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Reduction of immaturity period of rubber tree: RRII 400 series clones and root trainer technology in a small holding

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INTRODUCTION

Hevea brasiliensis (Willd. ex. A. L. Juss.) Muell. Arg. is a tree grown for commercial production of latex. Early starting of tapping and high precocious yield from trees is important when discounted cash flow and return on the investment is considered (Wycherley, 1969). Cultivars with high trunk growth rate and yield are on high demand. Exploitation of heterotic vigour in breeding and improvement in clonal propagation techniques would be the possible solutions for early return. Recently, five hybrid clones of RRII 400 series (Licy *et al.* 2003) and Root Trainer technology (Soman et al., 2002) have been recommended for adoption. However, documented feed back on the role of these recommendations in reducing the immaturity period from small growers' holdings is meagre. In the present investigation, effect of five hybrid clones and root trainer technology in reducing juvenile phase was investigated and the results were discussed.

MATERIALS AND METHODS

The study was performed at a small holding situated in Kanjirappally (Latitude 9°33' N, Longitude 76°47' E; altitude 160 m) in the Kottayam District of Kerala. The planting materials consisted of five genotypes (RRII 414, RRII 417, RRII 422, RRII 429 and RRII 430) selected from the hybrid population of cross RRII 105 x RRIC 100. These five clones along with control (RRII 105) were brown budded onto rootstocks. After successful bud grafting, stumps were planted in polythene bags (55 cm x 25 cm when laid flat) filled with top soil and raised in a nursery. Plants of RRII 414, RRII 417 and RRII 422 (30-75 numbers of each clone) were also raised in root trainer cups with 30 cm length and 7.5 cm diameter with 800 cc capacity (Soman et al., 2002). The root trainer (RT) and poly bag (PB) plants were field planted at 2-3 whorls stage in separate unreplicated blocks adopting uniform spacing of 4.9 m x 4.9 m. Recommended crop management practices were performed throughout the experiment. Trunk girth (at a height of 125 cm) was measured every year. Mean girth and tappability percentage of trees were computed from each group of clones planted using root trainer and polybag method. Incidence of diseases (Abnormal leaf fall, Shoot rot, Powdery mildew and Pink disease) was also noted through out the study.

RESULT AND CONCLUSIONS

Five clones of RRII 400 series along with the control (RRII 105) were field planted in separate plots to study the performance of growth and tappability. Monitored the girth and growth curve was plotted (Fig 1). During the lag (one to three years), and log phase (four to six years) of growth, all the clones except RRII 105 kept its

superiority in vigour. RRII 414 (55.2 cm), RRII 430 (54.8 cm) and RRII 417 (54.3 cm) registered noticeable high girthing followed by RRII 422 (53.2 cm) and RRII 429 (51.4 cm) over six years, whereas RRII 105 registered only 47.6 cm. In general, these clones exhibited tolerance towards shoot rot and abnormal leaf fall except RRII 105. No severe attack of pink disease and powdery mildew was noticed during the immaturity period. Data appears to be useful for reconfirming the earliness of these clones and disease tolerance when compared to the control (RRII 105). The high growth rate observed in these clones indicates the expression of heterotic vigour and fungal disease tolerance.

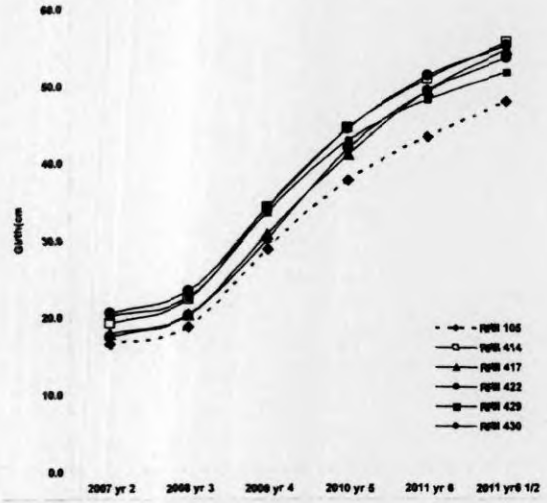


Fig 1. Growth curve of clones

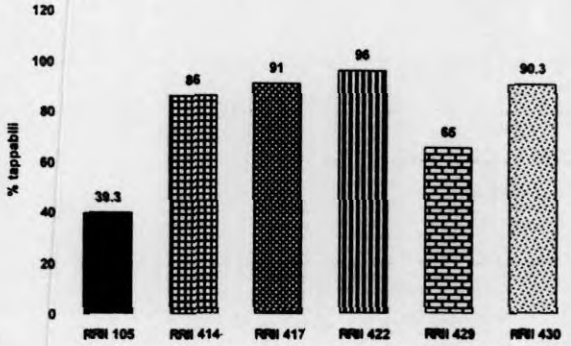


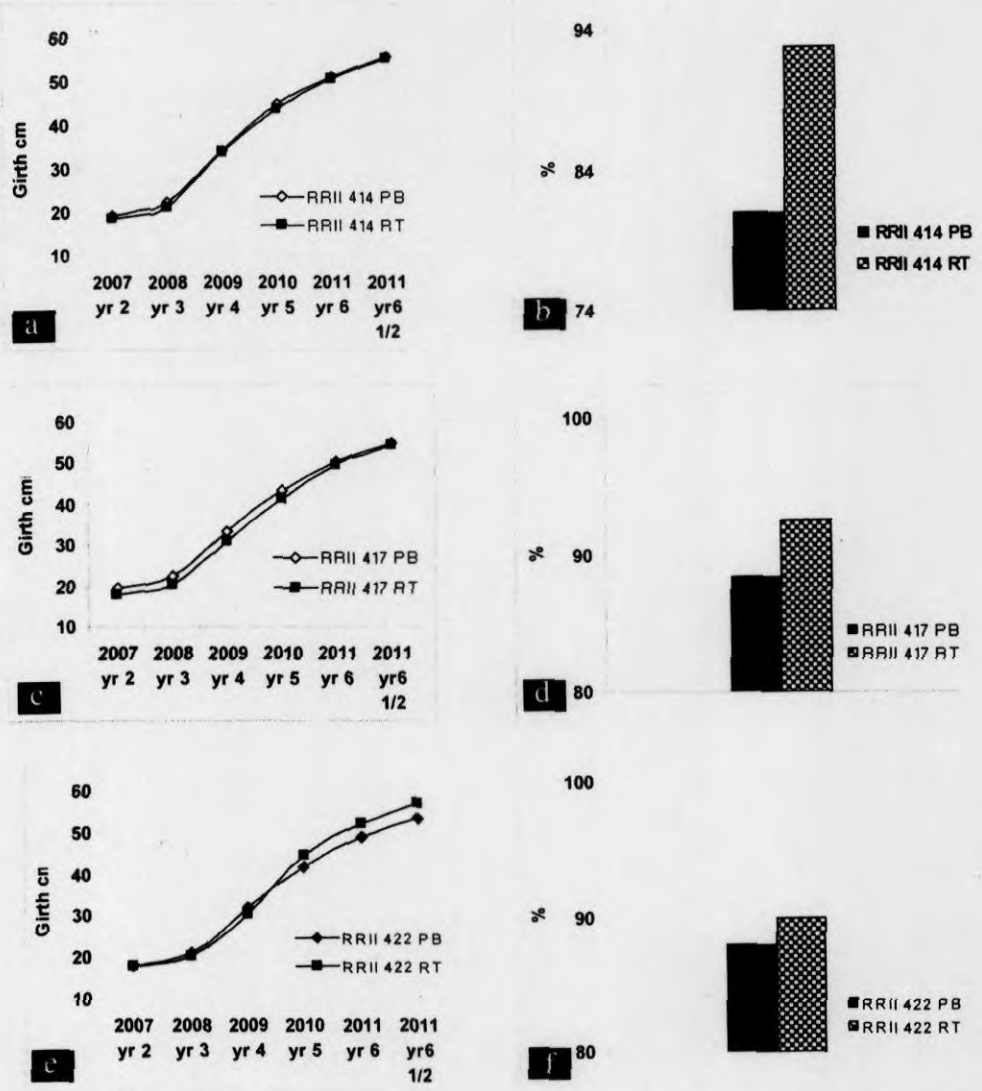
Fig 2. Tappability (%) of clones at the age of six

Early maturing clones will be preferred by the growers to reduce the unproductive period and cost of maintenance of the trees and thereby early return from the plantations.

Comparative tappability of clones is plotted (Fig. 2). Of the six cultivars studied in the juvenile phase, tappability of clones ranged from 39.3–96 % in the 6th year whereas RRII 105 tended to grow slower (39.3%). RRII 422 registered highest tappability of 96% followed by RRII 417 (91%) and RRII 430 (90.3%). Uniformity of trees indicate earliness and 70% tappability has been recommended for initiating commercial tapping in a rubber plantation.

Tappability percentage: Percentage of trees in the population (n=30-75) attained girth of 50cm at the trunk height of 125cm from the bud union of trees, in the 6th year after planting.

Clone wise growth (Fig. 3 a, c and e) and tappability (Fig. 3 b, d and f) of trees raised in the PB and RT was compared and growth curve plotted. It could be seen that growth pattern of trees (RRII 414) in both cases was almost equal but trees raised in RT attained higher tappability (93%) when compared to PB (81%). The same trend in tappability percentage was found in the case of RRII 417 (PB: 88%; RT: 93%) and RRII 422 (PB: 88%; RT: 90%) also. Cost of poly bag planting is high by three fold than the RT method (Soman *et al.*, 2002) and the latter is gaining popularity among the rubber growers. Increased uniformity of trees across the genotype apparently indicate early and better establishment of plants in the soil as reported in other tree species (Khedkar and Subramanian, 1997). From this case study, it can be concluded that the adoption of new clones and root trainer technology could help the growers in minimizing the unproductive age and early return from the holdings.



PB: Poly bag planting; RT: Root trainer planting. Values are means. Tappability percentage*(b, d, and f): Percentage of trees in the population (n=10-40) attained girth of 50cm at the trunk height of 125cm from the bud union of trees, in the 6th year after planting.

Fig 3 Comparative growth curve and percentage of tappability*: Poly bag vs. Root trainer propagation

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