# FRIM IN FOCUS

A QUARTERLY OF THE FOREST RESEARCH INSTITUTE OF MALAYSIA

ISSN 1394-5467

This issue's focus

Celebrating Our Plant Heritage Conserving & Enjoying Indigenous Flora

**Recyclable Recreation** The Science Of Forest Ecotourism

Fighting Superbugs • Ant Antidotes • Oil Palm Cement Composites
On Forest 'Rats' • Coaxing Forests Back To Life
The Gene Genie • The Art Of Mining Trees • Rare Species
Lesser-known Timber Species • Pending Patents

## Plant Conservation A Field Day For Malaysian Flora

FRIM is planning a centre of plant diversity, making its grounds a repository for living plant material, not only of trees, but the whole spectrum of Malaysian flora for systematic research and conservation

HERE is as yet no evaluation and monitoring system in place to record the current conservation status of Malaysian plants and ecosystems and the changes in their status over time.

Conservation strategies for threatened and endangered species and

ecosystems are also very much in their infancy in this country.

These are some of the urgent issues of biodiversity that will be addressed in FRIM's plan to house a centre of plant diversity in its grounds, since the Institute's herbarium, besides those of the Forest Departments of Sabah and Sarawak, has already acquired much expertise in the documentation, identification and understanding of plant communities.

Conservation measures to be explored include restoring threatened plants into the wild in protected sites *More on page 8* 

# From the **Editor**

N THIS issue we focus on some of the areas that our Forest Environment Division is currently tackling.

In particular, the plan to have a reference centre for botanical studies in areas such as plant conservation, sustainable use and commercialisation of plants, and the promotion of public education and enjoyment of our plants. This means, among others, FRIM having its very own niche botanic garden to showcase Malaysian flora and FRIM spearheading the way forest recreation should be done sustainably.

Besides this more thematic treatment of FRIM In Focus's contents (from pages 8-10), readers will notice we are introducing new sections as part of our regular features – The Grapevine (news briefs), Scientist In Focus (spotlighting a FRIM scientist) and Tree Tech/Minding Our Business (latest FRIM patents, consultancies and collaborations). Plus as usual, we highlight some of the other research being carried out at the Institute.

The most visible change, of course, is the change in the look, feel and design of the magazine. It was a change necessitated by a slashed budget, but an improvement hopefully, nonetheless. We are back to an A4 paper size to include much more research, as has been requested by some of you. We are also increasing FIF's frequency to four issues this year.

We have a talented and dedicated bunch of scientists at FRIM, experts all of them, in various aspects of the intriguing world of forest science. But we want you, our readers, to tell us how else FIF can further serve your interests.

Tell us what you think, feel and want – whether you are a government official, a businessman, a fellow researcher, a university professor, a tertiary student, an NGO member, a scientist abroad, a visiting tourist or a member of the public.

The Editorial Board looks forward to your continued following of the goings-on at FRIM. Belated wishes for a very Productive New Year.

## Announcements Notice Chipboard

#### Seminar s

CHALLENGES Facing Forestry And Forest-Based Industries In The New Millennium. This will be the theme for the FRIM-organised national seminar on Forest And Forest-Based Industries: Socio-Economics And Policy Issues this June 17 & 18

## IN MEMORIAM

*Timothy Charles Whitmore* (9 June 1935 - 14 February 2002)

TIM WHITMORE, whose initiative, drive and dedication towards the Tree Flora of Malaya project inspired the current work on the Tree Flora of Sabah and Sarawak, died peacefully in Cambridge, UK at the age of 66. Whitmore, acknowledged by his students and peers as 'the guru of tropical rainforests' wrote, edited or co-edited 32 books and published more than 190 scientific papers on ecology, biogeography and taxonomy. We are deeply indebted to his invaluable contribution towards the advancement of botanical and ecological knowledge of Malaysia's tropical rainforests - Dr E. Soepadmo Socio-Economics And Policy Issues this June 17 & 18 at the Institute's auditorium. Contact Dr Norini Haron (norini@frim.gov.my; 603-62797820 x 7540) or Dr Lim Hin Fui (limhf@frim.gov.my; 603-62797820 x 7541).

Research And Development For The Resource-Based Industries In The New Millennium is the focus of the Fourth Asian Science & Technology Congress 2002 to be held at Hotel Nikko, Kuala Lumpur this April 25-27. The Congress's Environment And Biodiversity Symposium is being coordinated by FRIM's Forest Environment Division.

The Seventh World Conference On T imber Engineering 2002 will be held in Shah Alam this August 12 to 15th. Contact the WCTE2002 Conference Secretariat, Faculty Of Civil Engineering, Universiti Teknologi MARA, 40450 Shah Alam; Tel: (603) 55435258/ 55435260; Fax: (603) 55435275; e-mail: deepak@engr.itm.edu.my

The Seminar On Medicinal Plants 2002 (Tongkat Ali,Kacip Fatimah, Pegaga) will be held at FRIM this August 20 & 21. Contact Mohd. Shahidan Mohamad Arshad, Medicinal Plants Division, FRIM, Kepong, 52109 Kuala Lumpur; Tel: 62797000 x 7368; Fax: 62797860; e-mail: shahidan@frim.gov.my

More on next page



Cover Photo: Sterculia megistophylla, a forest tree endemic to Borneo with large fruits of up to 1 m across

## **EDITORIAL BOARD**

#### CHAIRMAN

Dato' Dr Abdul Razak Mohd Ali

#### **ADVISORY COMMITTEE**

Dato' Dr Wan Razali Mohd Puan Wan Rahmah Wan A. Raof Dr Abd. Rashid Malek En Choo Kheng Ten Puan Norhara Hussein Dr Wan Rashidah Abd. Kadir Dr Abd. Rasip Ghani Dr Abd. Rahman Kassim

#### **EDITOR & WRITER**

Veronica Poopathy

### PHOTOGRAPHER

Asmar Hassan

FRIM In Focus is distributed free of charge upon request, but donations to help us defray costs are most welcome. Address all queries to:

The Chairman, FRIM In Focus Forest Research Institute Malaysia, Kepong, 52109 Kuala Lumpur, Malaysia

**Telephone** 603-62797804

**Facsimile** 603-62797878

E-mail veron@frim.gov.my

Webite www.frim.gov.my

#### Appointment

## The Man That Botany Built

FRIM's new chairman, an architect by training and an informed amateur botanist by inclination, is aggressively pushing plans to upgrade FRIM's grounds into a niche botanic park

HESE days, Datuk Lim Chong Keat is more into conservation than construction. Which is fortunate, considering that he helms the Board overseeing the nation's top forestry research institute. Over the years, the robust 71-year-old has criss-crossed the country with over 400 expeditions into forests in search of plants, particularly the palms and gingers which have become his fondest flora.

Now as FRIM chairman, he intends to bring his architectural skills and layman's passion for botany into play by calling for 'arboretum gardens' within the Institute's 600-ha campus as one of the key components in FRIM's move to have a one-stop centre for research, conservation, education and ecotourism. (See also pages 8-10)

"FRIM's domain is already a famous arboretum – it is *de facto* a botanic garden of trees, that can be enhanced to be a 'green ark', a research conservation haven, rather than a show garden, of indigenous flora. To become, in effect, the National Botanic Centre of Malaysia," said Datuk Lim.

The chairman's role, no doubt, will be catalytic, accelerating the project's progress with his drive and enthusiasm. "The good news and the bad news is that I'm interested in what you guys are doing," quipped Datuk Lim by way of introducing himself to FRIM researchers.

But what is an architect doing, one might ask, even if possessing a proclivity for plants (he has a personal herbarium of some 4,000 specimens), poking his nose into the affairs of a forest research institute?

But the Penang-born, Massachusetts Institute of Technology-trained Datuk Lim, who succeeds Tan Sri G.K. Rama Iyer who retired in September last year, is the first to admit that he is on a learning curve and open to feedback from all quarters.

He insists, in turn, that FRIM staff be always on their toes, well versed with not only the issues of their

specialisation, but in all aspects of forest science. FRIM researches, he said, must be in the business of collecting "forest intelligentsia." They must know the big picture, the latest news and what others in similar fields are doing.

The best approach to research would be of the collaborative kind, a well-established tradition in FRIM that needs to be stepped up in order to draw upon the skills of a multitude of scientists from multiple disciplines that is forest science today.

"We would need enhanced human and library resources, second to none and concomitant with Malaysia's aims for higher standards in education and research. FRIM should become the most conducive environment for research and its application."

Datuk Lim calls for a mountain research station to study and propagate montage flora, in addition to the existing FRIM field research stations. He also hopes to set up a society, to be headquartered at FRIM, for the conservation and promotion of indigenous flora set up in the form of a trust, and later to become a foundation. It would be patterned after royal societies of botany abroad.

Here's wishing the chairman a fruitful tenure at FRIM. Welcome aBoard, Datuk!

"The good news and the bad news is that I'm interested what you guys are doing."

– Datuk Lim Chong Keat



#### From previous page

#### **Announcements**

#### Awards

**FRIM's Wood Chemistry Division** obtained the MS ISO 9001:2000 accreditation from AOGC Moody (Malaysia) Sdn Bhd for its **paper testing, wood preservatives, wood composites** and **soil chemistry laboratories.** The award is a first for FRIM.

The paper testing lab tests the grammage, moisture content, tearing resistance, thickness, burst strength, tensile strength, water absorptiveness and bending resistance of commercial papers. To date, more than 1,000 samples have been tested.

Analyses of copper, chromium and arsenic, boron and/or sodium pentachlorophenol in wood preservatives and treated wood, wood moisture content, wood density and pH analysis in solutions are among the tests conducted at the wood preservatives lab which has also won the IKM Quality Award for Chemical Laboratories for five consecutive years since 1996.

The wood composites lab is a recycler of wood residues into useful

wood-based panel products such as medium density fibre boards, particle boards and oriented strand boards.

The soil chemistry lab tests soil and plant samples to support research activities in FRIM. It also conducts tests for the private sector upon request. Various materials such as compost, herbs, spices and medicinal pills besides soil and foliage are examined.

This year FRIM's seed laboratory, furniture testing unit and library are applying for similar accreditation.

## <u>Collaborations/Consultancies/Research Projects</u> <u>Minding Our Business</u>

TOTAL of RM298,000 was generated from 23 consultancies that were carried out by FRIM research officers last year. Forestry, forest management system auditing, wood processing and disease and pest management were among the aspects covered by the consultancies.

The projects included assessing light organic solvent preservatives on selected hard woods and a pre-feasibility study to identify the potential of charcoal production in Sarawak.

To date, two more consultancies will be carried out this year: A revision of the forest revenue system in Sabah under the Malaysian-German Sustainable Forest Management & Conservation Project and a survey on private plantations in Peninsular Malaysia for the Japan International Cooperation Agency.

There were five MoUs worth RM665,000 that were signed last year. These are projects involving bamboo furniture, advanced wood composites, spices, *tongkat ali* and the development of a web-based timber information resource portal called FRIM Online.

In February, FRIM and Gerik Timber Industries Sdn Bhd signed a MoA to undertake a pioneer bamboo industry at a Felda scheme in Pahang.

FRIM also developed the mechanisms for effective institutional evaluation of IRPA (Intensification Of Research In Priority Areas) research proposals. Among the criteria used to evaluate the proposals are the scientific merit of research objectives, credibility of benefits claimed, feasibility of technology transfer, cost effectiveness and commercialisation potential. Most FRIM projects are Experimental Applied Research (EAR) projects (small to medium-scale research that can be conducted in-house), with the remaining ones being Prioritised Research (PR) projects (large-scale multi-disciplinary, multi-agency projects).

Last year, just over RM5 million was procured for 27 new projects, of which two were in PR areas, namely 1) the construction of a genetic linkage map for wood pulp quality in Acacia hybrids using microsatellite markers and 2) the genetic mapping of quantitative trait loci controlling wood pulp quality in Acacia hybrids using CAPS and RFLPmarkers.

EAR projects included anti-diabetic properties of *Phyllanthus niruri* (dukung anak) and *Gynura procumbens* (kecam akar), utilisation of rubber glove industrial effluent sludge as fertiliser for timber species grown on ex-mining land, the genetics and ecology of four selected endemic and/or rare dipterocarp species in Peninsular Malaysia, the determination of optimal growth stock and cutting cycle for sustainable harvest in timber production hill forests in Peninsular Malaysia and acoustical properties of Malaysian timbers.

These were selected from the 36 projects submitted for IRPA funding, an R&D grant scheme from the Ministry of Science, Technology and Environment.

Altogether FRIM researchers submitted 58 proposals last year for IRPA funding.

Compiled from data provided by the Research Management Division and External Projects Unit of FRIM Business Centre

#### Patents

## **Tree** Tech

**2001 Pending Patents** 

#### **Foldable Flexi Easel**

THIS is an improved version of the traditional easel that has a more stable base than the tripod system. It has more leg room, greater number of working angles and is easier to set up.

#### **2000 Pending Patents**

RESEARCH carried out by Malaysian scientists working in Malaysia and at the Massachusetts Institute of Technology under the Malaysia-MIT Biotechnology Partnership Programme has yielded several inventions with commercial potential that are ready to spur the next phase of biotechnology development in Malaysia.

Two patents in its Natural Product Discovery subprogramme, directed towards the commercialization and development of natural products based on indigenous medicinal plants of Malaysia namely tongkat ali *(Eurycoma longifolia)* and pegaga *(Centella asiatica)* have been applied for. They are:-

#### 1) Use Of Asiatic Acid For Treatment Of Cancer

ONE of the triterpene constituents isolated from *Centella asiatica*, asiatic acid has a cytotoxic effect on cancer cells and is potentially useful as a future cytotoxic and anticancer agent. This finding will help to determine pegaga varieties with high asiatic acid content and will provide pegaga-planting material for commercial cultivation for asiatic acid production.

#### 2) Bioacti ve Fraction Of Eurycoma longifolia

THE bioactive components isolated from the extracts can be used as marker compounds for tongkat ali products. These findings can scientifically verify the claimed properties of tongkat ali and will boost it as the first Malaysian premier quality herbal medicine in the evergrowing world herbal market.

Information for this report is obtained from Dr Ilham Adenan and from Abdul Hamid Salleh from FRIM's Medicinal Plants Division and Timber Technology Centre respectively

## Forest Databases What's that tree, again?

Lesser-known tropical timber trees get into the limelight

HE development of a database on lesser-known/ lesser-used tropical timber (LUS) species is into its final phase and when ready, will be a tool for developing new market products and strategies to promote alternative species within sustainable forest management policy regimes.

The Yokohama-based International Tropical Timber Organisation (ITTO) held a consultative meeting in Kuala Lumpur in February to assess the progress of the data compilation which eventually will be available in CD-ROM format.

The ITTO project began in 1999 and presently the database has information on 942 timber species, 381 of which are from the Asia-Pacific. Among the timber species selected, the most abundant group is the Leguminosae, followed by the Meliaceae and Lauraceae groups, with the Dipterocarpaceae and the Anacardiaceae following the Leguminosae group in the Asia-Pacific.

The database includes information on tree characteristics, anatomy, ecology, geographical distribution, wood properties, technological properties, workability and end uses, besides its scientific, trade and common names.

The use of LUS will relieve pressure in the over-exploitation of currently highly valuable timber trees by extracting a broader spectrum of species, including small diameter logs. (But the danger of over harvesting is always present even in this case when loggers disregard, or are not aware of, the growth and mortality data of residual timber species).

LUS can also serve as a potential alternative to rubberwood which is fast dwindling in supply, as rubber plantations convert to oil palm and other uses, while the demand for it remains high. LUS are not unknown from a taxonomic perspective, but rather from its utilisation aspect – even if the local construction industry is using LUS widely in the form of 'chap-char' (mixed species) timber. But present LUS use in the country can best be described as haphazard and dangerous with inadequately strong timbers being used for structural purposes. Very often, buildings are doomed to fail from the start due to poor choice of timbers.

Mempening ('Malaysian oak'), for example, can be better used for flooring, furniture and other value-added products, but instead is commonly used for scaffolding and other temporary uses. Ara, a weak wood, has been found to be used for roof trusses in which strength is critical. Ramin, a valuable timber for panelling and furniture, has been used as batten in roofs.

There are many LUS that are comparable in terms of wood properties (like strength, density, colour and grain) to currently established commercial species. LUS that are reasonably high in strength include mertas, kandis, pauh kijang and penaga.

Information for this article is obtained from the Business Support Division of FRIM Business Centre and the paper, Availability And Utilisation Of Lesser-Known Timbers by Lim, S.C. Samsudin Musa and Gan K.S. Mr Lim and Mr Gan are from FRIM's Forest Products Technology Division, while Encik Samsudin is from the Natural Forest Division

## Product Development Oil Palm Cement, Anyone?

Lighter, cheaper, stronger – that's the oil palm fibre reinforce cement composite

AKE one mature oil palm tree. Shred its trunk to bits, using the super-duper mobile oil palm trunk machine. Mix in the resulting fibres of loose vascular bundles into a cement-water admixture of 50% oil palm fibre (based on dry weight).

This will produce a lightweight cement block of density ca. 650-750 kg/m<sup>3</sup> within 14 days of curing at ambient room temperature.

And now what you have is a product with great potential to be used as reinforcement material in lightweight cement block manufacture.

This is because oil palm fibres have extremely high tensile strength (compared to other natural fibres), are renewable, have natural long fibres and are relatively light (bulk density ca. 93.8 g/l), the latter due to the incorporation of the 50% fibre formula. This reduces density by some 300% when compared with ordinary cement blocks.

So much so that two big guns in the construction industry – Brunsfield Corporation Sdn Bhd and IJM Corporation Bhd – are interested in developing the concept further for use as internal partitions in their pilot housing project.

The commercial production and application of these composites are expected to be realised later this year.

Dr Rahim Sudin from FRIM's Wood Chemistry Division worked together with the private company Yen Huat Sdn Bhd, under the Industrial Grant Scheme (IGS) of the Ministry of Science, Technology and Environment to develop this product

#### From page 3 Announcements

FRIM In F ocus was awarded a Merit Award as runners-up in the Government Agency category in the Institute Of Public Relations Malaysia's Best Malaysian Newsletter Award, 2001. The Sime Darby Group emerged the overall winner among 19 categories.

#### Errata

IN OUR last issue (December 2001), in paragraph four and five of our article entitled Food With A Past In The Present (page 11), we had stated that arsenic, a reputable poison, is the "culprit" that can cause kidney damage and cancer of the bladder. It's actually inorganic arsenite that is responsible. Organic arsenic may in fact be essential to physiological mechanisms.

It was also stated that since 1988, FRIM has been carrying out research studies on exmining land. However, FRIM only embarked on tin tailing research some **three years ago.** The errors are regretted.

## Forest Genetics The Gene Genie

Working magic with genes from the forest has paid off for FRIM's Dr Lee Soon Leong whose research has far-reaching implications for genetic conservation and tree improvement. He bagged Malaysian Nature Society's Tan Teck Guan Gold Medal Award for his doctoral thesis in natural history and conservation

**J**UST like people, trees are a fruit of the nature-nurture principle. Both genes and the environment (or 'ecological factors'as scientists say) play a part in their present vigour and future viability of generations to come.

The higher the genetic variation within a species, the greater its chances of survival now and forever... until the end of the world. A lot more genes to play around with, you see, so the trees are more adept at adaptability with changing (usually adverse) environments, fighting off pests, diseases and what have you.

Being the majestic, long-lived, sessile beings that they are, trees, more than other organisms, need plenty of this genetic stuff in all its permutation to last the ages.

Thus, it stands to reason that obtaining the extent and pattern of their genetic variation, their population differentiation over geographical ranges and the ecological/genetic relationship among individuals and populations are essential for setting their conservation guidelines.

It will determine whether one population or many different populations will be an effective collection of all the important genes for a particular species and thus aid in the efficient management of natural forests or of any effort to restore deforested habitats by re-introduction.

What's more, once the genetic resources of a species is known and the richer the storehouse in terms of its diversity, tree improvement is enhanced with a wider selection of superior genes to choose from in breeding.

Dr Lee's work aims to generate such genetic data, using DNA and enzyme extractions from the inner bark tissues of trunks to develop genetic markers and statistical tools.

These would determine the population genetic structure, mating system parameters, optimum population size of virgin jungle reserves (VJRs), and effects of logging on genetic variation of forest timber tree species, in particular Dipterocarpaceae and Leguminosae.

In his study on the genetic variation and mating systems of meranti tembaga (*Shorea leprosula*), kapur (*Dryobalanops aromatica*), and merbau (*Intsia palembanica*), Dr Lee discovered that the three species exhibited mixed-mating systems and harboured high levels of genetic variation within populations. The studies conclude that more than five strategically placed populations for each of the species should be protected to maintain 99 percent of the total genetic variation.



Playing with genes... Dr Lee (top) and his team at the Sg. Pinang Forest Reserve, Pangkor Island

The genetic variation at both the population and species levels for *S*. *leprosula* is among the highest recorded for tropical rainforest trees with the mean expected heterozygosity (a parameter to measure levels of genetic variation) within populations even higher than the temperate long-lived tree species (mainly conifers).

The study of the mating system of *D. aromatica* in three different forest types and a seed orchard indicated that forest plantations and regenerated forests should consider maintaining extensive forest stands to surround the managed areas to serve as sources of pollinators as well as genes.

These would also buffer the managed areas against reproductive failure or loss of allelic (alternative gene) diversity.

Dr Lee found that VJRs located at the fringes of a designated reserve had a lot of inbreeding. Inbreeding is an indicator of sick, degenerative forests. The study suggests that in establishing newly

proposed VJRs, compartments located in the center of forest reserves of at least 154 to 162 ha should be allocated for this purpose.

"Malaysian forests are rich in plant species diversity, but for the majority of these species, we will never obtain adequate knowledge about their genetic structure," Dr Lee said.

But by combining the results obtained for *S. leprosula*, *D. aromatica* and *I. palembanica*, Dr Lee proposed that for the genetic conservation of widespread and common tree species in forest reserves, the species can be grouped according to their mating systems. Genetic information generated for a species can then be adapted to species with similar mating systems.

Outcrossing species exhibit higher levels of genetic variation. High levels of genetic variation require big effective population sizes for capturing genetic variation, and subsequently, large conservation areas. Hence, conservation of outcrossing species will require the largest area, and this in turn will favor the conservation of other species with mixedmating, selfing, or apomixis (asexually reproducing) systems.

Dr Lee's eventual goal is to integrate the study of genetics with ecology as genetics alone is not the whole story behind the saga of trees. That nature-nurture motif again.

Information for this article is obtained from Dr Lee and from the paper, Genetic Diversity Of A Tropical Tree Species, Shorea leprosula Miq. (Dipterocarpaceae), in Malaysia: Implications For Conservation Of Genetic Resources And Tree Improvement

## Forest Microbiology Fighting Superbugs: A Race Against Time

Seeking cures for infections due to resistant microbes

OSPITAL-ACQUIRED infections from Methicillin resistant *Staphylococcus aureus* (MRSA) are among the main culprits in infectious diseases, the leading cause of death in developing countries, while pathogens resistant to drugs have become a major threat to the health sector worldwide.

The race to find cures is hotting up as these MRSA bugs are fast developing resistance to many other drugs, reversing advances made in the field of antibiotics for the last six decades, and threatening to throw us back into the prepenicillin era when four out of five hospital patients died from *S. aureus* infections – surely an irony in this age of genome sequencing.

(Currently in the United States, MRSA infections rank 11th as the leading cause of death, costing hospitals at least US\$4 to 5 billion yearly).

Cancer-stricken patients, those who have undergone transplants, burn victims, dialysis patients and those in critical care units are most at risk of succumbing to MRSAinfections, because of imprudent and/or prolonged antibiotic use and pathogen adaptability.

Billions are being spent all over the world to fight these superbugs via among others, genetic engineering and the formulation of new drugs from synthetic chemicals. But since 1998, the quest for potential anti-infective agents for MRSA from natural plants has been quietly going on at FRIM's Medicinal Plants Division, the first of its kind in the country.

"The bountiful flora and fauna in our forests are an enormous source of untapped phytochemicals just awaiting discovery," said Mastura Mohtar who is heading the research team in identifying MRSAanti-infective agents.

## Forest Plantation Pests Ants: An Anti-Borer Antidote

The kerengga ant may hold the key to combating shoot borer attacks on mahogany trees

PEST control research worldwide aimed at combating the mahogany shoot borer (*Hypsipyla robusta*) has been mostly unsuccessful – until now.

The various biological, chemical and silvicultural methods developed so far have been unable to prevent these borers (or more specifically, their larvae) from destroying the terminal bud of the trees, resulting in forking, bole deformation and depression of growth.

Although the use of natural enemies like ants have been proposed, they are largely uninvestigated in *Hypsipyla* control, the main constraint on mahogany (*Khaya ivorensis*) cultivation in Malaysia.

It has since been observed that a dominant arboreal ant known locally as kerengga (*Oecophylla smaragdina*), had a deterrent effect on the occurrence of shoot borers on the trees. In a commercial forest plantation in Malaysia, many trees that had ants appeared to be free from shoot borer damage, and the To date, Mastura and her team have profiled 220 species representing 83 families of Malaysian flora and early results look promising. Several potential species have been identified with two having undergone comprehensive bioassay guided isolation processes leading to the discovery of several bioactive compounds.

"The anti-MRSA and chemical profiling of plants generated through this work will form the basis for further exploration, and we hope to expand our research to other multi-drug resistant bacteria," adds Mastura.

Information for this article is obtained from Mastura Mohtar, Mazurah Mohd. Isa and Nuziah Hashim from FRIM's Medicinal Plants Division



most abundant type of ants present were these fiery-red critters.

Results from a survey showed that there were no shoot borer attacks on *K. ivorensis* trees that had ants present, while many of the trees without ants were damaged.

A predatory ant that preys on many insect species, the kerengga congregated mainly on the stems, branches and canopies of the trees. Further field experiments confirm that these ants can indeed protect *K. ivorensis* from attacks by the mahogany shoot borer.

Studies are being planned to determine how *O. smaragdina* can be managed in mahogany plantations to enhance its potential as a biological control agent.

This report is based on research by Grace T. Lim and Dr Laurence G. Kirton, both of whom are from FRIM's Forest Plantation Division. Lim Sun Heng of Maju Aik Sdn Bhd provided insightful observations and invaluable support in addition to facilitating the work

#### From cover page

## Working Out Conservation Strategies...

where original populations may have disappeared. This would require promoting the science of plant reintroduction and habitat restoration.

Bringing plants into cultivation as ex-situ conservation, once the species is better understood in terms of its ecology and its requirements, is another measure that can be employed. Analyzing plant distribution via the Geographical

Information System will help map out important conservation areas.

In recent years, a number of highly valued plant species have been the target of the ornamental trade. The Cycas and Streblus plant species, found in limestone hills, may end up extinct. The centre intends to work out conservation strategies for sustainable use of these plants. These strategies can then serve as models for other rare flora or plants facing similar collection pressures (like some medicinal plants, for instance)



Live and let live... The conservation of endangered plant species like this Cycas clivicola in Langkawi will be an important task for FRIM's plant diversity centre

With over 15,000 flowering plants, over 800 species of pteridophytes and vast numbers of mosses, liverworts, lichens and algae, Malaysia aptly qualifies as one of the 12 megadiversity countries of the world. A party to the UNCED Convention on Biological Diversity, we also have our own

national policy on biological diversity. A centre of plant diversity will be able to advise the Government on these matters.

The centre could also become the scientific authority of CITES (Centre on International Trade on Endangered Species) on Malaysian plants as it is in a position to coordinate CITES listings of plants listed in its Appendices.

> Another target of the centre would be to engage in the domestication of wild species that have potential uses other than for timber production. We are extremely rich in our plant resources, much of which have commercial potential. Some plants, for example, are very attractive and have horticultural potential as ornamental plants, while others can be used for medicinal, health and culinary purposes.

Investigating plant species with edible fruits can bear fruit

commercially too. Some 500 species are estimated to fall under this category.

Information for this article is obtained from Dr Saw Leng Guan from FRIM's Forest Environment Division.

## Forest Botany All Things Rare And Beautiful

A survey and documentation of higher plants in the Krau Wildlife Reserve in Pahang to determine its conservation status has unearthed several rare and one new species. Also, although the reserve is just one percent of the forested area in the peninsular, it contains 18% of the region's dicotyledons, 15% of its monocotyledons and seven percent of its fern diversity

WO rare gingers, *Scaphochlamys concinna* and *Alpinia petiolata* have been discovered so far in the on-going survey and documentation of higher plants in the Krau Wildlife Reserve (KWR). *S. concinna*, collected from the confluence of Sg. Baik and Sg. Neram in the present study, is the second collection after the type collection, which was collected from Perak in the late 19th century.

A. petiolata, found at the swamp forest along Sg. Baik, the south-east part of KWR, had so far been known only from the mountain forests. Until this collection appeared, there has never been a lowland record.

Other rare plants found during the survey were *Phalaenopsis maculata* (Orchidaceae) and *Soejatmia ridleyi* (Graminea). *P. maculata* has so far been recorded only from Sg. Tahan in Taman Negara. A new record for KWR, it was collected as an epiphyte by the riverbanks of Sg. Lompat Hulu. *S. ridleyi* is restricted to the lowland forests of Kelantan and Pahang. During this survey, it was recollected again beyond the Bukit Rengit Station and in the lowland forest along Sg. Baik Keratong.

The one-and-a-half year

survey, conducted from October 1999 to February 2001, also recorded one new species of palm and several very rare dicots and monocots. *Licuala sp. nov* (Palmae) is a new species encountered from the lowland dipterocarp forest at Sg. Kudung, south of the reserve.



Rare finds... A first lowland record of the Alpinia petiolata (left) and the epiphyte, Phalaenopsis maculata found by the riverbanks of Sg. Lompat Hulu

Further taxonomic study and description is on-going. *L. pahangensis*, endemic to south-west Pahang (KWR and its

## **Botanical Gardens Plants for Pleasure, Plants to Treasure**

A whole array of plants can be enjoyed by the public when FRIM's plans for a full-scale niche botanic garden comes into fruition

HE humble weed in your garden will take on a new significance should you visit FRIM's botanic garden, once it is fully set up. Up close, weeds can be quite pretty with a wealth of stories to tell.

House weeds may well be among the plants to be displayed in the niche botanic garden being planned within FRIM's grounds. But this will not be the distinguishing feature of the gardens, uniquely quaint as it may sound. Rather, it will be the bewildering variety and beauty of our indigenous flora that will be the star attraction.

"One of the marks of an excellent botanic garden is its theme," says Dr Saw Leng Guan from FRIM's Forest Environment Division.

More specifically, Dr Saw suggests several sub-themes on indigenous plants that can constitute the Institute's gardens. A section on useful plants would comprise medicinal, aromatic and culinary plants as well as a home garden featuring the common fruit trees found in many Malaysian homes. This is the section that will include weeds (because they always spring up when you try to grow something useful!) and naturalised exotic plants of Malaysia.

A section on the specialised vegetation of Malaysia would include flora like limestone plants, beach plants, riverside plants, quartzite plants and mangrove plants. Understorey herbaceous plants, climbers, water plants, timber trees and wild fruit trees could form another section.

Interesting plant groups will include ferns, gingers, palms, bamboos, aroids, orchids and figs. Last but not least, a section on Malaysian plants under threat

#### From previous page

vicinity), was gregarious throughout most of the lowland forest in KWR.

*Calamus flabellatus* (Palmae) is known in Malaya from two collections i.e. by E.J.H. Corner from Sg. Kayu, Johor, from the lowland swamp forest, and by Saw L.G. from Bintang Hijau Forest Reserve in Perak. Encountered will inform and educate the public on some of the plants in danger of becoming extinct.

Authenticated botanical specimens – the diligent keeping of records of all plants grown in a garden (its origin, location and history besides its nomenclature) – is key to a successful and fully functional botanic garden, says Dr Saw.

Forming a network to link all botanical institutions here (in Forest departments, research and tertiary institutions) is another indication of a good garden in its ability to share its expertise such as in plant exchange programmes. So, too, the close collaboration with international botanical institutions.

Another component of a successfully run garden would be its public education role. Dr Saw says ideally, environmental education should be taught with the causes and consequences of environmental problems tackled in a problem-solving context.

"Personal and societal values need to be questioned if necessary, with values education being deliberately incorporated into educational programmes for protected areas," he says.

Presently, tree species form the bulk of flora at the FRIM grounds, but other plant species of taxonomic and economic value have been planted as well. The Institute houses some 800 of the 2,830 tree species in Peninsular Malaysia, with 103 out of the 157 species of Dipterocarps (the most significant family of trees for timber). Another 3,500 species of trees are estimated in Sabah and Sarawak. FRIM's current arboreta are already



Towering buttresses... Networking with other gardens like this one, the Royal Botanic Gardens in Peradeniya, Sri Lanka will be carried out by FRIM's proposed botanic garden

home to some of the finest tropical tree collections in the world.

The grounds are buffered by stands of virgin forests (the Bukit Lagong Forest Reserve, albeit a production forest) so that species diversity within the stands have been increasing with the invasion of several species from the natural forests encompassing the ridge tops.

The variety of ecological niches in the grounds (ranging from the different tree species stands, the open areas, streams and rocky hillsides to the developed areas with buildings and roads) have favoured inter-habitat diversity compensating for the loss of intra-habitat diversity.

during the present study at Sg. Kudung in scattered, small populations, this is the third record for Peninsular Malaysia and the first for Pahang.

Preliminary findings from this study funded by IRPA suggests that the studied area is extremely rich in plant diversity. Part of this research has been reported in Chua, L.S.L. & Saw, L.G. 2001. Management Of Krau Wildlife Reserve – Capacity Building And Human Resource Development – Flora Component. Technical Report submitted to the PERHILITAN and DANCED. Dr Chua is from FRIM's Forest Environment Division

#### Forest Ecotourism

## **Green and Clean:** On Responsible Recreation

Ecotourism – one that entails low visitor impact, benefits indigenous communities, promotes conservation, enhances environmental education and leaves natural areas undisturbed – is getting the attention of government, private enterprise – and researchers – as tourism becomes a big money-spinner (surpassing the GDP growth rates for the 1995-2000 period) and as the United Nations designates 2002 as the International Year Of Ecotourism

Dip you know that the damage inflicted on flora in forest recreational activities could be more severe than logging? The reason is that logged-over forests have regenerative capabilities, while the same cannot be said of forests opened up for tourism.

Even if some 80% of our forested land are gazetted as protected areas designated as permanent forest estates, national parks and wildlife sanctuaries, much of Malaysian nature tourism is still exploitive, paying scant regard to the especially fragile ecosystems that characterise the tropics.

But Nature despoiled by tourists eventually becomes a turn-off to them, making ecotourism a losing industry. Hence, conservation actually promotes ecotourism and it pays for ecotourism, if it is to be a viable venture that can be enjoyed by successive generations, to promote conservation in turn.

An important concept in ecotourism

is to limit tourists to a site's "carrying capacities", defined as the limits of a site's ability to support visitors in terms of its ecology, sociology, economy and management. Mass tourism is a no-no. Special interest tourists groups would be ideal.

While establishing and maintaining absolutely pristine ecosystems is impossible in many instances (because of previous land use, external management activities and policies), there are options open for the recreation manager to consider in lessening impacts of forest recreation.

Dividing up a site into various zones is one way to reduce impact. A buffer zone, for example, would be areas rarely disturbed and penetrated by tourists and hence act as areas of refuge for animals and as reserves for plants, while the intersite zone would be the relatively undisturbed area between the corridors of heavy use (the impact zone).

Buffer zones would be delineated

and protected from development as far as possible.

Developing different trails and adding other attractions with different degrees of nature opportunity, accessibility and difficulty will help redistribute visitor impacts, as long as the development is well planned.

So too "hardening resources" like building elevated walkways (such as a timber bridge) at well-used trails and sprinkling wood chips, shredded rubber or oil palm kernels along nature trails, to reduce ground compaction and help prevent visitors from straying into prohibited areas.

Mandatory permits and user fees can reduce visitor stress in the more sensitive zones, while public education can minimise some of the downside of nature tourism.

Information for this article is obtained from Dr Noor Azlin Yahya from FRIM's Forest Environment Division

## Assessments Treading Carefully

THE move to further develop FRIM's grounds into a niche botanic park that would feature forest recreation as a major attraction will proceed with wisdom and caution.

The project will create a pleasant working environment, generate income towards a degree of self-sufficiency for the Institute, and promote public education on forests.

However, in encompassing the role of an amenity forest (forests for ecotourism) besides that of a research forest (forests for the conduct of research, education and conservation of biodiversity), FRIM will keep in mind its mandate of managing its grounds mainly for scientific research.

Crowd control, if not effectively managed, would prove worrisome with

the inevitable increase of stress for the environment (soil compaction, leaving of footpaths and trampling of plants, reduced seedling regeneration, littering, vandalism, pilfering of endangered species and the non-aesthetics of overcrowding, for example).

The fear is legitimate because of the targeted three-fold jump in the number of visitors to FRIM. A staggered increase in visitors would be best. Last year, some 80,000 people visited the Institute.

One needs to consider the acceptable maximum level of urban development on FRIM grounds so that any increase in population, built-up area and infrastructure would not tilt the balance towards the negative.

Currently, one-sixth of FRIM grounds (some 100 ha) are developed,

consisting of physical infrastructure like offices, staff quarters, labs and roads. The rest are made up of forest plantations and various arboreta and gardens.

Ideally, a buffer forest (the Bukit Lagong Forest Reserve) should come under FRIM's jurisdiction to ensure strict enforcement against urban development encroachment at the Institute's boundaries.

As it is, various parties at various times who are neighbours to FRIM, despoil boundary territory by tree felling and dumping of rubbish (which are then often burned openly) after pulling down or cutting out the Institute's fences.

The masterplan for the project is expected to be drawn up by June.

## Rehabilitating Natural Forests Coaxing Forests Back To Life

On improved planting techniques in rehabilitating highly compacted logged-over areas

**B** IGGER holes for better aeration and space for virile root growth, tree saplings rather than seedlings, and slow-release fertilisers are aiding degraded, logged-over forests to attain subsequent productive levels.

This new approach to rehabilitation does not require frequent, repeated returns to the forests for silvicultural treatments, thus saving costs and compensating for using the more expensive slow-release fertilisers, bigger tree saplings and mechanised planting.

Current logging in the hill Dipterocarp forests of Peninsula Malaysia uses the crawler-tractor which excessively damages forest structure and the soil.

This is due to the extensive logging road networks and skid trails which have to be constructed within logging areas, the need for log landing sites and the numerous tree fall gaps, all of which make the soil highly compact, resulting in poor regeneration of commercial tree species. Restorative planting would have to be carried out, but seldom are such enrichment planting successful. The survival rate of these planted trees is low due to the harsh environment. Also, post-planting treatments are not easy because the logged-over areas usually become inaccessible because of landslides, collapsed logging roads and the growth of inferior vegetation, a year or two after logging.

The new planting technique overcomes these obstacles by digging large holes (0.9 - 1.0 m width and 0.9 - 1.0 m depth) to plant tree saplings (preferably of  $\pm 2 \text{ m height and } \pm 2 \text{ cm}$  diameter), instead of seedlings.

Mechanical augers (the track tires skid steer loader model 753 or 773 attached with a 36-inch hydraulic auger is best) is used to plant the holes. These machines are portable and workable even in difficult terrain such as steep slopes (maximum gradient of 28°) and slippery, soft earth in hilly logged-over forests, and can be operated by untrained workers.

Another plus point is minimal site preparations since clearing for line planting and canopy openings are not required.

There was improved ability to outcompete weed growth after two years of planting without post-planting treatments. The *Shorea leprosula* stood out in growth performance. The mean annual height (hMAI) and diameter increments (dMAI) of the saplings over a period of two years were 1.2 m y<sup>-1</sup> and 2.5 cm y<sup>-1</sup> respectively.

The Piah Forest Reserve in Sungei Siput, Perak will be the first to make use of this planting technique.

This article is based on research done by Dr Raja Barizan Raja Sulaiman, Dr Shamsudin Ibrahim and Mr Chong Phang Fee from FRIM's Natural Forest Division. A manual is currently in the process of being produced to guide forest concessionaires in rehabilitating logged-over forests

## Forest Inventories **'Rats' In The Forests**

Currently data on the status of logged-over forests is sorely lacking, but a cost-effective rapid appraisal technique (RAT) is being developed to rectify the situation

R OAD conditions deteriorate once loggers leave forests. Compound this with the vastness and inaccessibility of natural forests, and it is not hard to understand why forest inventories of logged-over areas are scarce – conventional methods of assessment are costly.

But post-felling inventories are essential as downstream wood-based industries, which rely on uninterrupted supplies of raw material, need to know the expected volumes, species composition and timber qualities of the logged-over forests.

Also, with 80% of our production forests already logged-over and virgin production forests expected to be exploited within the next few years, second-growth forests will be next in line for logging. (Already in some states, logged-over forests are now being relogged).

This would call for new forest management approaches as the structure and composition of second-growth forests is quite different from the virgin stands. Think 'degraded'.

There is widespread concern, based on preliminary observations, that most of the residual stands have not regenerated according to projections and will not be ready for commercial harvesting on a sustainable basis as expected.

This is due to poor harvesting practices and illegal logging which seriously damage stands and soil.

As a result, most of the secondgrowth forests are expected to contain less commercial species, have high mortality, reduced overall growth rates that are far less than the assumed 2.5 m<sup>3</sup>/ha under the selective management system now being applied for production forests, and a highly variable size and distribution pattern of trees. Thus the new management approach would be to enhance residual stand productivity.

It is against this backdrop that a rapid appraisal technique of stand conditions is being developed as an alternative assessment tool in an ongoing study. The methodology is currently being tested at the Tekam Forest Reserve in Pahang.

Information for this article is obtained from the paper, Assessing The Status Of Logged-Over Production Forests – Development Of A Rapid Appraisal Technique: Preliminary Report that was presented at the EC-FAO Forest Policy Workshop jointly organised by FRIM in January. Samsudin Musa, Safiah Muhammad Yusoff, Ismail Harun and Abdul Rahman Kassim from FRIM's Natural Forest Division are involved in the project

## Afforestation The Art Of Mining Trees

Or how ex-mining land, instead of idling away, can save our forests and generate timber dollars too

(Top) Cracked slime after drought

(Bottom) Two-year old Fragraea

crenulata grown on slime tailings

can destroy the feeder roots of trees.

EGRADED forests earmarked for forest plantations may soon be spared and left alone to regenerate naturally, judging from promising results of afforestation research on exmining land.

With the option of turning to some 100,000 ha of abandoned tin mines that have remained idle for decades, but 'greened' for the growing of timber species, poorly-stocked logged-over forests will face reduced pressure from conversion to pl



pressure from conversion to plantations.

At present, 56,250 ha of degraded forests have been converted to *Acacia mangium* plantations in Peninsular Malaysia, well below the targeted 188,000 ha under the Government's compensatory forest plantation programme to meet the shortage of timber, the main reason for the shortfall being the lack of suitable land.

A 121.4 ha ex-mining site in Bidor that was leased from the Perak State Government in 1997 to conduct an afforestation project is proving that timber species grown on the site can fetch good revenue. A recent survey of *Pinus, Flindersia brayleyana* and *Khaya ivorensis* produced from

plantations estimated yields as high as US\$30,000 per 40,000 ha at 40 years after planting.

Afforestation of 100,000 ha of the existing 360,000 ha of BRIS (beach soils) and tin tailings (ex-mining land soils) with *A. mangium* at seven years rotation would provide about one million cubic metres of pulpwood or reconstituted materials that can produce 0.238 million tons of paper and paperboard.

Hopea odorate, Swietenia macrophylla, Acacia hybrid and Acacia crassicarpa are the high value timber species that have been successfully grown on the Bidor site's sand tailings (the extremely dry hot and infertile soils that form the bulk of exmining land).

Other high value timber species include *Dyera costula*, *Fagraea crenulata* and *K. ivorensis* which grow well on slime tailings (the fertile clay-silt mixture that comprise a small portion of ex-mining land, but which are water-logged).

These timber species can be used for quality cabinet wood and sawn timber. The pulpwood species *A. mangium* and *A. auriculiformis* do well on both types of tailings.

The survival rate of the timber trees range from 40 to 90%, while their mean annual height increment are from 0.3 to 2.4 my<sup>-1</sup>.

The prospects for agroforestry are also bright. The planting of *Eurycoma longifolia* (tongkat ali) is a case in point. The traditional herb has a 85% survival rate at one year of planting (compared to five percent of the plant surviving in the open).

The prospect of converting ex-mining land into forest plantations is especially pertinent in the light of findings that agricultural produce cultivated on tin tailings is potentially toxic.

The large amounts of fertilisers needed to reclaim the land also make tin tailing farming expensive, which is one of the

reasons why such land remains idle to this day (only some 10% of ex-mining areas have been

converted to other land uses).

The greening of ex-ming land is also contributing towards carbon sequestration (where trees as carbon sinks would help reduce the global concentration of carbon dioxide).

Also, the Bidor field research station is slowly but surely turning into a biodiversity park with over 20 tree species covering about two-thirds of the area.

A target of 2,000 plant species for the park has been set for the next 10 years. Still, a forest may be duplicated, but not its diversity. Hence a park, and not a forest.

> "The formation of forest cover will be the first step for the development of a biodivesity park," says Dr Ang Lai Hoe who has been conducting research on tin tailing afforestation at FRIM for the last 13

years. Natural forest species will eventually be incorporated for conservation purposes.

Says Dr Ang: "While we do not intend to enrich the site with good mineral soils (the costly approach), one of the methods to determine the effectiveness of improved site quality from the man-made forest cover on the tin tailings is the introduction of small amounts of forest soils under tree stands to see the regeneration of forest species from the seed bank of the soil."

It was the English scientist B.A. Mitchell who first started work on timber cultivation in tin tailings in the 1950s. But his research in Selayang, Selangor was destroyed by illegal settlements. However one need go no further than FRIM's own grounds to get an idea of tin tailing rehabilitation – a small portion of the grounds (where the present nursery is and the ornamental stands along Jalan Kapur) originated as exmining land that colonial forest scientists started to rehabilitate from the 1920s. But all of FRIM's forest plantations are grown on good mineral soil.

So while efforts in ex-mining land afforestation is not exactly new, research now being conducted by FRIM is heliping to form top grade forest plantations and agroforestry projects – and by happy happenstance, save our natural forests too.

Information for this article is obtained from Dr Ang Lai Hoe from FRIM's Forest Plantation Division and from the paper, Establishment Of A High Value Timer Production Area On Tin Tailings

# **TIN TREES: Bidor's Green Mine**

WEATHERING and vegetation have little influence on the texture of tin tailings, which continue to lose clay content to erosion, even after 20 years. Thus natural restoration of site fertility is very slow: A 20-year-old area of tin tailings has only about one-twentieth the fertility of a 20-year-old plantation and its organic content is only about 35% that of an undisturbed lowland forest.

The exceedingly hot soil temperatures of 45° C (in excess of the 50% heat killing temperature of primary rainforest species) and dryness (of sand tailings) due to high porosity and low water table levels make for harsh conditions. This prevents the cultivation of anything useful, save some miserably-looking grasses, creepers, shrubs and unmarketable tree species that eventually colonise tin tailings after decades of desolation.

So tin tailing cultivation is a write-off, right? Wrong, actually. The Bidor Field Research Station, a tin tailing site that is being successfully converted into a biodiversity park cum small-scale forest plantation with agroforestry on the side, is proving that miracles do happen – when you get your amelioration techniques right.

First, you plant pioneer tree species to act as 'nurse' trees. These are the fast-growing, nitrogen-fixing, heatand-water-stress-tolerant types of species that will be the 'site improvers'. Organic matter (mostly leaf litter) deposited by these desert/semi-arid/coastal species will, after some years, enhance soil fertility in preparation for the cultivation of higher quality timber trees.

Plant and animal waste, combined with a small amount of compound fertiliser or industrial waste, is very cost-effective compared to commercial fertilisers alone. Soil microflora and fauna with forest top soils are used in potting mixtures.

Top soil enrichment and mulching can also be employed to improve water retention of sandy tin tailings. Other ways to tackle dry soils include reducing water loss from the root zone (via evapotranspiration) with root-balls of seedlings planted to 45 cm below the soil surface.

Deep-hole planting at sand tailings, rotovation rounds and ploughing are used in planting, while raised planting beds and drains to carry away rainwater are used to address water-logging in slime tailings.

Thus, by using nurse trees to ameliorate the soil before quality timber species are introduced, the site is being rehabilitated at minimum cost.

However, assessing overall economic viability is still on-going as this can only be determined after taking into account growth data at stand age 5 or 6 years and all tending costs involved.

## <u>News Briefs</u> The Grapevine

## Minister:Aim for Zero

**ZERO** waste management must be instilled and practised by mills to achieve full use of timber and other forest resources. So said Primary Industries Minister Dato'Seri Dr Lim Keng Yaik when speaking at the pre-exhibition briefing of the recently-concluded Malaysian International Furniture Fair (MIFF) at the Putra World Trade Centre in March.

The Minister also said that furniture manufacturers and exporters should regard certification as a marketing tool especially when targeting the European, American and Australian markets where sentiment for the environment is very "intense".

Dato'Seri Dr Lim called for proper product development and design to produce quality furniture that can stand alongside the best in the world.

"We must shed our image as a producer of cheap rubber wood furniture," he said.

Export earnings from the timber industry, one of the top three foreign exchange earners for the country, took a dip to some RM15.4 billion last year. – MIFF

#### German Loggers Into African Conservation

A GERMAN logging company last year gave up its lease on a tract of rainforest in the Congo Republic. An untouched ecosystem set in a fast-deteriorating landscape, the 100square-mile Goualogo Triangle would be added to the adjacent Nouabalé-Ndoki National Park.

African conservation experts said this was the first time a logging company had voluntarily given up land rights without some trade-off.

The agreement was announced by company officials, the Congo government and scientists from the Wildlife Conservation Society (WCS) which worked with the company to survey the region's wildlife.

Officials of the company, Congolaise Industrielle des Bois, or CIB, said that once the biological riches in this particular tract were evident, it was clear the land had to be set aside, even though they estimated the timber was worth US\$40 million.

Hinrich L. Stoll, the president of the company, said the decision was part of an intensifying effort to shed the long-standing image of tropical loggers as despoilers of fragile ecosystems.

However some private environmental groups were not as quick to hail the announcement. – *The New York Times* 

#### Perak Go vernment: Fell And Be Fined

**BEWARE**, tree fellers in Perak. The State government is serious in enforcing legislation that prohibits the cutting down of trees measuring 0.8m and more in circumference. Trees in house gardens, included.

In line with the Nation In A Garden plan by 2005, culprits have to cough up as much as RM 5,000 or up to RM 50,000 if the trees felled are marked for conservation.

Local Government and Town Council chairman Datuk Chang Ko Youn said the law prohibiting tree felling had long *More on next page* 

#### From previous page

existed but faced difficulty in enforcement because of "uncertainties" in damage evaluation among others. – *Berita Harian* 

#### Forget SFM: Slash And Burn Away

**GREEN** forestry practices such as selective logging are not helping a certain species of tree saplings to grow as much as large-scale land clearings. The recalcitrant species? None other than the most valuable Amazonian hardwood on the international market – mahogany.

"Forest departments around the world have invested millions of dollars doing something that doesn't work," says Laura Snook of the Indonesian-based Centre For International Forestry Research. Snook and her team in Central America have found that planting mahogany under the forest canopy – a practice known as enrichment planting – is futile.

To propagate and prosper, mahogany needs plenty of sunshine – a rare commodity in both primary rainforest and selectively logged forests. Forests cleared bare of trees (as when happens in natural catastrophes) provide the ample light the trees need.

Experiments show that seedlings planted in slash-andburn (a good approximation of a catastrophe) plots have the best growth results, while those planted under canopy were least able to thrive. The findings are already influencing forestry practice in Mexico – Mayan Indians who harvest mahogany, are now being encouraged to plant seedlings in their slash-and-burn fields. – *New Scientist* 

#### FMUs: Too Long, Too Big, Too Hard

**SEVERAL** groups and non-governmental organisations have called on the Sabah government to review some components of the forest management units (FMUs) agreement that is being run by the Sabah Forestry Department and some firms.

They felt the management period was too lengthy, the areas allocated were too large and the management of units too difficult for some companies.

Under the programme, 2.7 million ha of Class II (Commercial) Forest Reserve under 27 packages of FMUs of 100,000 ha each were allocated to 15 companies to implement mainly reforestation projects over a period of 100 years to check the State's fast-dwindling timber resources.

The Department and companies running the units are said to meet soon to review their progress. – *Bernama* 

#### Forest Facts & Figures

**A TOTAL** of 20.20 million ha or 61% of the country's land area is forested land (but this includes forest plantations).

Of this, 14.44 million ha constitute Permanent Forest Estates (PFEs) which includes protected forests (3.84 million ha) and 10.6 million ha of productive forests which can be logged. National parks, wildlife and bird sanctuaries comprise 2.19 million ha (of which 0.32 million ha are in PFEs).

The total area marked for biodiversity conservation is 5.31 million ha with 111,800 ha designated as virgin jungle reserves.

The forestry sector garners RM17 billion in export earnings and employs 250,000 people to date. – *Ministry Of Primary Industries* **T** 

# A **Milestone** In Rainforest Biodiversity Conservation

One of the most significant Southeast-Asian projects to date, this tree flora book and its precursors, are must-reads for varsity students, EIA formulators – and loggers

Review by John P ayne

#### Tree Flora Of Sabah And Sar awak Volume Three by E. Soepadmo & L.G.Saw (Editors) 2000/119 pages; RM 50; Order Code:TFSS 3

HIS volume, and that of earlier ones, fulfill admirably the aims of the Tree Flora Of Sabah And Sarawak Project launched in November, 1991.

The aims include documenting and updating the taxonomic status of Sabah and Sarawak's native trees, upgrading Malaysian capability and expertise in plant taxonomic research and strengthening the management capability of Malaysian herbaria and their databases.

This volume covers just three large families (Fagaceae, Moraceae and Myristicaceae) and the subfamily Caesalpiniodeae (Leguminosae). Fagaceae is a common family in Borneo's hill and lower montane forests, while Myristicaceae accounts for a high proportion of understorey trees in most Borneo dipterocarp forests. About 75 species of stranglers, climbers and epiphytes are included in an excellent key based on vegetative characters.

I rate this project as one of the most significant in Southeast-Asia in relation to conservation of rainforest biodiversity, and hope that funding limitations will not be a constraint to the continuation of the project. Most tropical rainforests will be lost. If we wish to save some of it, we must identify and argue for the preservation of specific areas (both protected areas and timber production forests).

But we first need to know what exists in as many areas as possible. I believe tree species composition is a good indicator of both biological endemism and diversity in a particular forest area. Describing and evaluating tree species composition requires, at the very least, an experienced botanist, or a keen biologist or ecologist armed with high-quality books.

Even now, there are perhaps only 25 or so people in the world who can go into any bit of forest in Borneo and immediately name to genus level, the first five trees that they see. In short, projects which help produce more good botanists and comprehensive tree identification aids are a prerequisite for identifying focal areas of high biological diversity.

The issues of comprehensive and consistent reliability are of great importance in rating the quality of tree flora books. On this basis, this project is of extraordinarily high value.

But I would love to have included in a future volume, a practical combined guide to identifying trees to family and genus level in the forests of Sabah and Sarawak, using features relating mainly to bark and leaves. Features of particular genera or species helpful to identification should be included. Features relating to bark slashes are helpful to field workers.

The Tree Flora volumes ought to be obligatory reading in Malaysian degree courses in biological sciences. People who conduct environmental impact assessments should read all the sections on Distribution. The volumes can also be made available to the

field operations of logging companies, which often employ one or two staff who have the potential to learn, but with no source of encouragement or information.

IREE FLOKA of SABAH AND SARAWAK Volume Three

This is an edited extract of the review that was published in the International Forestry Review 3 (1), 2001. Payne is an ecologist for the Indonesian-EU South and Central Kalimantan Production Forest Project

## Forest Charms To Give Away

FRIM in a nutshell is charmingly portrayed in all its multi-faceted forest lure in this pictorial gem, making it an ideal gift for nature lovers

Review by Dr Gary Theseir a

#### Windows On The Forest:Glimpses Of FRIM For The Nature Loving Visitor by Louis Ratnam 1995/144 pages; RM55; Order Code:WIN

AM frequently asked by friends, relatives and potential clients what FRIM is all about and I find myself not knowing really where to start.

How does one begin to describe the wealth of

flora and fauna, not to mention the plethora of human activities that occur within FRIM's boundaries even within a single 24-hour span?

Well, I, for one, have found the answer in the form of this attractively bound coffee-table book. And it would make a great gift too, I would imagine.

It is a great deal to ask of an author to squeeze FRIM between two 9-inch by 10-inch covers of a book. Any writer will submit that compressing the little over 600 hectares of FRIM into less than 150 pages is a daunting task. To comprehensively encompass such a broad range of topics, Mr Ratnam uses a balanced collage of text and photographs to paint a vivid and colourful image of FRIM in all its diverse moods, which is at once both complete and concise.

Updated with a second edition in 1997, the book fills a long-empty niche in documenting the day-to-day (night-to-

night, for the nocturnal) activities of FRIM and both its human

and non-human denizens. The book quite logically divides into seven chapters, each of which 'opens a different window', as it were, on FRIM.

This is followed by a special tribute to Dato'Dr Salleh Mohd Nor, who piloted FRIM through the transition from its previous incarnation as Forestry Research Institute, and nurtured it through its infancy as the fledgling Forest Research Institute of Malaysia.

A large part of what makes this book so engaging is the quality and subject matter of the photography contained therein. The book features more than 200 works by no less than 12 photographers, some professional, and others whose work is no less so.

Like a virtual tour through the multi-stratified forest ecosystem, the photographs depict vistas ranging from a soaring, crested serpent eagle-eye-view of the tallest dipterocarps to a civet cat's up-close inspection of minute fungal organisms straining clear of the living mat of organic matter carpeting the forest floor; from the stillness of a mistshrouded wetland dawn to the frenzied cacophony of children at play in FRIM's many recreation areas.

Reading this book was a wonderful learning experience as well. I have been questioning my FRIM colleagues about a rich 'pandan'or fragrant screw pine (*Pandanus amaryllifolius* Roxb.) smell that frequently permeates distinct areas of

FRIM. I actually suspected that a species of tree might have been responsible

for the fragrance; but I never suspected the source to be a member of a mammal family that is more often known for its rank or musky odour – a civet cat, *Paradoxurus hermaphroditus* to be precise. The book is also balanced

in its presentation of technical and scientific concepts using terms easily grasped by scientist and layman alike. Extremely technical topics ranging from tissue culture plant propagation to materials testing and composite wood products research are presented in a transparent,

comprehensible manner. The more insatiably curious (of which I am one) will wish for a bibliography and reference list to follow-up the topics that we find more captivating, but that is the sole shortcoming of the book.

I am unequivocal in recommending this book as an invaluable addition to any home or office library (equal perhaps, only to a week-long guided tour of all 600 hectares of FRIM).

Dr Theseira, from FRIM's Forest Plantation Division, specialises in the simulation of biological and physical systems, plant physiology and soil physics



koompasta excelsa, Malaysta's tallest tree, found in lowland forests, with a highest recorded height of 91 m

# In Praise Of Forests

It's free entry to FRIM this World Forestry Day on March 21st

ONSIDER our forests.

They produce timber to fashion our furniture, refurbish our houses, and craft a great many other forest products. They give us paper for our literature in our not-yet-paperless society. They give us herbs in our cooking and medicines for our healing. They are home to an astonishing host of wondrous plants and fascinating animals. They are a source of livelihood for our 'sons of the forest', the Orang Asli. They are a provider of local employment and national income. They are the great sponges which gather and release water, the regulators of our climate, the green lungs breathing out that fast-vanishing commodity: oh-sosweet, oxygen-rich air. They are havens of retreat.

Blessings like these ought to be treated with a little more respect,

don't you think? Problem is, many are not aware of the role forests play in sustaining our very lives.

So, let's arm ourselves with forest knowledge. FRIM, being a forest research institute can help. In the *kampungs* as well as the universities, among the learned and the layman, we can all do our bit.

Since the United Nations body, FAO, marked March 21st to remember our forests, many nations have adopted this practice.

In the United States, a presidential proclamation marked World Forestry Day as part of a week of activities and ceremonies about the role of the forest and forestry in every man's life. In Australia, a national committee representing states, territories, universities and timber producers launched a campaign which included distribution of free booklets and a 15-minute television film.

# FRIM Happenings **Tip Toe Up A Tree... And Save It**

FRIM conducts a tree climbing course for staff

REES used to get hurt when spiked-shod plant collectors scaled them, be they to collect seeds from elite mother trees for tree breeding or to gather shoots of infested trees for entomological studies, for example. Well, not anymore.

To ensure minimal stripping of barks and other trunk wounds, (and incidentally the safety of climbers as well!), FRIM conducted a tree climbing course using improved methods devised by the German Agency For Technical Cooperation.

With the expertise of a Pahang Forest Department staff engaged by FRIM to conduct the January 21-25 course, 34 staff from various divisions learnt the 'free-style and pump-up'approach to tree climbing.

A throw bag with throw line is first hoisted over a large, sturdy branch followed by the climbing rope. Once secured, the climber, fitted with a safety harness, can start planning his movement into the canopy.

Free style requires considerable skill on the part of the climber to twist the rope with both his feet while pushing himself upwards using an ascender (metal clips to secure climbers to the main rope system), while an ascender pump equipment is used to pull and push the climber along a suspended rope in the pump technique. As the climber is basically moving up *without* holding onto the main tree trunk, the tree is not injured in the process.

Climbers must use safety gears such as the cambium saver, carabiner and dynamic rope to work within tree tops. He can also 'monkey around'– transfer from one tree to another (within 5 to 10 metres apart).

There are several reasons why FRIM staff need to climb trees, in case you think it's for the sport of it. (Although there *were* representatives from the Institute's Outdoor Recreational Club).

The care and maintenance of trees, the identification of plants within ecological plots, the sampling of leaves, fruits and flowers in biodiversity projects, the collection of shoots for tissue culture and the collection of plants for medicinal evaluation are some of the reasons.

Yet another reason is the setting up and pulling down of cable systems atop trees to extract logs from the forest to minimize damage to residual stands, using the latest in reduced impact logging technique – the ground-based and mobile tower yarder.

Information for this article is obtained from Dr Marzalina Mansor from FRIM's Seed Technology Section and Tree Breeding Unit which helped organise the course

