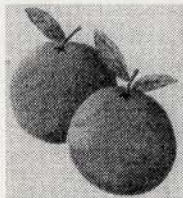


# AA NEWS

## RESEARCH

### EDITORIAL



**Happy New Year, Gong Xi Fa Cai and Selamat Hari Raya Aidilfitri !**




Looking back, 1997 has been a tumultuous year for much of the Asian region. The devastating financial turmoil triggered off by Thailand has left many Asian countries seriously wounded. The International Monetary Fund (IMF) has to be called in to rescue (or is it to give a final blow) Thailand, Indonesia and the once mighty South Korea.

Although an IMF bail out was not needed, our economy has suffered serious setbacks caused by the financial crisis.

The currency turmoil has caused the Ringgit to depreciate against the US dollar from about RM2.50 before the crisis to a low of nearly RM5.00 for a brief bleak moment in January 1998. Almost everyone has suffered in the current economic crisis. Some unfortunate ones have even lost their jobs.

The plantation sector is one of the few industries to benefit from the current currency crisis, the main reason being that the palm products are denominated in US dollars (which accounts for a high portion of the high prices in Ringgit terms). The impact of the current currency fluctuations on oil palm estates was discussed at a Boustead Estates Agency Workshop held in Sandakan on 17th November, 1997. The topical paper is reproduced here.

Looking forward, we hope 1998 will be a better year. May the year of the  bring some cheers.

Happy Reading!

Ooi, L.H.

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### 1997 AARSB SPORTS CLUB ANNUAL DINNER AND ROLL OF HONOUR

A record breaking crowd of over 250 AAR Sports Club members, their families and friends descended upon the ball room of Rahman Putra Golf Club on the night of 6th Dec. 1997 for the Annual Dinner.

This year's celebration was dubbed a night of Melody and Harmony. Indeed all present were treated to melodious tunes from a variety of musical instruments and harmonious singing and dancing by AAR's talented employees.



**CHEW POH SOON REWARDING EMPLOYEES WITH 10 YEARS OF DEDICATED SERVICE WITH AAR. FROM TOP (CLOCKWISE): ALATIPAH HUSIN, MAHANUM RAMLI AND SAMSUDDIN SALEH**

The night started with a welcome speech by the Sports Club president, Tan Cheng Chua who also called for the club to live up to its name of a Sports Club. He asked members to be more active in the club's sport activities with the aim of reviving friendly games with Boustead and Taiko. This was followed by a down to earth discourse by Chew Poh Soon. In light of the prevailing economic woes faced by the country and the region as a whole, he advised fellow AARians to be prudent in their spending, even though AAR is in the plantation business which has actually benefited from the current currency and economic turmoil.

Mr. Chew noted that AAR has made numerous contributions and advancements in 1997 in oil palm agronomy. GIS/GPS mapping, the decision support system, plant breeding and seed production, tissue culture, mechanisation and crop protection. He hoped to see greater success in 1998.

Following his speech, Mr. Chew presented awards to AAR staff and workers' children who obtained outstanding results in their UPSR, PMR and SPM examinations in 1996. Awards were also given to employees for best attendance, 10 year service and dedication.

The buffet dinner started immediately after the awards presentation. As usual, food was sumptuous and plentiful with many unabashedly going for second, third, fourth, .....helpings.

The night's entertainment kicked off with a harmonica presentation by Chan Weng Hoong alias Rubber Chan. All these years his musical talents have been hidden and all agreed that he did a good blow job to earn him second spot in the musical presentation. The top spot was won by Heriansyah and his Kelasia voices (Kelantan - Indonesia).

Their rendition of "Anak" captured the hearts of the audience, especially the tissue culture girls. Third was a flute recital by Jamaluddin, a Bangladeshi research recorder based in Balau estate. Under the harmony category, our boys and girls from Sabah again won top honours with a dance called "Joget Asli". The field section research assistants and recorders showed how well tradition and harmony can be blended in their Dikir Barat presentation called "Belia AA Research". They narrowly missed the top honours. A traditional Indian dance had to be called off at the last minute when a few of the dancers from Balau fell sick.

The final event of the evening required the participation of the various tables to sing prepared pantuns to the tune of "Rasa Sayang Eh". Initially shy, they gradually warmed up and gave some good group croakings to the encouragement of all present.

AAR's annual dinner would not be complete without lucky draws. This year, over 40 lucky draws were made including 11 prizes donated by Chew Poh Soon. Many among the audience walked away with a prize and a smile on their faces.

This year, in addition to the lucky draw, there was a Raffle Draw with a 21 inch Sony television as the first prize. However, todate the winner has yet to claim the prize.

The night ended with dancing and karaoke sessions and pleasant memories where AARians came up gamely to show their true talents in music and dances. So estate managers, should you hear drums and chanting coming from your oil palm fields, do not be alarmed, its just AAR's leaf sampling team having a break, a dikir barat break!

**Tan, C.C.**

## Roll of Honour

### Our heartiest congratulations to the winners of :

#### 10 years Service Award

<u>Recipient</u>	<u>Position</u>	<u>Operating Centre</u>
Alatipah Husin	Canteen caterer	Canteen
Mahanum Ramli	Computer clerk	Main Office
Samsuddin Saleh	Research Assistant	Field Section

#### Top Student Award for 1996

<u>Exam/Result</u>	<u>Student</u>
UPSR (3A)	Alvin Ong Boon Kooi - son of Mdm Yee Kiat Ng
PMR (5A)	Megala A/P Anbarasu - daughter of K. Anbarasu
SPM (3A)	Prabakaran Devadas A/L Krishnan - son of K. Krishnan

#### Best Attendance Award for 1997

<u>Section</u>	<u>Name</u>
Main office	Alatipah Husin
	Nora Mohd. Anuar
	Norani Mohamed Said
	See Choon Mooi
	Umi Kalsom Sabran
Field Staff/ Worker	Vanaja Mani
	Anbarasu Karuppan
	Isnine B. Norhasan
	Mazlan Mamat
Chemistry Lab.	Samsuddin Saleh
	Saruddin B. Selamat
	Lim Lee Hua
	Rukumany Devi

### Best Attendance Award for 1997

<u>Section</u>	<u>Name</u>	<u>Section</u>	<u>Name</u>
TC Lab.	Rosita Mohd. Akhir Jariah kasmat Noraimi Minka Lolaina Tinie Olivia Robert Mariammah Muathu	Balau Sub-station	V. Subramaniam B. Sante
Coalfields Sub-station	V. Sendrasegaran Manimegalai D/O Munusamy Zohli Muzibur	Paloh Sub-station	K. Kumar
		Lepan Kabu Sub-station	Dzulkefle Ismail

Chen, K.C.

### Dedication Award

#### **Ms. Tan Ching Mooi**

Many of us who work within the main office have often heard the excited voice of Ching Mooi at the telephone. This is the dedication of **Tan Ching Mooi** to her job at work.

For the past year or two, we have expanded our seed-production and sales several fold mainly for export to East Malaysia and Indonesia. Seed exports to these places require skillful coordination of a number of procedures and schedules e.g. production and supply schedule, flight and documentation schedules e.g. custom form, phytosanitary certificates; etc. all to be done within a brief period in order that the export proceeds without a hitch. Hence she's constantly reminding the clients, the forwarders, the quarantine officers and the Research Officers to get our documentation and schedules on time.

Despite her busy workload in the seed sales area, she still gave excellent clerical support to the Research officers. She's a person who will give her full dedication to the task when entrusted with a particular job.

This award shows our appreciation for her dedication.

#### **Encik Mohd Apandi Husin**

Over the last two years or so, there have been two important changes in our Research Assistants and Research Recorders, viz.:

1. The present Research Assistants also excute the work themselves just like the Research Recorders, and they are no more the "clean" supervisors as previously, and
2. The present Research Assistants and Research Recorders continue their work after lunch break, and there is no more "in the office after lunch".

These changes have enabled AAR to complete the advisory and agronomy work programmes with only minimal delays, if any, and reduced the number of sampling teams despite shortage in manpower.

To a large extent, these changes can be attributed to one particular person, who, over the last three years or so, unselfishly spent his evenings and weekends persuading his colleagues to change positively toward their work.

For his efforts, **Encik Mohd Apandi Husin** deserves the AAR Dedication Award for 1997.

Soh, A.C.

### Excellent Performance Award

#### **GIS/GPS Team**

The GIS/GPS team is critical towards AAR's concerted effort to promote and use GIS/GPS technology in plantations. Less than three years ago, we started from scratch to develop useful GIS/GPS applications for our industry. Today, we have made significant progress in applying these technologies to most of our plantations and are commonly acknowledged as the most advanced in this field for plantation tree crops in Malaysia. The GIS/GPS team has certainly helped to enhance AAR's image and status in Malaysia. This excellent team comprises:

Mr. Anbarasu Karuppanan  
Miss Lynda Anne Lourdenathan  
Encik Mohd Nordin Husin  
Cik Nora Md Anuar  
Puan Norani Mohamed Said  
Encik Samsuddin Saleh  
Encik Saruddin Selamat  
Cik Umi Kalsum Sabran



**The GIS/GPS Team**

## Sabah Agronomy Team

The Sabah agronomy team comprises:

Mr. Bacho @ Kachong Ambo Sappe  
Mr. Minin Tuboh  
Mr. Muhamad Abdullah  
Mr. Wan Nazlee Rhanlli

Their ability to work as a team and dedication to their job is well known in Sabah, and particularly demonstrated in the recent "Soil Familiarisation Tour" organised by the Malaysian Society of Soil Science. They have maintained their efficiency in managing our important field experiments in Sabah despite the mounting workload. Those who have visited AAR trials including outside researchers have praised them for the high standard achieved.

Goh, K.J.

## Impacts of the current currency fluctuations on oil palm estates

By Ooi Ling Hoak

(Paper presented at the BEA Mechanisation Workshop at Sandakan on 19th November, 1997)

### 1) Introduction

The current currency turmoil has caused the Malaysian ringgit to depreciate against the US dollar by a hefty margin, from about RM2.50 to a US dollar before the crisis to as low as RM3.50 to a US dollar at one stage.

The sharp depreciation of the ringgit has dealt a severe blow to the Malaysian economy. In fact the resultant general credit squeeze and the economic slow down have adversely affected almost everyone. However, the plantation sector stands to gain from the current currency crisis mainly because prices of the palm products are denominated in US dollars.

### 2) Impacts of increase in the price of inputs on oil palm estates

The depreciation of the ringgit has resulted in the prices of most of the inputs such as fertilizers, herbicides, pesticides and machinery to go up. At the same time, prices of palm products have also moved up.

This paper attempts to examine the impacts of the currency fluctuations on the prices of fertilizers and other major agricultural inputs and fresh fruit bunches (ffb) and the resultant profitability in our oil palm estates.

#### 2.1) Fertilizer price

The currency turmoil and the sharp depreciation of Malaysian ringgit have caused the prices of most fertilizer to increase.

The Malaysian ringgit has depreciated by about 30% since the last fertilizer tender in May '97 when the ringgit was traded at about RM2.50 to a US dollar.

The recent fertilizer tender called in November '97 for Sabah and Sarawak estates indicated that changes in the fertilizer prices, although did not strictly follow that of the currency fluctuations, were nevertheless on the upward trend for all the fertilizer except ammonium chloride and ammonium sulphate.

The deviations were mainly due to changes in the prices of fertilizer in the international market.

Price changes between the May 1997 and November 1997 from best prices quoted for estates S and HL are compared in Table 1. Where prices were not available for comparison for the two estates, prices for some other estates were compared instead. A summary of the major changes is highlighted below:

Prices for the nitrogenous fertilizers were mixed. AC (crystalline ammonium chloride) declined marginally by between RM3 t<sup>-1</sup> (0.9%) to RM12 t<sup>-1</sup> (3.7%), AS (ammonium sulphate) also declined by RM7 t<sup>-1</sup> (1.9%). But prices of AN (ammonium nitrate) have increased by RM29 t<sup>-1</sup> (6.2%) to RM33 t<sup>-1</sup> (7.0%).

Prices of CIRP (Christmas Island Rock Phosphate) have increased by RM50 t<sup>-1</sup> (20.8%) to RM55 t<sup>-1</sup> (22.6%). GRP (Gafsa Rock Phosphate) price has increased by RM60 t<sup>-1</sup> (21.6%) and JRP (Jordanian Rock Phosphate) was higher by RM55 t<sup>-1</sup> (20.9%) to RM60 t<sup>-1</sup> (21.7%).

Prices of MOP (muriate of potash) have rocketed upward by 56.4% to 57.8% (RM195 t<sup>-1</sup> to RM196 t<sup>-1</sup>).

Prices of CCM, ASF and BM compound 65 have increased by about 3.1% to 8.4% (RM23 t<sup>-1</sup> to RM57 t<sup>-1</sup>).

Prices of AA1 mixture have increased by between RM75 t<sup>-1</sup> (20.2%) to RM89 t<sup>-1</sup> (22.1%). AA2 mixture was up by 14.9% (RM55 t<sup>-1</sup>).

The price of HGFB 48 for Estate R was up by RM290 t<sup>-1</sup> (21%).

**Table 1 : Fertilizer Price Changes**

	Prices RM t <sup>-1</sup>				Difference in price between May'97 and Nov'97			
	May'97		Nov'97		Estate S		Estate HL	
	Estate S	Estate HL	Estate S	Estate HL	RM t <sup>-1</sup>	%	RM t <sup>-1</sup>	%
1) Amm. Chloride	326	324	323	312	-3	-0.9	-12	-3.7
2) Amm. Sulphate	368(HY)	367(TT)	361(HY)	360(TT)	-7	-1.9	-7	-1.9
3) Amm. Nitrate	473	468	506	497	33	7	29	6.2
4) R.Phosphate(CIRP)	243	240(TT)	298	290(TT)	55	22.6	50	20.8
R.Phosphate(GRP)	278	278(TT)	338	338(TT)	60	21.6	60	21.6
R.Phosphate(JRP)	263	277(TT)	318	337(TT)	55	20.9	60	21.7
5) Muriate of Potash	346	339	541	535	195	56.4	196	57.8
6) Kieserite(China)	369(TT)		370(ST)			1	0.3	
Kieserite(German)								
7) CCM 65 (ICI)	747(HY)		770(HY)		23	3.1		
CCM 65 (BM)	780(HY)		831(HY)		51	6.5		
CCM 65 (ASF)	678(HY)		735(HY)		57	8.4		
8) AA1 Mixture	371(HY)	402(LB)	446(HY)	491(LB)	75	20.2	89	22.1
9) AA2 Mixture	369		424		55	14.9		
10) HGFB 48	1380(R)		1670(R)	1670	290	21		

Note :

S, HL, HY, TT, ST, LB and R are acronyms for estates.

## 2.2 Cost of manuring

The impact of the changes in fertilizer prices on the cost of manuring will depend on the types of fertilizer used, rates applied and of course the quantum of the price changes. Some likely scenarios are illustrated in Table 2.

**Table 2 : Increase in manuring cost due to increase in fertilizer prices**

Fertilizer rate	kg/ha	Increase in manuring cost (RM ha <sup>-1</sup> )						
		May 1997 price (RM t <sup>-1</sup> )	% increase in fertilizer price					
			+10%	+20%	+30%	+40%	+50%	+60%
3 kg AC x 135 p ha <sup>-1</sup>	405	325	13	26	39	53	66	79
4 kg AC x 135 p ha <sup>-1</sup>	540	325	18	35	53	70	88	105
5 kg AC x 135 p ha <sup>-1</sup>	675	325	22	44	66	88	110	132
2 kg AN x 135 p ha <sup>-1</sup>	270	459	12	25	37	50	62	74
3 kg AN x 135 p ha <sup>-1</sup>	405	459	19	37	56	74	93	112
4 kg AN x 135 p ha <sup>-1</sup>	540	459	25	50	74	99	124	149
4 kg AS x 135 p ha <sup>-1</sup>	540	368	20	40	60	79	99	119
5 kg AS x 135 p ha <sup>-1</sup>	675	368	25	50	75	99	124	149
6 kg AS x 135 p ha <sup>-1</sup>	810	368	30	60	89	119	149	179
2 kg x GRP x 135 p ha <sup>-1</sup>	270	276	7	15	22	30	37	45
3 kg x GRP x 135 p ha <sup>-1</sup>	405	276	11	22	34	45	56	67
2 kg x JRP x 135 p ha <sup>-1</sup>	270	275	7	15	22	30	37	45
3 kg x JRP x 135 p ha <sup>-1</sup>	405	275	11	22	33	45	56	67
3 kg x MOP x 135 p ha <sup>-1</sup>	405	344	14	28	42	56	70	84
4 kg x MOP x 135 p ha <sup>-1</sup>	540	344	19	37	56	74	93	111
6 kg x AA1 x 135 p ha <sup>-1</sup>	810	371	30	60	90	120	150	180
7 kg x AA1 x 135 p ha <sup>-1</sup>	945	371	35	70	105	140	175	210
8 kg x AA1 x 135 p ha <sup>-1</sup>	1080	371	40	80	120	160	200	240

A typical case for the mature palms with annual application of 4 kg AC + 2 kg GRP + 4 kg MOP would experience an increase in the cost of manuring of about RM126 ha<sup>-1</sup>, assuming no change in AC cost and increase in GRP (20% increase in price) and MOP (60% increase in price) cost of RM15 ha<sup>-1</sup> and RM111 ha<sup>-1</sup> respectively (Table 2).

### 2.3 Effects of increase in fertilizer cost on the production cost of ffb

The production cost of ffb may be simply defined by the following equation :

$$\text{Production Cost} = \frac{\text{GC} + \text{Upkeep} + \text{Collection} + \text{Transport}}{\text{Yield}}$$

Note : GC = General charges

It is obvious from the production cost equation that apart from the cost of inputs, the yield levels achieved have an important bearing on the cost of ffb production.

The 1996/97 ffb production cost for Estate A has been chosen to illustrate the above.

The actual production cost for the estate in 1996/97 is summarised in Table 3 below.

**Table 3 : Cost of ffb production for Estate A in 1996/97 (ffb yield = 22.07 t ha<sup>-1</sup>)**

Cost item	1996/97 ffb production cost	
	RM t <sup>-1</sup>	RM ha <sup>-1</sup>
G.C. (fixed cost)	23.43	517
Upkeep (fixed cost)	47.30	1044
Collection (variable cost)	17.32	
Internal transport (variable cost)	6.44	
Total	94.54	

The effects of increase in manuring costs and yields on the production cost of ffb is illustrated in Table 4 below :

**Table 4 : Effects of increase in manuring costs and yields on the production cost of ffb - Estate A 1996/97**

Increase in fertilizer cost Ffb yield (t ha <sup>-1</sup> )	ffb production cost (RM t <sup>-1</sup> )			
	+RM Nil ha <sup>-1</sup>	+RM100 ha <sup>-1</sup>	+RM150 ha <sup>-1</sup>	+RM200 ha <sup>-1</sup>
20	102	107	109	119
22	95	99	102	104
25	86	90	92	94
30	76	79	81	83

Table 4 shows that if the cost of manuring goes up by RM100 ha<sup>-1</sup> and the yield remained at 22 t ha<sup>-1</sup>, ffb production cost will increase from RM95 t<sup>-1</sup> to RM99 t<sup>-1</sup>. However, if an attempt is made to reduce the fertilizer inputs, so as to maintain the cost of manuring, but results in a yield decline, say from 22 t ha<sup>-1</sup> to 20 t ha<sup>-1</sup>, the cost of ffb produc-

tion will increase from RM95 t<sup>-1</sup> to RM102 t<sup>-1</sup>.

Hence it is not advisable to withdraw fertilizer if such withdrawals will result in a decline in yield.

On the other hand, it is even worthwhile to increase manuring if yields could be improved. For example if by increasing the fertilizer rates (say by RM150 ha<sup>-1</sup>), ffb yield is improved to 25 t ha<sup>-1</sup>, production cost will in fact decline from RM95 t<sup>-1</sup> to RM92 t<sup>-1</sup>.

Judicial and temporary withdrawal of fertilizer, particularly in areas with a long history of P and K manuring accompanied by high build up in soil nutrient status may, however, be considered if such withdrawals will not affect the ffb yields adversely.

At the current "sky high" price of MOP, any attempts to utilize EFB (empty fruit bunches) fully to replace MOP would be extremely rewarding.

Also, correct application of fertilizer in terms of dosage, placement and timing should be stressed to obtain the maximum benefits.

### 2.4 Effects of increase in the prices of other agricultural inputs

The impacts of the price increase of other agricultural inputs such as herbicides, insecticides, equipment and machinery on the production cost of ffb may be similarly assessed as for fertilizer using the same "production cost equation" mentioned earlier under section 2.3.

The decision to reduce or withdraw any inputs should always be guided by the principle that it should not be detrimental to yields and hence profits.

### 3) Impacts of increase in the price of ffb on profitability

The effects of increase in ffb price on profits may be defined by the following equations :

1) **Profits = Revenues - Costs**

2) **Revenues = Price x Yield**

3) **Cost = Fixed costs + Variable costs  
Yield**

It is obvious that any increase in the price of ffb will result in higher profits. Apart from the price of ffb, yield and production cost also

influence the profits. The level of yields achieved is particularly important as it has a direct bearing on both the revenues and production cost.

It is a well known fact that as yield goes up, production cost comes down. Hence any forced savings that lead to yield declines should be avoided as far as possible.

The price of ffb has risen by more than 30% as a result of the currency turmoil and uncertainty over the world supply of edible oil particularly palm oil, caused partly by the 'El Nino' effects.

It is therefore advisable to go for higher yields even if extra inputs are needed.

#### 4) What shall we do ?

Assuming that the current currency turmoil has resulted in the "fixed cost" of production to go up by RM200 ha<sup>-1</sup> (a fairly generous assumption). At the same time, price of ffb increased by RM50 t<sup>-1</sup> (actual increase was much higher), the resultant marginal increase in revenues, production costs and profits for different yield levels may be summarised in Table 5 below:

**Table 5 : Impacts of ffb price and cost of inputs on profits**

ffb yield (t ha <sup>-1</sup> )	Marginal increase in revenues(RM ha <sup>-1</sup> ) assuming ffb price increased by RM50 t <sup>-1</sup>	Marginal increase in production cost assuming fixed cost increased by RM200 ha <sup>-1</sup>		Marginal increase in profits (RM ha <sup>-1</sup> )
		RM t <sup>-1</sup>	RM ha <sup>-1</sup>	
(1)	(2)	(3)	(4)	(5)
20	1000	10	200	800
22	1100	9	198	902
25	1250	8	200	1050
30	1500	7	210	1290

**Formulae :** (2) = (1) x RM50t<sup>-1</sup>      (3) = RM200 ha<sup>-1</sup>/(1)      (4) = (3) x (1)      (5) = (2) - (4)

The above example shows that the benefits arising from the increase in the price of ffb outstripped the increase in the cost of inputs by a big margin. This is particularly so at high yield levels. Hence, it pays to maintain or even increase inputs if this leads to improved yields. The emphasis should therefore be to achieve high yields.

#### 5) Conclusions

The current currency turmoil has resulted in the prices of many agricultural inputs to go up. This calls for prudent steps to be taken to control production costs and to optimise the use of inputs to get the maximum benefits. However, reduction in inputs that leads to yield decline should be avoided. This is especially so when the prices of palm products are high. The emphasis should be to achieve high yields even if it means increasing the use of essential inputs.

**THE EFFECT OF LIGHT, FERTILISER AND PLANTING DENSITY ON THE GROWTH AND FLOWERING OF ASYSTASIA GANGETICA SUBSP. MICRANTHA**

By Quah Yin Thye

Abstract of thesis submitted to the Senate of Universiti Pertanian Malaysia in fulfilment of the requirements for the degree of Master of Science. (1997)



*Asystasia gangetica*  
subsp. *micrantha*

*Asystasia gangetica* subsp. *micrantha*, commonly known as Asystasia, is a prolific weed that has recently become problematic to the plantation industry in Malaysia. The weed's success in invading plantations over a wide geographical range is attributed to its fast establishment, rapid growth rate and early flowering.

The pot trial study of *Asystasia* showed the weed's life-cycle consists of four growth phases, each of about 45-days' duration: namely phase 1 - juvenile, phase 2 - initial flowering, phase 3 - intense flowering and phase 4 - senescent.

Phase 1 was characterised by rapid vegetative growth with the first flower blooming by Day 42. The total dry weight for high-density plants under full sunlight and high soil nutrients was 34 g pot<sup>-1</sup>. The dry matter partitioning of leaves:stems:roots was 40:28:32 and the leaf area index was 5.37. The weed's fast growth from seed germination is one of its outstanding characteristics and has made it highly successful in colonising exposed sites brought about by land cultivation or chemical spraying.

The second growth phase from Day 45 to 90 consisted of both vegetative and flowering. The total biomass has increased to 95 g pot<sup>-1</sup> and dry matter partitioning of leaves:stems:roots has changed to 30:37:32. Emphasis of dry matter allocation has shifted from leaves to stems as the plant grew. This stage of growth could also be considered the "building phase" as the weed accumulated biomass and leaves for the next stage of high reproduction. Leaf

index has more than doubled to 12.8. Inter-plant competition has affected flowering: low-density plants have higher capsule potential of 302 capsules/pot compared to only 34 capsules/pot for high density under open conditions with high fertiliser rates.

Phase 3 growth of *Asystasia* was primarily the flowering and reproduction stage and these might be considered the "climax" growth. The total dry matter of 232 g pot<sup>-1</sup> has more than doubled the previous phase but the capsule potential has increased many folds. Flowering was intense. Under open conditions, capsule potential ranged from 325 to 1078 capsules/pot while under shade conditions, the potential was 285 to 820 capsules/pot. These dispersed seeds would become part of the soil seed bank and ready to germinate at the next growth opportunity and

perpetuate future generations of *Asystasia*. Dry matter partitioning of leaves:stems:roots was 22:36:42 was confounded by capsule production. Leaf index has increased to 19.8.

The last phase is senescent growth. Most of the ripe capsules have dispersed their seeds and most plants were chlorotic and suffering from considerable die-backs.

The noxious status of this weed is attributed mainly to its ability to absorb high amount of soil nutrients. At its "climax" growth by Day 135, the *Asystasia* biomass of 232 g pot<sup>-1</sup> consisted of 5.4 g N, 0.4 g P, 4.1 g K and 0.6 Mg excluding the biomass produced as capsules. Thus, cultivated crops that are heavily infested with *Asystasia* will face severe competition for soil nutrients.

## SOCIAL AND PERSONAL

### *Congratulations to :*

**Mr. Heng Yong Choon** our analyst programmer who tied the knot on the 15th Nov 1997. His lovely bride, **Miss Lim Soo Hoon, Doreen**, is his hometown sweetheart whom he has known since secondary school days. Let us all wish them a blissful marriage.

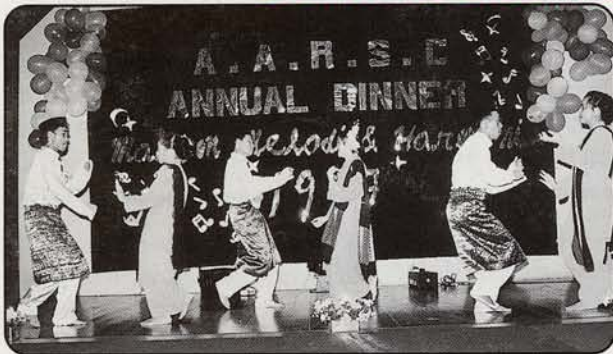
#### **Staff recruitment**

Name	Date joined	Designation
Jansari B. Jamaluddin	1/1/98	RA III Chen, K.C.



**Heng Yong Choon and his lovely wife,  
Lim Soo Hoon**

### ENCHANTING ENTERTAINMENT BY AAR PERSONNEL



**Joget Asli AAR**



**Dikir Barat AAR**



**Our homesick  
Jamaluddin from  
Bangladesh**

**Our PRO (Principal  
Research Officer)  
Chan Weng Hoong  
in action**

