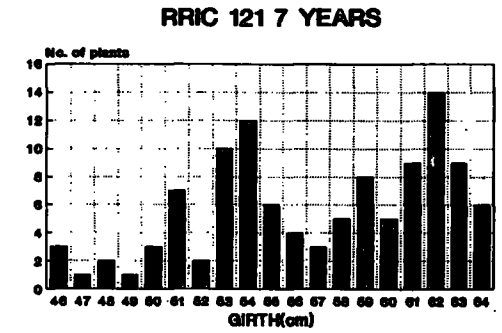
The variation in growth present in different aged clearings of RRIC 121 are shown in Figures 4a-f.



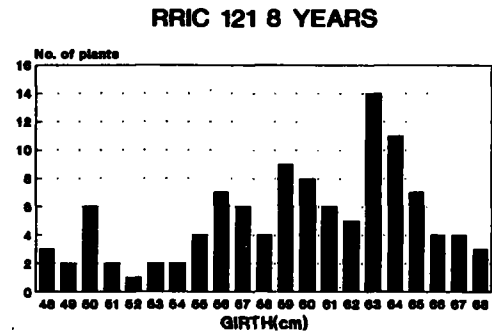
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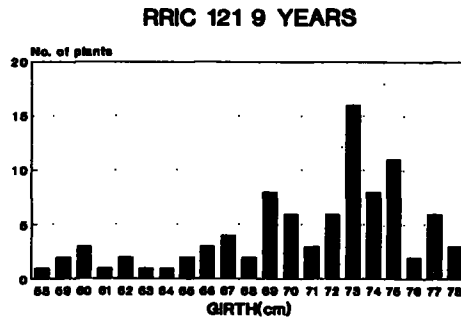
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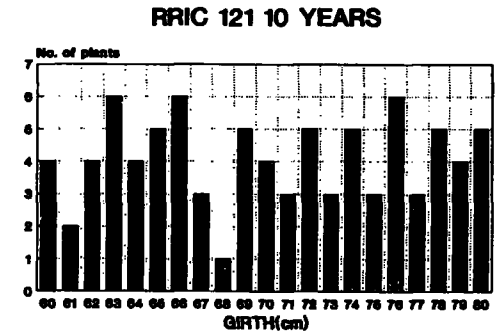
c



d



e



f

Fig. 4. The variation in girth of different aged clearings of RRIC 121

As it can be seen from the figure 4 a-f, in each clearing, the difference between the smallest and the highest is about 20 cm, which is very high.

1. This variation lengthen the immature period of the clearing.
2. As girth is a yield determinant, within a clone, relatively poor girth trees will result in low productivity.

This affects the productivity most, specially when the clearings are nearing to opening. Because a clearing can be opened when 60% of the trees in that clearing has girth above 50 cm measured at 120 cm. Therefore, it is clear that presence of trees with lower girth will postpone the time of opening, most probably by one year if not more since opening of trees is done only during some specific months of the year.

For instance, the six year old RRIC 121 clearing (Fig.4 b) has only 42% of the trees above 50 cm. This long immature period will also reduce the economical return. As stated earlier, the variation in clearings affecting the productivity and the economical return can be minimized by replacing below standard plants.

Generally, the yield of a clone is given as, killogrames/hectare/year and not as killogrames/tree/year. When the yield is given by killogrames/hectare/year, the main factor which affects the yield is the number of trees in the hectare. The next important factor is whether the total number of trees will equally contribute to the total yield. If there are trees in which the yield is very low and hence the contribution is not significant, that will reduce the productivity of the clearing.

How to minimize the undesirable variation which affects the productivity?

1. Good quality seeds as well as budwood should be used in producing budded stumps.
2. Culling practices, before and after bud grafting should be fully adopted.
3. Growth of individual plants should be monitored during the first 2-3 years and any plant having below average girth should be replaced. During the first two years, replacing can be done with polybag plants but at the age of 2-3 years, stumped buddings should be used for this. The expected annual girth increment of new clones in immature plantations is approximately 10cm.
4. While adopting the agromanagement practices correctly, *i. e.* land preparation, cover crop management, weeding and manuring, etc. the branching pattern of the tree should also be checked and corrected.

It should always be noted that with high quality planting materials and by improved agromanagement the rate of girdling can be increased and exploitation can be commenced earlier than five years. Therefore, use of high quality planting materials and adopting recommended management practices are important to reduce the immature period and increase productivity. As far as the quality of planting material is concerned, the first priority should be the clone, which determines the yield per hectare. Secondly, in order to obtain the potential yield of that clone, the type of planting material specially the growth rate is important. Nevertheless, it should be borne in mind that the growth rate is equally influenced by the quality of the stock plant, the budwood used and the agromanagement practices adopted. The quality of the planting material will become sub-standard if the recommended agromanagement practices are not adopted.

ACKNOWLEDGEMENTS

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