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AAR NEWS

EDITORIAL

Inside this issue:

Of all the significant global events to remember 2005 by, it has to be the tremendous rise in crude oil price. At the last count, the price breached the US$65 per barrel mark. All input items are expected to rise or have already increased in price as a result of the effect of crude oil price on transportation cost.

Whilst the effects of the oil price are mostly adverse, an item which has benefited from the price rise is natural rubber. This commodity has been experiencing a continual rise in price, having breached RM6.50 for SMRCV grade, due in part to its current competitive edge over synthetic rubber. Rubber price has been predicted to remain at current equitable prices for a while. In view of this, it may appear timely to re-evaluate the position of rubber in relation to areas considered marginal for oil palm. These probably include areas which are steep and /or lateritic and where rainfall is low and/or poorly distributed, where oil palms have not yielded well. The districts of Bahau, Segamat and Karak and the state of Kelantan come to mind where replanting to rubber may be considered. The article on `Evaluation of gaseous systems for rubber` provides some home grown data on RRIMFLOW and Reactorrim`.

The rise in input costs due to higher crude oil prices will also greatly impact profitability of oil palms. Fertilizer prices are likely to remain high. Running costs will also continue to escalate as will also the full gamut of other inputs. The oil palm sector must continue to strive for higher yields to maintain its competitive edge over other oil bearing crops. Clonal oil palms offer much scope in elevating the yield plane of estates.

Whilst this has been well accepted, planters still feel they are overpaying for such palms. Mr. Ooi Ling Hoak, Principal Research Officer, has computed the fair price to pay for clonal palms. Please read his article and buy more immediately if the price you are paying currently falls far short of his projected `fair` price!

AAR officers play their part in providing research findings to the plantation sector. Abstracts of some papers presented in 2005 are provided for information.

HAPPY READING!

Chan Weng Hoong

How Much to Pay For Clonal Oil Palm?

By LING-HOAK OOI

ABSTRACT

The choice of planting material has an important bearing on the profitability of a planting. This is because it is a "one off" decision and once planted, a planter has to live with it for the entire lifespan of the planting. Clonal palms have been reported to be superior to DxP hybrids in both fresh fruit bunch (FFB) yields and oil extraction rates (OER) and are sold at more than 10 times the price of the latter. The question of what is a fair price to pay for clonal palms is an issue of much debate. The net present value ratio (NPVR) between clonal palms and DxP hybrids was used to evaluate their comparative profitability. Initially, net present value (NPV) for 162 combinations comprising 3 levels each of clonal palm price (RM15, 20 and 30 per acclimatized bare root ramet), FFB yield, OER and palm products price (crude palm oil, CPO at RM800, 1100 and 1400 per ton and palm kernel, PK at RM480, 660 and 840 per ton), and 2 levels of discounting rates at 5 and 10%. Clonal palm was assumed to be 5, 10 and 15% better than DxP hybrid in both FFB yield and OER. DxP hybrid was priced at RM1 per germinated seed. At long term low CPO and PK prices (RM800 and 480 per ton respectively), negative NPV was recorded in all but three of the 54 combinations evaluated, indicating that it is not profitable to plant either DxP hybrids or clonal palms in 94% of the cases evaluated. Hence NPVR was computed for the balance of the 108 combinations at long term medium and high palm product prices only. Between DxP hybrids and clonal palms, the latter would be more profitable in 97, 94 and 81% of the time at clonal palm prices of RM15, 20 and 30 respectively. Therefore, it would be worth paying a higher price for superior clonal palms in most of the cases. This is particularly true for clones with high OER as an increase in OER

has a more favorable impact than a similar increase in FFB yield. This is expected as the former will lead to higher CPO yield without incurring additional harvesting and transport cost and savings in processing cost. The internal rate of return (IRR) and discounted payback period (PBP) were also computed as supporting economic criteria. At medium and high palm product prices, IRR is higher than the cut-off rate of 10% throughout with the highest value of 23.2%, while PBP varied from 7 to 22 years.

INTRODUCTION

Replanting of old oil palms is a major management decision and the most important issue is probably the choice of planting material. This is because it is a "one off" decision and once planted, a planter has to live with it for its entire harvestable lifespan of about twenty five years. Currently, there are basically two types of planting material i.e. DxP hybrids and clonal palms. Although clonal palms have been around since the 1970s, they have not taken off because of the mantling problem and their limited supply and high cost. However, this is expected to change in the near future. Recent trial results (Simon and Koh, 2005; Soh *et al*., 2005 and Zamzuri *et al*., 2005) indicate that clonal palms are superior to DxP hybrids in both oil extraction rate (OER) and yield of fresh fruit bunch (FFB). The other good news is that the mantling problem has largely been circumvented. Tan *et al.* (2003) reported that clones and reclones that were cultured from 1992 onwards produced ramets with around 2.6% mantling, a level well below the commonly accepted tolerable limit of 5%. The main constraints to large scale planting of clonal palms currently are their limited availability and the very much higher prices compared to the DxP hybrid seeds. The question of what is the fair price to pay for clonal palms is an issue of much contention. This paper attempts to answer this. Corley *et al.* (1987) provided some general indications on the return on investment in clonal palms in the form of a series of graphs, one of which showed that investment in clonal palm at US$5 each will give a 17% internal rate of return at palm oil price of US $300 and a yield increase of 20%.

MATERIALS AND METHODS

The net present value ratio (NPVR), internal rate of return (IRR) and discounted payback period (PBP) were used to evaluate the comparative profitability of planting DxP hybrids and clonal palms.

Assumptions

1. The replanting and production costs for DxP hybrids reported by Ooi and Kodiappan (2005) were used in the computations.
2. FFB yield of clonal palms at 5, 10 and 15% higher than DxP hybrids and approximated to the nearest 0.1t have been assumed.
3. Oil extraction rate (OER) of clonal palms at 5, 10 and 15% higher than DxP hybrids and approximated to the nearest 0.1% and kernel extraction rate (KER) at 5% throughout (KER of 5.5% has been assumed for DxP hybrids) have been assumed

Combinations of factors evaluated

A total of 162 combinations comprising three levels each of, price of clonal palm, FFB yield, OER, palm product price and two levels of discounting rate were evaluated (Table 1). The price of a DxP hybrid seed was fixed at RM1.

TABLE 1: COMBINATIONS OF FACTORS EVALUATED

Factor	Level		
	1	2	3
Price of clonal palm (RM)	15	20	30
FFB yield of clonal palm	5% > DxP	10% > DxP	15% > DxP
OER of clonal palm	5% > DxP	10% > DxP	15% > DxP
Price of CPO(RM/t)	800	1100	1400
Price of PK(RM/t)	480	660	840
Discounting rate (%)	5	10	
Total number of combinations	162 (3x3x3x3x2)		

RESULTS AND DISCUSSION

Results of the economic analysis, assuming constant long term palm product prices, for the 162 combinations of factors evaluated are discussed below.

Any increase in the price of palm products, FFB yield and OER will result in a higher NPV and hence profitability. On the other hand, any increase in the price of planting material and discounting rate has the opposite effect.

At long term low palm product prices (CPO=RM800/t and PK=RM480/t), negative NPV is recorded in all but three the 54 combinations evaluated, indicating that it is not profitable to plant either DxP hybrids or clonal palms in 94% of the time at long term low CPO and PK prices.

At higher long term palm product prices, NPV varied from RM614 (at clonal palm price of RM30, 10% discounting rate, long term medium palm product price and 5% increase in both FFB yield and OER) to RM43,826 (at clonal palm price of RM15, 5% discounting rate, long term high palm product price and 15% increase in both FFB yield and OER).

An increase in OER has a more favorable impact on NPV than a similar increase in FFB yield. This is expected as the former will result in higher CPO yield without incurring additional harvesting and transport cost and savings in processing cost. This is illustrated in Table 2.

TABLE 2: IMPACT OF INCREASE IN FFB YIELD AND OER ON NET PRESENT VALUE (NPV) AT CLONAL PALM PRICE OF RM15

Increase in FFB yield and OER of clonal palm over DxP hybrid	Discounting rate (%)	NPV at medium price of palm products (RM)
10% OER and 5% FFB	10	4297
10% FFB and 5% OER		3735

Net present value ratio (NPVR)

As it is not profitable to plant either DxP hybrids or clonal palms in 94% of the time at long term low CPO and PK prices, there is little point in computing their NPVR. Hence only the NPVR for the balance of 108 combinations of factors at long term medium and high palm product prices were computed.

At long term medium and high palm product prices and clonal palms priced at RM15, NPVR is greater than one in all but one case, indicating that it is worth paying RM15 per clonal palm in 97% of the combinations evaluated. At clonal palm price of RM20, NPVR is more than one in all but two cases (6%) i.e. it is profitable to pay RM20 per clonal palm except for these two cases when clonal palm is only 5% better in both FFB yield and OER at discounting rate of 10%. When clonal palm is priced at RM30, NPVR is more than one in 29 of the 36 combinations evaluated i.e. it is profitable

to pay RM30 for a clonal palm in 81% of the combinations evaluated. Overall, it would be worthwhile paying a higher price for superior clonal palms in the majority of the cases evaluated. This is particularly so for clones with high OER as it will result in higher CPO yield without incurring additional harvesting and transport cost, and savings in processing cost.

Internal rate of return (IRR)

As with NPV, any increase in the price of palm products, FFB yield and OER results in higher IRR and hence profitability. On the other hand, any increase in the price of planting material has the opposite effect. At long term medium and high palm product prices, IRR is higher than the cut-off rate of 10% throughout. The highest IRR is 23.2% at clonal palm price of RM15, high palm product prices and 15% increase in both FFB yield and OER.

Discounted payback period (PBP)

PBP varied from 7 to 22 years. As expected, any increase in the price of palm products, FFB yield and OER will shorten the payback period. On the other hand, any increase in the price of planting material and discounting rate has the opposite effect. The shortest PBP is 7 years at clonal palm price of RM15, high palm product prices and 15% increase in both FFB yield and OER.

The validity of the above results is dependent on the assumptions made. An important assumption is that mantling, which was a very serious abnormality in oil palm fruits could now be managed. Floral abnormalities occur in both female and male inflorescences and can be observed from the first inflorescences produced. In abnormal female inflorescences, the vestigial stamens develop into fleshy carpels to form a mantle surrounding the fruit. In abnormal male inflorescences, the stamens feminise into stigma-like structures. The mantled fruit bunches may fail to ripen and abort due to poor pollination (Wong *et al.*, 1997). The non-abortive mantled fruits may have fertile seeds or may be parthenocarpic and the bunch will ripen and is harvestable. The former will result in complete loss of crop while the latter has an adverse effect on both FFB yield and OER. With improved tissue culture techniques and good house keeping, the mantling of palms has been reduced to about 2.6% in large scale commercial scale plantings (Tan *et al.,* 2003). The small percentage of mantled palms could be easily replaced with normal palms once identified.

The other nagging question is whether clonal palms will live up to expectations in improved yields. Corley *et al.* (1987) suggested that a clone can be considered for commercial planting provided that there was at least an 80% probability that the required yield increase will be achieved. Both published and unpublished results have been taken into consideration in assuming that clonal palms are 5, 10 and 15% better than DxP hybrids in both FFB yield and OER. Corley and Law (1997) reported that although reliable ortet selection has proved difficult, the best clones appear to yield at least 30% more than mixed seedling populations. Duval *et al.* (1997) reported that clonal palms out-yielded the DxP hybrids by between 10 and 45% in Indonesia and Ivory Coast. More recently, Simon and Koh (2005) reported clonal palms out-yielded DxP hybrids by 29 and 41% in FFB and oil yield respectively in the first 10 years of production in Sabah, and by 27 and 39% respectively in 442 ha commercial planting in Sarawak. Zamzuri *et al.* (2005) reported that clones out-performed DxP hybrids in FFB yield by between 10 and 48% in three Malaysian Palm Oil Board (MPOB) trials. Initial four to five years yield results from five trials by Advanced Agriecological Research (AAR) showed that production clones (clones released by AAR for commercial scale plantings) produced an average of 15% more FFB and 28% more oil yield than DxP hybrids (Tan, pers. comm.). Soh *et al.* (2003a, 2003b) reported that cloning improvement would be ahead of breeding improvement, and that ortet selection is more efficient with oil to bunch ratio (O/B) than FFB and substantial yield improvement can be achieved by recloning the proven better clones. The good news is that initial trial results indicate that recloning of proven better clones is the way forward (Soh *et al.,*2001).

The FFB yield assumed in this study is on the conservative side as they were based on data taken from oil palms planted between 1967 and 1989. However, this is not expected to significantly affect the NPVR, which is a ratio. If higher FFB yields had been assumed, higher IRR and shorter PBP could be expected. This is illustrated in Table 3 where the yield of FFB generated by polynomial equation was increased by 20%.

TABLE 3: NPV, NPVR, IRR AND PBP AT 10% DISCOUNTING RATE AND HIGH PALM PRODUCT PRICES

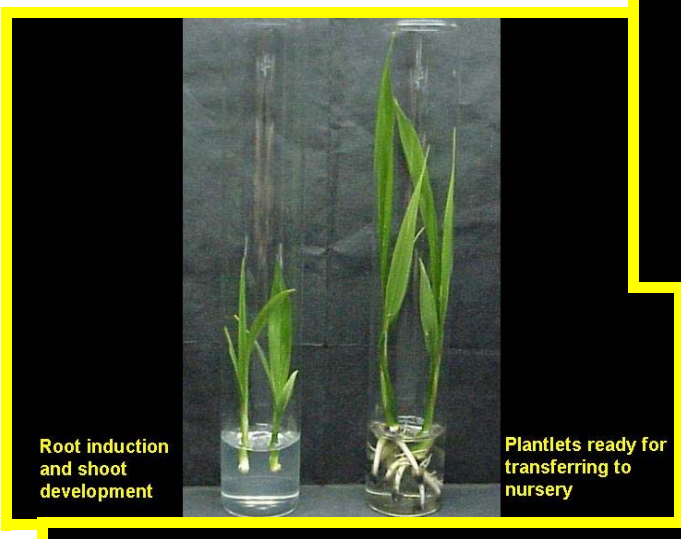
Increase in FFB yield and OER of clonal palm over DxP hybrid	Economic criteria	At FFB yield generated by polynomial equation	FFB yield increased by 20%
	DxP hybrid at RM1		
	NPV (RM)	12009	18640
	IRR (%)	20.9	25.5
	PBP (Year)	8	8
	Clonal palm at RM15		
15 % FFB and 15% OER	NPV (RM)	19623	28372
	NPVR	1.63	1.52
	IRR (%)	23.2	27.5
	PBP (Year)	8	7

CONCLUSIONS

It is not profitable to plant either DxP hybrids or clonal palms at long term low CPO and PK prices in 94% of the cases evaluated. However, it is profitable to plant both DxP hybrids and clonal palms at higher palm product prices as NPV is positive and IRR is higher than the cut-off rate of 10% throughout at higher palm product prices.

At long term medium and high palm product prices, NPVR was greater than one in all but one case at clonal palm price of RM15, indicating that it is worth paying RM15 per clonal palm in 97% of 36 combinations evaluated. At clonal palm price of RM20, NPVR is less than one for only two cases i.e. it is profitable to pay RM20 per clonal palm except for these two cases when clonal palm was only 5% better in both FFB yield and OER at discounting rate of 10%. When clonal palm was priced at RM30, NPVR was more than one in 29 of the 36 combinations, or 81% of the cases evaluated. Therefore, it is worth paying a higher price for superior clonal palms in most of the cases particularly for clones with high OER. An increase in OER has a more favorable impact than a similar increase in FFB yield. This is expected as the former will lead to higher CPO yield without incurring additional harvesting and transport cost and savings in processing cost.

At long term medium and high palm product prices, IRR is higher than the cut-off rate of 10% throughout with the highest value of 23.2%, and PBP varied from 7 to 22 years. If higher FFB yields had been assumed, higher IRR and shorter PBP could be expected, but it would not affect the NPVR which is a ratio significantly.



EVALUATION OF GASEOUS STIMULATION SYSTEMS FOR RUBBER

By Chan Weng Hoong

Ethylene gas was first directly applied to rubber trees by the Rubber Research Institute of Malaya (RRIM) in 1968, resulting in very large increases in yield (Boatman *et al.*, 1968). Gaseous stimulation on rubber was, however, not reported for a while thereafter. Instead ethephon was shortly developed as a compound which when mixed in suitable carriers such as water or palm oil and brushed onto the bark could release ethylene gas into the tree for high yield increase (Abraham,1970). Ethephon has been the dominant latex stimulant used in rubber estates ever since.

In mid 1990, Dr. M.M. Guha announced over television his `Hypodermic latex extraction` system which produced very high yields by direct gassing of ethylene into rubber trees. Guha`s system was subsequently published in 1992 ( Guha *et al*., 1992). The announcement of Guha`s system was subsequently followed by the Rubber Research Institute of Malaysia`s `RRIMFLOW` system which also made use of direct gassing of ethylene to obtain very high yield response (Sivakumaran *et al*., 1992). Another form of gassing system to stimulate the production of high yields, the `REACTORRIM` system was reported in 1995 (Mohd Raffali and Ahmad Zarin, 1995).

The main difference between the RRIMFLOW an REACTORRIM systems is that the former uses intermittent gassing while the latter, continuous gassing.

In their initial stages of development, much difficulties such as high cost, slow rate of fixing of equipment, pest damage to equipment etc. were encountered in implementation of the various gaseous systems. With the passage of time, much improvement in the systems was reported resulting in more sustained high yields and lower costs of implementation (Yew *et al.,* 1998; Ahmad Zarin and Mohd Akbar, 1998).

In response to the latter, three trials were laid down to evaluate whether the RRIMFLOW and REACTORRIM gaseous stimulation systems would be suitable for implementation under estate conditions.

MATERIALS AND METHOD

Trial details

Details of the three trials are given in Table 1. All three trials were laid down on clone PB260.

Table 1. TRIAL DETAILS

Trial number	*Location*	*Clone*	*Year planted*	*Panel*	*Tapping system*
ET1	Sg Kawang estate	PB 260	1984	HO1	1/6Sd4 upward
ET2	Ayer Hitam estate	PB 260	1990	BO1	1/4Sd4
ET3	Ayer Hitam estate	PB 260	1990	BO2	1/4Sd4

Treatments

Details of treatments are given in Table 2.

Table 2. DETAILS OF TREATMENTS

Trial number	*Treatment*	*Plot size*	*Replication*	*Commencement/ Duration*
ET1	1. RRIMFLOW 2. Superflow mini 3. Superflow 4. Conventional ethephon stimulation (control)	10 trees	2	May 2001/ 20 months
ET2	1. RRIMFLOW 2.Conventional stimulation (control)	Task size (600 trees)	2	January 2001/ 24 months
ET3	1.RRIMFLOW 2.Conventional stimulation (control)	Task size (600 trees)	2	January 2001/ 24 months

RESULTS

Yield and dryness percentage

Trial ET1

The yield per tree and dryness percentage in Trial ET1 are given in Table 2.

Yield per tree was highest for the RRIMFLOW system at 216g for the first 8 months of the trial, being 18 percent higher than conventional stimulation. Yield per tree for conventional stimulation and both the Superflow systems was generally similar at around 180 g. For the next 12 months, yield per tree was still highest for RRIMFLOW at 166g or 42 percent higher than conventional stimulation. Both Superflow and Superflow mini were however 9 percent and 3 percent lower in yield than conventional stimulation respectively. At the end of 20 months, RRIMFLOW outyielded conventional stimulation by around 30 percent. Superflow was 5 percent lower in yield while Superflow mini gave the same yield as conventional stimulation.

Panel dryness was fairly high in both the Superflow systems, ranging from 20-30 percent at the end of 20 months. Both RRIMFLOW and Conventional stimulation did not show any panel dryness over the same period.

Trials ET2 and ET3

On panel BO-1, the RRIMFLOW system yielded 16 percent higher than conventional stimulation in the first year but dropped to only 77 percent of conventional stimulation in the second year (Table 3). Cumulative yield over two years amounted to 2672 kg per ha or 95 percent of conventional stimulation.

Panel dryness was generally similar between RRIMFLOW and conventional stimulation at 5-6 percent in the first year, increasing to 7-9 percent, a year later.

On panel BO-2, the RRIMFLOW system yielded 11 percent higher than conventional stimulation in the first year but dropped to only 78 percent of conventional stimulation in the second year (Table 4). Cumulative yield over two years amounted to 4413 kg per ha or 93 percent of conventional stimulation.

Panel dryness was low in the first year especially for conventional stimulation, but increased to around 5 percent a year later for both conventional stimulation and RRIMFLOW.

Table 3. YIELD (G) AND DRYNESS PERCENTAGE ON PANEL HO1 OF 1984 PB260 IN TRIAL ET1

Treatment		*Yield per tree per tapping (g)*		*Cumulative dryness %*	
		May - December 2001	*January - December 2002*	*May - December 2001*	*January - December 2002*
1.	^1/6Sd4 + 6 X 2.5% ethephon	182 (100)	117 (100)	0	0
2.	^1/6Sd4 + RRIMFLOW (three gassings per month)	216 (118)	166 (142)	0	0
3.	^1/6Sd4+ Superflow mini (one gassing per month)	186 (102)	114 (97)	15	20
4.	^1/6Sd4 + Superflow (one gassing in 3 months)	180 (99)	107 (91)	20	30
LSD 0.05%		27	32		

Figures in parenthesis denote percentage

Table 4. YIELD AND DRYNESS PERCENTAGE ON PANEL BO1 OF 1990 PB260 IN TRIAL ET2

Treatment		*January -December 2001*			*January – December 2002*		
		Kg/ tapper	*Kg/ha*	*Cumulative dryness %*	*Kg/ tapper*	*Kg/ha*	*Cumulative dryness %*
1.	1/4Sd4 + 6 x 1.5% ethephon	31.4 (100)	1491 (100)	5.2	30.2 (100)	1434 (100)	8.7
2.	1/4Sd4 + RRIMFLOW	36.5 (116)	1773 (116)	5.9	23.2 (77)	1101 (77)	7.6

Figures in parenthesis denote percentage

Damaged applicators

Trial ET1

All gaseous stimulation systems suffered damage to their applicators and therefore leakage of gas. The common damages seen in the RRIMFLOW system were holes in the plastic covers probably caused by insects and other pests in search of water, flaking of bark beneath the area of adhesion and loss of other paraphernalia like plastic hose, stopper etc. Punctures in the plastic bottles, partially crushed plastic bottles and loss of button diffusers were the common mishaps in the REACTORRIM systems.

The cumulative `damage` amounted to 40 percent in RRIMFLOW and 70 percent for both Superflow and Superflow mini. As aforementioned, the damages were rectified immediately to ensure full functioning of equipment at all times.

Trials ET2 and ET3

Among the common forms of damage to the RRIMFLOW paraphernalia were holes in the plastic cover, loss of plastic tubings and loss of stopper. Flaking of bark beneath the adhesive bark surface was also commonly observed.

On panel BO1 in trial ET2, damaged applicators amounted to 26.1 percent one year after installation (Table 6). After these were replaced with new applicators, loss of functional equipment at the end

of the second year amounted to 46.7 percent.

On panel BO2 in trial ET3, the initial damage was 13.3 percent, increasing to 65 percent in the second year (Table 7).

DISCUSSION AND CONCLUSION

Performance of the RRIMFLOW system appeared to be related to the intensity of maintenance of the applications. In the small scale trial where leakages were minimised by immediate resealing/ replacement of applicators, yields exceeded conventional stimulation in the first 8 months and also the subsequent 12 months of experimentation. In both the task size trials where maintenance of the stimulation paraphernalia was less intensive, yields were higher than conventional stimulation only in the first year. The drop in yield by 22-23 percent of conventional stimulation in the second year may be attributed to leakage in the applicators amounting to 45-65 percent of the total installed. The leakages probably originated mostly from the applicators which were not replaced after one year. New applicators may therefore have to be installed shortly after one year in order to sustain positive response to the system.

The potential loss of effectiveness of RRIMFLOW applicators in the small scale trial after 20 months at around 40 percent was lower than the quanta of damage in the task size trials. This could be attributed to the smaller number of applicators used in the small scale trial which allowed greater attention to proper installation. In the same token, a higher percentage loss of effectiveness may be expected where applicators are installed on large scale.

Both the Superflow systems performed around the level of conventional stimulation in the first 8 months but dropped below the latter in the following year due mainly to inducement of high panel dryness amounting to 20-30 percent after 20 months of observation. The plastic bottles holding the gaseous stimulant also appeared highly susceptible to pest damage with 70 percent of equipment having to be replaced over the trial period.

Overall, of the two groups of gaseous systems, RRIMFLOW performed better than the Superflow systems.
Many of the difficulties of the RRIMFLOW system reported by Yew *et al.*(1998) i.e. pest damage, tedious maintenance of applicators, high labour requirement to install applicators and also for regular application of gas, were also encountered in the task size trials. On larger scale implementation of the system, the difficulties encountered appear likely to be magnified, including cost of replacement of equipment.

The key to sustenance of the RRIMFLOW system appears to be prevention of leakage of the gaseous stimulant. Estates in Peninsular Malaysia may not have the luxury of surplus labour to achieve that end on a large scale.

Table 5. YIELD DRYNESS PERCENTAGE ON PANEL BO2 ON 1990 PB260 IN TRIAL ET3

Treatment		*January- December 2001*			*January – December 2002*		
		Kg/ tapper	*Kg/ha*	*Cumulative dryness %*	*Kg/ tapper*	*Kg/ha*	*Cumulative dryness %*
1.	1/4Sd4 + 6 x 1.5% ethephon	46.0 (100)	2184 (100)	0	44.8 (100)	2122 (100)	5.2
2.	1/4Sd4 + RRIMFLOW	51.5 (111)	2446 (111)	3.5	35.0 (78)	1662 (78)	4.3

Figures in parenthesis denote percentage

Table 6. PERCENTAGE OF DAMAGED APPLICATORS ON PANEL HO1 OF 1984 PB260 IN TRIAL ET1

Treatment		*May - December 2001*	*January – December 2002*	*May 2001- December 2002*
1.	^1/6Sd4 + 6 X 2.5% ethephon	0	0	0
2.	^1/6Sd4 + RRIMFLOW (Three gassings per month)	20	20	40
3.	^1/6Sd4+ Superflow mini (one gassing per month)	30	40	70
4.	^1/6Sd4 + Superflow (one gassing in 3 months)	40	30	70

RRIMFLOW

REACTORRIM

Table 7. PERCENTAGE OF DAMAGED APPLICATORS ON PANEL BO-1 OF 1990 PB260 IN TRIAL ET2

Treatment		*January- December 2001*	*January – December 2002*
1.	1/4Sd4 + 6 x 1.5 ethephon	0	0
2.	1/4Sd4 + RRIMFLOW	26.1	46.7

Table 8. PERCENTAGE OF DAMAGED APPLICATORS ON PANEL BO-2 OF 1990 PB260 IN TRIAL ET3

Treatment		*January- December 2001*	*January – December 2002*
1.	1/4Sd4 + 6 x 1.5 ethephon	0	0
2.	1/4Sd4 + RRIMFLOW	13.3	65.0

ABSTRACTS OF SOME PAPERS PRESENTED BY AAR IN 2005

Addition of cations to urea does not necessarily reduce N volatilization losses presented at the Soil Science Conference Malaysia 2005, Sg. Petani, Kedah

By [1]Petronella G Ah Tung and [2]Tan Lei Hong
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[2]Applied Agricultural Resources Sdn. Bhd

This paper investigates the ammonia volatilization losses of a urea-based compound fertilizer as compared to urea fertilizer under laboratory conditions. Ammonia volatilization losses of surface applied fertilizer on Rengam series soil are determined by measuring the residual total N in the soil and deducting it from the initial N added (Chan, 1986). The mean percentage N loss between the urea-based compound (16.2%) and urea fertilizer (9.4%) was found to be significantly different. The higher N loss in the urea-based compound fertilizer was probably caused by the presence of highly reactive rock phosphate (RP) and EMag in the fertilizer, which increased soil pH. There was, however, no significant difference in the mean percentage N loss between 227 ppm (mg N/kg soil) and 455 ppm (mg N/kg soil) fertilizer rates with 11.9% and 13.7% N losses respectively. However there was a significant difference in percentage N loss at day 3, 7 and 15 between the two rates where higher N rate increased N volatilization.

Applications of Spatial Information Technology in Oil Palm Plantations presented at the 5th ISP National Seminar, Johor

By Tey Seng Heng

In the oil palm plantations in Malaysia, global positioning system (GPS) and geographic information system (GIS) have largely been used primarily for basic surveying and updating of estate maps. Very few attempts have been made to utilize the unique descriptive and interpretive functionalities of the GIS. In order to improve the productivity of the limited land resources and realize the potential yields of the new planting materials, adoption of these spatial information technologies for site-specific management may be necessary. This paper aims to provide some insights into a few practical uses of GIS, GPS and remote sensing (RS) in oil palm plantations and to promote the research and development of these technologies for adoption to enhance our management.

GIS can be useful for visualizing variations in fresh fruit bunch (FFB) yield of oil palms across fields. For a poor yielding field, a detailed yield record of the harvesting task may be kept for visual display to reveal low yielding palms for field inspection. The advancements and anticipated improvements in GPS over the next three years will enable us to expend the use of low-cost GPS receivers for basic surveying and planning in the estates. A new Mobile GIS that allow us to view our positions in relation to the ground feature on a digital map and at the same time record and access useful information on the go is introduced. The space-borne SPOT5 and Landsat TM satellite imagery has been found to be suitable for delineating poorly grown palms for field inspection. Given the time constraint for agronomists and planters to effectively oversee large fields, further investigations into the use of remote sensing for the vegetative growth assessment of the oil palm are warranted. Absence of clear benefits and measurable positive impacts on the yield and profit together with high additional cost of investments, maintenance and human resources could be some of the main factors contributing to the slow development and poor acceptance of these technologies in our plantations. Occurrence of cloud coverage which have limited the supply of clear satellite images in tropical countries and the need to engage professional workers who are also familiar with agriculture to operate the expensive remote sensing software are other main drawbacks. Developments in the radar sensor and unmanned aircraft vision system, together with the growing interest among local universities in the field of remote sensing and the increasing number of graduates who are familiar with spatial information technologies hopefully will help to spur the development of some useful applications for adoption in our plantations.

Impact of phosphate rock on P uptake and dry matter production of mixed legumes under oil palm in Malaysia presented at the XV International Plant Nutrition Colloquium, Beijing, The People's Republic of China

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Phosphate rock (PR) is the most common source of P for oil palm and conventional leguminous cover crop (LCC) in Malaysia due to the generally high soil acidity and low soil P. LCC is planted as ground cover during oil palm establishment for soil conservation measures and to recycle P from the soil and PR to the palms. but most LCC generally dies off after three years due to heavy shading by the maturing palms. Growth response of LCC such as *Pueraria javanica* (PJ) to P fertilizers has been well documented but limited work has been done on *Mucuna bracteata* (MB), a new, vigorous shade-tolerant perennial legume. This study aims to investigate the effect of medium reactive PR on P uptake and dry matter production of MB planted pure or mixed with PJ. Three P rates to the legumes and four P rates to the palms plus a control without P were tested in four replications. Two replicates were planted with "pure" MB and the other two with "mixed" MB and PJ. Results indicated that PR did not increase the dry matter production of MB and PJ in the first year after treatment. Total legume dry weights of both pure and mixed plots were similar at 2674 and 2633 kg ha^{-1}. Mean dry weights of MB were at 2102 and 1250 kg ha^{-1} in pure and mixed plots respectively but the latter has another 1384 kg ha^{-1} of PJ. P concentrations of MB responded linearly to PR rates up to 80 kg P ha^{-1} whereas no significant response was obtained for PJ. MB planted with PJ showed higher mean P concentration of 0.133% compared with pure MB of 0.116%. This apparent symbiotic effect might be attributed to the rapid ground coverage of PJ, which would reduce erosion and run-off losses of applied PR and the solubilized PR will consequently result in higher P availability to MB. Within six months, the MB and PJ mixture have immobilized only 2.92 kg P ha^{-1} from the applied PR and soil P, but it was 70% more than pure MB. This study showed that medium reactive PR can supply sufficient P to the legumes for subsequent remobilization to the palms via leaf litter and when the LCC die-back.

SOCIAL AND PERSONAL

Scenes from 'Minggu Komoditi' , Exhibition, The Mines Resort

Don't AAR personnel look happy?

AAR Principals
The meeting/conference of Heads!

Plantation Industry and Commodity Minister visiting our booth

That's why AAR's standards are high!

Smile, HAR and Mr. Tan, C.C.
You are with two pretty ladies.

THE QUEUE

A man was travelling home when he saw a strange sight.

A hearse was moving slowly and walking behind the hearse was a man holding a leash tied to his dog. Behind the man and dog was another hearse and behind this hearse was a row of 50 men all wearing dark glasses and walking slowly in single file.

The man stopped his car and spoke to the man with the dog.

`What`s happening`. The other man replied ` Oh, it`s my wife`s funeral, She is in the hearse in front of me`

`What about the dog ?`

`Well, he`s the one who bit my wife on the neck until she died`.

`That`s horrible. What about the other hearse ?`

`My mother-in-law is in there. When she saw the dog biting my wife, she took a bat and swiped at the dog. The dog released my wife who was already almost dead, jumped on my mother-in law and bit her on the neck until she also died`.

The onlooker smiled and with a wicked grin on his face, asked the man with the dog, `Is it possible for me to borrow your dog ?`

The man replied ` Of course! Please join the queue`.

CWH