

# NEWSLETTER

## Malaysian Society of Plant Physiology

(Inaugurated on 29 April 1989. Reg. No. 889 Wilayah Persekutuan)

Locked Bag No. 282, UPM Post Office, 43409 UPM, Serdang, Selangor D. E.

Website : <http://www.mspp.org.my>

JULY 2007

### CONTENTS

News	2
Notes from Member	4
Announcement	8

Editor : Dr. Tsan Fui Ying  
Co-editor : Mr. Ahmad Nazarudin  
Mohd. Roseli

### PATRON

Y. Bhg. Dato' Hj. Embi Yusoff

### EXCO 2005/2007

#### PRESIDENT

A.P. Dr. Siti Hajar Ahmad  
Crop Science Department  
Faculty of Agriculture, UPM  
[hajar@agri.upm.edu.my](mailto:hajar@agri.upm.edu.my)

#### IMMEDIATE PAST PRESIDENT

A.P. Dr. Hawa ZE Jaafar  
Crop Science Department  
Faculty of Agriculture, UPM  
[hawazej@agri.upm.edu.my](mailto:hawazej@agri.upm.edu.my)

#### VICE PRESIDENT

Dr. Elizabeth Philip  
Ecotourism and  
Urban Forestry Program, FRIM  
[philip@frim.gov.my](mailto:philip@frim.gov.my)

#### SECRETARY

Dr. Hamid Sulaiman  
Crop Science Department  
Faculty of Agriculture, UPM  
[hamid@agri.upm.edu.my](mailto:hamid@agri.upm.edu.my)

#### ASSISTANT SECRETARY

Dr. Phebe Ding  
Crop Science Department  
Faculty of Agriculture, UPM  
[phebe@agri.upm.edu.my](mailto:phebe@agri.upm.edu.my)

#### TREASURER

Dr. Umi Kalsom Md. Shah  
Strategic Resource Research Centre,  
MARDI  
[umishah@mardi.my](mailto:umishah@mardi.my)

#### COMMITTEE MEMBERS

Dr. Roothaida Othman (UKM)  
Dr. Tsan Fui Ying (UiTM)  
Mr. Ahmad Nazarudin Mohd.  
Roseli (FRIM)  
Ms. Puteri Edaroyati Megat  
Wahab (UPM)

## MSPPC2007

by

Phebe Ding

Malaysian Society of Plant Physiology (MSPP) together with Universiti Putra Malaysia (UPM) and Universiti Malaysia Sabah (UMS) and supported by Ministry of Science, Technology and Innovative (MOSTI) will hold its 18<sup>th</sup> Malaysian Society of Plant Physiology Conference (MSPPC) on 21<sup>st</sup> – 22<sup>nd</sup> August 2007 at Le Meridien Hotel, Kota Kinabalu, Sabah. The theme of the conference is “Yield and Quality Enhancement of Plant”. It will be officiated by Minister of Agriculture and Food Industry Sabah, Yang Bahagia Datuk Hj. Abdul Rahim Ismail. About 110 participants are expected to attend this gathering. The papers presented in this conference will be compiled and published in MSPP Transaction Volume 15. Selected papers will be published in Journal of Tropical Plant Physiology (JTTP), the official journal of MSPP.

A keynote address with the title of “Sabah: Gearing Towards Being the Centre for Food Crop Production of Malaysia” will be addressed by Minister of Agriculture and Food Industry Sabah. Another keynote address will be delivered by Prof. Datuk Dr. Mohd. Noh Dalimin, Vice Chancellor of UMS. The title of this keynote paper is “Opportunities and Challenges of Sustainable Yield in the Changing World”. Three plenary papers will also be given by three well-known researchers with the topics related to enhancing plant yield and quality. The plenary papers are “Equations to estimate the interception of direct and diffuse light by discontinuous canopies” to be given by Dr. Christopher Teh Boon Sung from UPM, “Carbon dioxide enrichment technology for growth and quality enhancement of tropical plant: Prospects and challenges” to be delivered by Assoc. Prof. Dr. Hawa ZE Jaafar from UPM also and “MPOB Fast Transfer Technique (MoFaTT) for maintenance and maturation of oil palm culture aggregates” which will be addressed by Dr. Ahmad Tarmizi from Malaysian Palm Oil Board (MPOB).

Two sessions with 20 interesting papers will be conducted during the 2-day conference. The first session is Plant Production Technology while second session is Plant Propagation Technique. Some 60 posters will also be presented during the conference and will be judged for the best poster awards.

In conjunction with the 18<sup>th</sup> MSPPC, MSPP 19<sup>th</sup> Annual General Meeting will be held from 1525 to 1630. Election of new executive committee members for the 19-20<sup>th</sup> term will be held too. A post-conference tour will be held on 23<sup>rd</sup> August 2007. The destination will be Mt. Kinabalu National Park and Hot-Spring Poring.



↑ Meeting in progress

*MSPP is a professional scientific body dedicated towards promoting research and development in tropical plant biology*

## NEWS

# CONGRATULATIONS .....

Dr. Umi Kalsom Md. Shah won the silver medal in the MARDI Science and Technology Exhibition 2006 for her project on "Ligninolytic Enzymes from *Pycnoporus cinnabarinus* for industrial effluents". The same project was also awarded bronze medal in Malaysian Technology Exhibition 2007 organized by MARS at Putra World Trade Centre, Kuala Lumpur

## NATURAL ENZYMES FROM WOOD FUNGI FOR TEXTILE INDUSTRIAL WASTE TREATMENT

by

**Umi Kalsom Md. Shah**

### BACKGROUND

Microbial enzymes for the treatment of textile industrial effluent are more economical and environmental friendly than chemicals. Malaysia exported textiles valued at RM8.48 billion to markets of the USA, Singapore, UK, Hong Kong, Cambodia, Indonesia, India and Vietnam. Synthetic dyes extensively used in textile industries are very recalcitrant against biodegradative processes. The effluents generated from these industries create major environmental pollution problems. Fungus identified as *Pycnoporus cinnabarinus* was isolated from local hard wood. This fungus was able to completely decolorized azo dyes namely congo red, orange II, orange G and Ponceau 2R (Figure 1). Under low nitrogen medium, this fungus produces laccases and lignin peroxidase that decolorize azo dyes forming phenolic compounds, thereby avoiding the formation of toxic aromatic amines. High yield of laccases and lignin peroxidase were obtained in liquid or solid fermentation using agro-waste particularly wood dust or rice straw as carbon source at ambient temperature.

### NOVELTY OF TECHNOLOGY

- Highly ligninolytic fungus was isolated from local hard wood
- Agro-wastes can be used as substrate for the enzymes production
- The enzymes are tolerant to a wide range of temperature and pH

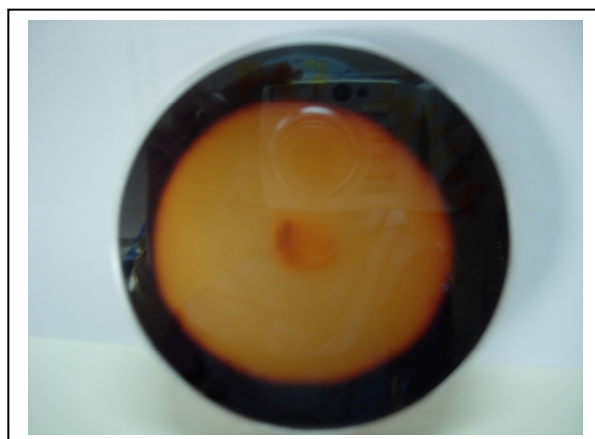


Figure 1. Decolorization of azo dyes

more on next page

from previous page

## COMMERCIAL POTENTIAL

- Market size: RM 7.5 billion
- Currently laccases and lignin peroxidase enzymes are not produced locally
- Production of these enzymes locally will reduce the amount of importation of enzymes
- Agro-wastes are available in large amount and this will be of immediate potential source for the enzymes production.

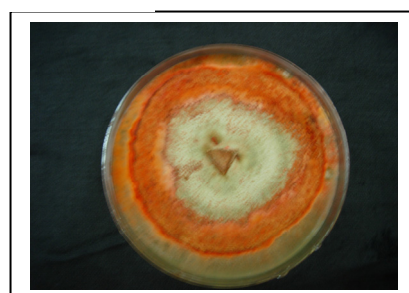
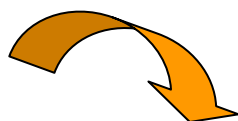
## USEFULNESS OF APPLICATION

- Bioremediation of textile industrial effluents
- Potential to be used in the production of sustainable biobased products and bioenergy to replace depleting fossil fuels
- Biobleaching in pulp and paper industries
- Enhance the colour appearance of food or beverage

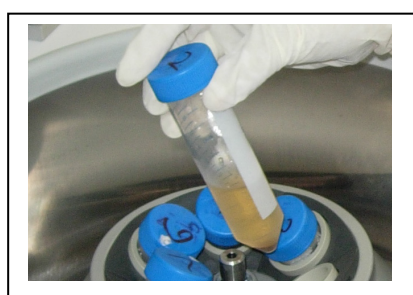
## DESCRIPTION OF TECHNOLOGY



← *P. cinnabarinus* grown on wood



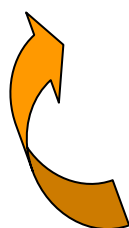
↑ Pure cultures of *P. cinnabarinus*



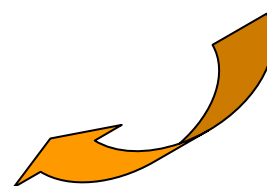
↑ Enzymes



↑ Liquid & Solid fermentation



← Extraction



# NOTES FROM MEMBER

## Time of fertilizer application for *Andrographis paniculata*

by

**Siti Aishah H., A.M. Asiah and A. Nurul Hayana**

Department of Crop Science  
Universiti Putra Malaysia, 43400 Serdang, Selangor

### Introduction

For herbs such as *Andrographis paniculata* (hempedu bumi) where leaf is the major plant part used for medicinal purpose, promoting vegetative growth is the priority. Attempts to improve foliar production through proper management of plant input such as fertilizer should become the main concern for commercial production. Biomass production of plants grown in nonlimiting conditions is generally dependent upon the availability of nutrients in the growing medium. Since the uptake pattern of nutrient varies in plants during progressive stage of development (Rempel et al., 2004), studies to identify the time of the most effective fertilizer application to ensure nutrients are sufficiently provided during rapid leaf growth need to be conducted. In addition, efficient usage of fertilizer will reduce cost of production and environmental pollution.

### How often does fertilizer need to be applied?

A study was conducted to identify the time of fertilization which can effectively provide continuous supply of nutrient for growth and dry mass production of hempedu bumi.

After 4 weeks in nursery, seedlings were transplanted in polybags filled with mixture of topsoil, peat and sand (3:2:1 v/v). A compound fertilizer, 15:15:15 (%N: %P<sub>2</sub>O<sub>5</sub>:%K<sub>2</sub>O), based on rate of 200kg ha<sup>-1</sup> N, was applied according to different timings of fertilization. Timings for fertilizer

application were: 100% at transplanting (only one application), 2 split applications (50% at transplanting and 50% at 3 week-after transplanting) and 3 split applications (30% at transplanting, 30% at 3 week- and 40% at 6 week-after transplanting). Plants were placed under rain shelter and watered manually as needed. Growth data were taken at 0, 3, 6 and 9 week-after transplanting.

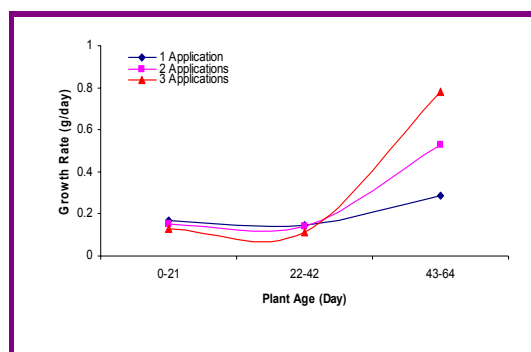


Figure1 Plant growth rate according to fertilizer

Time of fertilization significantly affected hempedu bumi plant growth rate. With single application, higher biomass accumulation occurred at earlier growth stages, at rate of 0.17gday<sup>-1</sup>, 32% more than 3 split applications (Figure 1). For two split applications, the rate (0.15gday<sup>-1</sup>) was 26% higher than that of 3 split applications. However as growth progressed (week 6 to 9), biomass accumulation rate for single application treatment was lower, 62% and 45% less than that of 3 and 2 split applications, respectively.

more on next page

Time of fertilization significantly affected hempedu bumi plant growth rate. With single application, higher biomass accumulation occurred at earlier growth stages, at rate of 0.17gday<sup>-1</sup>, 32% more than 3 split applications (Figure 1). For two split applications, the rate (0.15gday<sup>-1</sup>) was 26% higher than that of 3 split applications. However as growth progressed (week 6 to 9), biomass accumulation rate for single application treatment was lower, 62% and 45% less than that of 3 and 2 split applications, respectively.

Split applications of fertilizer were able to stimulate vegetative growth, leading to higher number of branches produced, total leaf area and total biomass at harvest (Table 1). At week 9, plants had an average of 5 more branches (34%) with 3 split applications of fertilizer. The total biomass of plants resulted from 3 and 2 split fertilizer applications was 81% and 37% higher respectively, as compared to that of single application as mentioned (Figures 2 & 3). Their leaves were also greener and contained higher amount of chlorophyll (Table 1).

Table 1. Vegetative growth and chlorophyll content at week 9 in relation to time of fertilization

Fertilization frequency	No. of branches	Total leaf area (cm <sup>2</sup> )	Relative chlorophyll content (SPAD)
1 x	13.67 <sup>b</sup>	981.4 <sup>c</sup>	45.02 <sup>c</sup>
2 x	16.33 <sup>a</sup>	1676.1 <sup>b</sup>	46.75 <sup>b</sup>
3 x	18.33 <sup>a</sup>	2172.6 <sup>a</sup>	49.92 <sup>a</sup>

Means separation within column by LSD at 5% level

Although split fertilization contributed higher cost of production, the advantages associated with effectiveness on growth and total biomass production as well as to the environment must be considered. The growth responses obtained by split fertilizer application were significantly better than single application. Single fertilizer application was unable to sustain higher growth rate later as nutrient availability probably became insufficient after being absorbed by plants and, at the same time, subjected to loss due to leaching (Salisbury and Ross, 1992). This suggested that 3 split fertilizer applications could satisfy nutrient demand for optimum growth and production of hempedu bumi.

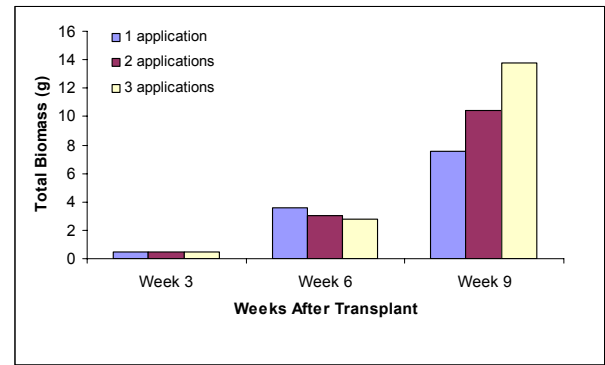


Figure 2 Total biomass in relation to fertilization timing



Figure 3. Plant height at week 9 (from left : single, 2 split and 3 split applications of fertilizer)

## References

- Barlog, P. and W. Grzebisz (2003). Effect of timing and nitrogen fertilizer application on winter oilseed rape (*Brassica napus* L) 1: Growth dynamics and seed yield. *J. Agronomy and Crop Science* 190:305-313
- Rempel, H.G., B.C. Strik and T.L. Righetti (2004). Uptake, partitioning and storage of fertilizer nitrogen in red raspberry as affected by rate and timing of application. *J. Amer. Soc. Hort. Sci* 129:439-448
- Salisbury, F.B. and C.W. Ross, (1992). *Plant Physiology* (4<sup>th</sup> Edition). Wadsworth Publishing Company, Belmont California. Pp 191-499

*It is difficult to say what is impossible, for the dream of yesterday is the hope of today and the reality of tomorrow.* - Robert H. Goddard

*The future belongs to those who believe in the beauty of their dreams.* - Eleanor Roosevelt

*They are able because they think they are able.* - Virgil

## NOTES FROM MEMBER

# A NEW APPROACH IN MAINTAINING THE URBAN LANDSCAPES

by

**Ahmad Nazarudin, M.R.**

*Forest Research Institute Malaysia (FRIM), Kepong, 52109 Selangor Darul Ehsan*

*E-mail: [nazarudin@frim.gov.my](mailto:nazarudin@frim.gov.my)*

### INTRODUCTION

The Malaysian landscape industry has grown dramatically over the last few years following a policy made by the government to turn the country into a garden nation by the year 2005. As a consequence, the number of plants planted was reported to be increasing yearly. In Kuala Lumpur, 674,019 plants have been planted including shade trees, palms, shrubs, annuals and ground covers in the year of 2001 (Kuala Lumpur City Hall, 2001). Out of them, 456,756 plants are shrubs that usually require high maintenance. Generally, as the quantity of plants increases, the maintenance activities in order to maintain the landscape functions become more crucial. One of the most essential maintenance activities is trimming, which needs to be performed to retain the attractiveness and purpose of planting. Trimming should be frequently scheduled especially for plants which have vigorous growth and when the plants are trained as hedges plant or topiaries. The aesthetic values of the landscapes, however, are always declining due to lack of fund and manpower. The use of new technologies needs to be tailored in managing the landscapes to overcome the shortage of manpower, time and operational budget. In temperate countries, growth inhibition in plants by the application of plant growth retardants (PGRs) has been widely used on many floricultural crops to reduce the vegetative growth and to increase their aesthetic value (Barrett and Nell, 1986). However, in Malaysia this technique may be new especially in the landscape industries.

Plant growth and development is controlled by plant hormones synthesized in the plants and they cause physiological responses (Salisbury and Ross, 1992). On the other hand, PGRs are synthetic compounds that are applied directly to targeted plants to modify their life processes or their structures for improving quality, increasing yields, or facilitating harvesting (Nickell, 1982).

PGRs of triazoles inhibit gibberellin biosynthesis; inhibiting cell division and subsequent cell enlargement, hence, resulting in reduced stem elongation. As an outcome of the application of these triazoles, the treated plants are retarded. Therefore, they have more compacted features. Frequent trimming activities for maintaining the crown forms can be reduced and the trimming rotation can then be extended. The aesthetic value of treated plants is increased and the landscape functions are retained. Ultimately, the maintenance group involved in landscape management can be available for many other maintenance aspects (Whipker and McCall, 2000). However, the dosages required may vary among plant species or cultivars. PGRs not only affect the plant morphological but are also responsible in ameliorating the physiological aspects of the plants.

### POTENTIAL USES IN MALAYSIAN LANDSCAPE INDUSTRY

In Malaysia, some studies on the growth regulation by PGRs were conducted on two

*more on next page*

popular ornamental plants, *Syzygium campanulatum* and *Ficus microcarpa*. These species are highly demanded in urban landscape due to their vigorous growth. They can also be trained as hedge plant or topiaries. *Syzygium campanulatum* is also widely planted in urban areas due to its reddish young foliage which can add color to the urban environment. The plants showed positive responses to growth inhibition following the application of paclobutrazol and uniconazole, which could then be utilized as a potential method in landscape maintenance. The topiary plants of *F. microcarpa* treated with paclobutrazol showed retarded growth. The compacted appearance of topiaries (Figure 1) were retained for up to 12 months after the application of paclobutrazol. Paclobutrazol was also found very efficient in controlling the height of hedge plant of *F. microcarpa* (Figure 2) as compared to the untreated control plants. Another experiment conducted on *S. campanulatum* found that the crown of the control plants was irregular in shape when compared to those treated with uniconazole at eight month-after the application of this PGR (Figure 3). Treated plants were also found to have a more compacted feature. The height increment in the control plants at this stage, on the other hand, required a trimming exercise to retain their landscape function.

## CONCLUSION

Paclobutrazol and uniconazole were able to inhibit the vegetative growth of *S. campanulatum* and *F. microcarpa* and hence, would allow trimming cycle to be extended. These PGRs could also be effective on other vigorous landscape species but the dosages may vary. Paclobutrazol and uniconazole would then reduce the maintenance cost due to their persistent inhibition effect on vegetative growth, giving more compacted crown. This will increase the aesthetic value of the plants and the landscape scheme can be retained. In short, the use of PGRs may offer a better landscape maintenance practice for managing vigorous plant species and landscape beautification, while reducing labour cost.



Figure 1: The compacted topiary of *F. microcarpa*



Figure 2: The difference in growth of *F. microcarpa*; paclobutrazol-treated part (centre) and untreated control part (both side)



Figure 3: Untreated control plant (left) and treated plant (right) of *S. campanulatum* at eight month-after the application of uniconazole

## REFERENCES

- Barrett, J.E. and Nell, T.A. 1986. Comparison of Paclobutrazol and Uniconazole on Floriculture Crops. *Acta Hort.* 251:275-280.
- Kuala Lumpur City Hall Annuals Report, 2001. Published by the Landscape Department, Kuala Lumpur City Hall. 131 pp.
- Nickell, L.G. 1982. Plant Growth Retardants: Agricultural uses. Springer-Verlag. Berlin Heidelberg. New York. Pp 1-3.
- Salisbury, F.B. and Ross, C. 1992. Plant Physiology. 4<sup>th</sup> Ed. Freeman and Worth. New York. 682 pp.
- Whipker, B.E. and McCall, I. 2000. Response of Potted Sunflower Cultivars to Daminozide Foliar Sprays and Paclobutrazol Drenches. *HortTechnology* 10:209-211.

# ANNOUNCEMENTS

## Malaysian Society of Plant Physiology AGM

Date : 21st August 2007

Time : 1525 - 1630

Venue : Le Meridien Hotel, Kota Kinabalu, Sabah

Check it out !!!

### Journal of Tropical Plant Physiology vol.1

#### Articles

- EST analysis in *Calamus manan* MIQ. 1  
*Nadarajah, K., Choong, C.Y., Ratnam, W., Leong, S.J., Thi, B.K., Hedley, P. and Waugh, R.*
- The effect of leaf shape on the interception of solar radiation 12  
*Teh, C.B.S., Henson, I.E., Goh, K.J. and Husni, M.H.A.*
- Abnormalities in pepper (*Capsicum annuum* L.) flowers and fruits induced by varying temperature and irradiance 27  
*Jaafar, H.Z.E.*
- Fruit water loss in relation to peel surface morphology and physical properties of *MUSA* AAA 'Berangan' and 'William Cavendish' during degreening 45  
*Ding, P., Ahmad, S.H., Abd. Razak, A.R., Mohamed, M.T.M. and Saari N.*
- Growth evaluation of planted forest species along a recreational trail 57  
*Phillip, E., Rizal, M.K.M. and Hui, T.F.*
- Growth inhibition of *Syzygium campanulatum* Korth. by the application of paclobutrazol 66  
*Ahmad Nazarudin, M.R., Mohd Fauzi, R. and Tsan F.Y.*
- Short Communication**
- Preliminary assessment of growth and leaf nitrogen of *Hopea odorata* established in two different soil conditions 73  
*Ahmad Azaruddin, M.N., Adzmi, Y., Adnan M., Mustafa Kamal, M.S., Mohd. Fauzi, R. and Anuar, A.R.*
- High yield RNA extraction from *Eucheuma denticulatum* and *Kappaphycus alvarezii* (Gigartinales, Rhodophyta) 81  
*Roohaida O., Chan, P.C., Diana, M.N. and Lawrence, S.E.K.*
- Molecular cloning and characterization of cinnamyl alcohol dehydrogenase cDNA from interspecific hybrid *Acacia mangium* x *Acacia auriculiformis* 89  
*Pang, S.L., Choong, C.Y. and Wickneswari, R.*
- Isolation of ripening-related genes of *Capsicum annuum* via a differential display technique 100  
*Zamri, Z., Roslinda, S. and Ismanizan, I.*

### Other forthcoming events :

- 17-20 August 2007  
**BI00HOR 2007 International Biotechnology Conference & Showcase**  
 Theme : Biotechnology: Business and Opportunity  
 Persada International Convention Centre, Johor  
 Website: <http://www.biojohor.com>
- 26-30 August 2007  
**International Palm Oil Congress (PIPOC 2007)**  
 Theme : Palm Oil : Empowering Change  
 Kuala Lumpur Convention Centre  
 Website: <http://www.mpob.gov.my>
- 23-27 September 2007  
**International Society of Horticultural Science**  
 Theme : Improving the Performance of Supply Chains in the Transitional Economies  
 Sofitel Plaza Hotel  
 Hanoi, Vietnam  
 Web: <http://www.muresk.curtin.edu.au>
- 1-2 November 2007  
**Applied Forest Science Research Seminar 2007**  
 Theme : Catalysing Planted Forest Development and Biodiversity Conservation  
 Wisma STA  
 Kuching, Sarawak  
 Email: [kjenang@sarawakforestry.com.my](mailto:kjenang@sarawakforestry.com.my)
- 27-29 November 2007  
**Conference on Forestry and Forest Products Research 2007**  
 Theme : Balancing Economic and Ecological Needs  
 The Legend Hotel  
 Kuala Lumpur, Malaysia  
 Email: [cffpr2007@frim.gov.my](mailto:cffpr2007@frim.gov.my)
- Natural abilities are like natural plants; they need pruning by study. - Francis Bacon*
- Ability is of little account without opportunity. - Napoleon Bonaparte*
- Ability without honor is useless. - Marcus T. Cicero*

Address all communications to :  
 The Editor, Newsletter of Malaysian Society of Plant Physiology.  
 e-mail : [tsanfuiying@salam.uitm.edu.my](mailto:tsanfuiying@salam.uitm.edu.my)