DOI: http://doi.org/10.4038/jrrisl.v97i0.1882

Journal of the Rubber Research Institute of Sri Lanka (2017) **97**, 58-71

The effect of the container and the potting media of nursery plants on the growth of rubber plants: experience with root trainers to raise rubber plants

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Abstract

Young buddings raised in 15 cm x 37 cm, gauge 300 black polythene bags filled with top soil are the recommended planting materials for rubber planting in Sri Lanka. The proprietary plastic root trainers are recommended in India along with a unique and rich potting mixture which is not available or affordable under local conditions. Proprietary root trainers 30 cm x 9 cm (diameter at the top and 1000 cc, and 15 cm x 37 cm recommended young budding bags with a hole at the base of the bag were tested along with two cone shaped polythene containers, having 32 cm x 9 cm (diameter at the top) and 1160 cc, 40 cm x 15 cm (diameter at the top) and 2000 cc. Six different combinations of coir pith, sand, top soil, saw dust and compost were tested with 100% top soil and 100% coir pith as the potting media.

The results indicated that the volume, the shape of the container or the potting medium have minimum impact on the survival percentage of the seedlings or on the quality of the budded plants. Nevertheless, 100% coir pith seems to affect the survival rate of seedlings. The growth measured up to two years in the field confirmed no difference among the container or the potting medium.

Key words: *Hevea*, polybag, root growth, root trainer, rubber, young budding

Introduction

In Sri Lanka the extent under rubber cultivation is 130,319 ha. as per the latest statistics available (Anon, 2017). In order to maintain this extent, 3.3% of this extent should be replanted annually. New planting takes place in non-traditional rubber growing areas, under various projects but only to a limited extent. Annual planting material requirement in Sri Lanka is 2.5-3 million plants and since 2003 the type of planting material used is young buddings as recommended by the Rubber Research Institute of Sri Lanka. Research has been carried out by many scientists and the current recommendation is based on trials conducted at the Rubber Research Institute of Sri Lanka for many years from 2002 (Seneviratne, 2002, 2003, 2004, 2005) and (Seneviratne *et al.*, 1994).

Polybags of 6" x 15" size (15 cm x 37 cm) made out of gauge 300, black polythene are recommended to raise young buddings in traditionally rubber

grown districts. For non- traditional areas of Sri Lanka such as Moneragala and Ampara, the recommended bag size is 7" x 18" (17 cm x 42 cm) as the nursery period is longer and climatic conditions are not conducive for plant growth. Root coiling at the base of the polybag is considered as a shortcoming in young buddings and this has not been studied in depth. But the tap root of the seedlings penetrates the base of the bag after coiling. However, a hole made at the center of the base of the bag seems sufficient to allow the tap root growth without coiling (Anon, 2009). However, when the size of the bag is smaller than the currently recommended size, the tap root tends to penetrate the bag without coiling since the area at the base is smaller. Since the large scale young budding plant production was initiated in government rubber nurseries under the management of RRISL in 2002-2003 period, manual polybag preparation using polythene tubing was stopped and polythene suppliers were requested to supply perforated and guzzetted bags of desired gauge and size.

Plastic cone shaped containers known as root trainers were developed in India in 1999 (Soman and Saraswathyamma, 1999), initially to grow bare root budded plants up to 2-3 whorl stage. The potting mixture recommended for root trainers was sieved coir pith and cow dung in 1:1 ratio, neem cake 500g, phosphate 10g, Mancozeb 75WP (10g) and super phosphate 250 g per 0.028$m^3$of potting medium**.** But to compare the growth, conventional polybags had been filled with just top soil. Germinated seeds have also been tested with root trainers by Soman and Saraswathyamma (1999) and found to be satisfactory to grow seedlings up to 2-3 leaf whorl stage, to be bud grafted and allowed the scion to attain the desired growth.

Coir pith is free and found in abundance in India, but in Sri Lanka it is widely used for value addition and therefore not free. The planting material requirement in India is about six times of that of Sri Lanka and part of the planting material requirement is supplied as root trainer plants by private nurseries. They do not discuss about the quality of plants but mainly focus on ergonomics. However, the capital investment is high to produce plants using root trainers. The necessary infrastructure changes in the nurseries are costly which should be recovered through adding the cost to the plants. Nanhorya *et al.*, (1999) also, while accepting root trainers, state the need of heavy capital investment to raise root trainer nurseries. Further, they accept the fact that India cannot afford such capital investment and recommend what is called a polytube to raise young buddings. Some estates under Regional Plantation Companies in Sri Lanka too started root trainer technique but stopped after 2-3 seasons due to failures in plant production using this technique. In this context, there was an interest and requests from the nursery owners to test and report on the performance of the proprietary root trainers. The objective of this study therefore was to find the best container and potting medium for raising young buddings and especially to see the growth performance of young buddings in root trainers.

Materials and Methods

This experiment was conducted at the main research station of the Rubber Research Institute of Sri Lanka (RRISL) at Dartonfield, Agalawatta. Fresh rubber seeds were collected and were sown in germination beds and the early germinated seeds were harvested and planted in polythene containers and proprietary root trainers. Maintenance of the plants and the manuring were done as per the RRISL recommendations given in Advisory Circular 2016/04-Fertilizer to Rubber and Advisory Circular 2016/09-Production of Budded Plants.

Root trainers were supplied for this study by a prospective supplier of root trainers in Sri Lanka. Recommended size (15 cm x 37 cm) polybags were used as the control treatment. Two other large size cone shaped containers made manually out of gauge 500 black polythene were also tested. Details of the containers used in the study are given in Table 1.

Potting mixtures

Composition of eight different potting media, tested with different containers are given in Table 2. Coir pith was bought from a regular supplier in the area. River sand was also from a regular supplier and top soil was dug from an abandoned area of the Dartonfield estate. Mixing was done manually as per the compositions given.

Table 1. *Dimensions, materials and volumes of the containers tested to raise young buddings*

Type	Size Diameter at the top x Height (cm)	Material	Volume (cc)
1	Cone shaped containers of 9 x 32	Black polythene cone	1,160
2	Cone shaped containers of 15 x 40	Black polythene cone	2,000
3	Root trainers of 9 x 30 (proprietary root trainer)	Black plastic root trainer	1,000
4	Normal YB bags of 15 x 37 with a central hole at the base	Black polythene	2,350

Table 2. *Composition of potting media used for filling bags and root trainers*

Type	Composition	Ratio v/v
A	Coir pith sand	1:1
B	Coir pith + sand + top soil	1:1:1
C	Saw dust + sand	1:1
D	Saw dust + sand + top soil	1:1:1
E	Sand + top soil	1:1
F	Compost + sand + top soil	1:2:1
G	Top soil	100%
H	Coir pith	100%

Design and data collection

There were 24 replicate plants for each polythene container whilst only six replicates for the root trainer due to limited number supplied. Media filled containers were arranged as RCBD.

Survival of seedlings was counted after three and seven months and percentages were calculated. Height and girth measurements were also recorded.

Seedlings were bud grafted with green budwood of clone PB 260. Height and diameter the scion shoot were collected after seven months of bud grafting. All plants were field planted.

Results

The survival percentage of seedlings in four different containers and in eight different media after 3 months are given in Table 3.

As it can be seen from Table 3, survival percentage after 3 months is about 88% in all container types and different media. But, the number survived reduced afterwards and, the number of seedling plants survived after seven months in four containers and eight potting media are given in Table 4.

Table 3. *Survival percentage of seedlings in four containers and in eight potting media after three months of transplanting*

Container type	**Potting medium**							
Diameter at the top x Height (cm)	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Cone shaped containers of 9 x 32	96	100	96	100	96	100	96	96
Cone shaped containers of 15 x 40	100	100	88	96	100	100	100	96
Root trainers of 9 x 30 (proprietary root trainer)	100	100	100	100	100	100	100	86
Normal YB bags of 15 x 37 with a central hole at the base	100	100	86	100	100	100	100	100

Table 4. *Survival percentage of seedling plants in four container types and eight potting media after 7 months*

Potting medium								
Container type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Diameter x Height at top (cm)								
Cone shaped containers of 9 x 32	20.8	29.2	37.5	45.8	25	12.5	25	0
Cone shaped containers of 15 x 40	37.5	29.2	33.3	45.8	12.5	33.3	33.3	20.8
Root trainers of 9 x 30 (proprietary root trainer)	33.3	0	33.3	100	33.3	33.3	33.3	50
Normal YB bags of 15 x 37 with a central hole at the base	29.2	29.2	20.8	29.2	75	37.5	45.8	0

As it can be seen from Table 4, survival percentage has reduced at bud grafting. However, 100% survival rate is seen with root trainers filled with saw dust, sand and top soil (1:1:1: medium, D). The lowest survival rate is seen with 100% coir pith in small cone shaped container and normal polybag with a central hole at the base.

Mean height of the scion shoots after seven months are given in Table 5. SEM values are given in brackets.

Table 5. *Mean height of the shoots (cm) in four container types and eight potting media after 7 months. SEM values are given in brackets*

Container type Diameter at the top x Height (cm)	**Potting mixture**								**Mean**
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	
Cone shaped containers of 9 x 32	57 (±10)	96.4 (±12)	85.2 (±5)	74.6 (±6)	62.8 (±9)	62.3 (±5)	77.7 (±10)	-	73.7
Cone shaped containers of 15 x 40	74.2 (±7)	88.3 (±6)	91.4 (±8)	114.9 (±9)	59.3 (±7)	113 (±7)	76.2 (±7)	70.6 (±10)	86.0
Root trainers of 9 x 30 (proprietary root trainer)	102.5 (±17)	-	102.5 (±17.5)	93.3 (±13)	83 (±7)	84 (±1)	81.5 (±12)	55.7 (±11)	86.0
Normal YB bags of 15 x 37 with a central hole at the base	77.8 (±11)	91 (±12)	82.6 (±11)	78.1 (±9)	78.3 (±5)	65.7 (±5)	69.1 (±5)	-	77.5
Mean	77.8	91.9	90.4	90.2	70.8	81.2	76.1	63.1	

The lowest mean height (55.7 cm) is given by plants grown in root trainers in 100% coir pith. However, the highest mean height 114 cm is seen in plants grown in saw dust, sand and top soil medium in 15 cm x 40 cm black polythene cone shaped containers. But high variation among seedling height is seen in all container types and in all media.

Mean diameter of shoots after 7 months in four container types and eight potting media are given in Table 6.

Table 6. *Mean diameter (cm) of shoots after 7 months in four container types and eight potting media. SEM values are given in brackets*

Container type Diameter at the top x Height (cm)	**Potting mixture**								**Mean**
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	
Cone shaped containers of 9 x 32	0.98 (±0.11)	1.28 (±0.12)	1.33 (±0.08)	0.995 (±0.06)	1 (±0.12)	0.783 (±0.06)	1.1 (±0.11)	-	1.1
Cone shaped containers of 15 x 40 (diameter at the top and height respectively)	1.24 (±0.11)	1.52 (±0.11)	1.325 (±0.14)	1.41 (±0.09)	1.3 (±0.06)	1.45 (±0.1)	1.31 (±0.12)	1.15 (±0.15)	1.3
Root trainers of 9 x 30 (proprietary root trainer)	1.55 (±0.25)	-	1.15 (±1.5)	1.14 (±0.07)	1.35 (±0.05)	1.2 (±0.2)	1.3 (±0)	0.93 (±0.09)	1.2
Normal YB bags of 15 x 37 with a central hole at the base	1.17 (±0.07)	1.37 (±0.11)	1.17 (±0.162)	1.31 (±0.103)	1.11 (±0.05)	1.16 (±0.107)	1.18 (±0.052)	-	1.2
Mean	1.2	1.39	1.2	1.2	1.2	1.1	1.2	1	

Mean diameter of plants vary from 0.78 to 1.4 cm but the mean values for the different containers only vary from 1.1 cm to 1.3 cm.

The diameter of the plants raised in the cone shaped black polythene containers which holds 2000 cc capacity show the best performance. This container has a hole at the bottom as in the proprietary root trainer but holds twice the volume of potting medium than in the root trainer.

The currently recommended polythene bag holds the highest volume of potting medium but it is observed that in most cases the tap root coils at the base before penetrating to the ground.

Mean girth of the plants measured at 10 cm above the ground level after one year of field planting are given in Table 7.

It can be seen from the data in Table 7 that the mean girth of the trees grown in different media and in different containers vary from 4.95 cm to 9 cm, one year after field planting.

Mean girth of plants measured at 10 cm above the ground level after two years of field planting are given in Table 8.

Table 7. *Mean girth of the plants (cm) measured at 10 cm above the ground level after one year of field planting are given in Table 8. SEM values are given in brackets*

Container type	Potting Medium								Mean
	A	B	C	D	E	F	G	H	
Cone shaped containers of 9 x 32 (diameter at the top and height respectively)	7.9 (±0.58)	6.95 (±0.66)	7.55 (±0.79)	7.61 (±0.35)	7.14 (±0.42)	7 (±0.41)	7.94 (±0.59)	-	7.4
Cone shaped containers of 15 x 40 (diameter at the top and height respectively)	8.05 (±0.6)	8.6 (±0.66)	7.92 (±0.71)	8.75 (±0.43)	6.5 (±0.29)	7.83 (±0.59)	8 (±0.73)	9 (±0.73)	8.1
Root trainers of 9 x 30 diameter at the top and height respectively (proprietary root trainer)	6.85 (±0.65)	-	6.75 (±1.25)	7.75 (±0.25)	-	7.25 (±0.75)	-	7.67 (±1.45)	7.3
Normal YB bags of 15 x 37 with a central hole at the base	7.86 (±0.67)	8.14 (±0.58)	7.5 (±1.5)	7.05 (±0.91)	7.93 (±0.36)	8 (±0.57)	6.8 (±0.35)	4.95 (±0.45)	7.3
Mean	7.7	7.9	7.4	7.8	7.2	7.5	7.6	7.2	

The girth measurements of field planted plants were measured after two years of field planting. The girth values vary from 13.4 cm to 13.7 cm indicating minimum effect of the container.

The mean girth of the plants grown in different potting media at field planting, one year after field planting and two years after field planting are given in Table 9 and Figure 1.

Table 8. *Mean girth (cm) measured at 10cm above the ground level after two years of field planting. SEM values are given in brackets*

Container type diameter at the top and height (cm)	**Potting medium**								**Mean**
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	
Cone shaped containers of 9 x 32	13.5 (±1.1)	10.4 (±1.02)	13.35 (±1.07)	13.7 (±0.76)	13.3 (±0.86)	13.3 (±2.4)	15.9 (±0.29)	-	13.4
Cone shaped containers of 15 x 40	14.1 (±0.71)	13.6 (±0.88)	12.3 (±0.93)	16.04 (±0.51)	12.1 (±0.31)	13.4 (±0.97)	13.6 (±1.28)	14.5 (±1.55)	13.7
Root trainers of 9 x 30 (proprietary root trainer)	12.5 (±1.5)	-	13.5 (±1.5)	14.2 (±0.81)	-	14.05 (±1.25)	-	14.3 (±2.33)	13.7
Normal YB bags of 15 x 37 with a central hole at the	13.8 (±0.8)	14 (±0.89)	14 (±0.5)	13.8 (±0.92)	13.7 (±0.68)	13 (±0.8)	12 (±0.38)	-	13.5
Mean	13.5	12.7	13.3	14.4	13	13.4	13.8	14.4	

Table 9. *Mean girth (cm) of field planted plants grown in different potting media at field planting, one year after field planting and two years after field planting*

Parameter	A	B	C	D	E	F	G	H
Girth at Planting	3.8	4.4	3.8	3.8	3.8	3.5	3.8	3.1
Girth at 1 year	7.7	7.9	7.4	7.8	7.2	7.5	7.6	7.2
Girth at 2 year	13.5	12.7	13.3	14.4	13	13.4	13.8	14.4

The mean girth of the plants grown in different containers at field planting, one and two years after field planting are given in Table 10 and Figure 2.

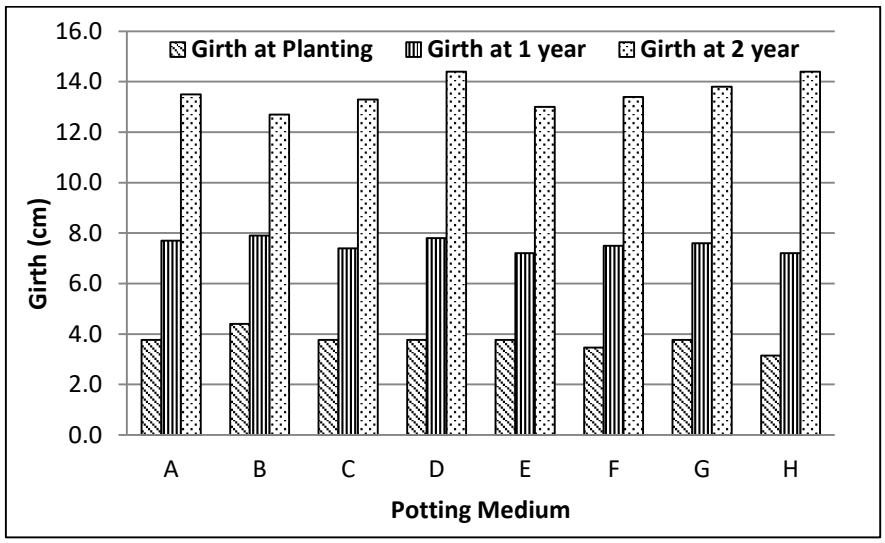

Fig. 1. Mean girth (cm) of field planted plants grown in different potting media at different at field planting, one year after field planting and two years after field planting

Table 10. *Mean girth (cm) of field planted plants with different container type at field planting, one and two years after field planting*

Parameter	Cone shaped containers of 9 cm x 32 cm (diameter at the top and height respectively)	Cone shaped containers of 15cm x 40 cm (diameter at the top and height respectively)	Root trainers of 9cm x 30cm diameter at the top and height respectively (proprietary root trainer)	Normal YB bags of 15 cm x 37 cm with a central hole at the base
Girth at Planting	3.5	4.1	3.8	3.8
Girth after 1 year	7.4	8.1	7.3	7.3
Girth after 2 years	13.4	13.7	13.7	13.5

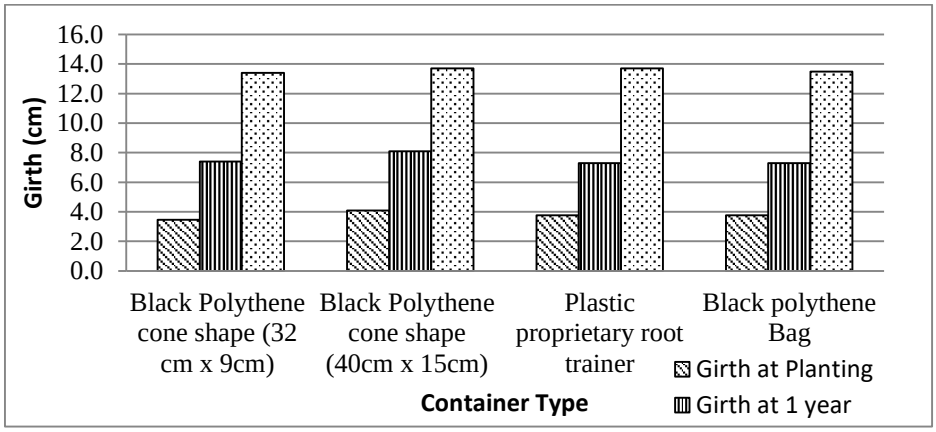

Fig. 2. Mean girth (cm) of field planted plants with different container type at field planting, one year after field planting and two years after field planting

Discussion

In the present study, the main difference among containers was the volume of the container. The similarity was the presence of a hole at the base of the container including poly bags. Root trainers and other two containers were cone shaped and young budding polybag was cylindrical.

The effect of the container on the growth of the seedling plants should be seen only during the initial period as the taproot penetrates the base of the bag within the first 4-5 weeks of transplanting of the geminated seeds into bags. Accordingly, after one month of transplanting, the tap root penetrates the bag and grows underground. Coiling of the tap root at the base of the bag is a common issue with poly bag plants, when polybag has no central hole at the base.

Coiling of the taproot at the base of the bag has been checked against the bags with central holes (Annual Review, 2011). When a central hole is introduced at the base of the bag, irrespective of the size of the hole (either ½" or ¾ square shape hole) root coiling has not been seen in about 50% of the plants. The normal 15cm x 33cm perforated bag has resulted about 50% of fully coiling at the base and another 16% half coiled, as reported by Seneviratne (2011).

In the present study root coiling was not monitored but growth of the seedlings and the grafted plants were measured. As reported by Seneviratne *et al*. (1994), the growth of the young buddings is affected by the size of the container. The currently used bag size was recommended in order to achieve buddable girth in 3-4 months. In the present study, the height of seedlings shows a large variation form 55 cm to 114 cm. This is mainly due to time taken by individual seedlings to develop a new flush. In seedlings inter-nodal length is about 25 cm. The effect of the medium should be minimum due to tap root penetrating to the ground during one

month or so, however, as shown by data, mean girth is almost the same among the container types also, as the tap root penetrated to ground and grown outside the container. Diameter is the only growth parameter important in the process of plant production as bud grafting can be done when the diameter of the seedling is more than 6mm. Without a proper root system, growth of the areal part of the plant will not happen. The lateral root growth within the bag depends on the medium; compost and coir pith improves lateral roots inside the container (Plate 1) but it is a waste of resources as the lateral roots die when the stock plant is cut back after bud grafting and regenerate with the growth of the grafted bud (Dharmakeerthi, *et al.*, 2008).

Wilson 1986 has mentioned that severing the tap root at the point of coiling may result in the loss of nearly one third of the root system and give a severe shock to the plant leading to heavy casualty on transplanting. This is practiced in Sri Lanka successfully by tailing the tap root about 10 days before transporting to the field. The size of the root trainer recommended by Soman and Saraswathyamma (2005) is 7.5 cm diameter at the top and 30 cm length. The poly bag tested by them was 55 x 25 cm. Accordingly, a longer tap root (25 cm more) is accommodated even if the tap root is cut at the base when coiling started. As both the root trainers and polybags had been arranged in trenches of 30 cm deep, until they grow up to 2 leaf whorl stage (4-5 months) and the root system had grown out. More over method of manuring had been different as root trainer plants were drenched with 2% solution of N:P:K:Mg 10:10:4:105 at weekly intervals while polybag plants had been manured monthly with the same solid mixture of the 10-30g during the 4 months period. In addition, a proprietary mixture of micronutrient solution had been sprayed on root trainer plants at fortnightly intervals. Once the plants attend 2 whorl stage, then the root trainers were lifted and kept on carriers made out of bamboo splinters after pruning the roots that had grown out of the root trainer. As reported by them, (Soman & Saraswathyamma, 2005) both the diameter and the height of plants grown in root trainers are lower than those of polybag plants, which has been attributed to the low quantity of potting medium despite tap root grow outside the container. Number of lateral root had been higher in root trainer plants. This is mostly due to the rich medium and the personal experience on lateral root development in coir pith and compost mixed media is similar or even better in polybags (Plate 1). However, higher number of casualties has been recorded for polybag plants.

Plate 1. Rich lateral root development in coir pith and compost mixed media in polybags

Coir pith had been soaked in water for two weeks in order to remove tanning and other growth inhibitors and then dried prior to use. This would be a real practical problem when producing millions of plants. Further, when coir pith was used at 100%, all plants died at five weeks in small cone shape containers and normal polybags, possibly due to being toxic to roots as Soman & Sarawathyamma (2005) reported. They further stated that the tap root coils after 6-7 weeks of planting of bare root budded plants in polybags. The length of the polybags used by them is 55 cm while the height of a root trainer is only 30 cm. Therefore, even if the tap root is pruned at the coiling point, 55 cm long tap root is available at field planting when plants are grown in poly bags whereas only 30 cm long tap root is available with root trainer plants.

As reported by Dharmakeerthi *et al.* (2008) the root system inside the polybag get decreased up to 60% after cut back of the shoot after bud grafting.

Hardening is recommended in Sri Lanka also for young budding plants, by bending the bag and trimming the tap root with a pair of secateurs 10-15 days prior to field planting. Soman and Saraswathyamma (2005) recommend to lift root trainers to get the tap root pruned. After that root trainers are arranged off ground, in carriers made out of bamboo splints until field planting. However, the time and the cost incurred in these practices are real issues in large scale plant production.

Soman and Saraswathyamma (2005) have reported, mean girth of the plants grown in root trainers and poly bags up to four years in the field. At planting mean girth of 3.2 ±0.66 and 3.41±0.71 has been reported for root trainer plants and polybag plants. Similarly after one year in the field 6.43±0.89 and 6.11±1.12 have been reported for plants grown in root trainers and polybags, respectively. After four years in the field, 38.75±2.05 and 35.25±2.64 have been reported for root trainers and polybags, respectively. As it is clear from girth measurements, the effect of the container is not seen until the plants are transferred to the field. Similar observations have been reported in an experiment with different sizes of polybags.

Soman *et al*. (2002) claim that the cost of transportation, distribution and out planting as the most attractive aspects of root trainers.

Soman *et al.* (2011) have reported of using smaller root trainers of only 22 cm height with a holding capacity of 350 cc for direct seed planting followed by green budding. They have used 30 cm long 800 cc root trainers for bare root planting. A medium different from that of Soman (1999) has been used which contains coir pith mixed with powdered rock phosphate (5g), neem cake (5g), bone meal (5g) Pesticide (Phorate 10g @ 100mg) and fungicide (Dithane M45 @ 100mg) to fill root trainers. Two polybag sizes 17.5 x 35.5cm and 25 x 55 cm have been used for direct seed planting and bare root planting, respectively filled with top soil mixed with rock phosphate. No significant differences have been reported among root trainers or polybags of two sizes each for budding success, scion establishment, height of the scion or more importantly diameter of the scion.

Soman *et al.* (2014) reported of an alternative potting medium for root trainer, a mixture of top soil, compost and cow dung with other ingredients. They have reported of no significant effect of the medium on various growth parameters like height, diameter, number of leaf whorls, total number of leaves *etc.* but on the number of lateral roots produced per seedling. They concluded the trial recommending many compositions for the potting medium.

Sumesh *et al.* (2015) reported that root restriction and air pruning of roots in root trainer plants has a significant effect on adaptation of the plants to survive better under harsh environments. The same technique is followed in normal young budding techniques in Sri Lanka by growing them in small size bags and tailing the tap root 2 weeks prior to planting.

However, the nursery period to rubber plants is about 10 months. In Sri Lanka, we are compelled to start the root stock nursery with the seed fall in August and the planting season is May/June with the on-set of the Southwest monsoon rain. The ideal method to raise rubber plants in Sri Lanka is the young budding technique which guarantees the high quality through selecting vigorous rootstocks and quality controlling of budwood. The plant should start growing in the field with proper establishment of its root system.

The biggest concern with root trainers is the nursery arrangement which is not only costly but also cumbersome. When the plants are transported, the vehicles should be specially prepared for that with metal frames fixed to keep plants erect.

In conclusion, the quality of rubber plants depends on the quality of seeds and the quality of budwood. The container and the potting medium have minimum effect on the ultimate quality of the plant but growth at a given time. Root coiling at the base of the normal poly bag could be stopped with a central hole, prepared at the center of the base of the bag. Also, this study shows that size of the bag can be further reduced which will be an added advantage. Moreover, the currently recommended 15 cm x 37 cm polybag with a central hole at the base filled with a mixture of top soil and coir pith can be used to young buddings successfully while depending on the availability of the other types different

media can be used but not 100% coir pith.

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