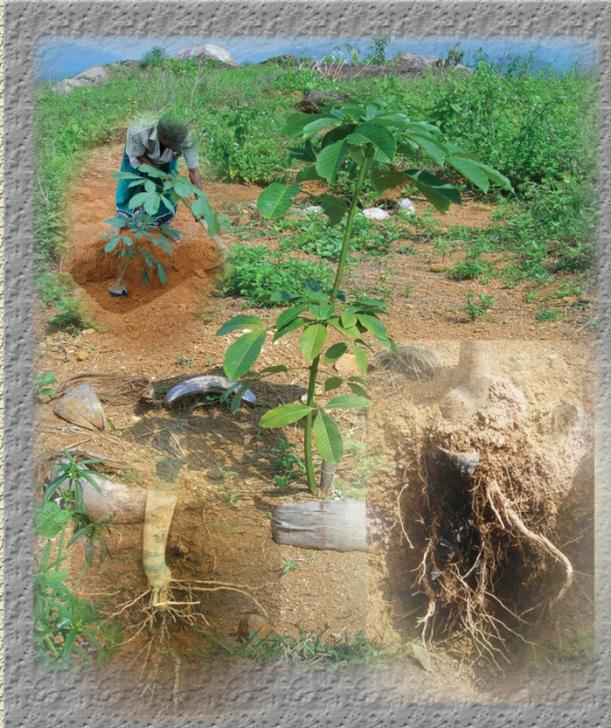


Advisory Circular No.2016/07

Field Establishment and Immature Upkeep



**Rubber Research Institute
of Sri Lanka**

Field Establishment and Immature Upkeep

The most important step !

Most of the rubber plantations in Sri Lanka, both large estates and smallholdings, have a poor stand. This condition reduces the land productivity to a greater extent. There are many reasons for this condition. Among them,

- Poor agro management practices at planting,
- Use of low quality planting material,
- Not adopting recommended planting practices,
- Not replacing weak plants,
- Not supplying vacancies with high quality plants are some.

Proper establishment of the clearing and immature upkeep according to recommendations can improve this condition. This document will help achieve this objective of correct establishment of a clearing.

Organizing the preliminary activities

Land preparation plays a vital role, specially if the old stand had been infected with white root disease.

Therefore, the areas infected with white root disease should be demarcated prior to uprooting the old stand. A mixture of lime and salt is recommended to mark the infected patches. When natural stones are absent in the area, stones can be buried and painted with lime mixture.

When uprooting, all roots up to the size of pencil thickness should be collected and burnt *in situ*. Use of a monkey grubber is a successful method to uproot white root infected trees. In traditional rubber growing areas, uprooting can successfully be done during the North-east monsoon season of the previous year. When the soil is moist, the entire root system comes out without breaking and leaving infected parts.

Prior to lining, the correct extent should be known to decide on the number of plants that can be accommodated, to maintain the correct density.

Planting distances and lining

Marking of planting holes or lining should be done on the contour on steep or undulating lands. If dead level contours are marked with a road tracer starting from the steepest part of the land, the contour lines will diverge to finish up as unbroken contours. If the space left exceeds double the planting distance between rows, subsidiary contours should be marked. If possible, it is best to avoid this by adopting a compromise between the straight lines (Fig. 1).

Presently recommended planting density accommodates 515-520 plants per hectare. In order to achieve this, three spacing systems have been suggested. Squire planting 4.3 m x 4.5m and avenue planting 3.5m x 5.5m will allow 516 and 519 trees/ha. respectively.

2.5m x 7.75m spacing system can be used when intercrops are planted which accommodates 516 trees.

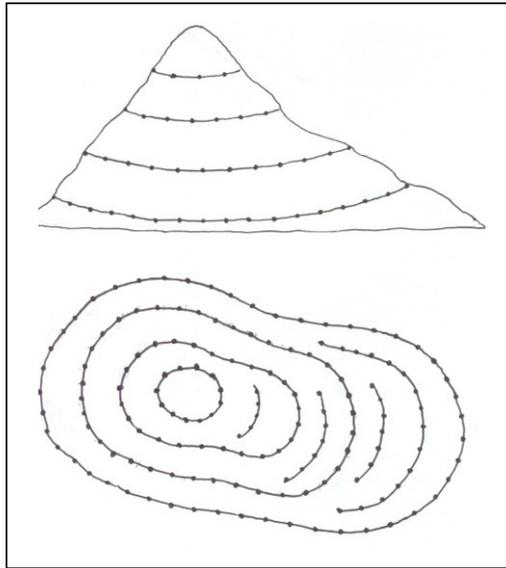


Fig. 1. Marking contours on undulating lands

Holing and filling

Planting holes can be cut either prior to uprooting or after uprooting and clearing the land. It is important to ensure that the root debris are not allowed to fall in to the planting hole specially if the land had Fomes patches. The recommended size of the planting hole is 60 x 60 x 75 cm (2' x 2' x 2 ½'). If holing is done using backhoes hole is tend to be larger. The important practices should be to protect the top soil from being washed off. The position of the hole may have to be changed if rocks are encountered. Holes must be refilled with top soil free of rocks, stones, roots or any other extraneous matter.

Planting holes should be prepared at least one month in advance, refilled and allowed to settle naturally. But this can be done at planting if sufficient labour is available (Fig. 2). If filled in advance, soil should be removed with a mamoty to accommodate the bag.



Fig. 2. Leaving planting holes unfilled till planting

It is emphasized that when young budding plants are used as the planting material, application of basal fertilizer is not required.

Planting seasons

Field planting is normally done with the onset of the monsoon rains. The longer rainy season in the wet zone is the South-West monsoon (SW) that falls in May-June each year and the shorter season the North-East monsoon (NE) that falls in October-November. As the duration and intensity of rainfall are relatively higher during the SW monsoon

than in the NE monsoon in the wet zone, planting with the onset of the SW monsoon is ideal.

In areas where the major rainy season is the North-East monsoon, *i.e.* in Monaragala, Bibile, Ampara, Vauniya and Mullaitivu districts, planting should be undertaken during that season and it is extremely important to plant with the onset of the monsoon.

Planting material

Only young - budded plants (Fig. 3) of recommended clones should be used to guarantee high field establishment and high quality and also, due to poor selection practices in the process of bare root plant production.



Fig. 3. A good quality young - budded plant

Clone can be identified in young - budded plants and the age of the plant at planting should always be less than a year. This helps the vigorous growth during the first 4-5 years in the field. When young - budded plants are used, then the growth rate is fast and growth is even, which minimizes the immature unproductive phase.

The process of young budding plant production is explained in detail in the leaflet “Production of young budding plants”.

Planting young buddings

Only plants with a hardened top whorl should be transferred to the field. The number of plants with a hardened top whorl can be increased by stopping fertilizer applications about 4-6 weeks prior to field planting.

Plants at shoot elongating stage or with leaves at copper brown or apple green stages (Fig. 4) should never be transferred to the field, because it will result in shoot dieback, uneven growth and casualties.



Fig. 4. Plants with immature top leaf whorls

Generally in a young budding nursery, when plants are ready for field planting, in almost all the plants the tap root has penetrated into the ground. In such cases, the root that is growing out of the bag should be cut 10 days before planting. This can be done by tilting the plant to a side carefully and then cutting the roots, preferably with a pair of secateurs or a sharp knife (Fig. 5). This should be done only in plants with a hardened top whorl. Once the roots are pruned, plants should be well watered until they are field planted. However, when plants are transported to the field, if the soil inside the bag is saturated with water, then there is a chance of soil moving and thereby distributing the root system. To prevent this, plants should be provided with only a limited amount of water during the last few days prior to field planting.



Fig. 5. Tailing of the tap root with a pair of secateurs before planting

Transporting the plants to the field should be done with great care without damaging the plant or disturbing the root system. If plants are stacked tightly during transportation, loosening of soil in the bags can be minimized.

Prior to planting the young - budded plants, the depth of the planting hole should be checked and it should be adjusted appropriately by removing or filling with soil.



Fig. 6. Checking whether the graft union is placed below the ground level

When planted, the graft union should be positioned a few centimetres below the ground level (Fig. 6). Young buddings with 2-3 leaf whorls can be deep planted as well, so that the graft union is positioned about 15-20 cm below ground level (Fig. 7). This practice has the advantage of minimum rootstock effect on yield when the tapping panel is close to ground level. Wind damage is minimized as the root system is established deep in the soil which has an added advantage of tolerance to drought conditions. Deep planting is possible with young buddings as basal fertilizer mixture is not added to the planting hole.

Once the depth of the planting hole is adjusted to suit the height of the bag, the base of the bag should be removed by cutting it around with a sharp knife or a blade (Fig. 8).

Possibility of transplanting the plant without damaging the root system is important to prevent any set back in the growth and it is cost effective and ergonomically important. It is better to remove the bag without disturbing the roots, before planting. In this case, base removed bag with the plant should be placed in the hole and a vertical cut should be made half way and soil should be filled up to that point and then the cut should be completed up to the brim of the bag and then soil should be filled up to the ground level. Finally the polythene piece can be pulled out slowly.



Fig. 7. A deep planted young – budded plants (after one year)



Fig. 8. Removing the base of the bag

When the hole is being filled, the soil around the plant should not be pressed hard as it can disturb and damage the root system of the plant.

If planted with care, the root system remains virtually undisturbed, the survival rate will be one hundred per cent and growth will be uninterrupted and uniform.



Fig. 9. A young budding planted with the bag
(after 3 years)

Care after planting in the field

First 4-6 weeks

The growth of the scion

Though planting is normally done in the rainy season, if an unexpected dry spell occurs after planting, the plants should be watered and suitable mulch placed around it.

All plants should be inspected at weekly intervals and the scion should be allowed to grow as a single unbranched stem up to a height of about 2.5m - 3.0 m by pruning of all side shoots as and when they appear.

First 2-3 years

Maintaining the stand

The extra plants equal to 10% of the total number of plants, are recommended to plant within the field as shown in Fig. 10 and those plants should be used to replace weak and dead plants. Transplanting of these plants should be done with the onset of both planting seasons during the 2nd and 3rd year upkeep.

Replacing weak plants is as important as infilling casualties. Transplanting should also be done as stumped buddings during the third year.

Maintaining the full stand with good quality plants by replacing weak plants and infilling the casualties with suitable advanced planting materials is one of the priority areas during the early upkeep.

Branch induction

Rubber trees of most of the clones recommended for planting in Sri Lanka branch naturally. However, a certain percentage of trees of some clones such as RRIC 121 seems to require artificial induction to produce side branches. If the trees do not start to branch even after about 2 years *i.e.* upto 2.5 m - 3.0 m of unbranched brown stem, then artificial branch induction should be undertaken.

The most suitable methods of branch induction are by leaf folding or placing leaf caps over the terminal bud. Though there can be other methods to induce branching, the two methods suggested here have been found to be the best for rubber.

It should also be remembered that the terminal bud of the main stem should be preserved throughout the life of the tree and it should not be damaged or removed in order to induce branches.

Further, within a clone, it has been observed that trees with more branches girth better suggesting that branch induction can be adopted to increase girthing of immature trees through enhanced light capture.

Leaf folding method

This method can be used when the terminal leaf whorl is sufficiently hardened.

A few intact terminal leaves should be brought together and folded covering the apical bud. The folded leaves should then be tied together, preferably with a rubber band, covering the apical bud until side branches develop (Fig. 10).



Fig. 10. Leaf folding method

Leaf cap method

This method can be adopted when the terminal bud is at bud break or when the young leaflets have just unfolded. A leaf cap is made with 3-4 detached mature leaves and this cap is placed over the stem apex and fastened with a rubber band to keep it intact until side shoots start to grow (Fig. 11).



Fig. 11. Leaf cap method

In both methods, the cap should be removed after 3-4 weeks, if it does not come off spontaneously. Branches should normally emerge from the leaf axils of the uppermost whorl of leaves. If more than 5-6 branches develop the excess should be removed without delay, while making sure that the remaining branches are uniformly distributed around the main stem.

Growth standards

- Productivity, and therefore the viability of a rubber plantation will depend on the growth of the trees and upkeep of the clearing during its immature period.
- The clone and the quality of the planting material are the main factors which determine the productivity of a clearing. However, the condition of the land and the agromanagement practices affect the growth of the plant to a greater extent.
- Rubber trees can girth fast only during its immature phase of growth which is about 5 years. Therefore, every effort should be made to achieve at least 10 cm girth increment every year (Fig. 12). This will be possible by maximizing the inputs along with dedication of the planter.

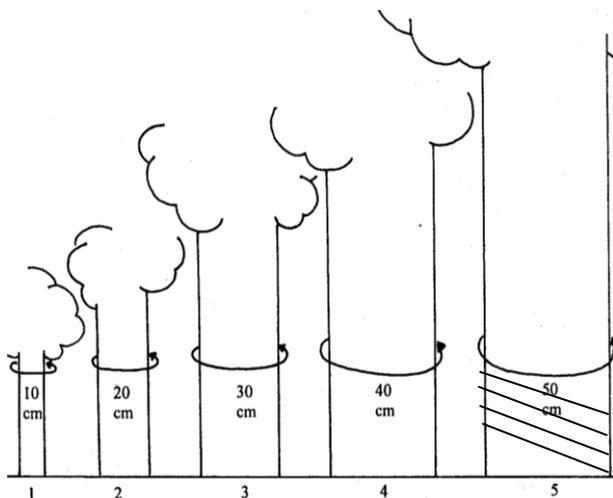


Fig. 12. Growth standards