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DEEP PLANTING FOR BETTER PERFORMANCE

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Budded plants are normally planted with the stock/scion union just below the ground level in order to avoid the formation of 'elephant foot'. This is strictly practiced when bare root budded stumps are used as the planting material. To place the graft union just below the ground level, budded stumps are planted in such a way, that the bud patch is positioned about 4-5 cm below the ground level (Fig 1.a).The level of the soil in the planting hole is kept below the bud patch until the grafted bud emerge out and elongate. Once the scion is grown to a certain stage, i.e., up to the first or the second whorl of leaves, then the planting hole can be filled with soil to the ground level.

If the budded stumps are planted with the bud patch above the ground level, the graft union gets exposed and it is termed 'Elephant Foot'. This is not accepted as this will reduce the length of the tapping panel and also such trees will become prone to wind damage. Another possible disadvantage of having the elephant foot is the effect of the root stock on the yield of the tree when the tapping cut nears the bud union. It is believed that this is due to the reduced drainage area. This disadvantage can be reduced by deep planting of plants, so that the graft union will be further away even from the lowest point of the tapping panel.

In the trial reported here, young buddings of clone RRIC 121 were shallow and deep planted. Bare root green buddings were also grown to compare the growth of these planting practices. Young buddings contained 2-3 leaf whorls when planted. For deep planting treatment, the scion shoot was buried up to the point of the first whorl and it sometimes carried leaves (Fig.1.b). The buried heights varied from 8 - 15 cm. Shallow plantings were those planted with the stock/scion union just below the ground level. Bare root budded stumps were planted according to the recommendation for planting bare roots (Fig.1a). Four blocks and twenty plants per treatment in each block were used. For the treatments of young buddings, no fertilizer applications were done to the planting hole up to two months of planting as for ordinary polybag plants. Planting was carried out with the onset of south-west monsoon in May 1992.

A one hundred percent field establishment rate was obtained for young buddings in both deep and shallow planting methods. Five to six percent casualties were experienced for bare roots despite of the fact that the weather conditions were favourable for a long period. If the weather conditions were unfavourable, the rate of casualties in the bare roots, perhaps, would have been higher, and a little

beneficiary effect in deep planted ones would have been observed, as the root systems of deep planted ones are established deeper in the soil.

The differences between the growth of the bare roots and the young buddings were significant from the beginning. The results up to three years of growth in the field showed that the growth of the plants as measured by the girth is comparable in deep and shallow planted trees. The mean girth of the three treatments up to the age of three years is shown in Fig.2.

As it can be seen from Fig.2, the difference between the growth of bare roots and young buddings, has maintained without significant change up to three years. This difference at the beginning is purely attributed to the presence of the scion shoot in young buddings (about five months' growth). Presence of well-established root system in young buddings may have contributed to maintain the superior growth. Contrary to this, bare roots contain no foliage and, the root system should be developed to continue the growth of the sprouted bud. Any set back in the root growth, will cause a set back in the growth of the scion as well. As the nursery time required to produce bare roots and young buddings are comparable, i.e., 6-7 months, producing and planting of young buddings may be very advantageous to the farmer. As far as deep plantings and shallow plantings are concerned, the girth of deep plantings should be less than shallow plantings due to the conicity of the stem that may or may not continue with the age. Anyhow, girth after three years of growth show hardly any difference in girth. Data will be collected at six month intervals, until opening for tapping, to see any differences in girth between treatments.

The establishment of the root system deeper in the soil (where the moisture levels can be higher compared with the soil at lower depths), can be advantageous for planting in regions with dry climates and also if dry weather prevails soon after planting even in wet regions. Further, formation of 'Elephant foot' is eliminated totally and the entire tapping panel will be usable.

The root systems of the three types were examined regularly by excavating. The root system of deep plantings (Fig.3a) and shallow plantings (Fig.3b) at the age of two years are shown in Fig.3. About 60 deep plantings, were checked, at the age of two years to see weather there were any roots formed on the buried portion of the stem. Only one out of 60 plants had one small adventitious root about 5" below the ground level. A few deep planted trees were checked again randomly at the age of three years also, but no such roots were observed.

The root system resulted from different planting methods, after three years from planting are shown in Fig.4. Prominent lateral root growth is seen in young budings (Fig.4 a&b) as compared to bare roots where the tap root growth is prominent (Fig.4c). .An initial stage of the formation of 'elephant foot' is seen in the bare root. Some times, it is not bad planting but, poor or no adoption of soil conservation methods which causes formation of 'elephant foot'.

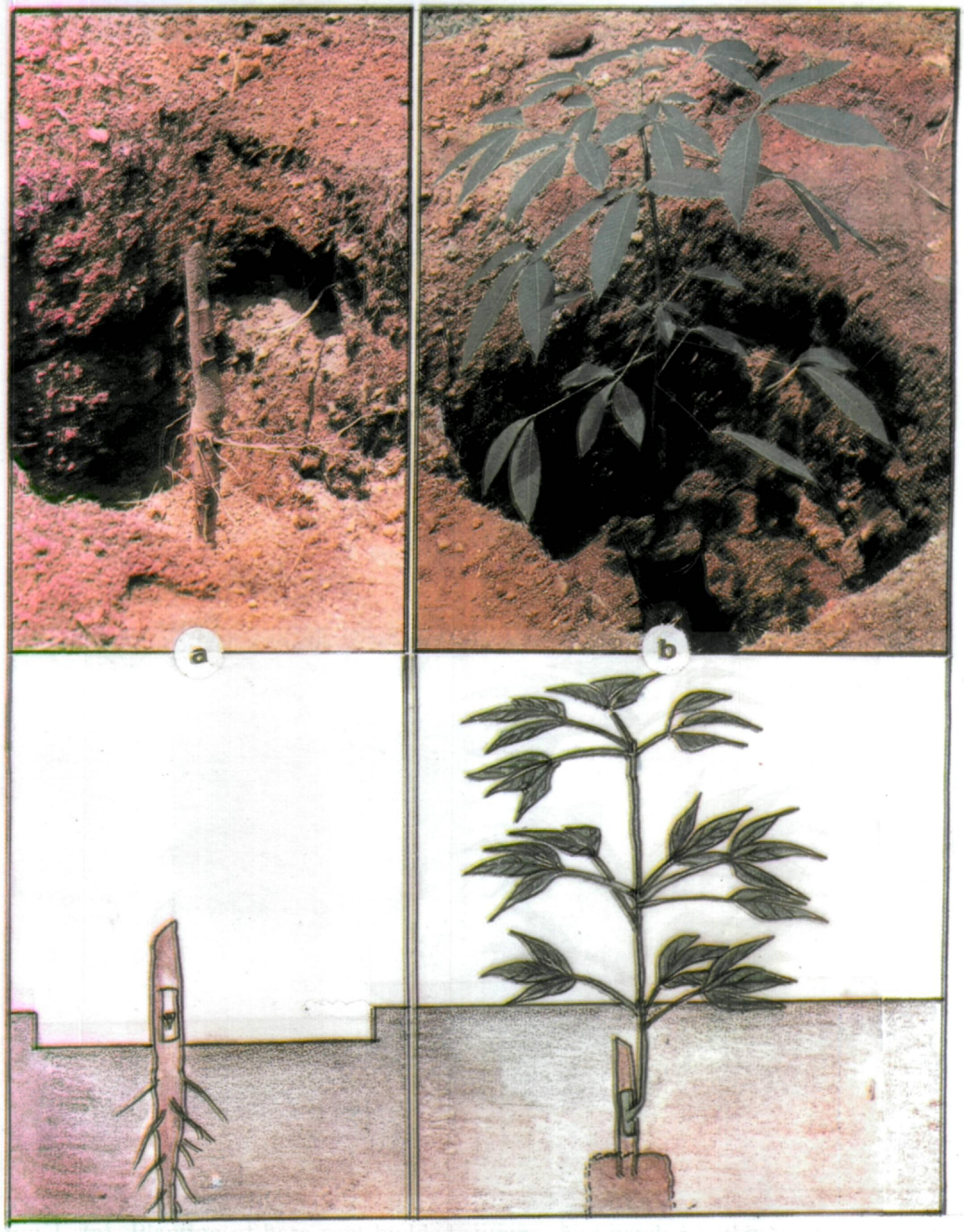

Fig.1. (a). Planting of bare root budded stumps, bud patch positioning 4-5 cm (~2') below the ground level, and (b). Deep planting of polybag plants burying 10-15 cm (6") of the scion shoot.

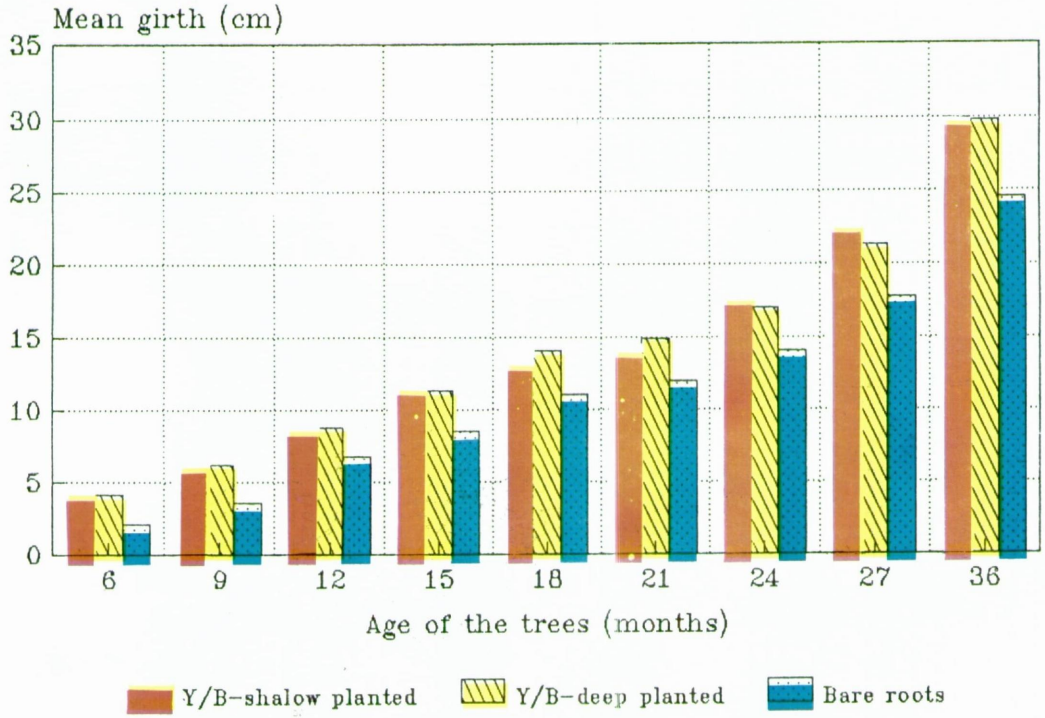

Fig.2. The mean girth of trees of three treatments up to three years of age in the field.

Fig. 3. The root system of (a) Deep planted young budding and (b). Shallow planted young budding at the age of two years.

Fig. 4. The root system of (a) Deep planted young budding, (b) Shallow planted young budding and (c) Bare root at the age of three years.

As reported by Yoon et al (1985) also, the growth of the trees has been better when they were deep planted. However, the yield during the initial years has been similar in two treatments in their trials. In any case, if any difference exists, it should be during the latter years when the tapping cut is approaching the stock/scion region. Anyhow, if the girthing is faster in deep plantings, trees can be opend for tapping earlier. The reduction of immature period even by a few months will be advantageos to the planters. Nevertheless, with the data available in the present trial, it is too early to make such conclusions.

However, as there are no disadvantages or risks, experienced or reported else where, deep planting can be safely adopted when using either young buddings or polybag plants as the planting material. The possible advantages that can be achieved are as follows:

1. No formation of 'Elephant foot' and therefore complete use of tapping panels.
2. Positioning the stock/scion union completely away even from the lowest point of the tapping cut. This reduces the possible effects from the stock on the yield of the scion when the tapping cut reaches the ground level.
3. Establishment of the root system deeper in the soil resulting better field establishment specially under unfavourable weather conditions.
4. Better anchorage that is important for the areas where the trees are prone to wind damage and more tolerant to drought conditions are added advantages.

REFERENCES

Yoon P K, Leong S K and Ooi C B (1985). The value of deep plantings in *Hevea* cultivation. In: *International Rubber Conference Proceedings*, Kuala Lumpur, pp. 578-609.