NEWSLETTER
Malaysian Society of Plant Physiology

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21st Malaysian Society of Plant Physiology Conference (MSPPC 2010)

by

Tsan F.Y.

Malaysian Society of Plant Physiology (MSPP) will be having her 21st Malaysian Society of Plant Physiology Conference (MSPPC2010) in 22-24 November this year. The conference will be co-organized by MARDI and is tentatively planned to be held in Cameron Highlands. The theme of the conference is "The Role of Plant Physiology in Climate Change Adaptation and Mitigation". This meeting is meant to serve as a follow-up of the last conference held in Port Dickson with the theme "Enhancing Plant Productivity and Ecosystem Services in a Challenging Environment". Such discussion is critical as climate extremes have been affecting plant growth and productivity recently.

The organizing committee members welcome high quality papers and posters in the areas on plant nutrition and ecophysiology, plant biochemisry, plant growth development, plant tissue culture, postharvest physiology and technology, plant diversity, precision agriculture and novel crop production systems, plant modelling and crop productivity, plant molecular physiology, robotics and mechanization and also policy in crop production and socio-economic aspects of crop production. We hope to share experience and research insights and foster further collaboration to bring excellent development or advances in the field of plant science and agriculture, which has been the prime concern in human civilization. Selected papers will be published in our official journal, Journal of Tropical Plant Physiology. You are invited to visit our website for updates on the conference……..

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

MSPP Training Course.....

Techniques and Instrumentation on
Photosynthesis and Data Handling

by

Azahar
Elite Scientific Instruments Sdn. Bhd.

This training course was held on 15-16 March 2010 at Faculty of Agriculture, Universiti Putra Malaysia (UPM). It was jointly organized by MSPP, UPM, LI-COR Inc. USA and Elite Scientific Instruments Sdn. Bhd. The training course was made successful with the eminent support and help of the enthusiastic participants from various local research institutes and universities. A total of 24 participants from UPM, University of Nottingham, Universiti Kebangsaan Malaysia, Malaysian Agricultural Research and Development Institute (MARDI) and Malaysian Palm Oil Board (MPOB) enrolled in the training course.

↑ Participants of training course …….

Brent Claassen, the International Sales Manager of LICOR Inc., USA portrayed contribution of LICOR in advanced scientific era of plant science. It was followed by Dr. Richard Garcia, the Senior Application Scientist of LICOR Inc., who confronted and gave a detailed report of the utility and application of LI 6400 XT portable photosynthesis system.

Demonstration on conducting measurements with LI 6400 XT was held during the training course. Then, the participants were given the chance to have hands-on experience on the use of this instrument. On the second day of the training course, Dr. Garcia delivered lecture on data handling procedure of LI-6400 XT. It was a two way communication – questions raised by the participants and précised answers rendered by Dr. Garcia.

In addition, Dr. Garcia also emphasized on some of the significant features about other products such as LI 8100 (CO_2 Flux Measurement), LI 3000C (Portable Area Meter), LI 7700 (Methane Analyzer) etc..

↓ Demonstration and hands-on …… ↓






MSPP Training Course .....

Sap Flow Measurement and Water Relation Measurement System

by:

Wong See Wah
Labquip (M) Sdn. Bhd.

In collaboration with MSPP, Labquip (M) Sdn. Bhd. and Dynamax Inc. USA have conducted a workshop on 13-14 May 2010 for researchers who are interested in sap flow measurements in plants. The workshop was held in Faculty of Agriculture, UPM. A total of 10 persons from UPM, MARDI and MPOB attended this workshop.

↑ Participants of Workshop on Sap Flow Measurement and Water Relation Measurement System

Mr. Michael Van Bavel, President of Dynamax Inc. from USA, delivered lectures and demonstrated sap flow measurement technology. He explained the application of sap flow sensing and issues relating to water conductance in stems and roots of the plants in plant science research.

Mr. Van Bavel also demonstrated measurement of sap flow using other instruments which are destructive methods. Some participants already had some experience on water relation measurement in plants for irrigation control. Some others also had some experience in measurement of water conductance in stems and roots. They actually possess some equipment for the mentioned purposes but they would like to have more detailed training and understanding on the data obtained from the equipments. Mr. Van Bavel also discussed the plant species specific equipment for presenting water relation and sap flow in plants.


↑ Measurement of water conductance…….

Mr. Van Bavel also touched on the use of the results from the sap flow measurements in reducing environmental pollution. The technology is also useful in remediation of effluent by using plants (phytoremediation technology).

NOTES FROM MEMBER 1

Government's Pledge to Reduce 40% Carbon Intensity by 2020:

What does it mean?

by:

Abdul Rahim Nik

Human activities release into the atmosphere huge amounts of six different types of gases collectively known as the greenhouse gases. These gases trap heat and raise the temperatures of the air, the ocean and the surface of the Earth. Increase in the greenhouse gas (or GHG) emission in the atmosphere enhances the greenhouse effect and thus, global warming. The biggest global warming culprit is carbon dioxide which accounted 75% of the global GHG emission, mainly contributed by the burning of coal for heat and electricity; fossil fuel such as gasoline, diesel and jet fuel for transportation; as also coal, oil and natural gas for industrial activities. The remaining 20–25% of the GHG emission is released from land use change and deforestation activities.

As a result, there had been an underlying increase in the average temperature over the past century. The ten hottest years have all been recorded since 1997. Lately, we have been witnessing more frequent and intense catastrophic events such as heat waves, floods, storms, wildfires and drought.

In the light of the 4th IPCC Report 2007 and the recent scientific findings, it is critical to establish the overall level of emission reductions, both in the short term and over the long run. Countries are still negotiating to an agreement through the United Nations. The United Nations Framework Convention on Climate Change (UNFCCC), endorsed by 192 national governments, has agreed to stabilise the GHG concentrations at a level that would prevent dangerous human interference on the climate system.

While earlier IPCC estimates suggested the stabilisation of GHG to 450 ppm carbon dioxide equivalent (CO2 eq), current scientific models indicate 350 ppm CO_2 eq is required to avoid dangerous climatic disruption and ocean acidification.

In Malaysia, the greenhouse gas emission increased between 2000 and 2007 from 223 Mt CO_2 eq to 293 Mt CO_2 eq (Table 1). Between this period, about 30% increase in greenhouse gas

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emissions was noted with the energy sector being the largest emitter. It is also anticipated that if no mitigation action is taken now, the emission trend will continue to increase. Hence, the Prime Minister of Malaysia announced an indicator of a voluntary reduction which amounted to 40% of emission intensity of gross domestic product (GDP) by 2020 compared to the 2005 level during the Climate Change Conference 2009 in Copenhagen. The effort is also conditional on receiving the transfer of technology and adequate financing from the developed countries.

Carbon intensity, the indicator used to measure voluntary emission reduction, is actually the total emission per unit of GDP. The indicator was adopted as it allows emission to grow in tandem with the economic growth, which is crucial for the developing nations. Essentially, 40% reduction of carbon intensity is equivalent to about 10% reduction of GHG emission from business-as-usual scenario. In an absolute term, Malaysia has to reduce about 38 million tons from the projected total of 376 million tons of GHG emission by the year 2020.

To achieve the 40% reduction of carbon intensity, three mitigation options have been identified comprising renewable energy (RE), energy efficiency (EE) and solid waste management (SWM). The three areas are projected to contribute 45 million tons of GHG reduction by 2020, provided effective and efficient mitigation measures are implemented.

Nevertheless, the above scenarios have not factored in the important role of forests as carbon sink. If Malaysia can maintain its current level of forest cover, an additional 250 million tons of carbon dioxide equivalent could be sequestered yearly.

Both forest and tree crop play an important role in sequestering carbon dioxide. In light of climate change this important ecosystem system must be maintained if not enhanced. Hence, the role of plant physiologist in exploring the different pathways of the plant systems would be crucial.

Sector	Emissions/removal (MT CO_2 eq.)		
	2000 (actual)	2005	2007
Energy	147.0	204.3	217.0
Industrial Processes	14.1	15.6	17.1
Agriculture	6.0	6.6	7.2
Land use land use change and forestry (LULUCF)	29.6	25.3	19.7
Waste	26.4	27.4	31.9
Total emissions	223.1	279.2	292.9
Total sink	-249.8	-240.5	-247.0
Net total (after subtracting sink)	-26.7	38.7	45.9

(Source: Second National Communication to UNFCCC, Ministry of Natural Resources and Environment, 2011)



NOTES FROM MEMBER 2

SLOPE BIO-ENGINEERING: THE ROLE OF VEGETATION ON SLOPE STABILISATION

by:

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Introduction

In striving towards being a developed country by the year 2020, vast areas of rainforest have been transformed into developmental land including highways and other transport systems in Malaysia. The changes in land-use have inevitably involved the clearing of vegetation cover and cutting of hill slopes, affecting physical, chemical and biological properties of the soil and the environment. Erosion of the soil due to the instability of the slopes is common and often disastrous. A significant number of tragedies have occurred in recent years. Persistent rain for several days had caused the tragedy at Pos Dipang. To this date, no one could ever forget the severe Highland Towers tragedy in which a 12-storey condominium block collapsed, killing 48 people. Another tragic incident occurred destroying a double-storey house at Taman Hillview, just 300 metres from the scene where the Highland Towers condominium collapsed. The landslide brought down trees and tons of earth and mud, causing the immediate collapse of the house and the death of eight people. In December 6, 2008, a massive landslide occurred at Bukit Antarabangsa causing several deaths. It has been claimed that all these instances of tragedies were caused by at least six factors: rainfall, soil erodibility, slope length and steepness, soil cover and human activity (Yoga, 2000). The first two factors cannot be modified but measures can be taken to alleviate and mitigate the last four factors. Because of the importance of vegetation cover on slope stability, it is suggested that slopes be revegetated to prevent and reduce soil degradation.

Bio-engineering Technique

The use of vegetation for preventing and controlling erosion to stabilize slopes has been practiced throughout the world. This new discipline has recently regained global recognition and given a new entity "Ecological Engineering" (Mitsch, 1998). It has been defined as "the design of sustainable ecosystems that integrate human society with its natural environment for the benefit of both". This so-called "Bio-engineering' technique combines mechanical, biological and ecological concepts to prevent slope erosion (Barker, 1996) which confers numerous advantages including high biodiversity, low maintenance, self-sustainability as well as being environmental-friendly.

Bio-engineering in Malaysia

In Malaysia, apart from extensive use of hydroseeding, some trials of mixed indigenous shrubs and trees have been carried out along the North-South Expressway (Barakbah, 1994). An introduction to potential slope plants which accelerate the process of natural succession, hence, the stability of slope, has also been discovered (Normaniza et al., 2009; 2011). However, the slope stability issue is a new phenomenon in Malaysia as development of slopes on extensive scale has occurred only recently. Being new, there is still a severe lack of empirical data regarding the attribution of plant cover on slope stability in Malaysia.

Problems

While the documentation is extensive in most parts of the developed world, it is lacking in the developing world. Slope problems vary between different geographical regions. For instance, in European countries, barren steep slopes are exposed to a range of fluctuating temperatures and humidity. Whilst in Malaysia, they are exposed to torrential rains with an annual average rainfall of 2500 mm. Thus, the hydrological influence on slope stability in Malaysia becomes a crucial element and has been a major cause of previous disasters. Due to this variability, the

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solutions are also different and have to be specifically tailored. Moreover, Malaysian slopes have added problems such as lack of nutrients, soil acidity, drought conditions and poor species selection.

Philosophy of Studies

For long term stabilisation and conservation purposes, alternatives have to be taken to overcome the above problems. This includes selecting suitable slope species and practicing cost-effective technique of planting in order to hasten the process of succession. Thus, choosing a suitable pioneer species is indeed important and crucial in order to integrate various vegetation succession parameters and slope sustainability aspects so that the revegetation programme will not be rendered useless. It is anticipated that once the pioneer is established, the succession process would be enhanced through the changes of abiotic and biotic factors (Fig. 1).

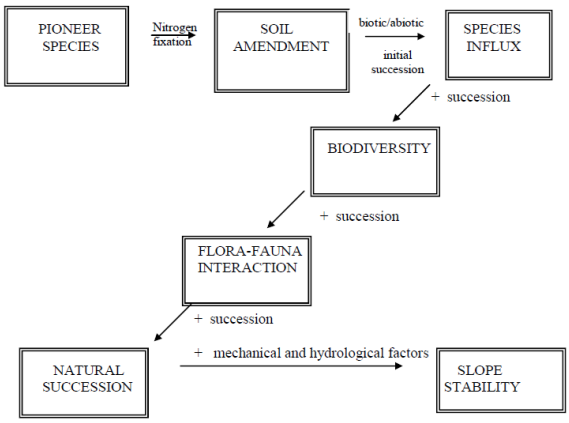


Fig. 1: A proposed concept for establishing vegetation cover on slopes and enhancing the process of natural succession (Normaniza, 2004)

Characteristics of Pioneer

Natural plant succession develops from initial pioneer vegetation (Fig.1). As such, the choice of plant is critical, as this pioneer must have several good characteristics. These include fast growing capacity, self-sustainability, good plant-water relations, acidic tolerant, extensive root system and high Water Absorption Capacity by root (Fig. 2). In addition, the pioneer vegetation must be able to rapidly convert infertile soil into a habitat suitable for vegetation. Thus, a leguminous tree is a good choice as a pioneer as it has the ability to enrich sterile soils. It fertilises soil by fixing nitrogen where soils are deficient in nutrients.

Fig. 2: An example of potential slope plant. The species must have an outstanding physiological and root profile characteristics (Normaniza et al., 2008 & 2009)

Challenges Ahead

Even though the importance of bioengineering has been largely accepted, the knowledge has not developed sufficiently. In global context, there is still insufficient knowledge regarding bio-engineering discipline. For example, the choice of species is limited. Surveys on diverse indigenous species which have good pioneering characteristics are still lacking. In addition, although acidity is believed to be amongst the major slope problems, there is insignificant attempt to identify suitable species tolerant to acidic condition. Due to the improper way of cutting slope, steep inclination has become amongst the major factors which cause slope failure. In particular, research on how plant can better establish on steep inclination and poor soil quality is wrongfully considered trivial.

References:

Barakbah, S.S. 1994. Vegetation on slopes-stabilisation and protection. In: Studies on slopes and pavements of expressways (Siri Seminar Pertama), 28 September 1994. pp 61-67.

Barker, D.H. 1996. Bioengineering techniques for erosion control and stabilisation of sloping ground. Abstract of paper for Philiphines Technology Forum Bioengineering Slope Protection. 19 November 1996. pp 1-22.

Mitsch, W.J. 1998. Ecological Engineering - the 7-year itch. *Ecological Engineering*. 10: 119-138.

Normaniza, O. 2004. The contribution of *L. leucocpehala* (Lam.) de Wit to slope stability. Ph.D. Thesis. University of Malaya.

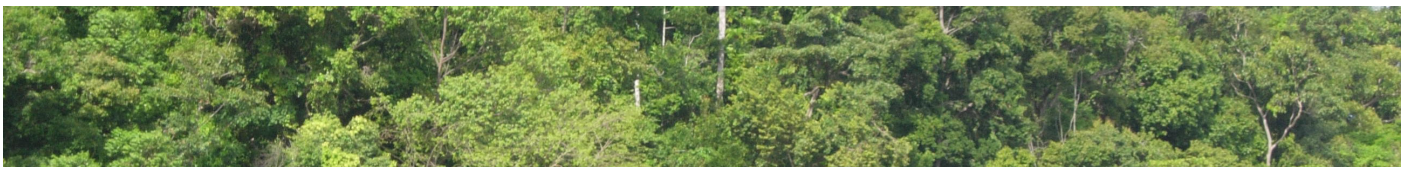
Normaniza, O., and Barakbah, S.S. 2006. Parameters to predict slope stability – soil water and root profiles. *Ecological. Engineering.*, 28: 90-95.

Normaniza, O., Faisal, H.A., Barakbah, S.S., 2008. Engineering properties of *Leucaena leucocephala* for prevention of slope failure. *Ecological. Engineering.,* 32(3): 215-221.

Normaniza, O., Faizal, H.A., Barakbah, S.S. 2009. The role of pioneer vegetations in accelerating the process of natural succession. *American Journal of Environmental Sciences,* 5(1): 7-15.

Normaniza, O. and Barakbah, S.S. 2011. The effect of natural succession on slope stability. *Ecological Engineering*. 37: 139-147. (ISI - cited /Scopus)

Yoga, S.S. 2000. Eroding the future of Camerons. *The Star*, 18 January, 2000.



Call for Papers

Malaysian Society of Plant Physiology Conference 2010 (MSPPC2010)

Date : 13-14 December 2010
Venue : Cameron Highlands

Tentative Scientific sessions:

Cultural Practices and Current Techniques in Production Technology

Effects of Climate Change

Developmental Physiology and Assimilate Production

Post Harvest Technology and Quality Control

Crop Production in Controlled Environment

Biotechnology

Plant Growth and Development

Ecophysiology and Stress Biology

Pest and Disease

Modeling and Simulation

Deadline for submission of abstract : 22 November 2010

Registration : RM650 (members), RM750 (non-members), RM350 (students), RM1,000 (exhibitor: corporate member), RM1,500 (exhibitor: non-corporate member)

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Gallery of MSPP workshops







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