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AAR NEWS

EDITORIAL

Superior nursery planting material is an important first step to higher profitability in oil palm cultivation. Very vigorous and uniform nursery materials are prerequisites to early bearing and high yields in the field. Much attention to details at all stages of the nursery is required to produce first class planting materials. Whilst all estates are already carrying out most of the practices required to produce first class nursery materials, Heriansyah's write-up on nursery practices would serve as a check-list to ensure the normal high standards practised in estates are maintained.

Esigel is a patented spin-off product from the AAR jacket system of rubber exploitation. It combines the improved efficacy of normal ethephon with the most efficient method of stimulant application namely the lace/groove brush application, resulting in a very low cost and efficient method of stimulation for rubber trees. The improved responses from stimulation with Esigel compared with normal ethephon are reported.

This issue of AAR Newsletter marks the first release of a special advisory note on topics of special interest to the estates. It is hoped that this and subsequent special advisory notes will be useful to estate personnel.

CHAN,W.H.

CONTENTS	*PAGE*
♦ *Nursery practices for production of superior oil palm planting materials*	*1-7*
♦ *Esigel*	*7-8*
♦ *Special advisory note on panel notation in Rubber*	*8*
♦ *Social and Personal*	*8*

NURSERY PRACTICES FOR PRODUCTION OF SUPERIOR OIL PALM PLANTING MATERIALS

By HERIANSYAH

Superior planting material is one of the basic factors affecting the success of an oil palm plantation. Good nursery management would be required to ensure the production of uniformly good and healthy seedlings from a nursery in order to achieve early bearing and high yields in the field. As the production of superior oil palm planting materials is fully dependent on attention to details at all nursery stages, proven standards and procedures are discussed with particular emphasis on oil palm nursery maintenance to achieve the same.

1. INTRODUCTION

The oil palm is a very precocious crop which comes into maturity at 26 months or earlier from field planting, with peak yield realised at four or more years thereafter.

As early bearing and high yields in the field are mainly dependent on production of uniformly good and healthy seedlings from a nursery, it follows that good nursery management would be required to achieve the latter.

The production of superior oil palm planting materials is fully dependent on attention to details at all stages in the nursery management and this entails following closely, proven standards and procedures.

Oil palm has a productive life span of 25 years or more and any shortcomings in the planting material will have long term consequences on yield.

2. SITE SELECTION

The selection of the area for a nursery is critical and it should be sited as centrally as possible to the field to be planted. In addition, the following should also be considered:

2.1 Topography (Terrain)

The selected area should be flat to gently undulating with slopes between 0 and 3^0 and preferably, with a reliable/permanent source of water supply for irrigation purpose at the lower end of the area so that runoff water from the nursery can be diverted back to the water source.

2.2 Water Supply

Water requirements (quality and quantity) must be determined prior to starting site preparation. The easiest source of water is where there is a large natural pond or lake whereby all that is required is to place an intake pipe to connect with a pump unit. A back-up system should be considered, particularly in isolated areas or areas of lower or unreliable rainfall.

2.3 Drainage

The site chosen should not be prone to flooding which will damage seedlings and buildings (stores).

2.4 Area

The general rule of thumb of 19,900 large polybags per ha. with 0.76 m triangular spacing can be used to estimate the required size of a nursery. However if space is not a constraint, a lower density of 13,000 polybag per ha with 0.91 m triangular spacing

is more desirable to minimise risk of etiolation and for better accessibility for manuring etc.

2.5 Accessibility and Nursery Roads

Roads within the nursery and their alignments will need to be carefully planned and laid out depending on the placement distance of the polybags and the type of irrigation to be utilised. Access roads to the nursery should be sufficiently wide to allow vehicles to pass during peak planting periods to facilitate supervision and movement of materials.

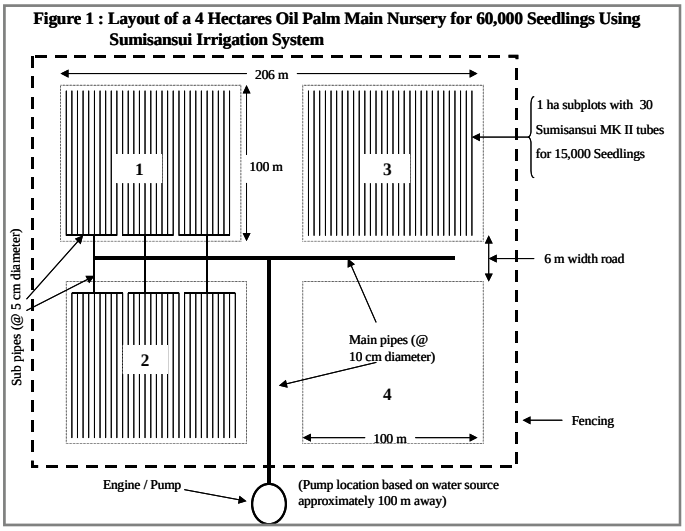
3. SITE PREPARATION

The preparation of the area for a nursery is important to allow optimum seedling growth, maintenance of nursery site, unimpeded access and to provide hygienic conditions. Four activities are involved in preparing a site for nursery, namely 1) nursery design 2) clearing 3) fencing and 4) lining.

3.1 Nursery Design

A well-designed nursery allows for access of many vehicles during evacuation of seedlings for field planting especially for large scale plantings. This objective can be achieved through the drawing up of a plan to show all paths, roads and irrigation points. An example is shown in Figure 1.

Figure 1 : Layout of a 4 Hectares Oil Palm Main Nursery for 60,000 Seedlings Using Sumisansui Irrigation System



3.2 Clearing

With the boundaries determined, felling and clearing should be carried out at least 2 months before the arrival of the seeds. Once clearing is completed, proceed to fence the area, fill the polybags and install the irrigation system.

3.3 Fencing

The major types of fences utilised for nurseries are the conventional barbed wire fence and the electric fence.

3.3.1 The Conventional Fence

The specifications for the conventional fence depends on the species of animals which it is required to keep out. For example, a four-strand barbed wire fence, with wires spaced at 0.3, 0.6, 0.9 and 1.2 m from ground should be adequate to control cattle and goats. However the introduction of used fishing net as fencing to prevent animals from going into the nursery area is being practised in some estates (N. Reventhiren, pers. comm., 2000).

3.3.2 Electric Fencing

Where there is threat of wild mammalian pests, an electrical fence is possibly the best form of defence. Wire of 250-300 kg breaking strain has been found to be the most suitable. The heights at which the electrified wires are placed above ground level are critical eg. 10 cm to repel porcupines.

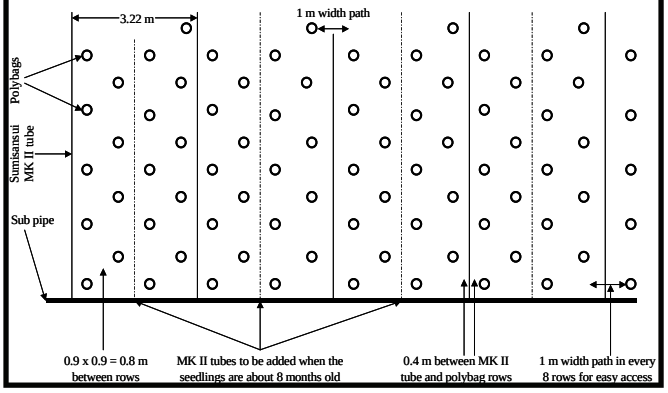
3.4 Lining

Lining is carried out to space the polybags evenly in the nursery, so that seedlings have good and uniform access to sunlight and to achieve the most efficient system and cost of irrigation.

Polybags are lined at 0.9 m triangular spacing to give each seedling the optimum growth space. All seedling rows must be straight along the axis at 60^{o} to each other and parallel to irrigation lines.

In the Sumisansui irrigation system, MK II tubes are laid down between the polybags at every 4 rows, a 1 m wide path is provided at every 8 rows for easy access. When the seedlings are about 8 months old, additional MK II tubes are added between the existing MK II tubes to give a final layout of 1 tube for every 2 seedling rows. This is illustrated in Figure 2.

Figure 2 : Polybags Spacing Using Sumisansui Irrigation System Based on 0.9 m △



4. ORDERING OF SEEDS

4.1 Placing of Orders

Seeds are normally ordered well in advance of requirement. It is normal to place tentative orders at least one year before delivery subject to confirmation at a date closer to delivery. Delivery must be spread out to provide time for planting out at the optimum age.

4.2 Source of Seeds

All germinated seeds, or any other planting materials, should only be purchased from reputable suppliers. Wherever possible seeds should be purchased direct from the producers to ensure legitimate seeds.

4.3 Quantity to Order

In determining the quantity to be ordered the various losses (in the nursery and field) and culling rates will have to be considered in addition to the potential total palms required in the field. Based on general estate experience, 175 germinated seeds per hectare is sufficient if the field stand is 138 palms per hectare. For a stand of 148 palms/ha, the requirement would be 186 germinated seeds.

5. SINGLE OR DOUBLE STAGE NURSERY

The decision to have a single stage or double stage nursery will be a matter of personal choice depending on the specific situation encountered eg. double stage nursery is advisable for large scale planting (>500 ha).

5.1 The Single Stage Nursery

This system utilises only large polybags and germinated seeds are planted directly into the bags in the same manner as planting out in the pre-nursery polybags as described in

section 6.1.3 on **Planting germinated seeds into the large polybags**.

Some of the advantages of this system are

- once the seed has been planted, there is no further movement until field planting so that the root system is not disturbed and therefore establishment and growth is faster.
- one can dispense with all the requirements in terms of layout, equipment and labour of the pre-nursery.

However this system has a number of disadvantages :-

- it is necessary to have the full nursery infrastructure ready from the initial seed delivery.
- it requires greater volume of water and additional engine fuel, wear and tear for the first two or three months.
- it is more difficult to observe and supervise when the seedlings are spread over a large area.
- there will be no space for receipt of the following year's seed delivery in case of delays in any one year's planting programme unless the nursery is enlarged.
- Culling and seedling replacement is cumbersome.
- it is not advisable for large scale planting which requires a very large area to prepare and also involves high cost.

5.2 The Double Stage Nursery

The double stage nursey system involves planting of the germinated seeds in small pre-nursery polybags packed closely together in a very small area for the first two to three months. The seedlings are then planted out in the large polybag nursery where they remain for a further 7-10 months before field planting. This system has a number of advantages over the single stage nursery such as

- only a small section of nursery is required for the first 2 to 3 months.
- less irrigation required for the first 2 to 3 months.
- easier to observe seedlings and supervise nursery work during the critical early stage (2 to 3 months after planting).
- culling can be carried out very quickly and easily at the first stage before planting into large bags.

However, the double stage nursery also has some disadvantages namely:

- an "extra" operation is created which is very labour intensive.
- Slower growth compared to the single stage.
- poor technique transplanting from small to large polybags could give rise to severe transplanting shock.

6. NURSERY SET-UP (Double Stage Nursery)

Since the double stage nursery is commonly adopted in most of the estates, and that the one second stage is the same as the single stage nursery, only this type of nursery is described.

6.1 The Pre-Nursery Stage

6.1.1 Polybag filling and placement

Polybags must be filled with soil within 2 cm of the bag rim and placed in the nursery beds at least four weeks before the planting date to allow settling, topping up with soil and pre-planting irrigation.

Only the best top soil available should be used in any nursery. The soil must be free draining, friable loam (eg. Rengam, Serdang, Bungor) with a sand content not exceeding 60% and free from contaminants (chemicals etc.). Rock phosphate (@ 10 kg/1000 small polybags of 15 cm x 21 cm x 250 gauge) must be premixed into the soil prior to filling to ensure P availability

The polybags should be turned inside out before filling so that they sit upright. Hoppers or funnels should be used to facilitate filling. The filled polybags should be arranged in beds of 8-10 bags width and of a convenient length. The beds should have wooden frames to prevent bags from toppling over. The arrangement of polybags at pre-nursery stage is shown in Photo 1.

Photo 1 : Arrangements of seedlings in pre-nursery stage

6.1.2 Shading

At this critical stage it is necessary to shade the plants either with palm fronds on frame, or with shade cloth or netting of 30% shade, possibly providing an additional safeguard against watering irregularities. If oil palm fronds are used as shade it is necessary to prespray the fronds with pesticide to ensure that they are not instrumental in introducing any pests or diseases. The shading in pre-nursery stage using oil palm fronds and netting is shown in photos 2 and 3 respectively.

Photo 2 : Shading in pre-nursery using oil palm fronds

Photo 3 : Shading in pre-nursery using netting

6.1.3 Planting germinated seeds into the polybags

It is essential to ensure that polybags are kept well watered prior to the commencement of planting. Planting of germinated seeds should be completed as soon as possible, preferably not later than 1 day after receipt.

Care must be taken to ensure that the workers can differentiate between the plumule (shoot) and the radicle (root) to avoid planting the seeds upside down. The seed is planted at 4 cm depth with the radicles pointing down and lightly covered with soil. Planting holes can be made with a stick.

6.1.4 Planting of clonal plantlets (ramets)

Clonal plantlets or ramets are usually delivered to the estate as bare rooted plantlets at the 2-3 leaf stage after conditioning. Usually each ramet bears a field code, a clone number and a cross number. It is of utmost importance that the identity of each ramet is maintained right through to field planting.

During planting, the requirement for polybags, soil medium and polybag arrangement are the same as for the germinated seeds. Planting holes should be deep enough to accommodate the roots, and may be made with a wooden stick. Place the roots gently into the hole and firmly cover with soil up to the collar.

Once the planting is completed, the identification tag must be stuck into the polybag soil and stapled to the polybag.

6.2 The Main Nursery

6.2.1 Polybag filling

The necessary ploughing and harrowing of the soil must be done to provide loose friable soil which can be directly filled into the bags. Prior to polybag filling, a basal fertiliser (100 g RP/polybag) must be thoroughly mixed with the

soil before filling.

Filling of the polybags should commence at least a month prior to the transplanting.

As per small polybag, the large polybag (38 cm x 45 cm x 500 gauge) should be turned inside out before filling, which gives the filled bag a good level base.

Hopper or funnels should be used for more efficient filling.

6.2.2 Spacing of bags

Spacing of polybags in the nursery is done to minimise light competition between palms and for easy access to the palms for pest and disease control, weeding and manuring. The spacing and placement of seedlings at main nursery stage is shown in photo 4. The spacing of seedlings depends on the duration seedlings are expected to be kept in the nursery. The recommended spacing for various seedling ages at field planting is given in Table 1.

Table 1 : Recommended polybag spacing in the nursery for various seedling ages at field planting

Age of seedling at field planting (months)	Triangular spacing of polybags in the nursery	
	(m)	(feet)
09-11	0.75	2.5
11-13	0.91	3
13-18	1.25	4

Photo 4:Arrangements of seedlings in main nursery stage

6.2.3 Transplanting from pre-nursery into large polybags (main nursery)

Prior to transplanting the seedlings to the large polybag, workers should immediately prepare planting holes within the bags. These holes are prepared using planting hole core-formers.

The seedling which should have been given a good soaking while in the pre-nursery beds is held in one hand while the polybag is pulled from the base by the other hand. The detached seedling is placed in the hole in the large polybag filled with soil, and the soil gently but firmly compacted around the root mass. Care must be taken to ensure that the planting is level with the pre-nursery soil level (Tan & Mohan 1981). Mulching of the bag surface with palm kernel shell should be carried out and heavy watering should follow immediately.

7. NURSERY MAINTENANCE

7.1 Manuring

It is well established that the fertiliser rates for nurseries require adjustment to varying management practices and according to different soil types (Hew & Toh, 1973). However the recommendations and system described in this paper are based on sandy clay loam, inland soils for general usage and on conventional fertilisers or controlled/slow release fertilisers.

7.1.1. Manuring programme based on conventional fertiliser

Fertilisers are not required until one complete new leaf has appeared (4-5 weeks after planting). Use of conventional fertiliser should preferably be confined to small nurseries for plantings of less than 50 ha or areas with adequate labour. The programme is given below.

	Seedling age		Manuring programme
	(weeks)	(month)	
Pre nursery stage	5-8	2	4 x weekly drench with Grofas Kuning (22:22:10:1) soluble fertiliser at 15 g in 4 litres water for 100 seedlings.
	9-12	3	4 x weekly drench with Grofas Kuning, soluble fertiliser at 15 g in 4 liters water for 25 seedlings.
Main nursery stage	16 (at transplanting)	4	4 x weekly drench as for 3rd month. Mix 100g RP/bag in soil medium for large bags. After transplanting no solid fertiliser application for 3 weeks. Continue weekly fertiliser drench at Grofas Kuning.
	20	5	5 g CCM45*/bag. If seedlings are chlorotic, continue weekly foliar drench as for 3rd month. Drench with HGFB solution*
	24	6	10 g CCM45 and 10 kieserite/bag
	28	7	15 g CCM45. Drench HGFB solution*
	32-39	8-9	20 gm CCM45
	40 - 47	10 - 11	30 g CCM45
	48	12	35 g CCM45
	>52	>13	30 g CCM45 + 15 g kieserite

***Dissolve HGFB48 at 1 g/10 litres water for 7 months old and younger seedlings. The HGFB48 solution should be drenched onto the palms in the bag at the rate of 500 ml/seedling or equivalent**

7.1.1.1 Fertiliser application

For foliar application, the drenching of the seedlings with foliar fertiliser solution should be carried out early in the morning or late afternoon. As far as possible, the whole seedlings should be wetted and no watering of the seedling should be carried out for the day of application. However for HGFB solution on large polybag, application should be made after normal watering.

For solid application, fertiliser should be weighed to obtain correct rates, and suitable equipment given to the workers to ensure correct rates are applied. The fertiliser should be evenly spread on the surface of the polybag soil at least 2-4 cm away from the base of the seedlings. The application of solid fertiliser should be carried out when the seedlings are dry i.e. in the morning before watering and in the afternoon after watering in the morning.
Good supervision of all fertiliser application is necessary to obtain full benefits from the inputs.

7.1.2 Manuring programme based on controlled/slow release fertiliser

There are many types of controlled/slow release fertiliser currently available in the market.

The controlled/slow release fertiliser selected for use should supply the required nutrients at the right time and amount to the seedlings for good growth.

7.1.2.1 Fertiliser rate

The general recommendation for use of controlled/slow release fertiliser in the nursery are as follows :-

Seedling age		Manuring programme
(weeks)	(month)	
1 - 12 (Pre-nursery stage)	3	Follow manuring programme for conventional fertiliser.
16 (Main nursery stage)	4 (at transplanting)	75 g Slow release fertiliser (SRF) per bag
20	5	15 g kieserite. Drench HGFB at 5th & 7 months.
40 - 48	11 - 12	30 g CCM45/bag/mth.

7.1.2.2 Fertiliser application

The controlled/slow release fertiliser (SRF) should be buried in three evenly spaced holes at 10 cm below the soil surface.

However if surface application is adopted, mulching e.g. with weathered palm kernel shell, is recommended to prevent wash out of the fertiliser granules by rain or watering. Supplementary fertilizers should be applied at the 11th and 12th months or even earlier to ensure good growth.

7.1.2.3 Corrective fertiliser application

It is essential to monitor the colour and growth of the seedlings regularly, due to the long interval without any other fertiliser application. In cases of wrong or inadequate application as indicated by seedling colour and vigour, fertiliser supplementation is required as per conventional fertiliser programme for the appropriate seedling age.

7.2 Culling

Culling is possibly one of the most important procedures to be carried out in the nursery to ensure that only the most uniform and vigorous palms which are likely to give the highest yields are planted in the field.

At least two rounds of selection and culling must be carried out during the nursery period. The final round should be done before etiolation sets in to mask the runts.

7.2.1 Culling in the pre-nursery stage

Culling and selection at pre-nursery stage is carried out prior to transplanting to large polybag (3-4 months stage).

This is one of the advantages of the double stage system when the first stage culling of undesirable palms can be done stringently and quickly over large number of young seedlings. The main types of undesirable palms (should be culled) at this stage are as follows : Narrow (grass leaf), rolled leaf, twisted leaf, crinkled leaf, collante and stunted or weak (runts) palms. Examples are shown in photos 5 and 6.

PHOTO 5

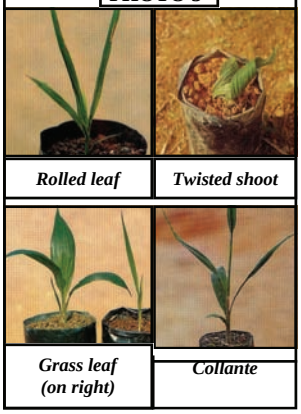


PHOTO 6

7.2.2 Culling in the main nursery

Culling at this stage is best carried out when seedlings are about 7 months old (3-4 months after transplanting) while the fronds of adjacent palms have not started to overlap and etiolation set in. Operations after this stage will also be more difficult

The final round of selection based on uniform size may be carried out as the seedlings are being loaded onto lorries/tractors for transport into the field. If planting is delayed the final round of culling must be carried out before etiolation sets in. The typical characteristics of abnormal seedlings in the main nursery are as follows :-

Erect, flat top, broad pinnae, narrow pinnae, wide internodes, juvenile (usually slow to pinnate), weak and slow growing (runts), crinkled leaf, collante, chimaera, badly diseased (Helminthosporium, Curvularia, Blast, Crown Disease) and palms badly damaged by chemicals. Some examples of abnormal seedlings in main nursery are shown in photos 7 and 8.

7.2.3 Culling ramets

The most common type of abnormality peculiar to ramets is the "truncated leaf" or "self pruning" leaf symptom. Severely affected ramets in the pre-nursery will be stunted in growth and may even die eventually.

Poor management and agronomic practices, particularly inadequate watering, can cause an apparent increase in seemingly defective seedling e.g. grass leaf seedlings, which can lead to unnecessary losses.

7.2.4 Recording

Accurate records of discarded seedlings are necessary to ensure that adequate seedlings are available at time of planting out.

Based on the census carried out on various nurseries the losses on culling and selection are 10-15% at pre nursery stage and 5-10% at main nursery stage.

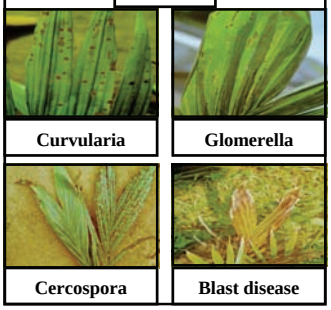
7.3 Pests and Diseases in the Nursery

This is another important aspect in oil palm nursery management. Pest infestations and disease infections can cause alarming losses if not recognized at an early stage and brought under control immediately. Most pest and disease problem can be avoided by correct agronomic and management practices, but where they are unavoidable, early detection and prompt control measures are crucial.

7.3.1 Common pests and diseases in the nursery

Common pests in nursery are ants, red spider mites, crickets and grasshoppers, caterpillars and rats. Common diseases are Curvularia, Cercospora, Glomerella and blast disease as shown in Photo 9.

PHOTO 9



7.3.2 Pest and disease control

There are a number of measures which if implemented can assist in reducing the incidence and severity of pest and disease attack in the nursery.

7.3.2.1 Prophylactic spraying

Routine prophylactic spraying is not necessary if the seedlings are growing vigorously and the nursery well managed.

However, where nursery palms are suboptimal in growth and vigour, prophylactic spraying may be carried out until palms return to normal vigorous growth.

Insecticides (eg. Captan at 20g/pump) for 700 seedlings can be mixed together with foliar mixtures for spraying in the prenursery stage.

PHOTO 7

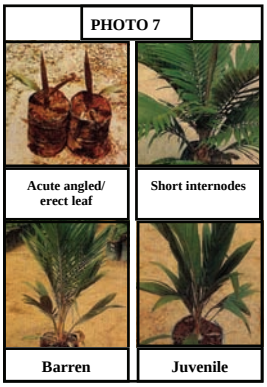
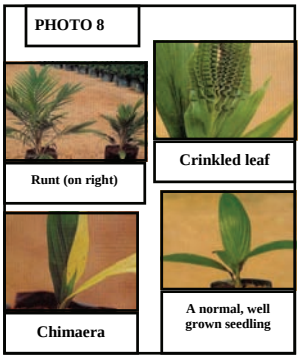


PHOTO 8



In the main nursery, spraying should only be carried out 2-3 months after transplanting. Keltane at 45 ml and Captan at 20g/ pump for 350 palms are usually mixed with 60g of Grofas Kuning/pump.

Spraying for both prenursery and main nursery should preferably be carried out in the evening after the last watering.

7.3.2.2 Training of nursery workers in pest and disease recognition

It is certainly worthwhile to train nursery workers to recognise the symptoms of common pests and diseases in the nursery. This training provides an "early warning" system on any outbreak reported by people who are working full-time in the nursery.

7.4 Weeding

Weeds in the nursery area should be eradicated since some of the weeds may harbour pests or are hosts for diseases. It is necessary to keep the polybags completely free of weeds which compete for nutrients, moisture and sunlight and to provide hygienic conditions in the nursery.

7.4.1 Weeding in the pre-nursery stage

In the pre-nursery where seedlings remain for only 12-16 weeks very little weeding is required. Hand weeding in the inter-bed paths and within the small polybags should be carried out monthly.

It is generally recommended that all herbicides be avoided at this stage in view of the fact that any error can easily lead to losses.

7.4.2 Weeding in the main nursery stage

Since mulching with palm kernel shells can greatly suppress growth of weeds in the large polybags, any weeds appearing can be quickly and easily hand-weeded.

However weeds on the ground and surrounding nursery area should be eradicated through chemical spraying. Monthly sprays with contact herbicides eg. Basta at 140 ml and Ally at 4 gram per pump for 450 seedlings will control most weeds effectively. Systemic and persistent herbicides eg. Glyphosate Diuron should not be used.

7.5 Watering

The most important factor in achieving good success in the nursery is the availability of sufficient water to ensure optimum growth of the seedlings.

The polybag soil in the nursery must be thoroughly moist with no dry patches at all times, to allow unimpended growth and to prevent any dehydration of seedlings.

With the current technology of irrigation system in the nursery either by overhead sprinkler system (OSS) or lay flat sprinkler tubes (e.g. Sumisansui), the watering should be carried out twice a day for 30 minutes to each "batch" per day. The watering operation and piping using Sumisansui system are shown in photos 10 and 11.

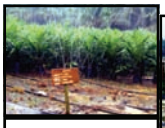


Photo 10 :Watering operation using the sumisansui system

Photo 11 : Piping system in a nursery

7.6 Storage of Chemicals and Equipment in Nursery

The control of chemicals in the nursery is of the greatest importance. Many instances have occurred of herbicides being incorrectly utilised by mistaking them for insecticides or fungicides. In view of this problem it is strongly recommended that the estate has separate lockable stores, one for herbicides and the other for fungicides/ insecticides/foliar fertilizers as shown in photo 12. It is important that spray pumps used for spraying fungicides/insecticides and herbicides be also clearly marked and kept apart in separate stores to avoid costly mistakes of cross contamination.

Photo 12 : A lockable store for chemicals in a nursery

8. SUMMARY OF RECOMMENDATIONS

The selected area for a nursery should be on flat to gently undulating terrain, accessible with good road conditions and not prone to flooding.

The preparation of nursery area should be carried out through proper designing of nursery, clearing, fencing and lining.

The ordering of seeds should be scheduled appropriately over a period of time to ensure that adequate labour is available to handle each batch of seeds received and for field planting.

The selection of single or double stage nursery should be decided based on the area to be planted and the size of the nursery.

The nursery practices/maintenance including manuring, culling, pest and disease control, weeding and watering should be closely supervised to ensure that all operations are on time and correctly implemented.

Herbicides and equipment for herbicides spraying should be clearly marked and stored separately from pesticides and foliar fertiliser to prevent contamination or incorrect chemical selection.

9. ACKNOWLEDGMENT

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ESIGEL

Introduction

Trials on the AAR jacket system (Chan and Ong, 1992) showed that ethephon formulations with higher pH tended to ameliorate damage to the bark when compared with normal ethephon, resulting in higher yields. However due to the tedium encountered in fixing and maintenance of the jacket system it was considered worthwhile to evaluate whether the amended ethephon formulations could be incorporated into the simpler convention groove method of stimulant application with a brush.

Two small scale trials (with plot size of 10 trees) were laid down to compare amended ethephon (codenamed Esigel) with normal ethephon, using the groove application. Preliminary results over 12 months with very detailed recording of yield (individual tree recording) indicated 15-20 % higher response from Esigel (Chan and Ong, unpublished, 1996). Owing to the promising results obtained, six task size trials were laid down to confirm the former.

Details of experiments

Details of experimental sites are given below.

Estate	Year/ Clone	Panel	Replication	Commencement	Duration (mths)
Batang Jelai	1998 PB217	BO1	4	May 1997	32
Jeram Padang	1998 PB217	BO1	4	May 1997	32
Voules	1997 PB217	BO1	4	May 1997	32
Kerilla	1998 PB260	BO1	5	May 1997	44
Kuala Hau	1998 PB260	BO1	5	May 1997	44
Tuan	1998 PB260	BO1	4	May 1997	44

Treatments

Normal ethephon at 2.5% concentration was prepared by the estate following procedure given by AAR. The normal ethephon was divided into two portions. The amendment was added to one portion to raise its pH (Esigel). Both normal ethephon and Esigel were applied using the lace/grove method of application.

Records

Yield was recorded at every tapping on a task size basis by the estate. Dry rubber content (DRC) of latex was determined with a metrolac. DRC of cup-lump was calculated assuming water content to be 55%.

Tree dryness

Census on tree dryness was carried out every 6 months by the estate. Only trees which were totally non yielding on both basal panels were considered as dry.

Results

Mean yield per tapper and tree dryness are given in Tables 2 and 3.

Table 2: Yield per tapper and tree dryness of trials on PB 217

Voules Estate	May 1997- December 1999		
Treatment	Yield/ tapper	(%)	Tree dryness (%)
1/2 Sd4 + Esigel x 6 rounds per year	33.5	111	6.3
1/2 Sd4 + Norm E x 6 rounds per year	30.2	100	5.2
LSD 0.05	1.8		
Jeram Padang Estate			
Treatment			
1/2 Sd4 + Esigel x 6 rounds per year	29.5	105	7.8
1/2 Sd4 + Norm E x 6 rounds per year	28.0	100	8.8
LSD 0.05	2.4		
Batang Jelai Estate			
Treatment			
1/2 Sd4 + Esigel x 6 rounds per year	32.0	103	4.4
1/2 Sd4 + Norm E x 6 rounds per year	31.0	100	2.3
LSD 0.05	1.8		
NB Concentration of stimulant = 2.5%			

Table 3: Yield per tapper and tree dryness of trials on PB 260

Kerilla Estate	May 1997- December 1999		
Treatment	Yield/ tapper	(%)	Tree dryness (%)
1/2 Sd5 + Esigel x 6 rounds per year	37.5	109	6.9
1/2 Sd5 + Norm E x 6 rounds per year	34.4	100	5.2
LSD 0.05	3.5		
Kuala Hau Estate			
Treatment			
1/2 Sd5 + Esigel x 6 rounds per year	32.2	102	3.8
1/2 Sd5 + Norm E x 6 rounds per year	31.5	100	3.5
LSD 0.05	2.5		
Tuan Estate			
Treatment			
1/2 Sd4 + Esigel x 6 rounds per year	39.8	121	2.7
1/2 Sd4 + Norm E x 6 rounds per year	32.8	100	2.3
LSD 0.05	3.5		
NB Concentration of stimulant = 2.5%			

<u>Mean yield per tapper</u>

On PB 217 mean yield per tapper of the Esigel treatment over 32 months was 3% to 11% higher than normal ethephon. Mean response over the three trials was 6.3% higher.

On PB 260 mean yield per tapper of the Esigel treatment over 44 months was 2% to 21% higher than normal ethephon. Mean response over the three trials was 10.7% higher.

Tree dryness

Tree dryness ranged from 1.7% to 8.8% in PB 217 and from 2.3% to 6.9% in PB 260. Difference in tree dryness between Esigel and normal ethephon treatments was marginal in all the trials.

Discussion

Overall mean response in yield to Esigel was higher than normal ethephon by 6.3% in PB 217 and 10.7% in PB 260. These responses were lower than those obtained from the earlier two small scale trials where responses ranged from 15-20%. The latter could be attributed to the more detailed recording carried out in the small scale trials where recording trees were also more uniform than trees in the task size trials.

Esigel is a spin-off product from the ethephon formulations concorted for the AAR jacket system. Esigel is produced by adding an amendment to normal ethephon whereby pH of the final product is raised to 3.0 - 3.5. The pH of normal ethephon is around 1.8, 1.5 and 1.1 for the corresponding 2.5%, 5.0% and 10.0% concentrations. In view of the better response obtained, estates have mainly switched from using normal ethephon to Esigel.

Reference

Chan Weng Hoong and Ong Tee San. (1992). AAR Jacket System: A Promising Improved System of Extracting Latex from Rubber Trees. The Planter, KL, 68, 1992.

Chan,W.H.

Special advisory note on panel notation in Rubber

At the meeting to standardize tapping systems in Medan, Indonesia in 1976, members of the International Rubber Research and Development Board (IRRDB) comprising representatives from Malaysia, Indonesia, Thailand, India and France/Ivory Coast formalized the Revised Notation for Exploitation Systems for rubber.

The revised notations may be divided into :-

1) tapping notation
2) panel notation
3) stimulation notation

Only the notations for tapping panels are reproduced below for practical in-house usage and understanding.

Panels located above the height of the first opening are called the high panels denoted by the letter 'H' and panels located below, base panels denoted by 'B'. Virgin panels are denoted by 'O', first renewed panel by I and second panel by II.

Examples

BO1 - The first cut on virgin bark of the base panel

BI-3 - The third cut on first renewed bark of the base panel

HO-4 - The fourth cut on virgin bark of the high panel

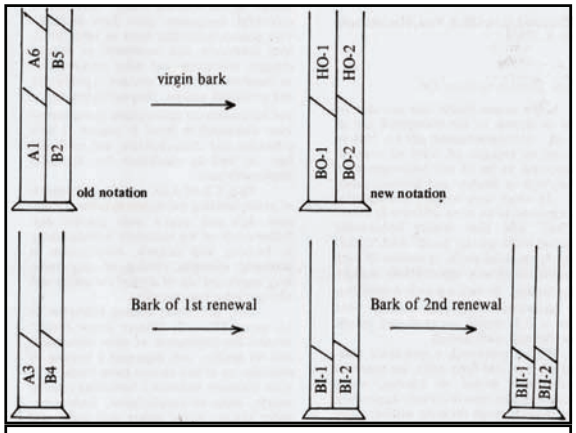

Figure 1 : Notations of panels

Chan,W.H.

SOCIAL AND PERSONAL

CONGRATULATIONS !

MARRIAGE :

Cik Aspalila Abdullah who tied the knot with En. Effendi bin Lehan on 1 June 2001.

BIRTH :

En. Rosazaman Md Nor - first child (daughter) Nik Nursyaza Asyiqin on 14 September 2001

Puan Masitta Ramli - third son Mohd Firdaus on 17 September 2001

En. Mohd Radzi Ariffin - first child (daughter) Nor Najwa on 26 October 2001

SEE,C.M.

WELCOME !

Mr. P. Rajendra who joined us on 1 June 2001 as an Agronomist.

P. Rajendra worked in Germany with Horticultural and Lanscaping firms before returning to Malaysia in 1995. In Malaysia he worked with an Engineering and Environmental Consultancy firm before joining AAR. He is currently based at AAR Sabah sub-station. Rajendra is married to Angelika Joiser.

Mr. & Mrs P. Rajendra

I say I say I say .....

Always remember the 'Golden Rule' – The Man with the Gold Rules!

So you think you are indispensible?
According to Charles DeGaulle, a former President of France, "The graves are full of indispensible people!".

Chan,W.H.