

**THE PERFORMANCE OF RUBBER CLONES
DURING THE PRE-TAPPING PERIOD
IN PATHANAPURAM TALUK
OF QUILON DISTRICT**

BY

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DISSERTATION

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VELLANIKKARA
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1993

DECLARATION

I hereby declare that this dissertation entitled "The performance of rubber clones during the pre-tapping period in Pathanapuram taluk of Quilon district" is a bonafide record of research work done by me during the course of placement/training and that the dissertation has not previously formed the basis for the award to me on any degree, diploma, associateship or other similar title of any other University or Society.

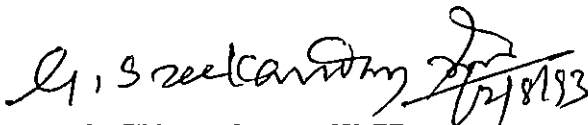
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Certified that the dissertation entitled "The performance of rubber clones during the pre-tapping period in Pathanapuram taluk of Quilon district" is a record of research work done independently by Sri.N.SREEKANTAN NAIR under our guidance and supervision and that it has not previously formed the basis for the award of any degree or diploma to him.

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INTRODUCTION

Elastomeric materials generally known as rubber have by virtue of their unique properties, become vital and indispensable for the production of wide array of strategic, industrial, agricultural and household goods. The versatile qualities of natural rubber makes it more important than synthetic rubber, which is the product of high priced petroleum compounds. The Para rubber (Hevea brasiliensis)[(WILLD.EXADR.DEJUSS) MUELL.ARG] is the main source of natural rubber in the world.

The first commercial planting of rubber in India was started by European planters who formed the Periyar Syndicate in 1902 at Thattakad near Alwaye in the erstwhile Travancore State. Rubber now enjoys an area of 4,51,252 ha. in India, of which 85 per cent is in Kerala State.

India enjoys a unique position in the field of natural rubber. The country has been consuming the entire production of natural rubber, which in fact runs short of demand. The shortage is made good by imports depending on demand. The demand for natural rubber is assessed to increase in the future.

Rubber plantations are classified by the Rubber Board as estates and holdings. Those having an area of 20 hectares or more under rubber belong to the estate category. Units with less than 20 hectares are classified as small holdings. Major share of the total production of natural rubber in the country is contributed by the small holding sector and there is scope for increasing their productivity. The productivity in rubber can be enhanced both through long term and short term measures. Bringing more area under the crop as well as replanting of units planted with older clones of lesser productivity are long term strategies. Adoption of scientific methods of cultivation and exploitation of trees are the short term approaches. The study of the conditions of the holdings and the management practices adopted is necessary to formulate policies for increasing the productivity.

Since last two plan periods 'Rubber Plantation Development Scheme' is being implemented by the Rubber Board. It is an integrated scheme for the large scale development of rubber plantations. The main objective is increasing production and productivity of natural rubber in India. The form and extent of assistance include cash subsidy, input subsidy, arranging long term credit

facilities from the bank and providing free technical support initially for a period of seven years. The various subsidies are distributed to the growers based on the performance of plantations and timely completion of various cultural operations. In spite of the best efforts put in by Rubber Board, certain percentage of growers do not fulfil the standards fixed from time to time probably due to various constraints.

The present study envisages a detailed analysis of various aspects in relation to the performance and adoption of package of practices by various growers. The results emerging from the study would enable the Rubber Board to identify the problem faced by the Board in achieving the specific target and to pin point the lacuna in the developmental activities, if any. This would help to streamline the developmental activities if needed. This has special relevance at the stage of implementation of the World Bank aided Rubber Plantation Project covering a target of 70,000 hectares (replanting and new planting) in the Eighth plan.

Review of Literature

REVIEW OF LITERATURE

The review of literature is presented under two heads:

1. Cultivation of rubber in Pathanapuram taluk.
2. Adoption of scientific method of cultivation.

2.1 Cultivation of rubber in Pathanapuram taluk

Traditionally rubber cultivation was confined to the southern parts of the country, the Kanyakumari district of Tamil Nadu and Kerala State. The picture has now changed and the crop is cultivated in non-traditional areas composed of North Eastern States/Union Territories, Orissa, Andhra Pradesh, Karnataka, Maharashtra, Andaman and Nicobar islands, etc., which together accounts for about 11 per cent of the total area under rubber (Menon and Unni, 1990). Rubber growing regions in the country has been classified into Kanyakumari region, Quilon and Thiruvananthapuram region, Kottayam region, Palakkad region, Thrissur and Malappuram region, Karnataka region, Andaman and Nicobar region, North Eastern region and Konkan region (Jacob, 1967). Pathanapuram taluk comes under the Quilon and Thiruvananthapuram.

The annual rainfall ranges from about 2000 to 3000 mm. South west monsoon is stronger but not so intense as in Kottayam, Idukki, Ernakulam and Thrissur region. June and July are the wettest months and abnormal leaf fall disease is present in this region owing to intense rainfall. January and February are normally dry months. The temperature fluctuations are of minor nature and the soil conditions are more favourable for rubber cultivation than in high rainfall areas. Laterite, lateritic and red soils are encountered in this region also. The soils are acidic and comparatively rich in plant nutrients. Laterisation is not as intense as in high rainfall regions. Pink powdery mildew and Phytophthora diseases are prevalent.

Though the region has concentration of rubber cultivation, the distribution of area under rubber indicated that Pathanapuram taluk of Quilon district occupies important position. Though rubber cultivation in India had a beginning in 1902, the first plantation in the taluk was started only in 1906. Contacts with the local office of the Rubber Board revealed that the pace of progress of the rubber plantation industry in the area was very fast.

rubber

In 1970-71 the area under/in Pathanapuram taluk has been 9289 ha has just gone up to 11369 ha. during 1978-79 (Rubber Board, 1991). Apart from this, no literature pertaining to the rubber cultivation in Quilon district in general and that in Pathanapuram taluk is available. On the basis of census conducted by Rubber Board in 18 villages and estimates made in respect of area of 5 villages revealed that there are 38,490 holdings covering an area of 12,346 ha.

2.2 Adoption of scientific method of cultivation

Adoption of recommended package of practices is a vital factor in improving the production and productivity of different crops. But various factors influence this aspect. This has been revealed by different studies conducted on various crops. Rajendran (1978) reported that majority of the small farmers were either low adopters or medium adopters of improved rice technology. However, Aleyamma (1983) reported that all the small rubber growers of Meenachal taluk in Kerala used high yielding planting materials. The level of adoption of other recommended cultural operations was also reported to be high.

Studies conducted by Manoharan (1979) revealed that farm size had significant correlation with income, knowledge, mass media exposure, contact with extension agency and adoption behaviour. He also found that knowledge was significantly correlated with contact with extension agencies and adoption behaviour.

In another study, the adoption of drought management practices in rice and coconut, Aziz (1988) observed that majority of the respondents belonged to medium level. Kunju (1989) opined that lack of proper and timely information about the schemes of the developmental agencies is a major constraint in the utilization of developmental schemes. The study also revealed that majority of the cardamom growers had medium level of awareness (51.33 per cent) about the developmental schemes. Nair (1992) observed that growth of rubber in Mavelikkara taluk is quite satisfactory. But indicated that small rubber growers require more familiarisation with the package of practices of the crop and more extension support is warranted in the line. Only a very few growers have adopted recommended planting density in the area and also reported high density of population and closer plantings are the main reasons for the delayed girthing. Planters are not aware of beneficial

effects of thinning out of weaklings. Intercropping was popular and some of the inter crops like bettle vine is unique in Mavelikkara taluk. There was tendency among the growers for opening the trees for tapping before attaining the recommended standard. Further, the growers are not much aware of the minor schemes like irrigation subsidy, bee keeping subsidy, smoke house subsidy, rubber roller subsidy etc. In short, more extension support is warranted in this line.

Ramachandran(1992) reported that more number of trees become eligible for tapping certificates on attainment of prescribed girth in areas planted with polybagged plants, when compared to the conventional budded stump planting. He, however, could not observe appreciable difference in girth of plants in these two systems of planting.

Materials and Methods

MATERIALS AND METHODS

The study is confined to the small growers of Pathanapuram taluk in Quilon district, where the cultivation of rubber started as early as 1906. Pathanapuram taluk has 23 villages viz. Edamulkkal, Channapetta, Punnala, Maloor, Pidavoor, Pathanapuram, Piravanthoor, Aryankavu, Kulathoopuzha, Vilakkudy, Ayiranelloor, Thalavoor, Karavaloor, Punalur, Anchal, Alayamon, Valacode, Pattazhy, Thinkalkarikkam, Thenmala, Eroor, Arakkal and Edamon. (Annexures II and III). All the 23 villages of the taluk has rubber as one of the crops. The latest statistical survey and projections of the Board indicates that there are 38,490 small holdings in the taluk covering an area of 12,346 ha. One hundred small holdings planted in 1986 randomly selected from the permit holders formed the sample for the investigation. Aryankavu village was excluded from the study since most of the planted areas are covered by large estates.

Normally, rubber requires seven years for obtaining prescribed girth for commencement of tapping. Cultural operations, care and management during immaturity period is very important. The 1986 planting were selected for the study to assess the impact of overall management done in the past years.

One hundred small holdings are selected at random after collecting the pertinent details from the records maintained at the Regional Office, Rubber Board, Punalur, field offices at Anchal, Pathanapuram and Pattazhy (Annexure V).

Details regarding planting materials, planting distance, density, pitting, refilling, pit-manuring, soil conservation works, weeding, manuring, discriminatory use of fertiliser; intercropping, branching, pruning, mulching, white washing, establishment of cover crops, various diseases such as pink, abnormal leaf fall, powdery mildew, plant protection methods adopted and wind damage were collected. Attempts have been made to gather information on the girth of plants, year of opening for tapping, implementation of various schemes, literacy status of the growers, exposure to mass media, source of extension services received etc. The field data pertaining to the above parameters selected for the study were collected personally using pretested proforma designed (Annexure VI). The data regarding planting distance, girth etc. were actually measured and expressed in centimetres. The available

rainfall data in Pathanapuram taluk were collected from Shaliacary Estate, Punalur and presented in Annexure IV.

The data thus collected were apporpirately tabulated, summarised, presented and discussed.

Results and Discussion

RESULTS AND DISCUSSIONS

The data collected during the study are presented and discussed below:

4.1 Rubber cultivation in Pathanapuram taluk

Available literature revealed that the first rubber plantation in the taluk was started in 1906. There was steady progress in area and production. There were only 4153 units in 1970-71. Now the total area in small holdings in the taluk is estimated as 12346 ha covering 38490 units according to the census and estimates of Rubber Board. Rubber cultivation is unique in the area when holding size is considered. Out of the 100 holdings selected for the study, all the units are below 2 ha and 52 percentage in between 0.20 to 0.40 ha (Table 1). The data revealed that all the units are small holdings.

The results of the present survey on performance of clones in small holders sector with particular emphasis on adoption of package of practices are presented and discussed in separate heads.

Table 1. Classification of units according to size

Class	Units	Area(ha)
Upto 0.20 ha	15	2.84
0.21 to 0.40 ha	52	15.67
0.41 and above	33	22.10
Total	100	40.61

4.1.1 Planting distance and density

Different planting distances adopted by growers are depicted in Table 2. They have adopted 12 different planting distances. For slopy areas planting is done in rectangular system and for flat areas, it is done in square system. This type of planting systems were also reported by earlier workers (Panicker et al.(1977); (Mani et al. (1990). The planting distances recommended by the Rubber Board for flat and slopy or steep areas are included in Table 2.

The data revealed that out of 100 units covered for the study 53 growers have adopted the distance recommended by the Rubber Board. Another observation was that those who have adopted the recommended planting distance in the area in general have adopted closer planting in the periphery. Closer planting on the periphery resulted in weaklings which comes nearly 20 to 25 per cent. Though the growers were aware of the beneficial effects of optimum stand per hectare, much impact was not seen made at the adoption stage. But growers of the surveyed area were found to be not aware of the beneficial effects of thinning out of weaklings. This is in agreement with the findings of Panicker et al. (1977).

Table 2. Distribution of Units according to Planting distance

Sl. No.	Distance		Units	Mean girth, at 7th year (cm)
	(ft)	(cm)		
1.	12 x 10	360 x 300	1	46.0
2.	14 x 12	420 x 360	1	52.0
3.	14 x 14	420 x 420*	3	49.0
4.	15 x 15	450 x 450*	2	52.0
5.	16 x 10	480 x 300	7	46.5
6.	16 x 12	480 x 360	3	46.5
7.	16 x 16	480 x 480*	2	48.0
8.	17 x 10	510 x 300	1	45.0
9	18 x 9	540 x 270	2	46.5
10	18 x 10	540 x 300	32	47.0
11	20 x 10	600 x 300*	45	47.5
12	22 x 11	660 x 300*	1	48.0
Total			100	47.8

* Recommended planting distance adopted in 53 cases.

(b) Planting density

Planting densities adopted in small holdings are depicted in Table 3. Planting density recommended by the Rubber Board is 420 to 445 plants per hectare in the case of budded plants. Only two units have adopted the recommended densities out of the 100 units selected for the study. For example, in Karavalloor village out of the 16 units, only 5 units are having density between 451 to 550, 5 units between 551 to 600, 3 units between 601 to 650 and 3 units between 651 to 750. Similar trend is noticed in other villages also. Wherever higher population densities were adopted, growth of the trees was poor and irregular.

The results obtained are in agreement with earlier studies conducted with regard to planting density and pattern of growth. The findings of Mani et al. (1979) conforms this type of relationship in rubber. Higher initial stand is recommended considering casualties during the immaturity period and for selective thinning out. Duration of immaturity period is increased with increase in density. The results of an experiment conducted by Buttery and Westgarth in 1965 with densities ranging from 110 to 1074 trees per hectare have revealed that 90 per cent of trees in the density of 119 per hectare reached tappable girth 3 years after planting whereas at 1074 trees per hectare, 31 per cent remain untappable even after 19 years.

Table 3. Classification of area according to stand/hectare.

Villages	Upto 400		401-450		451-500		501-550		551-600		601-650		651-700		701-750		751-800		800. & above		Total	
	unit	area	unit	area	unit	area	unit	area	unit	area	unit	area	unit	area	unit	area	unit	area	unit	area	unit	Area
Punnala					1	0.43	1	0.20	1	0.26	1	0.56									4	1.45
Pidavoor					4	1.66	1	0.34	1	0.22											6	2.22
Piravanthoor.	1	0.60			5	1.59			1	0.22	3	0.64	1	0.32			1	0.26			12	3.63
Pathanapuram	1	0.75	1	0.36	4	2.50			2	0.40											8	4.01
Karavalloor					2	0.80	3	0.98	5	3.68	3	1.40	2	0.66	1	0.56					16	8.08
Chennapetta							1	0.41			1	0.28	1	0.50							3	1.19
Thenmala							1	0.38													1	0.38
Edamon					2	0.93	1	0.71	1	0.47							1	0.32			5	2.43
Edamulakkal							1	0.25	3	0.82	3	0.86									7	1.93
Alayamon									1	0.20	1	0.18			1	0.54					3	0.92
Pattazhy & Meloor					1	0.19	1	0.31	2	0.42	1	0.38	1	0.40					1	0.28	7	1.98
Thalavoor							4	1.49			1	0.24							1	0.27	6	2.00
Vilakkudi															1	1.27					1	1.27
Arackal									1	0.20											1	0.20
Anchal									1	0.36	1	0.88									2	1.24
Valacodu					1	0.54									1	0.37					2	0.91
Yeroor			1	0.61			1	0.60	1	0.24	2	0.45									5	1.90
Thinkal Karikkam					1	0.61	1	0.52	4	1.44					1	0.56	1	0.21			8	3.34
Kulathupuzha.											1	0.39									1	0.39
Arayanalloor											1	0.18									1	0.18
Punalur														1	0.96						1	0.96
Total	2	1.35	2	0.97	21	9.25	16	6.19	24	8.93	19	6.44	6	2.84	5	3.30	3	0.79	2	0.55	100	40.61

4.1.2 Pitting and refilling

The details of pitting are shown in Table 4. The study revealed that in 3 units which cover an area of 1.29 ha had taken pits of size 0.90 m x 0.90 m x 0.90 m, 2 units which cover an area of 1.04 ha had taken pits of size 0.60 m x 0.60 m x 0.60 m and 95 units covering an area of 38.28 ha had taken pits of size 0.75 m x 0.75 m x 0.75 m. All the growers have taken care to fill the pits with top soil.

Adoption of pit manuring is depicted in Table 5. Cowdung alone is used in 36 units, cowdung and compost in 23 units and bonemeal in 17 units. No manuring is done in 24 units.

The growers in general were found to be well aware of the importance of taking pits of appropriate size and also about pit manuring. More awareness regarding use of rock phosphate is needed.

4.1.3 Soil and moisture conservation

In flat as well as in slopy areas terracing was found to be a common practice adopted (either contour terrace or individual terrace). In 95 cases the area was slopy and steep and in 5 cases, the area is almost flat or undulating (Table 6). More awareness is needed in this case as well.

Table 4. Details of Pitting

Size of pit(cm)	No. of units	Area(ha)
90 x 90 x 90	3	1.29
75 x 75 x 75	95	38.38
60 x 60 x 60	2	1.04

Table 5. Adoption of Pit Manuring

Type of manure used	Units	Area	Percentage area
Cowdung	36	11.78	29.0
Cowdung + compost	23	9.14	22.5
Bonemeal	17	7.14	17.6
No manure used	24	12.55	30.9
Total	100	40.61	100

Table 6. Adoption of Soil Conservation

Type of soil Conservation work done	No.of units	Area	Per cent
Contour terrace individual platforms	100	40.61	100

4.1.4 Clones, planting material and planting

It was revealed that all the growers have planted RRII 105. This revealed that 100 per cent of the growers have used advanced clones. Growers are all well aware of the high yielding clones and advanced planting materials. The effect of extension strategy appears to be very good in this regard. Data furnished in Table 7 revealed that 59 per cent of the units, covering an area of 25.87 ha have planted polybagged plants. Field budding in 21 cases cover an area of 7.83 ha and budded stumps in 20 units cover an area of 6.91 ha. This shows that majority of the growers have used polybagged plants as per the recommendation of the Rubber Board. The 31 per cent of plants have attained tappable girth (50 cm) 54 per cent attained a girth ranging from 44 to 49 cm and 15 per cent attained girth 40 to 44 cm (Table 8 and 9). This is in agreement with the finding of Ramachandran (1992) who reported that more number of trees become eligible for tapping certificate on attainment of prescribed girth in an area planted with polybagged plants compared to the conventional budded stump planting. He, however, could not observe the appreciable difference in girth of plants in these two systems of planting.

Table 7. Distribution of Area according to planting material

Type of planting material	Units	Area (ha)	Percentage
Polybagged plants	59	25.87	63.7
Seed at stake	21	7.83	19.3
Budded stumps	20	6.91	17.0
Total	100	40.61	100

Table 8. Effect of Planting materials on Girth of trees at the 7th year.

Planting materials used	Girth (cm)			
	50 & above	49-45	44-40	39 & below
Polybagged	18	32	9	-
Seed at stake	4	13	4	-
Budded stmps	1	17	2	-
Total	23	62	15	-

Table 9. Data of trees which attained different girth limits at 7th year (percentage)

Material used	cm	cm	cm	cm
	50 & above	49 -45	44 -40	39 & below
Polybagged	31	54	15	-
Seed at Stake (B.G.)	19	62	19	-
Budded stumps	5	85	10	-



4.1.5 Manuring

The data with respect to manuring (Table 10) revealed that 100 per cent of the growers have adopted manurial practices using chemical fertilizers. A total of 96 growers followed general recommendation of the Rubber Board and four growers adopted discriminatory fertilizer applications from fourth year onwards after testing the soil. A well balanced nutrient application is found necessary for enhancing the growth rate and thereby reducing the immaturity period. (Mani et al. 1990). Motivation in discriminatory fertilizer application is further required.

4.1.6 Canopy control measures

(a) Branch induction and pruning

The data collected for pruning and branch induction is presented in Table 11. Out of the 100 holdings no inducement was made in 91 cases and in 9 cases leaf cap method is seen used for branch induction. Branching is usually induced at 2.5 m from the bud union. Delayed branching can slow down girthing. Pinching or cutting of apical bud causes excessive and unbalanced branching leading to wind damage. If branches do not develop above 2.5 m from the ground, it should be induced by artificial methods like notching or by temporarily

Table 10. Units under different practices of Manuring

Particulars	Units	Area(ha)	Percentage adoption	Average girth
Use of rubber mixture as per general recommendation	96	38.76	95.4	46.8
Use of fertilizer on the basis of soil analysis.	4	1.85	4.6	47
Total	100	40.61	100	46.9

Table 11. Canopy Control Measure

Details of pruning and branching.	No.of Units	Area(ha)	percent
A. Pruning done	64	22.33	55
Not done	36	18.28	45
B. Branching induced	9	2.49	6.1
Not induced	91	38.12	93.9

suppressing the growth of apical bud by closing it with tender leaves around (George, 1989). Thus, it was revealed that the growers are adopting recommended methods for induction wherever found necessary.

4.1.7 Mulching and white washing

Results of the present survey (Table 12) revealed that mulching was practiced in 50 units covering an area of 23.38 ha (57.6 per cent). Mulching was not seen practiced in 50 units covering an area of 17.23 ha. (42.4 per cent). Dried leaves and other green materials were used for mulching.

In 86 units white washing was done. Under this, 41 cases are with lime, 39 cases with china clay and 6 cases lime with copper sulphate. In 14 cases no white washing was done.

George (1990) and Rubber Board (1992) stressed the importance of mulching and whitewashing for better growth. Majority of cases have adopted the recommended practice.

4.1.8 Leguminous cover

In the present study it was observed that 44 units covering an area of 18.15 ha have raised leguminous cover crops. In 56 units covering an area of 22.46 ha leguminous cover crop was not planted (Table 13.)

Table 12. Mulching and Whitewashing

Particulars	Units	Area	Percent
A. Mulching done	50	23.38	57.6
Not done	50	17.23	42.4
B. Whitewashing done			
(i) Lime	41	19.38	47.7
(ii) China clay	39	13.80	34
(iii) Lime with copper			
Sulphate	6	2.67	6.6
Not done	14	4.76	11.7

Table 13 Details of Leguminous cover cropping

Particulars	Units	Area (ha)	Percentage of adoption	Girth
Leguminous cover Crops planted	44	18.15	44.7	46.6
Leguminous cover Crops not planted	56	22.46	55.3	47
Total	100	40.61	100	

Pueraria phaseoloides is the cover crop mostly used in the area. While establishing leguminous cover and maintaining them properly from very beginning, rubber plants could be brought into tapping earlier. This will also result in saving of nitrogenous fertilizer and has several other advantages (George, 1990; Rubber Board 1992).

The study revealed that the growers are aware of the effect of cover cropping but the adoption was medium level.

Non establishment of cover crop is not due to ignorance but due to economical consideration of raising intercrop in the first three years. Marked difference in girth of plants is not seen in areas with and without cover crops.

4.1.9 Inter cropping

The data on inter cropping is presented in Table 14. The practice of intercropping was followed fairly extensively. In the area surveyed 58 per cent of the growers have adopted intercropping. Tapioca was seen intercropped only in 18 holdings in the first year. In all other cases, plantain, banana, ginger were planted in the second and third year also. The net return achieved on intercropping attracted those growers to generate income during pre-bearing period. (Pottyet al. 1978; Rajasekharan, 1988). In three cases growers have resorted to a mixed intercropping system comprising of banana, dioscorea and colocasia.

Table 14. Data on Intercropping

Details of intercropping	Not done	Done
Intercropping done		
(i) Tapioca	-	18
(ii) Plantain	-	32
(iii) Banana	-	4
(iv) Ginger	-	1
(v) Others	-	3
Intercropping not done	42	-
	<hr/>	
Total	42	58

The growers, in general, were happy about raising intercrops on account of additional income generated during non-productive phase. This was supported by the views of Menon (1977) who suggested that the choice of the intercrop should, however, be done very carefully depending on the locality, crop preference of growers and economic considerations.

4.1.10 Weeding

Proper weeding is carried out in all the units. But in cover cropped areas the leguminous cover crops reduced weed growth (Rubber Board, 1992). Use of chemical weedicide is not practiced (Table 15). There is enough awareness among the growers about weeding and weed management.

4.1.11 Diseases, pests and their management

The major diseases affected rubber in the surveyed area are pink disease, abnormal leaf fall and powdery mildew. Wind damage was also noticed.

(a) Pink disease

The data pertaining to pink disease is given in Table 16. Out of 23855 trees surveyed, 1225 trees were affected with pink disease (5.14 per cent). Application of

Table 15. Data on Weeding

Type of weeding	Units	Area
Manual	100	40.61
Chemical	-	-

Table 16. Incidence of Pink disease, wind damage, Leaf fall et

No. of trees Surveyed	Pink		Wind damage		Abnormal leaf fall	
	No. of trees affected	Percent-age	No. of trees affected	Percent-age	No. of trees affected	percent-age
23855	1225	5.14	279	1.17	255	1.07

Bordeaux paste is the remedial measure (Pillai and George 1980). Majority of growers have adopted the control measures. Thus it was revealed that the growers are aware of this disease and control measures to be adopted.

(b) Abnormal leaf fall

The data pertaining to abnormal leaf fall is given in Table 16. Out of 23855 trees surveyed, 255 trees were affected by abnormal leaf fall (1.07 per cent). Spraying with Bordeaux mixture was practised in all the units. This disease if not effectively treated may lead to considerable crop loss (Jacob et al. 1989; Pillai et al. 1980). Growers were aware of the disease and control measures.

(c) Powdery mildew

This disease is affecting new tender leaves at the time of refoliation and it has been observed only in 3 units in mild form. Effective control measures are available against this disease (Pillai et al. 1980; Thomson et al. 1988). No remedial measures are being practised by the growers, probably due to the mild incidence of the disease.

(d) Wind damage

The data in Table 16 revealed that out of the 23855 trees surveyed, 279 trees were affected by wind damage (1.17 per cent). In all the case, damage was partial branch breaking. Breaking of major twigs were common in partly damaged cases. Growers resorted to removal of damaged bark followed by application of wound dressing compound. This is a recommended practice (Abraham 1991).

4.1.12 Maturity

The survey revealed that out of the 100 small holders selected for the study only 28 have started tapping and the remaining 72 holders are yet to start tapping. It is because of the fact that the trees have not reached the tappable girth of 50 cm at 125 cm height (Table 9). It may be noted in this connection that only in 28 units trees have attained the tappable girth of 50 cm. The main reasons for delayed girthing are the high density of population and closer planting. This was evident from the data discussed under planting distance and planting density in this chapter. This type of relationship was already confirmed by Mani et al. (1979). Planters were not aware of the beneficial effects of thinning out of weaklings as suggested by Panicker et al. (1977).

Trees having a girth of 44 cm and above but below the prescribed girth have been tapped ie. early exploitation. These facts revealed the fact that more intensive extension strategy is to be undertaken to convince them about the ill-effects of high density planting and early application of trees.

4.2.1 Literacy status of growers

The details shown in Table 17 has revealed that in the surveyed area 45 growers have primary education, 40 growers have high school education and 15 have college education. If we critically analyse the situation we can see that the growers are literate enough to grasp the ideas and adopt the recommendations. ie. literacy is not a limiting factor.

4.2.2 Exposure to mass media

All the growers used to read Malayalam daily and listen to Radio. Only 22 growers used to read the monthly Rubber Magazine. This shows that more extension strategy is needed so that all the farmers start reading Rubber Magazines.

Table 17. Literacy

Stage	No. of growers
Primary education	45
High school	40
College	15
Illiterate	-
Total	100

4.2.3 Source of extension service

The data on Table 18 revealed that the main source of information were the newspapers and radio. The "Rubber" magazine was not that much popular. Further all the growers got the benefit of extension service from the Field Officer.

However, the study revealed the necessity of strengthening of extension activities on selected areas on a priority basis. This would help in better adoption of scientific rubber cultivation which in turn will help improving production and productivity .

4.2.4 Financial assistance

Out of the 100holdings surveyed, 99 growers received subsidy under rubber plantation development scheme in time (Table 18). Area covered is 40.29 ha. Subsidy was not paid to one grower due to the presence of excess trees other than rubber above the prescribed limits.

The majority of growers were not found availing the subsidy linked loan from the nationalised banks and other financial institutions. Only 8 growers covering an area of 2.94 ha have availed bank loan. Following are the general reasons attributed for not availing the loan.

Table 18. Source of Extension Service.

Source	No.of growers benefited.
Rubber Board Field Officer	100
Rubber Board Regional Office	46
Rubber Producers' Society	17
Nearby growers	18
Malayalam Daily	100
Radio	100
Rubber Magazine	22
Other agencies.	Nil.

Table 19. Financial Assistance availed by Growers.

Type	Unit	Area
1. Rubber board subsidy		
Not paid	1	0.32
Paid	99	40.29
2. Bank Loan		
Not availed	92	37.67
Availed	8	2.94

1. Cumbersome procedure for availing loans.
2. Unwillingness to mortgage the area.
3. Non co-operation of the organisations who are connected with loan scheme.
4. Small size of the area and requirement of more documents etc.
5. Sufficient financial background.

More liberalised schemes are required to help the marginal rubber growers.

Summary and Conclusion

SUMMARY AND CONCLUSION

An attempt was made to assess the performance of rubber plantations during the pretapping period of Pathanapuram taluk of Quilon district. Primary data were collected through personal visits and interviews with the help of a pretested questionnaire. Secondary data were gathered from the records available at the regional office and field offices of the Rubber Board.

For the study, 100 units were selected randomly from among those who planted rubber in 1986 and availed the subsidy from the Rubber Board. The region has the topography well suited for the rubber cultivation with good soil and climatic features. There has been a tendency for raising higher number of plants per unit area than what is recommended. Only in two units, planting density was between 401 to 450 per ha. Regarding planting distance in 53 units the growers have adopted the recommended planting distance. Even in these cases, close planting is noticed in the boundaries. In majority of the cases, pitting and refilling were found to be as per recommended package of practices. All the growers used advanced clones for planting. The most popular planting material used was RR11 105 which covered hundred per cent of the area under study. Majority of growers have used polybagged plants, advanced planting material.

The trees were sturdy with average vigour and the clones had a fair degree of tolerance to abnormal leaf fall disease caused by Phytophthora species under normal prophylactic measures. But it was susceptible to pink disease as seen from the details already furnished. The plants were free from serious wind damages as branch development was kept balanced.

Discriminatory fertiliser application was not adopted by majority of the farmers in surveyed areas. However, intercropping was popular. The crops grown were plantain, banana, tapioca, yam, dioscoria. Only 46 growers out of 100 had planted leguminous cover crop. Higher density increased the immaturity period. This has been brought out by the study. All the trees had not attained tappable girth even after seven years of growth.

More extension effort in reducing the stand per hectare during immaturity period is highly essential. In general, maintenance of plantations during the pretapping period was satisfactory. But there is further scope for improvement so as to reduce immaturity period. There is also a tendency among growers to open trees for tapping before attaining the recommended standard girth.

It is interesting to note that eventhough majority of growers are literate, they seem to be less receptive especially about the optimum planting density and tapping stage.

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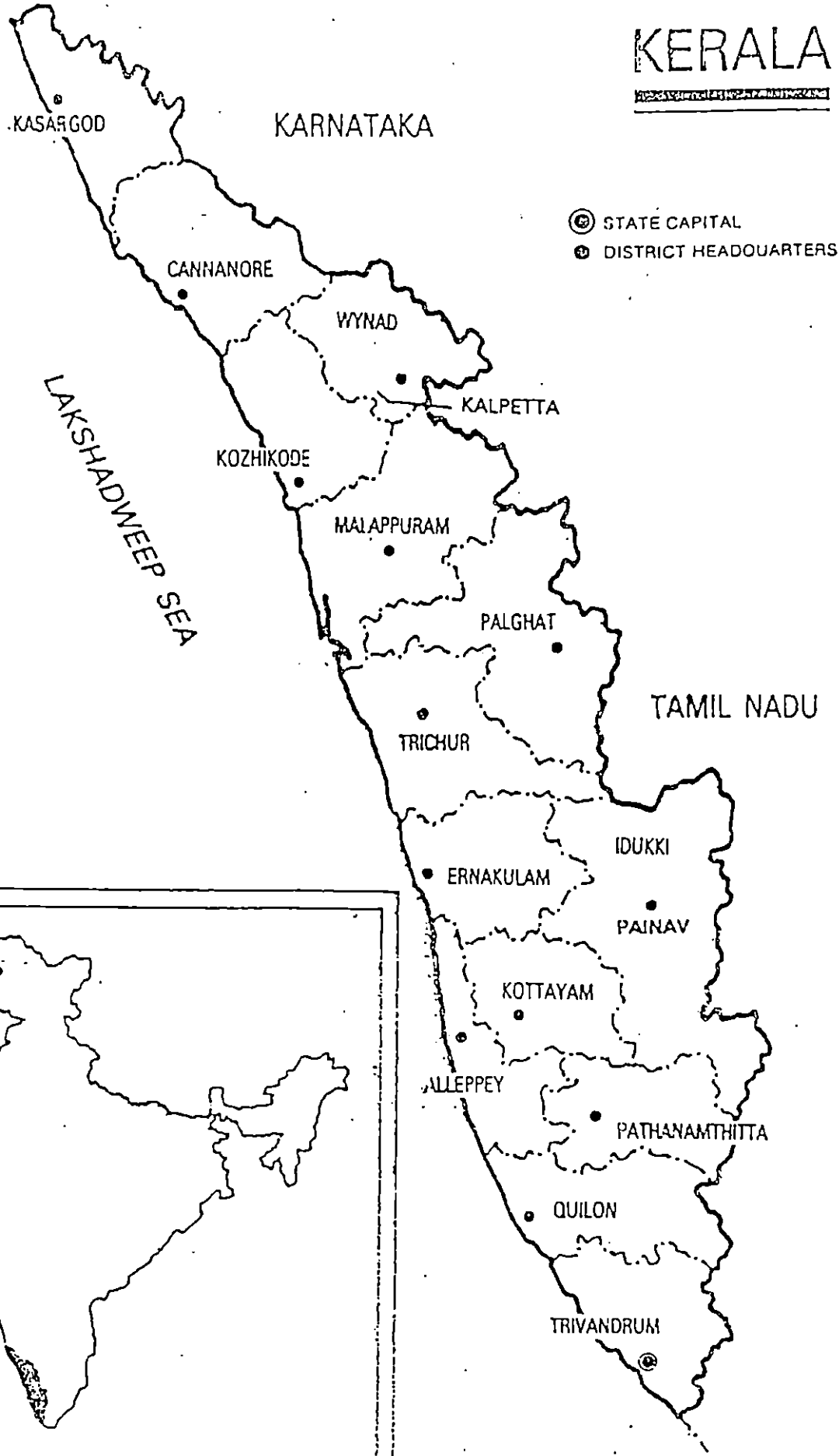
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ANNEXURE I

Projection on area, productivity and total production of
natural rubber in India.

Year	Total area ('000 ha)	Tapped area ('000 ha)	Yield (Kg/ha)	Production ('000 tonnes)
1990-91	451	306	1076	330
1991-92	461	325	1125	365
1992-93	473	342	1180	405
1993-94	487	358	1240	445
1994-95	503	373	1300	485
1995-96	521	387	1350	522
1996-97	541	398	1390	553
1997-98	561	407	1430	582
1998-99	581	416	1465	609
1999-00	601	427	1495	638
2000-01	623	443	1523	675

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ANNEXURE IV

Rainfall data in Pathanapuram Taluk - Shaliacary Estate, Punalur (Rainfall in cm)

Year	M O N T H												Total
	JAN	FEB	MARCH	APR	MAY	JUNE	JULY	AUGUST	SEP	OCT	NOV	DEC.	
1986	0.39	6.63	5.29	33.23	16.73	28.57	35.28	44.67	27.89	32.53	22.86	0.00	254.05
1987	1.82	0.45	4.23	15.94	24.34	52.19	39.36	39.22	18.52	59.86	19.27	12.17	287.34
1988	0.00	14.73	19.05	33.98	10.61	47.93	29.42	34.72	43.68	22.50	9.84	1.00	267.44
1989	0.90	0.00	20.80	32.47	17.92	53.43	44.35	37.01	44.04	46.60	14.84	0.60	312.92
1990	3.04	0.91	5.16	11.33	38.54	34.90	48.25	18.31	7.32	56.51	19.20	0.24	243.69
1991	1.57	0.91	18.10	14.23	15.38	124.41	45.04	18.64	4.76	44.28	16.16	2.30	305.75
1992	0.75	1.33	3.60	8.35	33.37	60.61	57.84	26.78	31.00	54.35	42.64	0.07	320.67
Average	1.21	3.56	10.89	21.36	22.41	57.43	42.79	31.33	25.31	45.23	20.69	2.34	284.55

ANNEXURE V

List of holdings selected for the study

Sl.No.	Permit No.	Name of permit holder	Area(ha)
Punnala			
1	PD PN 560/86	G.Pappan	0.26
2	" 1246/86	Abdul Khani	0.43
3	" 1263/86	Mariamamma Edikulam	0.56
4	" 1379/86	N.Damodharan	0.20
Pidavoor			
5	" 24/86	S.Sushamma	0.68
6	" 500/86	Rema devi, S.	0.23
7	" 1218/86	P.N.Bhargavan Nair	0.37
8	" 1587/86	Joykutty K Others	0.38
9	" 1406/86	G.Thomas	0.34
10	" 1228/86	Purushottaman Potti	0.22
Piravanthoor			
11	" 1135/86	A.N.Vijayan	0.38
12	" 1562/86	G.Raghavan Pillai	0.39
13	" 1615/86	M.Divakaran	0.30
14	" 1541/86	P.N.George	0.26
15	" 1664/86	M.C.Kamamma	0.20
16	" 1680/86	K.V.Varghese	0.22
17	" 1684/86	B.Omana	0.22
18	" 1688/86	K.Purushothaman	0.22
19	" 440/86	Mary Cherian	0.20
20	" 1191/86	P.J.John	0.32
21	" 479/86	Annamma Cheriyan	0.60
22	" 480/86	Thomas Cheriyan	0.32

(contd..)

Sl.No.	Permit No.	name of permit holder	Area(ha)
Pathanapuram			
23	PD/PN/32/86	S.Karakoyya	0.20
24	" 650/86	S.Subhadra Devi	0.20
25	" 1468/86	S.Thankamma Samuel	0.79
26	" 1601/86	Mohammed Sheriff	0.24
27	" 457/86	Varghese Thomas	0.75
28	" 1245/86	J.Iype	0.61
29	" 456/86	Zacharia Thomas	0.86
30	" 1250/86	Abdul Azeez	0.36
Karavaloor			
31	" 475/86	K.Somarajan & K.S.Padmavathy	0.60
32	" 1155/86	Raja V.V.	0.40
33	" 1156/86	Rani, V.V.	0.40
34	" 314/86	MV.Thomas	0.21
35	" 410/86	M.Raghavan	0.40
36	" 1080/86	P.G.Mammachan	0.20
37	" 565/86	Mariamamma K.Varghese	0.40
38	" 648/86	Janardhanan Pillai	0.28
39	" 956/86	Mariamamma	0.60
40	" 1594/86	K.Radhakrishnan Nair	0.56
41	" 1193/86	Panly Joseph	0.50
42	" 1234/86	K.Thomaskutty & Shyla T	0.70
43	" 1265/86	D.Balakrishna Pillai	0.10
44	" 1311/86	P.M.Thomas & P.M.Joseph	0.97
45	" 1312/86	M/S.Lizzy Thomas & P.M.Joseph	1.20
46	" 1596/86	K.Radhakrishnan Nair	0.56
Chennapetta			
47	" 50/86	M.Gee Varghese	0.28
48	" 150/86	Shri.Chacko Geeverghese	0.50
49	" 930/86	K.M.Abraham	0.41
Thenmala			
50	" 1145/86	H.Hassan	0.38

(contd...)

Sl.No.	Permit No.	name of permit holder	Area(ha)
Edamon			
51	PD/PN/535/86	N.Vidhyadharan	0.32
52	" 1212/86	M/S.Shahul Hameed & Sara Ummal	0.71
53	" 716/86	Raja Abraham	0.20
54	" 718/86	Leelamma Varghese	0.73
55	" 1271/86	M.S.Abraham	0.47
Edamulackal			
56	" 219/86	Smt.K.Devaki	0.38
57	" 573/86	Sri.N.Thankappan Pailli	0.20
58	" 574/86	Oomony Babu	0.19
59	" 592/86	Mazood Rauther Rasheed	0.28
60	" 594/86	A.M.Nazer	0.25
61	" 614/86	Geeverghese Cheriyan	0.35
62	" 615/86	Shereefa Beevi	0.28
63	" 36/86	C.J.Pathrose	0.54
64	" 208/86	Raghavan Unnithan	0.20
65	" 653/86	M.G.George	0.18
66	" 1392/86	Sri.Alexander M.P.	0.28
67	" 333/86	Sri.M.Nayoorkani Rawther	0.21
68	" 45/86	Sri.N.G.Mathai	0.31
69	" 199/86	Sri.K.G.Kunjumon	0.19
70	" 244/86	Sri.N.Vijayan	0.40
71	" 1520/86	Sri.M.Jalaudeen	0.38
72	" 1549/86	Shri C.Pappachan	0.21
Thalavoor			
73	" 305/86	Shri G.Abraham	0.21
74	" 315/86	Shri C.Yohannan	0.22
75	" 789/86	Sri.M.J.Johnson	0.24
76	" 971/86	Sri.K.Narayanan Unnithan	0.73
77	*" 1041/86	Sri.C.T.Alexander	0.27
78	" 1432/86	Shri Koshy Daniel	0.33

(contd...)

Sl.No.	Permit No.	Name of permit holder	Area(ha)
Vilakkudi			
79	PD/PN/1267/86	Sri.T.Soman	1.27
Arackal			
80	" 1487/86	M/S.Mathaikunjumon & Achama	0.20
Anchal			
81	" 61/86	Sri.N.Nadesan	0.88
82	" 1341/86	Smt.R.Sarala	0.36
Vilacodu			
83	" 105/86	Smt.Chinnamma George	0.37
84	" 1246/86	Sri.S.C.Radhakrishnan	0.54
Yeroor			
85	142/86	SmtD.Lalitha	0.24
86	880/86	M/S.P.Madhavan Pillai & Meenakshi Amma.	0.24
87	" 472/86	M/S.Aleyamma Thomas & Daniel	0.61
88	" 1550/86	Dr.N.Sivanandan	0.21
89	" 942/86	M/S.Bhaskaran & Saraaswathy Bai.	0.60
Thinkalkarikaram			
90	" 1017/86	M/S.D.George Tharakan & Kunjamma George.	0.21
91.	" 247/86	Sri.Sam John	0.52
92.	" 617/86	Sri.Soloman Idicula & Smt.Lizzy soloman.	0.61
93.	" 1627/86	M/S.Johnkutty & Saramma Johnkutty.	0.33
94	" 1635/86	Thomas Joshua	0.30
95	" 229/86	ShriK.M.Jospeh	0.56
96	" 929/86	Shri P.M.Philipose	0.49
97	" 908/86	Smt. M.K.Lekshmikutty	0.32

(contd...)

Sl.No.	Permit No.	Name of permit holder	Area(ha)
Kulathupuzha			
98	PD/PN/786/86	Smt.R.Chandramathy	0.39
Arayanalloor			
99	" 974/86	Sri.Babu Mohanan Nair	0.18
Punalur			
100	" 1058/86	Sri.Oommen Thomas	0.96

KERALA AGRICULTURAL UNIVERSITY

DEPARTMENT OF PLANTATION CROPS AND SPICES
COLLEGE OF HORTICULTURE, VELLANIKKARA. THRISSUR.

Programme of Research work for the dissertation for P.G.Diploma
in NRP by N.Sreekantan Nair.

Title - Performance of Rubber clones in the pre-tapping period
in Pathanapuraam taluk of Quilon district.

Programme for Interview Schedule

- 1.(a)Name and address of grower :
(b)Literacy :
(c)Location :
(d)Village :
2. Permit/Application Number : PE 2/PN/
PDA/PN/
3. Total area under rubber(Ha) :
4. Permitted area (ha) : Area under Subsidy:
5. Year of Planting: : Planting material used.

Year	US	CS	105	BG 600	GTI	Others
------	----	----	-----	-----------	-----	--------

(b)Method of Planting:

<u>Year</u>	<u>B.S.</u>	<u>Seed at Stake</u>	<u>Polybag</u>
-------------	-------------	----------------------	----------------

(c)Multiplication : Own / Nursery / Nil.

(d) Procurement of source materials. Board/Private/Relatives/Friends

6(a).Planting distance : Flat 14' x 14', 15' x 15', 16' x 16'...
 Steep 18' x 9', 20' x 10', 22' x 11' ...

(b)Density : No..... Area

7(a) Pitting & Refilling:

Size of pits : 2'x 2' x 2', 2½' x 2½' x 2½', 3' x 3'x 3'...

If manured, quantity per pit : Cowdung Compost Manure Other
 : : : :

(d) Additional pitting done :
 If so, No. of pits :
 Reason for such pitting :

(c) S.C. works done : Done/ Not done: Type

(d) Nature of land: Slope / Steep/ Steep more than 1 in 2/Flat.

8(a) Field maintenance Done Not done

Weeding 1st year
 2nd year
 3rd year
 4th year
 5th year
 6th year
 7th year

(b) Use of weedicide Done/ Not done
 If done materials used:

(c) Manuring: Done/ Not done
 If done, basis: Recommended by Board/Local grower

(d) Adopted discreminatory Fertilizer application : Yes/ No

(c) No. of application & dose

Type of rubber mixture	Pre Monsoon	Post Monsoon
1st year
2nd year
3rd year
4th year

Type of Rubber Mixture	Pre Monsoon	Post Monsoon
5th year
6th year
7th year

- (f) Source of R.M-: Dealer/Co-op:Society/ RPS
- (g) Pruning Done/Not done
- Branching Induced/ Not induced
- Method
- (h) Mulching Done/Not done
- (i) White washing Done/Not done

If done : i. Lime ii. Lime +CuSO₄ iii. China clay

9.(a) Cover crop establishment / Success

Type	Year of establishment	Success	Source
.....

(b) Intercropping

Year	Type	Extent
.....

(c) Tillage for intercropping

Year	Extent	Nature
.....

- (d) Additional fertilizer applied if any for intercrops. Yes/No.
- Type 1
- 2
- 3

10.(a)Disease affected'	No.of plants	% of plants
Pink
Root disease
Wind damage
Abnormal leaf fall
Others

(b) Plant protection	Done/Not done
Spraying	Self/PVT/RPS
Dusting	Self/PVT RPS Type/No.

(b)Boundary/Fire protection : Done|Not done

(c)Irrigation : Done/Not done

(c)Bee keeping : Done/Not done

11.(a) Present girth of plants & uniformity :

(b)Year of opening for tapping :

12.(a) Insurance for tree Yes/No

(b)Bank Loan availed Yes/No

(c)Subsidy received in full Yes/No Area.....

(d)Technical Advice
obtained from FO/RO/RPS/Near by growers

(b)Bank loan if not availed, reasons:

1.

2.

13. Problems encountered by the growers if any:

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14. Use of Publications:

15. Remarks: