AA RESEARCH NEWS

January, 88

EDITORIAL

WHY OUR OWN R&D PROGRAMME?

Why should plantation companies Malaysia carry out R&D activities and have their own research stations when the country has the premier plantation crop research institutes in the world? The benefits of good R&D activities are not in doubt. This is testified by the improvements in yields and profitability of plantations crops over the years and the phenomenal development and growth of the oil palm industry in the past two decades. Excellent examples of possible direct economic gain from research innovations in the plantation industry are given by Wood *et al.* in their articles in the Planter (1987, June issue).

The best short answer lies in the need to translate the research ideas and results generated from limited defined areas by the government research institutes to the fields in the plantations i.e. to enable the plantation companies to quickly exploit results and develop- nts from these institutes by evaluating and adapting the advances to the plantations. This complementary and exploitative aspect of commercial plantation companys' R&D teams is probably the most important as company practices, enviornmental and other factors may be different and adaptability of the ideas and results needs to be checked. Having one's own R&D team also means that local potential or existing problems peculiar to a particular company policy which are inadequately covered by other R&D programmes can be investigated eg. potential problems with rhinoceros beetles where underplanting of old oil palms is undertaken as company practice. And finally, an active and innovative R&D team can, in certain areas of research, make significant advances and contributions to the overall research effort and crop performance particularly in 'young' crop situations such as oil palm and cocoa where intense effort on R&D has been only relatively recent with potential significant improvement. Examples are AAR's research work on urea volatilisation losses in oil palm and breeding and tissue culture programmes in oil palm and cocoa.

Of necessity in perennial plantation crops, research results are slow and long in accomplishment. The long gestation brings about many factors which can interfere with the research and interpretation of the trial results. Location of the trials "on site" on one's estate under Company management is frequently contributary to confidence in the results secured eg. clonal and progeny trials.

Incidental but in our view, extremely important contributions from Company's R&D programme are the deep insight allowed into the various crop and invaluable experience developed and also the degree of independence gained as a result.

Confucius proclaimed that one picture is worth a thousand words. We could also state that one good field trial is worth ten years of advisory experience to an agronomist. The close monitoring of crop behaviour and results under well controlled situations with different treatments and subsequent study and interpretation of crop responses is very difficult to duplicate in ordinary fields in plantations where not infrequently, things are not what they seem to be due to unmonitored factors. The agronomists with research experience are then better placed to interpret research results from other research stations and better equipped to offer sound advice and recommendations to improve crop performance.

The best research results are useless unless the results can be digested and translated to the fields. Having research officers who understand R&D and experience of Company field practices and policies will ensure the proper implementation of advances and innovations by the industry and that the Company's plantations continue to be progressive and competitive.

Chew, P.S.

Editor's Note: Questionnaire Response

We would like to express our sincere thanks and appreciation to the readers who responded to our questionnaire and for their helpful, encouraging and supportive comments.

We are pleased to note that a large majority of the readers who responded looked forward to and enjoyed reading AAR News, and found it not too heavy reading and of some use to their work. Some commented that the writing was too technical. We will ask our article writers to bear this in mind in future contributions. Many expressed requests to include photographs, light jokes and cartoons and social and other news in the Newsletter. We will try our best and perhaps this is where readers can occasionally help out, besides article contributions which need some work. Don't worry if your contribution is deemed "Definitely Not Publishable!" It will be aired during our "happy hour" sessions.

AAR's Research Programmes

A. Oil Palm Breeding and Tissue Culture Breeding

AAR purchased through Boustead Estate Agency's former associaton with another plantation research company, some mature pisiferas and teneras of Dumpy-AVROS and Yangambi-AVROS origins and young trial plantings of selected dura x dura and tenera x tenera materials. These materials form AAR's oil palm breeding and seed production base.

The Dumpy-AVROS pisiferas

HIGHLIGHTS

when crossed with selected Deli duras, (which form the base of the commercial DxP materials of a plantation research company) have been proven to be not only high oil yielding but also of a shorter palm stature. AAR has the pisiferas but its Deli duras are still immature and will have to await about five years after yield and bunch quality evaluation before they can be used as mother palms for commercial seed production.

Fortunately with the supportive cooperation of two other plantation research companies who are willing to spare some of their superior Deli dura mother palms for AAR's use, AAR can begin supplying superior commercial DxP materials, capable of yielding over 30 t/ha with an oil extraction of 25% and of height 20% shorter than others under good growing conditions, to our Estates and for commercial sales for the next five years before switching back to our own duras. Anticipated capacity for this programme is 3/4 – 1 million seeds per year.

A programme to recapture the best specific combinations of the Ulu Remis Deli dura and Dumpy-AVROS pisifera parents using the selfs (progeny derived by self-pollination) of the respective parents is under way. In five years time, we can then produce DxP materials which will recapture the best cross performance, with an additional 10% oil yield improvement.

AAR will not be able to make further significant breeding improvement after this with its rather restricted genetic materials and will need infusion of desirable genes from other breeding and genetic populations. In order to decide which genes and genetic materials to bring into AAR's breeding programme, we have to specify the required characteristics or attributes of the desired or ideal palm (sometimes called the ideotype) to be bred.

AAR's concept of the oil palm ideotype is a palm capable of producing 40 t/ha. of dry matter per year, 60% (i.e. 40 t/ha FFB) of which is channelled into production of bunches with an oil content of 34%. The palm is 50% shorter than current DxP materials and its oil is 70% unsaturated.

AAR had indentified genetic materials, both advanced breeding materials, as well as semi-wild materials from Ivory Coast, Nigeria and Cameroun available in the governmental (PORIM, Sabah Dept. of Agriculture) and private research companies, and exchange crossing programmes are already underway. This broader genetic base will allow AAR to breed progressively towards the attainment of the ideal palm.

Tissue Culture

Again, through Boustead's previous share in another research company, AAR obtained embryoid cultures of selected mature palms and selected seedlings. With AAR's improved tissue culture technique, the tissue culture laboratory will be pushing out plantlets into the nursery for subsequent field evaluation trials from 1989 to 1991. About 7 trials involving more than 100 clones will be planted during this period.

With AAR's improved tissue culture protocol, AAR is capable of producing millions of plantlets commercially. However, in the light of the adverse report of abnormalities in clonal palms, AAR has decided to await results from its own field trials and others before proceeding with commercial propagation using its present protocol. In the interim, the laboratory will devote its time to R&D to develop alternative protocols which will minimise risk of producing abnormal palms. The likely causes of abnormalities in clonal palms have been attributed to use of hormones in culture multiplication, to length in culture and through use of a callus culture phase. Research efforts are now focused on minimal use of hormones in culture multiplication, to improve efficiency of culturing to reduce culture time and to achieve direct differentiation of explants to embryoids, obviating or reducing the callus phase.

The laboratory is also devoting some of its spare facilities to researching into techniques in micropropagation of other valuable crop species eg. orchids, "baby's breath" and papaya, to enhance its versatility and viability.

Soh, A.C.

B. Oil Palm Agronomy

Competitiveness in palm oil production will depend on how efficiently each plantation group or country can produce its oil.

In order to achieve and maintain a competitive edge, we have to increase our overall yields per ha and bring down production costs per tonne oil.

Thus our research programme has been geared to evolve a system of high yields through an understanding of factors contributing to this, control of factors adverse to this, and finally to an efficient system of implementing the necessary agronomic inputs.

The main thrust areas of agronomic research can be divided into six main sections.

1. Prediction of yield potential

Oil palm yields are affected by many factors but the potential yield of any given site is influenced mainly by the soils and the climatic conditions. A knowledge of the yield potential of any area is very important in feasibility studies of new areas and for the management and agronomic inputs of existing areas. The method of yield potential prediction developed by PORIM will be tested. At the same time AAR will also formulate and test its own method.

2. Maximum yield systems

One of the most effective ways of reducing the cost of oil production is to increase yield. Although yields are generally satisfactory in Malaysia, we do find that exceptional yields are obtained in some areas. It is therefore important to understand the reasons why such yields are attainable. To this end a programme is formulated to evaluate the effect various factors that determine yield variation with a view of determining the combination of various favourable factors that give rise to maximum yields (i.e. attaining the site yield potential).

3. Nutrition

Fertiliser cost in oil palm can exceed 60% of the field cost and therefore constitute a very high proportion of field expenditure. The method of estimating the fertiliser requirements of oil palm is therefore important and forms the basis of the advisory service. Thus research into the detection of nutrient deficiencies using soil and plant analysis, the quantification of nutrients in various components of the oil palm ecosystem and the fertiliser response of oil palms in various localities f[illegible] the main areas of nutritional wo[illegible]. The efficient use of fertilisers through proper application techniques and better alternative sources of nutrients are also being pursued.

4. Growth regulators

The oil palm has vigorous growth and is capable of producing 40 t dry matter per ha. Unfortunately it has a bunch index (ratio of weight of bunches to vegetative matter) of only 0.4–0.5. This is partly due to the relative size of the vegetative components as well as to the sex-ratio (proportion of flowers which are female) of the inflorescences. Currently there are chemicals that claim to alter the growth habits of plants as well as improving the sex ratio of the inflorescences. A programme is underway to assess some of the more promising chemicals with an ultimate view of producing palms with a higher bunch index and sex-ratio. Planted at the correct densities these palms could result in higher yields per ha.

(to be continue on page 4)

OIL PALM TISSUE CULTURE

A. Role of Tissue-Culture Research in Oil Palm

There has been much interest and activity in tissue culture in the plantation industry in recent years. Below are the potential advantages and applications of the tissue culture technique for oil palm.

1. Commercial propagation of uniform high yielding palms i.e. clones

Palms derived from seedlings tend to vary more in yielding ability.

2. Clonal propagation of the dura (female) and pisifera (male) parents of the best cross for mass production of the seeds of the best cross

Current commercial seeds are mixtures of many crosses with varying yield performances.

3. Embryo-rescue in wide-crosses

In crosses between species e.g. *Elaeis guineensis* (W. African) x *E. oleifera* (American) palms, the resultant embryos, which may subseqently abort, can be rescued by culturing the embryos *in vitro.*

4. Germplasm-storage

Oil palm genetic materials are usually stored as seeds which have a short shelf life or as field plants which are rather cumbersome. With cryopreservation (cold storage in liquid nitrogen) plants can be stored conveniently as tissue-cultures and for much longer periods.

Genetic engineering in plants

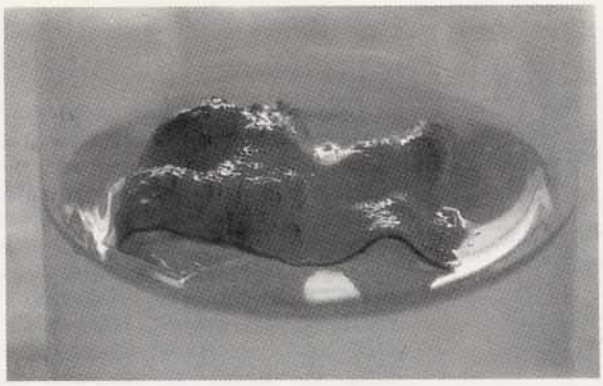
A protoplast (cells without cell-wall) tissue culture system forms an integral part of the process to transfer novel genes from one species to another by genetic engineering techniques.

6. *In vitro* screening of palms for disease and stress resistance and perhaps also induction of useful genetic variants.

7. Improving precision of field experiments

Incorporation of clones, which are genetically identical, will allow separation of the effects of heredity and environment allowing better detection of real differences between experimental treatments in agronomy field trials and more efficient palm selection in breeding trials.

B. Steps in Tissue-Culture Propagation of Oil Palms

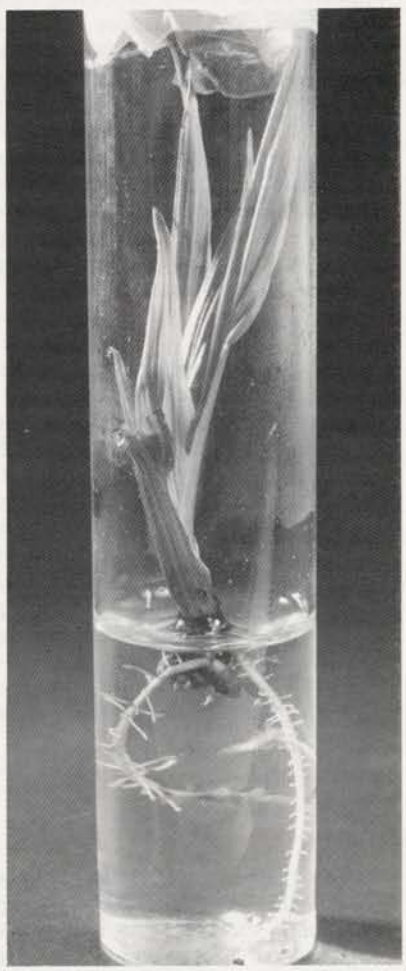


1. Young plant tissues or explants e.g. young leaf segments; are put into culture on agar medium containing nutrients and hormones under aseptic or sterile conditions.

2. Callus (unorganised cell growth), formation on explant.

3. Embryoid (embryo-like structures) formation and multiplication from caltus cultures.

4. Shoot formation in embryoids (embryo-like structures).



5. Rooting of shoots to give plantlet (ramet).

6. Conditioning and transplanting of plantlets to soil in nursery for subsequent field planting.

5. R&D Programme

Rhinoceros beetle control

Vast areas of oil palm planted in the 1960's are now due for replanting. As replanting costs are high using the conventional felling and burning technique, many estates are now practising underplanting old palm areas with young palms. Although this method is much lower in cost initially, there is a major constraint in the form of rhinoceros beetle damage. This is a serious problem in underplanting and a research programme is underway to determine the losses due to beetle damage and evaluate various measures to control it. This programme will also entail some basic work on the breeding habits of the beetle and an understanding of this is essential before an effective method of control can be formulated.

Rat control

Control of rats has been going on in the estates for many years through the use of rat baits. Although rats can still be reasonably controlled by the regular use of suitable rat baits, the spectre of chemical tolerance appears to be slowly becoming more prominent. It is therefore fortunate that there is at present the barn-owl which feeds specifically on rats i.e. a highly specific biological control agent for rats. Although initial reports from PORIM have been favourable, the data available is too scanty. A research programme will be started to check on the feasibility of using the barn-owl as a rat control agent in the long term.

6. Crop recovery

With the current scarcity of labour, crop recovery may be a problem during peak crop periods especially during high rainfall periods. Although this problem exists, it's extent and actual losses have not been properly assessed. Since various factors can lead to poor crop recovery, this research programme will assess the individual factors involved and the quantification of losses due to each factor. Appropriate precautions/solutions can be formulated once the main causes of these losses are known.

Teoh, K.C.

C. Rubber Agronomy

The rubber research programme covers the research needs of the Principals' estates, with the overall objective of improvement in both growth and productivity.

Towards this end, the main thrust areas in the research programme are:–

1) reduction in period of immaturity
2) tapping, exploitation and related aspects
3) nutrition
4) evaluation of clones

Reduction in period of immaturity

The objective of this programme is to reduce the period of immaturity of rubber from the normal 60 months to below 40 months by using advanced planting material i.e. large stumped buddings in polybag, with the appropriate agronomic inputs eg. moisture retaining gel **(Aquasorb)**, mulching, legumes etc. This would significantly enhance the profitability of rubber as compared to other crops.

Three trials are underway in a high rainfall area while three more will be attempted later in a low rainfall area. To overcome the variable establishment success previously encountered when bare rooted stumped buddings were used, stumped buddings in polybag, raised from young buddings in which the active root mass remains intact will now be employed.

Nursery preparation for the trials incorporating high agronomic inputs and which commenced in late 1986 has produced very vigorous polybag plants which are due for field planting in the second half of 1988.

Tapping, exploitation and related aspects

These consist of long term and short term trials.

Long term trials

a) Puncture tapping

Three on-going long term trials on puncture tapping have given useful interim information on this mode of tapping, viz. that it can be used to advantage where skilled labour is scarce, task size and net revenue are marginally higher than conventional tapping and tapping lifespan may be extended by 2–5 years. When rubber prices are high, puncture tapping may be gainfully employed to open trees at a smaller girth than conventional tapping. The trials are continued to monitor the long term effects of high rates of stimulation applied during the puncture tapping phase on the performance of the trees.

b) Study on tree dryness in PB235 and PB260

There have been recent reports of higher than normal incidence of dryness in clones PB235 and PB260. As recent plantings in the estates comprise mainly these clones, there appears a need to look into this problem with a view to contain dryness incidence in existing areas and also to minimise the incidence in newly opened areas. A survey of dryness in three climatic regions has been carried out and preliminary results appear to indicate much higher incidence of dryness in lateritic areas, among poorly grown trees and also in wind damaged areas. More detailed characterisation of dryness is being carried out. Investigations into control of spread of dryness are likely to combine isolation techniques (pre-isolation, post-isolation) with rest periods. More fundamental work into latex analysis will be carried out in collaboration with RRIM.

Short term trials

a) Intensive stimulation of old rubber

Up to 18 rounds of stimulation are applied in old areas due for replanting within the next few years to maximise yields. The intensive stimulation is also envisaged to compensate for the additional labour normally required during the last 6–12 months prior to replanting. Preliminary results appear promising. Three trials are in progress.

b) Observations on rainguards to reduce rain interference

Rain interference to tapping is a problem especially in high rainfall rubber estates and could account for 5–10% crop loss per year.

Preliminary observations on the use of aluminium foil rainguard show very promising results due largely to the marrying with an excellent sealant produced by RRIM. The sealant appears to have overcome the problem of seepage of rainwater down the trunk. The rainguard/sealant combination is durable for at least two years. One trial has already been laid down and five more are in the process of being sited in high rainfall estates. The trials are jointly laid down with RRIM. Results would be available for evaluation of the cost efficiency of the rainguards within the next 12 months.

Nutrition of rubber

Fertilisers generally constitute about 40% of upkeep costs. As rubber has also been relegated to the poorer soils currently, proper nutrition would be an important prerequisite for high productivity and profitability.

Two long term trials have been planned on nutrition of mature rubber. As previous observations indicate roots may encroach into adjacent plots thereby introducing the possibility of fertiliser poaching, wide guard rows would be laid down in the nutrition trials.

A few *adhoc* trials using fortified POME sludge cake with some slow release characteristics in both nursery and field immature rubber are already on the ground.

Evaluation of new clones

The right choice of clone for a

particular area is of paramount importance in order to maximise returns and AAR is constantly monitoring the performance of new clones especially in clonal trials where the latest clones are being evaluated. Promising clones planted within the Group estates in evaluation blocks are closely monitored and their characteristics noted.

General

A fairly comprehensive research programme consisting of about 29 trials has been drawn up to meet current investigative needs of the Group. The short term trials on rainguards and intensive stimulation hopefully will provide useful results that could be adopted by estates within the next 1–2 years. Some interim recommendations can probably be derived from the preliminary characterisation survey work on tree dryness eg. better moisture conservation measures in lateritic areas planted with clones prone to dryness, early removal of runts etc.

The long term trials on nutrition will provide valuable information for advisory work. Results from the puncture tapping trials may also provide a better understanding on the effects of stimulation. It is hoped that investigations to be laid down on control of spread of dryness will provide some answers to the age-old problem of dryness in rubber trees.

Continued upgrading of high yielding clones, a prerequisite for yield improvement, will be made possible from the clonal evaluation programme.

Finally, the research programme will be constantly reviewed to meet existing needs of the Group, with the ultimate goal of achieving the highest possible productivity in Group estates.

Chan, W.H.

Editors' Note: The Cocoa Breeding, Selection and Agronomy research programmes will be featured in the next issue of the Newsletter.

Commodity News

PALM OIL

India: Palm Oil Imports

India imported 1.18 million tonnes of palm oil in 1986. 1987 import was expected to be around 1.35 million tonnes. Total oil imports for 1988 is expected to exceed 2 million tonnes.

Indonesia: Target Shortfall

According to Hasjrul Harahap, junior minister for Tree Crop Development, Indonesia will only achieve half of the planned target of tripling palm oil plantation area to 1 million ha by the end of 1989.

Only 7 of the 47 companies that had originally applied for new plantation licences had started operations, but a further 7 would soon be given licences.

The government provides each firm with 100,000 ha. under its nucleus estates scheme, where smallholders take 60% of the area and sell output to plantation companies. Land titles previously granted for 35 years could be extended for another 25 years. The new measures also entitled investors credit to develop smallholder plots while duties on imported capital goods were waived. But the new measures floundered on the high cost of bank loans, averaging 20% last year.

U.S.A: Olestra; Synthetic Fat Substitute

Cincinnati-based Procter and Gamble Co. has created a new division to manage the potentially major business created by the synthetic fat substitute **olestra.**

Although **olestra** is still being reviewed by the US Food and Drug Administration, the creation of the new division indicates that P&G are "beginning a string of **olestra**-related developments and the day it is approved it will be ready to sell immediately".

P&G is seeking approval to substitute **olestra** for up to 35% of the fats in home cooking oils and up to 75% in commercial cooking oils and salty snacks.

Nigeria: Crop Expansion

Nigeria will make large quantities of high yielding and disease resistant hybrid seeds of oil palm available between 1987 and 1990 to promote the country's palm oil production. The Nigerian Institute of Oil Palm Research is expected to produce 8 million germinated seeds in 1987/88. (Ed. note: Malaysia's production was 30 million per year).

United Kingdom: Soya Ink

The Newspapaer Publisher's Association of U.K. is developing and licensing a new formula for newspaper ink that uses soya bean oil as the main ingredient. Printing ink could use up to US$525 million of soya bean oil a year if tests now underway continue to look promising.

From Oils & Fats International
No. 4 : 1987

Miscellaneous

Palm oil imports into China have increased rapidly in recent years as a result of its open policy and rising living standards. Palm oil imports as per statistics in Singapore, Malaysia and Hong Kong were 16,000 tonnes in 1984, 60,000 tonnes in 1985 and 185,000 tonnes in 1986. In 1987 palm oil imports were estimated to be about 300,000 tonnes of which about 50% was used for edible purposes (mainly instant noodles) and 50% for non-edible purposes (mainly in soaps).

US Senate Agriculture Committee, on October 20, 1987 has rejected the proposed amendment requiring palm, palm kernel and coconut oils to be

World production, consumption and prices (estimated 1987)

Type of oil	Production ('000 tonnes)	Consumption ('000 tonnes)	Price (monthly average) in US$/tonne			
			1984	1985	1986	1987
Soya bean	14424	14791	726.0	571.2	346.3	327.5
Palm	7480	7866	731.8	504.8	262.1	334.4
(Olein)	–	–	(787.5)	(549.8)	(329.0)	(380.9)
Sunflower seed	7266	7273	769.2	603.4	373.8	356.7
Rapeseed	7280	7355	687.3	540.5	308.0	298.9
Cottonseed	3157	3379	846.2	714.3	495.9	495.4
Groundnut	3398	3107	1015.5	913.6	578.2	493.8
Coconut	3225	3268	1154.6	590.2	295.7	436.8
Palm kernel	1055	1023	1038.5	556.7	287.7	415.9

labelled as "saturated fats", when included in processed foods.

The amendment was sponsored by a Senator on the grounds that it would save American tax payers US$83 million and in reducing heart disease. In opposing the amendment, the speaker for the administration cited the letter from the US Trade Representative attacking the amendment as a non-tariff barrier. The bulk of soya oil consumed by the Americans was hydrogenerated, thereby increasing its saturated fat level and yet only tropical oils were singled out as deserving labelling. He concluded by saying that "the Administration was of the opinion that the main objective of the proposed amendment was to protect the domestic soyabean industry through legislation disguised as a health measure".

From: PORIM TAS News, Nov. 1987

RUBBER

Natural Rubber – A Top Foreign Exchange Earner

NR again proved its resilience in 1987 and it is poised to maintain its position as the second top foreign exchange earner (after forestry products) for Malaysia in the non-petroleum sector for the second consecutive year.

The Treasury's 1986/87 Economic Report forecasted export earnings from NR at about $3.6 billion, based on average unit value of M$2.38 a kg on estimated export volume of 1.58 million tons. However, going by the buoyant price trends, the eventual harvest in ringgit terms may be more since prices have been hovering about M$2.70 a kg for the major part of 1987, their highest levels in 3 years.

The continued high rubber prices (at about M$2.80 per kg at time of writing) have also revealed a number of very vital points, as follows:–

a) Malaysia is capable of responding very well to demand changes, an achievement which affirms the increasing elasticity of the country's rubber production. Despite the reduction of planted hectarage of rubber (1.54 million ha in 1987 from 1.59 million hectares in 1986), production in 1987 is deemed to have increased by 3.8% to 1.6 million tons or 35.8% of the world's NR production.

b) The 19th October 1987 global stock market crash did not seem to have affected rubber prices at all.

c) International research consulting firm, Landell Mills Commodities Studies Ltd., said that the further plunge of the US dollar at the end of November too did not effect any change at all in the NR trade patterns, with trade-flows between the main importing and exporting countries staying astonishingly stable.

d) The failure of apparently extensive sales from INRO buffer stockpile to bring down NR prices appeared to reaffirm tight supply &/ or high demand. Before the sales began, the stockpile stood at some 360,000 tons. Buffer Stock Manager was forbidden to reveal the quantum of sale even to INRO members but market analysts estimate it to be around 125,000 tons.

On the international front, 1987 also witnessed the successful renegotiation of the second International Natural Rubber Agreement (INRA II) which is intended to replace the previous five-year pact that expired on October 22 1987. The INRA II, once in operation in either October or November 1988 (after an interregnum of one year from expiry of INRA I) is expected to further bolster rubber's position to new heights.

Consumption has picked up while bad weather and/or wintering in Malayisa & Indonesia has hampered production. The INRO buffer stock manager was quoted as saying "We have had a true tightness. Everyone is buying in larger amounts – there is no build-up of inventory; stocks are minimal". He also said that the remaining stockpile could "go in a hurry" over the wintering period.

Rubber brokers are now pondering what future prices will be like without a stockpile overhanging the market. Undoubtedly production will increase in response to the recent price trend, particularly from the smallholders who produce around 60% of the rubber in Malaysia. However some analysts now believe NR is well set to "pull the trigger" and there is little to prevent the average price rising as high as M$3.50 a kg by around mid-1988. Going by the present scenario, NR is making a strong bid to redeem its golden crop status.

Ref: 1) New Straits Times 4/1/1988
2) Far Eastern Economic Review 28/1/1988, 4/2/1988
3) Investors' Digest 1/1/1988

RUBBER GROWER'S CONFERENCE 1987

Introduction

The Rubber Growers' Conference 1987 was organised by RRIM and held in Desaru, Johore on the 26th and 27th October.

The theme for the Conference was 'Towards Reduction of Production Cost of Natural Rubber' with the main objective of improving our competitiveness against other rubber producing countries.

Paper Highlights

A total of 24 papers including one from AAR was presented. Papers of interest and the panel discussions are summarised below:–

SESSION I
PLANTING MATERIALS

1. Promising Speculative Clones for Block Planting.
S.K. Khoo (RRIM)

The paper reported the progress of 25 outstanding clones with commercial potential out of 138 tested in five groups of trials. Many of these clones outyielded RRIM600 markedly. However, some of these high yielders had poor secondary characteristics such as susceptibility to wind-damage and tree dryness on s/2 d/2 tapping.

Promising clones included were RRIM901, 921, 922, PC51 & PC55. As the right choice of clones is of utmost importance, AAR has planned to evaluate some of these clones in the next few years.

2. Potential Three-part-trees for Use by the Industry.
W. Leong and P.K. Yoon (RRIM)

The performance of 10 outstanding three-part-tree combinations compared with Class I clones (RRIM600 or PR255) and Class II Clones (RRIM623 or PB28/59) as controls was given. All 10 combinations yielded higher than the controls. The increases ranged from 9%–48% for GTI/PB28/59 and 2%–64% for RRIM612/PB28/59 on panel BO-1. On the other hand, Avros 2037/PB28/59 and Avros 1279/Avros 1447 yielded 62% and 30% more than RRIM600 respectively. Besides yield, these combinations also performed better than the controls in terms of growth and secondary characteristics.

The paper was not well received as modern clones can surpass the performance of these combinations. The concept of three-part-tree is still good and combinations with precocious clones such as PB260 and PB217 would probably be more useful.

3. Current Status on Effects of Planting Density on the Performance of

Hevea brasiliensis
A.P. Ng *et al.* (RRIM)

This paper provided the latest results of the density trials on RRIM600 & RRIM701 which were first reported in 1979. Based on the above results and three other recent trials with newer clones, RRIM continued to recommend 400 trees/ha for estates and small-holdings where share cropping are practised. For small-holders having available family labour, a high density of approximately 740 trees per hectare was recommend.

This is in agreement with AAR's recommendation of 382-440 trees/ha; taking into account tree dryness, planting materials and terrain.

4. Some Improvements to Young Budding Technique.
P.K. Yoon, S.K. Leong and Hafsah Ja'afar (RRIM)

This paper presented improvements in "Young Budding" technique. Nicking of snag buds and the use of '**Atrinal**' to enhance earlier and uniform sprouting were proposed by the authors. To overcome the problem of slurry application, a slow release fertiliser '**Nurseryace**' has been recommend. It was tentatively suggested to apply '**Nurseryace**' twice; once at the time of planting of stock and the additional application when the scion shoot had reached the copper-bronze leaflet stage.

Latest observations on '**Nurseryace**' in some RRIM trials sited in our Group estates indicate nutrient release may be too slow for bigger nursery plants. Investigations are continuing.

SESSION II.
AGRONOMIC PRACTICES

1. Development of 'Core' Stumped Buddings to Reduce Immaturity Period in *Hevea.*
S.K. Leong and P.K. Yoon (RRIM)

The benefits of using 'core' stumped buddings raised through the 'Young Budding' technique in bigger polybags were discussed in this paper. A series of field experiments was carried out to compare the merits of 'core' stumped buddings against conventional bare rooted stumps and other advance planting materials. The results showed that 'core' stumps with intact root system gave higher transplanting success compared to the others. Mean transplanting success of 'core' stumps during wet and dry weather plantings ranged from 94–98%. Rapid recovery was also noted in 'core' stumps.

With appropriate agronomic inputs, 'core' stump buddings could probably be used as a viable practice to shorten the period of immaturity in rubber. Besides, the use of these stumps which offers potential for year-round planting could augment the development of the rubberwood industry which is currently constrained by seasonal felling.

2. Soil Moisture Conservation in Rubber
G. Haridass *et al.* (RRIM)

Mulching and silt pits as soil moisture conservation practices for improved rubber growth and yield were discussed. In the experiment lallang straw was used as a control. Results showed that palm shell, empty FFB, palm fronds and peat in descending order were all superior to the control in terms of girth increment. This paper also evaluated the benefits of silt pits in reducing soil erosion and conserving moisture. Higher yields of bwtween 10% to 15% were recorded on the upper terraces for clones RRIM600 and RRIM703 crown budded GT1 when silt pitting was carried out.

However, the basis of the experiments appeared weak due to apparent flaws in the methodology and the results should be viewed with reservation.

SESSION III
TAPPING AND EXPLOITATION

1. Futher Puncture Tapping Trial Results in *Hevea.*
Chan Weng Hoong *et al.* (AAR)

This was the only paper presented by AAR in the Conference. The abstract of this paper had been published in the previous issue of this newsletter.

Though puncture tapping was economically viable, there was reservation on the high ethephon concentration used which ranged from 6.7 to 13.3% for different clones.

2. 'Rollmark' – A New Device for Marking Bark Consumption.
Wing Tee Kiang (RRIM)

The use of 'Rollmark', a simple, practical and cheap but effective method of pre-tapping spot marking to reduce excessive bark consumption was highlighted in this paper. This device costs $16 per unit for upward tapping and $3 per unit for downward tapping.

"Rollmark' appears to be a useful device in controlling bark consumption in estates where bark consumption is excessive.

SESSION IV
ECONOMICS OF TAPPING AND COLLECTION

1. Economics of Separate Tapping and Collection Operations in Rubber Production.
James Nayagam *et al.* (RRIM)

This paper highlighted the economic benefits of two separate tapping and collection systems. The collection and delivery of latex were done by a field worker on a daily basis **(Dolcup)** or in two to three weeks in the form of lumps using polybags **(Dolbags)**. In higher yielding areas, the tappers' wages would improve by $2 to $3 per day and the collectors' wages by $1.5 to $2 per day compared with conventional practice.

2. Increasing Productivity By Division of Labour
M.D. Stewart (Asiatic Development Bhd.)

Division of labour and polybag collection when introduced gave high yields and improved wages to tappers. This proved useful when there was a shortage of tappers but unsuccessful in normal areas due to fear of labour redundancy.

3. Large-Scale Evaluation of Tapper-Collection System in *Hevea*
L.T. Gan and C.K. Chew (Ebor Research, Sime Darby)

This paper evaluated the results of four field-scale trials on the tapper-collector system. The most attractive type of payment was in paying the tapper 60% of the latex incentive plus other basics while the collector was given the general workers' rate. The daily average earnings of the tapper was increased by 20%. The overall cost of tapping was also reduced by 4–9% depending on yield levels.

These tapper-collector systems appeared beneficial both for management and tappers. However, the above benefits favoured the tappers in terms of income under the present MAPA/NUPW wage agreement.

4. Panel Discussion

There was active participation during the panel discussion on 'Towards Reduction of Production Cost of Natural Rubber' at the end of the conference. The panel composed of some prominent figures from the

plantation industry and the main points in their speeches are summarised below:–

Mr. Ong Beng Kee of TPSB spoke on the rising cost of production from 1978 to 1986 with no proportionate increase in yield. Labour productivity can be increased by using high yielding planting materials, extending the task size and separating the tapping and collection operations. He concluded that the industry which has no control over price will always face the dilemma of rising cost, unless newer clones can surpass the performance of current clones like RRIM600 and GT1.

Dr. Aminuddin Rouse KGSB spoke on the need for research projects to be tied to commercial value since they are time consuming and costly. The main objectives in research and development should be to increase yield, reduce cost of production and to improve and develop new products.

Dr. Mahmood b. Kadir of MARDEC spoke on the processing front which accounts for 10–15% of the total cost of production. He gave examples where processing capacity had not been optimised and where cost reduction was possible.

Dr. Lim Sow Ching (MRRDB) discussed the various factors that contributed to cost of production by means of an equation.

Mr. M.D. Stewart (Asiatic Dev. Bhd.) stressed that certain capital inputs could not be saved during recession if efficient cost of production was to be achieved.

Dr. Sharifuddin Hamid (UPM) representing the National Association of Smallholders spoke on the need for effective extension.

Overview

Overall, the improved clones from RRIM appeared to be promising but they have still to be evaluated in different agroclimatic conditions. 'Core' stumped buddings could probably become a viable practice in reducing the period of immaturity and casualities due to vagaries of weather. The trials on tapper-collector systems appeared promising with benefits for the tappers which might attract new tappers and persuade existing tappers to remain in the estates.

P. Kayaroganam

AAR TECHNICAL PAPERS 1987/88 (OCTOBER '87 TO FEBRUARY '88)

1. Confidential
   Feasibility report on commercial plantings of hybrid Solo papaya
   SAC
2. 26/87
   Selection propagation and field establishment of cocoa
   OLH
3. 27/87
   Field practices and harvesting of cocoa
   OLH
4. 1/88
   Review of AAR recommendations of rubber clones for 1989–91
   OTS, PK & CWH
5. 2/88
   Stinggang oil inspection and crop suitability report
   KKK &GKJ
6. 3/88
   Some root studies and possible evidences of poaching in a *Hevea* manuring trial – a short communication
   CWH

SUMMARY

A study of lateral root proliferation to establish whether root encroachment existed was carried out in a manuring trial which had still not shown any significant yield response after five years.

The study revealed that lateral roots with horizontal distances ranging from 7.7m to 11.2m crossed into adjacent plots in 4 out of the 6 trees examined, alluding to the existence of fertiliser poaching in the manuring trial.

The significant response in leaf nitrogen which was observed in the third year, disappeared in the fourth and fifth year suggesting that roots possibly crossed into adjacent plots after the third year, thereby nullifying the earlier effect.

As yield responses tend to manifest only after the development of leaf nutrient responses, the lack of yield response in the trial may have been due to fertiliser poaching surmised to have existed from after the third year, thereby masking any possibility of yield response in the next two years.

AAR Advisory Circulars

1/88
1. New price of AAR rat bait
   MMM

2/88
2. Technique of sampling of cover crop seeds for viability test
   MMM

3/88
3. Outbreak of leaf eating caterpillars on oil palm
   MMM

4/88
4. Survey of availability of equipments for pest/disease control
   MMM

SPECIFIC RECOMMENDATIONS CONTAINED HEREIN SHOULD ONLY BE IMPLEMENTED WITH PROPER AUTHORISATION