ARBORICA

"Pioneer in Malaysia Tropical Arboriculture"

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PERSATUAN ARBORIST MALAYSIA

ARBORICULTURE GURU

Professor William M. Fountain

PArM

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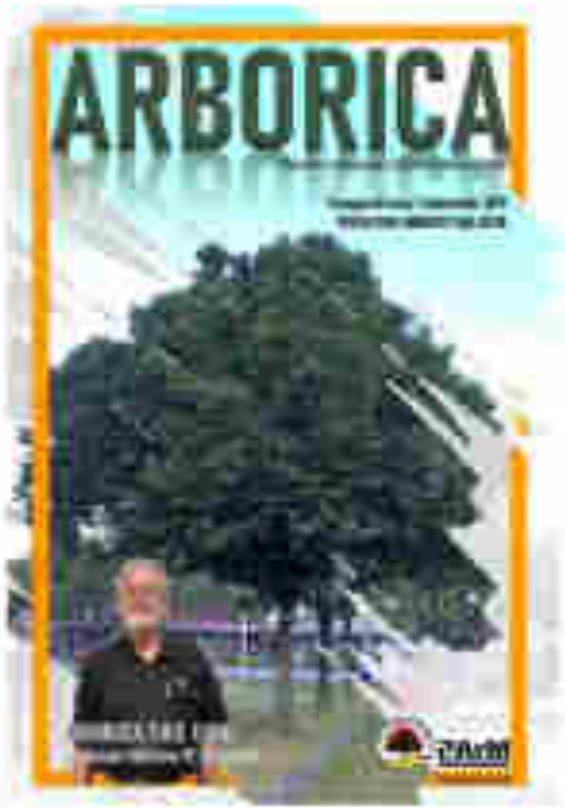

ON THE COVER

Prof. William M. Fountain
The Arboriculture Guru

The Elegance Ironwood
An Iconic Tree of PARM

THE ARBORICA TEAM

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Malaysian Society Of Arborist (PArM)

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FOREWORD

from the President

بسم الله الرحمن الرحيم

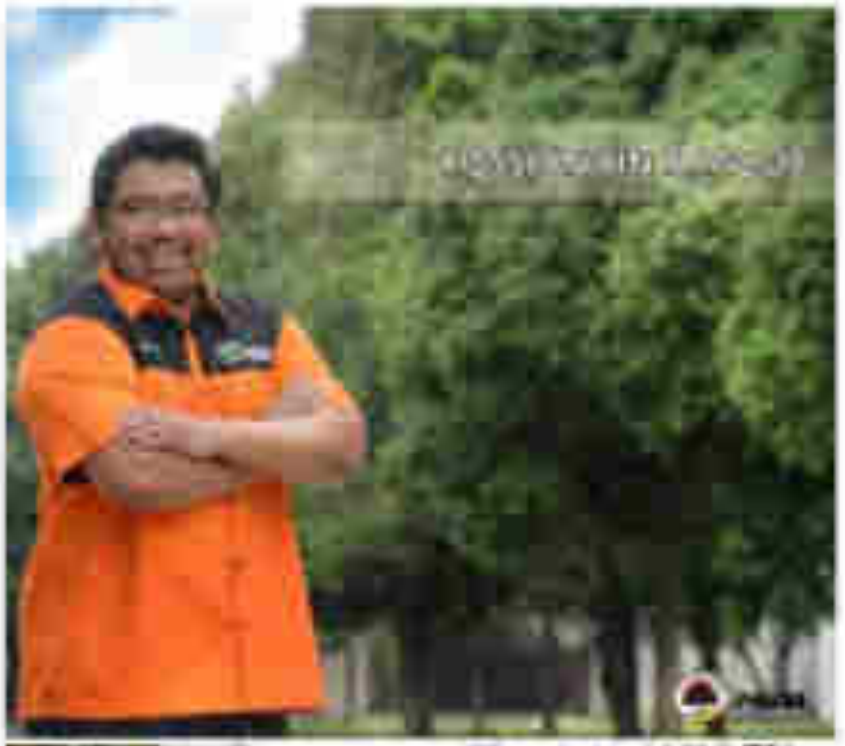
Assalamualaikum Warahmatullahi Wabarakatuh dan Salam Sejahtera.

Syukur ke hadrat Illahi kerana buat julung kalinya Persatuan Arborist Malaysia telah berjaya menerbitkan senaskah penerbitan berkaitan arborikultur yang dinamakan sebagai ARBORICA. Nama ARBORICA adalah hasil cetusan idea jawatankuasa penerbitan yang menggabungkan perkataan arborikultur dan tropika. Seiring dengan keperluan semasa yang menekankan perkongsian ilmu di dalam bidang arborikultur, penerbitan ini menjadi titik permulaan untuk penyebaran maklumat berkenaan aktiviti arborikultur di Malaysia. Bertemakan Manfaat Pokok dan Persekitaran, penerbitan edisi pertama ini menekankan peranan dan kepentingan pokok kepada persekitaran dan manusia.

Selaku Presiden Persatuan Arborist Malaysia (PArM), saya ingin merakamkan setinggi-tinggi terima kasih di atas kerjasama dan juga kepercayaan yang telah diberikan oleh semua ahli kepada Jawatankuasa PArM Sesi 2018/2020. Tanpa sokongan ahli, pasti sukar untuk kita melahirkan ARBORICA. Penerbitan ini sejajar dengan hasrat PArM untuk menjadi sebuah Persatuan Bukan Kerajaan (NGO) yang disukai dan disegani. Sehubungan ini saya amat mengalu-alukan setiap ahli PArM untuk menyumbang idea dan maklumat terkini di dalam industri arborikultur di negara tropika. Sumbangan idea daripada pelbagai agensi luar terutamanya dari pihak universiti tempatan, Institut Penyelidikan dan dari Pihak Berkuasa Tempatan juga amatlah dihargai untuk penambahbaikan ARBORICA.

Saya sentiasa meletakkan harapan yang tinggi untuk PArM agar menjadi sebutan ramai sebagai Persatuan yang boleh diteladani atau ditanda aras oleh lain-lain Persatuan di negara ini, dalam pelbagai aspek.

Akhir kata, saya ingin merakamkan ucapan setinggi-tinggi penghargaan dan terimakasih kepada semua ahli jawatankuasa dan ahli PArM yang telah menyumbangkan artikel, idea dan tenaga dalam menghasilkan penerbitan ini. Komen anda semua amat dialu-alukan bagi memperolehkan penambahbaikan dibuat untuk keluaran akan datang. Diharap dengan penerbitan ARBORICA ini, maklumat berkaitan arborikultur dapat dikongsi bersama ahli persatuan khasnya dan masyarakat secara amnya.



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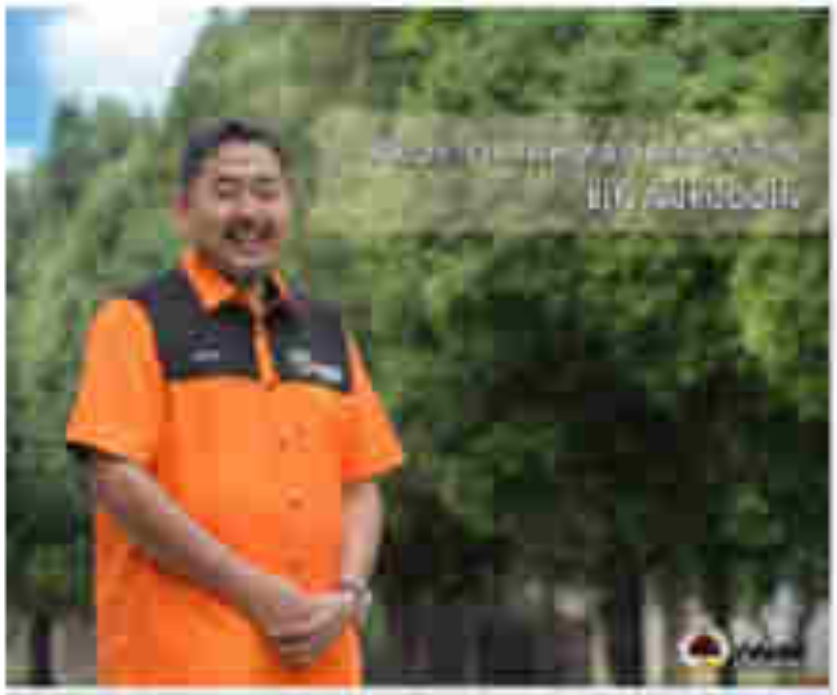

Trees have multiple functions and are being planted in the cities primarily to beautify the urban landscape. They provide the green comforting view of the cities and soften the rough images of the concrete features usually dominant in the cityscape. These trees through their canopies ameliorate the urban environment by reflecting the incoming solar radiation and help in reducing thermal radiation emanating from the absorption of sun energy by the concrete and road asphalt.

Trees enhance other life forms and increase biodiversity in the cities by providing habitats and food for the wildlife further enriching the urban ecosystem. These animals also help the trees by helping the process of pollination and dispersal of their seed for the germination and species rejuvenation.

Recent research findings have shown the importance of trees in improving the health and well-being of urban inhabitants. These trees and nature can relieve 'nature-deficit disorder' which is caused by excessive time indoors. Trees also absorbed and removed air pollution and help in preventing incidences of acute respiratory symptoms.

Realising these benefits, many urban cities are increasing their efforts in planting more trees and increasing their tree covers in their cities. This effort is recommended but looking into the future, the need for tree care and management will increase. As such, more tree care professionals such as arborists will be needed to manage and maintain the increasing number of trees. These tree care professionals need to be updated with various scientific advances, best management practices and technology on arboriculture. Therefore there is a need especially in Malaysia to have a good forum and medium where these latest arboricultural technologies and innovations can be disseminated for the Malaysian arborists.

Recognising this needs, PArM has taken the initiatives to produce and launch a publication called ARBORICA which can serve this needs. This is our inaugural issue of ARBORICA, a publication which aim as a forum and information dissemination for arboriculture knowledge. Through this publication, we hope to publish innovations and new research findings from our researchers and practitioners that can benefit and increase the knowledge on arboriculture leading to an increase in better practices and professionalism in Malaysian arboriculture.

I hope you enjoy this inaugural ARBORICA issue and looking forward for contribution from our readers.

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WHO'S WHO?

Bill Fountain

FRIEND OF TREES

In his more fit, energetic days Bill enjoyed hiking; long hikes, often for over a week at a time. Long distance hikers often follow the Native American tradition of giving names to others that reflect their personality or character. He became Walks With Trees. Walking with trees is not an act of superiority or the role of manipulator seeking to control trees for personal benefit but the act of living with them in symbiosis. Were it not for plants, we would soon perish. We truly live as guests of the plant kingdom.

Life should be a series of adventures. Adventure is not to be confused with recklessness. In our profession, arboricultural safety is paramount. Adventure is finding joy in what you do and begins with the excitement, surprises and adventures that come with the first rays of morning light. Risks? Disappointments? Yes, there have been a few. A life without some adversity has not been lived to the fullness.

Bill's love of trees can be traced back to a warm, fall day in New Orleans. His family had just moved to this major international seaport located near the mouth of the Mississippi River. There was a giant sweetgum in the front yard; at least it seemed like a massive giant as it called to the 7-year-old boy. He leaned his bicycle against the trunk, stood on the seat and, with a single bound grabbed onto the lowest branch. Hearing the call of the ancient primate in the boy, a swing of the legs over the branch was followed by a scampering up the ladder of branches. Higher and higher until he was taller than the ridge of their 2-storey house. He felt the exhilaration as the central leader swayed in the breeze. Ocean-going ships 2 km to the north beckoned him to come and explore the world; forests to the west that in time would need to be explore; canals to the south that would teach him patience needed to fish; and oh yes, the elementary school to the east. School, the base of the little boy that thought the forest was a much more exciting and educational classroom. Many years of education later, 21 to be exact would mark the start of a career in arboriculture.

As the child of a minister, the family of five moved frequently. Leaving friends and familiar places for unknown faces and places is always hard on a child. For that matter, change can be hard on us at any age. But, the same fire that hardens steel, melts butter. New opportunities would nurture a growing curiosity of why things were. Moving to new parts of the United States every four years or so exposed the young, plastic mind to new people, new ways of thinking, and new ways for doing old, familiar things. The minister and the daughter of a minister would teach him more than just tolerance for different cultures, races and religions.

Figure 1: Bill and his wife, Cindy. Figure 2: Bill's love for trees never fades.

He learned to appreciate what was dear to others. With time he would grow to revel in the cultural richness and history of Southeast Asia.

The love of travel and people grew and so did the self-confident. The first 12 years of school were tolerated so that the young Walks With Trees could wander and wonder in the woods, observing the delicate balance and interconnectedness of what he would come to know as natural biotic systems.

After completing graduate school, Bill settled in Lexington, Kentucky, working at the University of Kentucky as Professor of Arboriculture and Landscape Management, raised a family, and now has seven grandchildren. (Could there be an eight? He and his wife Cindy can hope.) Lexington is located at the foothills of the Appalachian Mountains. Appalachian is a Native American word meaning "rich, wooded hunting grounds." What better place to live and to watch your grandchildren learn the joy of nature from their parents? Forty years later there is still no target date for his retirement. Why would someone not be retiring as soon as possible? It has to do with finding passion and meaning in a vocation.

As Bill & Cindy's children matured they were encouraged to seek a profession that would result in personal satisfaction. Money is not everything. You have to spend too many years working to dread Monday mornings. Work should give a feeling of productivity, of adding lasting value to society, doing things to help others without expectation of anything in return. Most of us in the green industry and especially the tree care profession know what this means. Some of Bill and Cindy's kids found it, others didn't. One's children are no different than the thousands of students who touch a teacher's life throughout their career. People and trees may look slightly different but in reality they are the same world over.

Passing along the gift of knowledge is an act of selfless love. We don't quit learning just because we reach a certain milestone; be it age, academic degree, or professional credential. Well, some do. Some people die decades before they quit breathing but that's another storey. We can and should all be teachers. Teaching is not just passing along facts to someone else. The connection between facts leads to knowledge. With knowledge and time comes understanding. Ultimately one hopes for wisdom. Wisdom is the intended destination, widely sought but rarely discovered. We credit the prophets of days gone by as having found it. Were they still alive they would be telling us that they are still seekers of knowledge and for us to never stop questioning, discovering, and exploring. Like the trees we care for, we are also a part of the urban forest. Society is always changing and we must never stop looking for ways to manage the urban canopy for the benefit of society.

Bill and Cindy consider Malaysia and their other Southeast Asian experiences to be the crown jewel of their adult lives. Life-long friends have been made. Friends who have taken them into their culture and lovingly taught them the culinary delights unique to their kampong; shown them the young, blossoming love at a Malay wedding; the spiritual oneness that comes with a walk in the tropical forests; and worshiped with us be it temple, mosque or church.

Bill, known as Pawpaw by his grandchildren is an International Society of Arboriculture (ISA) Board Certified Master Arborist™. He is a Registered Consulting Arborist™ with the American Society of Consulting Arborists (ASCA). He is ISA Tree Risk Assessment Qualified and ASCA Tree and Plant Appraisal Qualified. As a citizen of the American south he loves nothing better than a good story, especially if it involves something funny that has happened to him.

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Employment
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- M.S. (Horticulture) Louisiana State University, 1977
- B.S. (Horticulture) Mississippi State University, 1973

Teaching
- PLS 220 – Introduction to Horticulture
- PLS 320 – Woody Plant Materials
- NRE 320 – Introduction to Arboriculture and Urban Forestry
- PLS 597 – Arboriculture

Cooperative Extension
- International Society of Arboriculture (ISA)
  - Council of Representatives (CoR), Chair, Executive Council (2002 to 2011)
  - Council Representative, Kentucky Chapter (KY 2012 to present)
  - Board of Directors (2008 to 2012)
  - Arboriculture and Urban Forestry Editorial Board
  - Arborist News Editorial Board
  - Governance & Bylaws Committee
  - Educational Goods and Services Committee
  - Board Certified Master Arborist (BCMA) Test Committee
  - BCMA Ethics Review Committee
  - Tree Risk Assessment (TRAQ) Instructor Advisory Committee
- Kentucky Arborists Assoc. (Kentucky Chapter ISA)
  - Board of Directors
  - Component representative to ISA CoR
  - Arborist Certification Committee, chair
  - Education & Research Committee, chair
  - Governance & Oversight, chair
  - President Elect (2016-present)

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(3) American Society of Consulting Arborists – Registered Consulting Arborist #[illegible]
(4) American Society of Consulting Arborists – Tree and Plant Appraisal Qualified, Instructor

- Kentucky Division of Forestry
  - Urban Forestry Advisory Board
  - Grants Committee
- Central Kentucky Ornamental and Turf Assoc.
  - Board of Directors, Technical advisor
  - Conference Program Planning
- Northern KY Urban Forestry Council
  - Advisor for urban forestry management practices
  - Training for municipal employees
- Metro Tree Advisory Commission (Louisville KY), Technical Advisor
  - Metropolitan Sewer District Stormwater Project
  - African American Heritage Center redevelopment project
  - Whitehall tree assessment
- Lexington Tree Foundation
  - Board of Directors, Technical Advisor
- LFUCG Tree Board, Technical Advisor
  - Public Policy Committee
  - America in Bloom
  - Tree City USA
- University of Kentucky
  - Ag. Faculty Council (2014-2016)
  - Tree Campus USA Committee
  - Evaluation team (Tree Campus Inventory)
  - Urban Tree Initiative Working Group
  - Implementation of BMP by Grounds Maintenance crews
- Boone County Arboretum – Plant Selection Committee
- The (UKBG/UCOS) Arboretum, State Botanic Garden of Kentucky
  - Events & Programs Committee
  - Walk Across Kentucky Council
- National Junior Horticultural Association (http://www.njha.org/)
  - Convention Site Committee, chair (Lexington 2014)
  - Training for KY youth horticulture judging team

International
- Tree Risk Assessment Qualification (Singapore, Malaysia, Hong Kong, Canada)
- National Parks Board (NParks) (Republic of Singapore)
  - Centre for Urban Greenery and Ecology (CUGE), Research Fellow
  - CUGE Research Advisory Board
- Institute of Arboricultural Studies, Leisure and Cultural Services Dept. (Hong Kong)
- Putra Tech University (HK) Urban Forestry Audit

THE ELEGANT IRONWOOD
An Iconic Tree of PARM

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Ever wonder what that tree is, being auspiciously displayed on PARM'S exclusive logo? Well, wonder no more as it is in fact non-other than the spectacular Ironwood Tree or more popularly known as Penaga Lilin as its local name. Penaga Lilin or India Rose Chestnut is also known by many other different vernacular names within this region such as Lenggapus (Peninsular Malaysia), Nagasari (Indonesia), Gangaw (Myanmar), Bunsak (Thailand), Ka Thang (Laos), Bosneak (Cambodia), Vap (Vietnam), Ceylon Ironwood (Sri Lanka) and Sirunagapoo (India). The botanical name for Penaga Lilin is *Mesua ferrea* L. from the Calophyllaceae family and not to be confused with its synonyms such as *Calophyllum nagassarium* and *Calophyllum penduvoculata*. In Latin, the species epithet 'ferrea' means belonging to iron, refering to its timber thus the name Ironwood. This species can be found naturally distributed in India, Sri Lanka, Nepal, Myanmar, Indo-China, Thailand, Peninsular Malaysia, the Philippines and Indonesia as well as planted as ornamental and shade tree elsewhere in the Malesian region. *M. ferrea* is occasionally found in evergreen forest, not only from the riverine, flat lowland forest to the undulating hills (up to 500 m altitude) but also on ridges with shallow soils. In the tropical forest, it is classified as a main storey species.

Figure 1 & 2. The handsome looking *M. ferrea* trees with a very dense and compact crown. Figure 3. The greyish-reddish-brown bark has its fair share of attraction

Figure 4. The attractive yellowish pink of the new flushes of *M. ferrea*

M. ferrea is an evergreen tree, medium-sized up to 30 m in height with straight bole and fluted or with small buttress at the base. Its bark is irregularly fissured and flaky, dull brown to grey with purplish tinge whilst the inner-bark is brown red to red or pinkish. Thus, some described the trunk as greyish reddish brown in colour. It produces an aromatic exudate or resin, which is clear whitish to pale yellow. The beautiful dark reddish brown timber is of great value as the heartwood is very hard and heavy and tends to sink in water. The timber is strong and durable with a density of 940 – 1195 kg/m3 at 15% moisture content. The timber trade name for this species is Penaga and is classified under Heavy Hard Wood (HHW) in Malaysia. *M. ferrea* is the most important source of Penaga timber. The timber is suitable for all forms of heavy construction including railway trash and boat but it may take up to more than hundred years to reach timber size due to its slow growth. The name Penaga is also synonym with the name of a place located in Penang.

M. ferrea is a handsome looking tree especially when in full vigour with its ever-attractive conical, dense and bushy crown (Figure 1 and 2). Its greyish-reddish-brown bark also adds to the attraction (Figure 3). This makes it an excellent tree for avenue planting. Albeit a very slow growing species, it is frequently planted in parks, gardens and by the roadsides. As opposed to its natural condition in the forest which is rather tall in appearance and perhaps branchless for up to 20 m, this species is likely to retain its lower branches until ground level when planted in the open environment. To a certain extent and if left unattended, even the tree trunk is concealed creating a hedges-like effect in the landscape. This has makes it as one of the preferred trees planted in the urban areas. The dense canopy with low branching habit of the tree is suitable for perimeter planting, windbreaker and

Figure 5. The dark green upper side and whitish beneath of mature leaves is a conspicuous combination.

screening to hide undesirable view. Due to its branching habit and dense foliage, a study by Mohd. F. Shahidan et. al. (2010) revealed that *M. ferrea* has a more significant thermal radiation filtration capability as compare to *Hura crepitans*. However, being a slow growing tree, the impact may not be immediate lest larger-sized saplings are used during planting.

One very outstanding feature of this elegant tree is undeniably its vivid and attractive yellowish pink young leaves, drooping gracefully in tassels (Figure 4 & 5). Having a row of Penaga Lilin in a particular landscape displaying these striking coloured flushes is definitely a sight to behold. This characteristic of young leaves certainly adds vibrant to the already beautiful and green landscape scheme. Flushes are produced several times in a year and flushing is notably conspicuous during the rainy period follows dry month. To complement the remarkable backdrop, the maturing leaves are pale green turning dark shiny green on the upper side with a distinct whitish and waxy beneath (Figure 6). It's vernacular name Penaga Lilin derived from this unique waxy condition or 'lilin' in Malay language (Figure 7), in contrast with Penaga Laut, another related species from the same family. Another interesting feature of the leaves is that the waxy side will produce popping or cracking sound when torched with fire.

The showy flowers of *M. ferrea* are large, very fragrant with four white petals and bright golden yellow stamens in the centre (Figure 8). Blooming is seasonal, mostly during dry weather upon the beginning of rain after a long dry spell. These beautiful flowers not only an eye-catching to human being but also an attraction to other being such as birds and insects. Interestingly, the flower buds are traditionally used to treat various disease like cough, diarrhoea, indigestion, loss of appetite and gastritis. The medicinal effects shown by the flowers buds could be due to the presence of volatile phytochemicals (eugenol and cinnamaldehyde) as studied by Rajalakshmi et. al. (2019). The fruits of *M. ferrea* are purplish-brown in colour and the seeds are easily propagated with a high germination rate. Similar to the flowers, both leaves and fruits are said to have some medicinal properties and are used as traditional medicines.

Figure 8. The flowers which resemble fried eggs giving the tree its nickname 'fried egg tree' (Photo: Mohd Afendi Hussin)

The desire by PARM's founding members to select *M. ferrea* as PARM's iconic tree and to eternalize the species on its logo was undoubtedly apt and befitting. Just as how the Ironwood tree grows, slowly but surely, from a tiny seedling to become a healthy, safe and functional tree, so does PARM. PARM has steadily grown from being a novice during its inception to become an established organization championing the course of tropical arboriculture in Malaysia as truly aspired by its founding members. With the immense support from its members who come from multiple disciplines and professions, PARM will absolutely grow stronger and better whilst stay elegant.

Figure 7. Young leaves turning pale green hanging vividly from the tree crown. Figure 8. A closer look at the waxy part of the leaves beneath hence the name Penaga Lilin

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http://www.worldagroforestry.org/treedb2/speciesprofile.php?Spid=1770

TREES AND HUMAN:
Invaluable Relationship

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Human and trees have had a deep and significant relationship throughout time. Interconnectedness with trees is manifested through tangible and intangible attributes such as the provision of oxygen, carbon storage, soil stabilization, aesthetic, psychological effects and many more. Streets, parks and playgrounds planted with trees create peaceful environment and foster habitats to the wildlife in urban settings. Embracing the benefits of trees will enhance our quality of life.

The rate of urbanization has caused pressure to the environment and the well-being of the human. Experiences with trees have been shown to have psychologically restorative effects, such as recovery from stress and fatigue and the triggering of positive emotions (Whitburn et. al., 2018; Colin et. al., 2014). In addition, exposure to trees and natural environments has also been shown to improve cognitive functions and feelings of vitality while decreasing physiological markers of stress (Berman et al., 2008; Nisbet et. al., 2011). The potential for reducing negative psychological states or increasing positive ones is a well-established value present in trees and natural landscapes, known as restorative potential. In urban context, urban green spaces, such as parks and urban forests, are green elements which many intuitively consider healthy. Besides that, mystery, as an indicator of having winding shapes of paths and expansive body of trees, was the most preferred spatial configuration of space (Figure 1). Walking among trees does contribute to spiritual healing, increase comfort and solace to human.

Figure 1: Mystery, as an indicator of having winding shapes of paths and expansive body of trees, was the most preferred spatial configuration of space.

Figure 2: *Azadirachta indica* (Neem Tree). The leaves are used to cure chicken pox.

Trees as healers carry powerful healing abilities which can be found in the real medicinal powers of materials and compounds they produce. For example, the leaves of *Azadirachta indica* or Neem Tree (Figure 2) relieve the symptoms associated with viral infections, including common cold, herpes, influenza and chickenpox (Kumar et. al., 2016). *Ginkgo biloba* which is also known as Maidenhair Tree has therapeutic properties from its extract which include improving cognitive function (Silberstein et. al., 2011). The leaves of *Cinnamomum iners* or locally called as Medang Teja is known to have antioxidant properties (Mustaffa et. al., 2016).

Trees also give indirect values and symbolism that determined people belief, culture and function (Ismail, 2016). Normiadilah and Noriah (2012) stated that Malay culture has an intricate relationship between traditional and cultural circumstances. Trees and other plants in the house garden are not merely for medical and healing purposes, but more or less it is a part of the culture. Some believed that trees with fragrant flowers like Pokok Tanjung or *Mimusops elengi* (Figure 3), Cempaka Kuning or *Magnolia champaca* (Figure 4) are associated with death and ghost. In certain cultures, trees are even considered sacred. For example, *Ficus religiosa*, or commonly known as "Sacred Fig" was considered sacred by the followers of Hinduism, Jainism and Buddhism (Verma, 2016). Besides that, mango trees or *Mangifera indica*, supplies fruit as food and leaves for ritual and religious purposes by the Hindus.

Figure 3: The fragrant, pale yellow flowers of *Mimusops elengi* (Pokok Tanjung)

Trees also play a key role in Chinese gardens. According to Lauher (2016), in Feng Shui, lush trees around the house signal health and prosperity. Trees located near the entrance but not so close that they block flow of chi and create a feeling of oppression, create a sense of protection, as if the trees are guarding your home. Planting trees on the front lawn in symmetrical groups of three, six or nine trees, since these number combinations have strong positive properties. The trees are not only physically linked but are also mysteriously bonded and connected to human's well-being. The function of trees in generating shen and ci and balancing the yin and yang forces of nature is the basic of successful Chinese garden design. It can be said that great diversity of tree species and varieties mirrors ethnic and cultural diversity in its differences in appearance, customs and traditions.

Figure 4: Flower of *Magnolia champaca* (Cempaka Kuning) which produced a sweet smelling fragrance

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SPESIS TEMPATAN vs. EKSOTIK
Kepelbagaian Biologi dan Spesies Tempatan

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Pemilihan pokok spesies tempatan dan spesies eksotik masih lagi menjadi dilema pengamal industri arborikultur di Malaysia dalam mengaplikasikan apa yang telah dipelajari dalam kursus arborikultur. Ahli arborikultur sudah sedia maklum tentang kekurangan dan kelebihan apabila menggunakan pokok eksotik sebagai bahan tanaman. Kekurangan yang paling nyata adalah kesan ke atas kepelbagaian biologi, namun pemahaman tentang kepelbagaian biologi ini masih kurang difahami dan dihadam. Ditambah pula dengan halangan-halangan atau kesukaran yang timbul bila menanam pokok spesies tempatan, maka usaha menanam spesies tempatan di landskap perdaran dan perumahan di Malaysia masih belum boleh dibanggakan.

Apa pentingnya kepelbagaian biologi ini? Selama berjuta tahun hidupan di dunia merupakan hidupan yang sentiasa bergantung di antara satu sama lain untuk hidup. Ini termasuklah yang paling penting dalam kitaran makanan. Kemandirian sesuatu spesies sentiasa bergantung pada sumber ruang, makanan, iklim yang sesuai, penyakit, pemangsa dan rakan sekeliling. Manusia juga sentiasa bergantung pada sumber kepelbagaian biologi terutamanya sumber makanan dari tumbuhan dan haiwan, mencari ubat mengubati penyakit, menjual hasil kepelbagaian dalam industri pertanian, perhutanan dan lain-lain.

Malaysia merupakan negara yang diiktiraf sebagai negara 'megadiversiti' yang menjuk pada negara yang mempunyai kepelbagaian biologi flora dan fauna yang tinggi. Pembukaan kawasan dan penukaran kawasan yang dulunya hutan menjadi kawasan perbandaran atau kompleks perumahan secara automatik mengurangkan jumlah kepelbagaian ini. Manusia termasuk kita telah mengubah sual landskap dunia daripada habitat semula jadi yang menampung beribu spesies kehidupan kepada habitat yang hanya boleh menjadikan beberapa spesies sahaja termasuklah Homo sapien yang selesa hidup di dalam rumah berhawa dingin atau kondominium mewah, beberapa spesies burung yang boleh bersarang di celah dinding, mamalia kecil seperti tikus di longkang, serangga seperti nyas di bawah tangki, reptilia seperti cicak di siling, amfibia seperti katak di celah paip bunga dan beberapa spesies serangga lain. Menanam pokok di kawasan yang telah berubah ini merupakan satu usaha yang terpuji dan mampu menampung kehidupan lain walaupun asal tujuannya adalah semata-mata memenuhi naluri manusia yang mendapat ketenangan daripada kehijauan, angin segar yang bertiup dan kicauan burung di pagi hari.

Jadi apa kaitannya dengan kita sebagai arborist dan pemilihan spesies tempatan? Jawapannya ialah kita sebagai manusia terpilih perlu mengambil kira tentang spesies-spesies hidupan lain yang telah hidup bersama-sama kita. Pokok yang ditanam bukan sahaja dapat memberikan manfaat kepada manusia malah dapat memberikan perkhidmatan kepada spesies hidupan lain. Sebanarnya soalan pertama yang perlu difikirkan bila menanam pokok adalah adakah spesies pokok yang ditanam akan mengganggu ekosistem sedia dan memberi faedah kepada hidupan lain? Berapa banyak spesies serangga atau burung yang menggunakan *Bucida* sebagai sumber makanan atau tempat tinggal dibandingkan dengan pokok Ketapang (*Terminalia cattapa*)? Serangga pada amnya adalah bersifat selektif dan hos-spesifik pada sumber makanan dan habitatnya. Ini boleh dilihat contohnya spesies lebah yanga amat selektif dalam menjadikan sumber makanan dan tempat tinggal seperti lebah Tualang (*Koompassia excelsa*). Lebah pula adalah antara agen pendebungaan yang paling penting di dunia sehingga ada yang berkata sekiranya spesies lebah pupus, spesies manusia dan haiwan lain juga akan pupus kerana kebanyakan tumbuhan berbunga tidak akan dapat lagi menghasilkan bunga dan buah serta kesannya menyebabkan spesies tumbuhan akan pupus.

Figure 1: *Koompassia excelsa* yang menjadi sumber makanan dan tempat tinggal sepam lebah Tualang. (Source: http://tropical-theferns.info/image.php?id=Koompassia+excelsa)

Antara sebab utama pokok asing boleh hidup subur di kawasan kita adalah kerana tiada pemangsa dan penyakit di negara/kawasan baru. Spesies tempatan juga memerlukan masa untuk beradaptasi dan berevolusi untuk bersama dengan spesies asing tersebut. Jadi apabila kita menanam pokok asing, apakah kita akan membantu dalam memastikan spesies hidupan lain seperti burung, serangga, kulat dan bakteria yang ada di negara kita dapat terus hidup?

Memang diakui terdapat pelbagai cabaran dalam menanam pokok tempatan terutamanya isu stok tanaman yang baik, kadar pertumbuhan yang perlahan, peratusan pokok yang mati di tapak dan lain lain masalah disebabkan oleh faktor biotik dan abiotik. Namun kita perlu sedar bahawa dunia sekarang sedang menghadapi krisis kehidupan yang serius. Pada era ini saintis dan pemikir dunia berpendapat krisis dunia yang sedang berlaku adalah akibat perbuatan manusia terhadap alam semula jadi. Badan panel antarabangsa IPBES (*Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*) pada bulan Mei 2019 yang disokong oleh PBB telah melaporkan bahawa sejumlah 1 juta spesies tumbuhan dan haiwan diancam oleh kepupusan. Semenjak era tamadun manusia berkembang pada tahun 1900 sehingga kini, jumlah spesies flora dan fauna yang hilang dari muka bumi ini adalah dengan kadar yang terlalu cepat dibandingkan dengan zaman sebelumnya. Ini disebabkan oleh (1) perubahan pada penggunaan tanah dan lautan; (2) eksploitasi organisma; (3) perubahan iklim; (4) pencemaran and (5) spesies asing bersifat invasif. Teknologi dan mesin yang dicipta manusia bukan sahaja membantu manusia hidup dengan lebih mudah tetapi menyebabkan proses kemusnahan ini berlaku dengan pantas.

Figure 2: *Terminalia mantaly*, salah satu contoh spesis eksotik yang ditanam secara meluas di Malaysia.

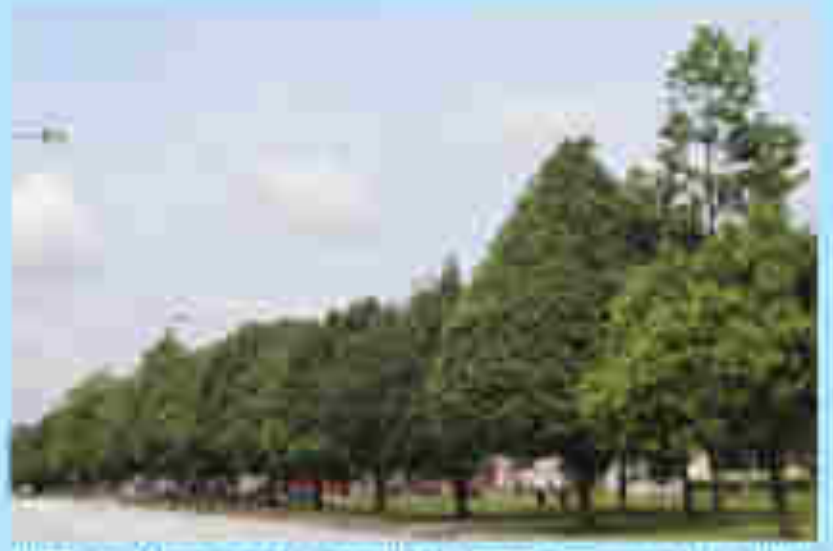

Figure 3: *Mesua ferrea*, spesis lokal yang mempunyai nilai estetika dan berpotensi untuk menjadi tanaman landskap yang komersial.

Ada juga yang menggelarkan era geologi ketika ini hanya ditujukan kepada 'Zaman Antropocen' [*Anthropocene Epoch*] yang mana ia merujuk kepada kepada era di mana perbuatan manusia memberi impak besar pada landskap dan hidupan di dunia [Nota: zaman sekarang dipanggil zaman geologi *Holocen* yang merujuk pada 12,000 tahun selepas iklim menjadi stabil daripad zaman ais (ice age) yang memperlihatkan tamadun manusia berkembang dan maju].

Sebagai arborist yang peka kepada alam sekeliling marilah kita sama-sama berusaha untuk menghijaukan kawasan dengan spesies tempatan dan bukannya menambah keparahan dalam krisis sumber kepelbagaian biologi yang sedang berlaku. Masyarakat dunia sedang berusaha untuk mengurangkan impak kemusnahan ini dan kita seharusnya bergerak serada dengan mereka dalam kapasiti kemampuan kita sendiri.

PTEROMA PENDULA
Common Bagworm Defoliating Landscape Trees and Palms

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INTRODUCTION

Trees are vulnerable to many insect pests. Some of these insects can severely affect the growth and ecological functions of the trees. Thus, a regular tree care-and-maintenance as prescribed in the Plant Health Care program, which includes pest monitoring should not be neglected. Pest monitoring will help identify potential problems and address any issues before damage can occur on the trees. Among the insects that need to be monitored are the bagworms. Bagworms are polyphagous insects that feed on a variety of trees and palms and one of the species is *Pteroma pendula*. The symptom of its infestations on trees or palms is easily noticeable but the caterpillar is always unnoticeable to many landscape managers because its feeding stage, the caterpillar, is hiding in the self-made case.

BAGWORMS

Bagworms are insects in the order Lepidoptera and family Psychidae. They are small to large-sized larvae (caterpillars) living entirely in self-made cases or bags as the name implies. There about 60+species known in South East Asia (Robinson et al. 1994). Bagworms feed on a wide range of host plants and some species are major pests of economically important crops in Malaysia. One of the most common economically important bagworms in Malaysia is *Pteroma pendula*.

Description of Pteroma pendula

Pteroma pendula is a serious pest of many palms, including oil palms, trees, and shrubs. It is a small bagworm, with its fully-grown larva measuring from 7 to 9 mm (Figure 1). The case is cylindrical and made up of fine pieces of dried leaves neatly woven with its silk. It pupates in the case and hangs itself, like a pendulum, on a long fine strand of silks = 10 mm, attaching below leaf surfaces or twigs (Figure 2).

Figure 1. A mature larva of *Pteroma pendula* feeding on an Areca leaf

Figure 2. Pupal cases of *Pteroma pendula* hanging from branches of a severely infested tree

Biology

Like most bagworms, *P. pendula* has relatively unique biology and morphology. The adult is dimorphic. The male moth is winged whereas the female lacks functional appendages, vermiform-like and remains entirely in the case till death. Figure 3 illustrates the morphological differences between pupae and adults of *P. pendula*.

Figure 3. (a) A male pupa (b) A female pupa in a cocoon (c) Adult females (Courtesy of Cheong Yew Leong) (d) Adult males

Newly hatched larvae crawl out of cases and hang on a fine strand of silk. They drift and spread the infestation to other parts of the tree or to a new host tree. Upon landing, they readily eat the foliage by scraping the leaf surface. The larvae only protrude their heads and thoracic legs from the front of the cases when they are moving and feeding, and retract into the cases, close both their openings and attach firmly to twigs or leaves when resting. The larvae continuously add leaf fragments to their cases while feeding. As the larvae molt and grow, the cases get longer and bigger until they stop feeding and pupating in the cases.

Upon emergence, the short-lived male moth guided by the female sex pheromone locate and mate with the female. The male protrudes and inserts its abdomen coupled with its copulatory organ through the posterior opening of the female case to reach the female moth (Figure 4). After mating, the female lays her eggs inside its cocoon enclosed within her bag (Figure 5). The number of eggs per female (fecundity) is about 75 eggs and varies with the host plant they were feeding (Lee et al. 2015). She finally shrivels and drops dead on the ground or dies in the case. This bagworm has a lifespan of about 50 days that translates into a minimum of seven generations per year (Cheong et al. 2010a).

Figure 4. A pair of *Pteroma pendula* copulating (Courtesy of Cheong Yew Loong)

Figure 5: Eggs deposited in its cocoon

Damages

Pteroma pendula is a very common pest of landscape trees and palms. Young larvae usually scrape upper surfaces of leaves or fronds without making holes in them. As they grow bigger, their feeding damages become more noticeable. The larvae consume the leaves or fronds, making many irregular-shaped holes in the leaves. The severely infested foliage turns yellowish to light brown that can be seen from a distance as if the tree or palm is partly or severely burned. Figures 6 and 7 respectively show, an *Andira inermis*, and a Bottle Palm, heavily infested with *P. pendula*.

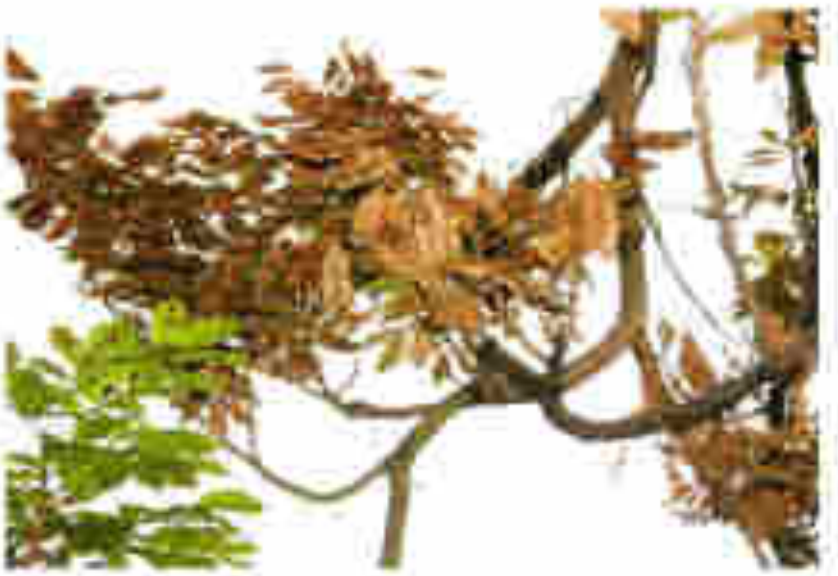

Figure 6: *Andira inermis* severely infested with *Pteroma pendula*

Figure 7: A Bottle Palm severely infested by *Pteroma pendula*

MANAGEMENT OF PTEROMA PENDULA BAGWORM

Several methods of managing bagworms, including *P. pendula*, have been recommended for bagworms attacking trees and palms. For effective management, the principles of integrated pest management (IPM) must be considered. The method to be selected, among others, should be based on the aesthetic value and location of the affected plants, level of the damages and environmental impacts of the selected treatment.

Cultural control

Cultural control together with monitoring should be regularly practiced in managing insect pests of landscape trees including bagworms. If the numbers are small, the bagworms may be removed by handpicking the cases or pruning the infested branches if it is permissible.

Biological control

There are several naturally occurring pathogens, parasitic wasps and predatory insects that attack the bagworms (Cheong et al. 2010b; Norman et al. 2017). The impact of these natural enemies, however, may not be enough to control the bagworm population. Thus, biological control using a pathogen, *Bacillus thuringiensis*, a bacterial insecticide, may be applied when the population is still low. It has been reported that *B. thuringiensis* offers good control of bagworms (Tan et al. 2008; Mohd Mazmira et al. 2011). It is host-specific and does not contaminate the environment. It is therefore recommended for controlling bagworms attacking landscape trees and palms.

Chemical control

Even though, chemical controls are the most effective means of controlling bagworms, they are recommended for critical cases. Products containing spinosad, imidacloprid, acephate, carbaryl, bifenthrin, cyfluthrin, and cypermethrin are listed for controlling bagworms. Depending on the mode of activity on insects, these insecticides may be applied as a conventional spray or a trunk injection. Trunk injection of systemic insecticides is often a preferred method for controlling insect pests, including bagworms, in the landscapes because it minimizes problems of spray drift, applicator exposure, and non-target effects. It should be noted that chemical control should be aimed to achieve acceptable control with minimal use of insecticides.

Habitat manipulation

Habitat manipulation is aimed to increase beneficial insects particularly populations of parasitic insects (parasitoids) in chosen habitats. This is done by planting nectar-bearing plants such as *Cassia cobanensais*, *Euphorbia heterophylla*, *Antigonon leptopus* and *Turnera subulate* in the habitat. These plants provide nectaries, which serve as a food source for parasitoids of the bagworms (Basri et al. 1998). Apart from providing a food resource, these plants also provide shelter from environmental hazards, such as extreme temperature, that may be detrimental to the survival of the natural enemies, (Rodriguez-Saona et al. 2012). This approach has been substantiated with reports that the presence of these plants significantly increased the abundance of parasitoids and decreased the bagworm populations (Basri et al. 2001). Thus, increasing the landscape diversity with flowering plants and integrating with an environmentally friendly biopesticide application, can augment the natural enemy population available to control insect pests of the trees. This innovation does not only benefit the natural enemies but also the pollinators, the bees and the butterflies, an important element in a sustainable ecosystem.

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PETUA ARBOR
Petua Penanaman dan Penjagaan Pokok

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Kita sering mendengar bahawa di dalam kehidupan ini terdapat pelbagai petua, tips atau amalan yang diamalkan bagi tujuan yang pelbagai. Sebahagian besar daripada petua, tips atau amalan ini boleh dikatakan telah diketahui secara umum. Kebanyakannya diperoleh dan diamalkan sejak turun temurun manakala tidak kurang juga terdapat sebahagiannya merupakan petua-petua yang agak baharu dan jarang-jarang kedengaran. Kata-kata seperti "orang-orang tua pesan,.." merupakan lafaz yang sering kita dengar apabila petua ini ingin disampaikan. Petua ini (baik yang baharu atau yang lama) sebenarnya berfungsi sebagai salah satu bentuk nasihat merangkumi pelbagai aspek kehidupan. Ia turut memainkan peranan yang besar di dalam memberi panduan menjalani kehidupan yang lebih baik. Mungkin kita juga perlu mengakui bahawa sebahagian daripada petua ini agak sukar untuk dikaitkan keberkesanannya dari sudut sains ataupun logik.

Tahukah anda bahawa beberapa aspek di dalam penanaman dan penjagaan pokok juga mempunyai petuanya yang tersendiri! Petua-petua ini sebahagiannya saling berkait dan berkisar mengenai kaedah memperoleh kejayaan di dalam penanaman serta menguruskan tanaman itu sendiri. Sebahagiannya agak pelik dan meluculkan! Antara petua yang dipraktiskan untuk merangsang pertumbuhan pokok di peringkat awal penanaman ialah dengan menyiram pokok yang kita tanam dengan air basuhan tangan kita sendiri! Secara peribadi saya sendiri pernah dinasihatkan bahawa ***orang-orang tua pesan , kalau dah habis(selesai) menanam, siramlah pokok dengan air basuhan tangan kita yang menanam.***

Selaku warga yang berkecimpung di dalam bidang yang berkaitan dengan pokok, ada masanya timbul keinginan untuk merungkai bagaimana pesanan ini dijadikan panduan oleh generasi yang terdahulu daripada kita. Pengetahuan asas di dalam teknik penanaman pokok melorongkan kefahaman yang lebih baik mengapa petua di atas dijadikan tips oleh orang yang terdahulu.

Tangan yang menggali, menyediakan lubang penanaman dan menanam pokok pastinya tidak dapat tidak, akan bersentuhan dengan tanah asal tapak dan begitu juga dengan tanah bebola akar anak benih pokok. Kedua-dua kawasan sentuhan ini merupakan lokasi yang diketahui terdapatnya pelbagai 'makhluk halus' yakni mikrob yang mempunyai peranan besar di dalam aktiviti menyuburkan tanah. Samada generasi terdahulu menukar tanah yang digali dengan tanah yang baharu atau menggunakan kembali tanah yang asal untuk diisi ke dalam lubang tanaman tersebut, aktiviti atau amalan membasuh tangan yang telah kotor dan berlumuran tanah bolehlah dilihat sebagai kaedah mengembalikan semula mikrob yang melekat di tangan ke lokasi pertumbuhan akar pokok tersebut.

Terdapat pelbagai lagi petua yang berkait rapat dengan penanaman dan penjagaan pokok. Sekiranya anda mempunyai petua anda yang tersendiri, kongsikanlah bersama kami! Petua yang dikongsikan tidak semestinya mempunyai penjelasan mengapa ia dikatakan begitu. Cukup sekadar menyatakan petua yang anda ketahui bagi tujuan memdaterangkan kebaikan kepada pokok yang kita tanam. Moga petua-petua ini membantu dan menyuburkan lagi semangat untuk kita terus memelihara khazanah alam ini. Jumpa lagi!

Rajah 1: Penjagaan pokok disalaikan berkaitrapat dengan petua tertentu

‘TINY FOREST’
Community Project at SK Air Baruk, Jasin, Melaka

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Tiny Forest is a community-based project at SK Air Baruk in Jasin, Melaka. This project is advised by a certified arborist, Dr. Sreetheran Maruthaveeran on the proper arboricultural practices. It is one of the activities under the Eco-School Programme which emphasises outdoor learning environment. SK Air Baruk is one of the pioneer schools in Malaysia to take up the challenge of turning this idea of having a 'Tiny Forest' in their school. This community project is a collaboration between the school with Green Growth Asia Foundation and Universiti Putra Malaysia (UPM). Green Growth Asia Foundation is a non-profit organisation based in Melaka where it provides a platform for leadership, thought and action in responding to sustainability challenges in Asia through their programmes. As for UPM we play the role as the technical experts in giving inputs in terms of species selection, planting scheme and applying proper arboricultural practices. In addition, we from UPM also nurture the teachers and students on by several talks and workshops on tree benefits in general and also tree care. This is important, because the aim of this project is to establish not only a 'Tiny Forest' but a 'Sustainable Tiny Forest'. This is crucial because the teachers and students will be the care takers of their 'forest'.

This project aims to raise awareness among the residents of the school particularly the children on the importance of forests in keeping the environment healthy and sustainable, as well as to promote an outdoor learning experience.

Figure 1: Teachers and students of SK Air Baruk are getting involved in the tree planting process

Figure 2: Trees with varieties of tree form, leave texture, flowers and height were planted to create the natural forest look.

This project involves the creation of a small patch like forest in the school compound. Initially the group from UPM suggested about 22 local species such as Tanjong (*Mimusops elengi*), Merawan Siput Jantan (*Hopea odorata*), Tembusu (*Cyrtophyllum fragrans*), Damar Minyak (*Agathis borneensis*), Pulai (*Alstonia angustiloba*), Penaga Lilin (*Mesua ferrea*), Kelumpang Jari (*Sterculia foetida*), Gelam (*Melaleuca cajuputi*) and many more. In order to create the forest effect, the trees were planted in a more informal way where trees with different characteristics such as different leave texture, shape, flower colours and different shape of canopies were plated next to each other. This is also to avoid any monotonous in the planting scheme and more importantly to create a natural look of the forest. This 'Tiny Forest' once established will cater the teachers and students for the outdoor learning environment. It also gives a sense of belonging to them.

The residents of SK Air Baruk also were introduced with some maintenance terms such as 'staking' which is very necessary for newly planted trees. Besides just planting the trees and let the students and teachers to look after them, the team have also developed a tree growth monitoring sheet for this project. The team strongly believes that this monitoring form will be useful for the students and teachers to monitor their trees such as taking simple data e.g. diameter, height, crown spread, any damaged parts etc. In the planning process, once the trees have established the team would like to introduce the QR code for each of the planted tree and also a name tag with local and scientific name for each of the trees.

Overall this project is still in progress. However, this was a great community project because a great deal of commitments and support from all parties were involved. It was also a good opportunity for me to share my knowledge on arboriculture with the residents of SK Air Baruk. In here I personally would like to acknowledge the principal of SK Air Baruk En Nizam Aziz for his full commitments in this project with Mr. Sri Themudu and his team from Green Growth Asia Foundation for inviting us into the project and my colleague from the Forest Faculty, UPM Dr. Akmar Abd Aziz who oversees the environmental education part in this project.

PERSATUAN ARBORIST MALAYSIA

Pemerajuan Bidang Arborikultur Tropika di Malaysia

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LIEW YING YIE (LAr., CA.)

PArM ACTIVITIES - 2018/19

Prepared by:
PUTERI NOORLELA BAHRUN (CA)
Persatuan Arborist Malaysia (PArM)

1. Program Penanaman Pokok Persatuan Arborist Malaysia bersama Komuniti di Sungai Kuyoh, Seri Kembangan, Selangor

Tempat: Sungai Kuyoh, Seri Kembangan, Selangor.
Tarikh: 28 Julai 2018
Masa: 9.00 pagi hingga 4.00 petang


2. Dialog Bersama Pelajar di ALAM 2018, UITM Seri Iskandar Perak

Tempat: UITM, Seri Iskandar, Perak
Tarikh: 27 Julai 2018
Masa: 8.00 pagi hingga 12.00 tihari


3. Kunjugan Hormat ke Jabatan Landskap Negara (JLN)

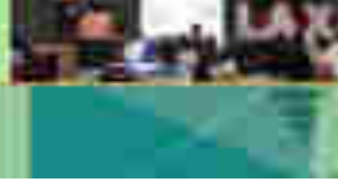
Tempat: Bilik Mesyuarat JLN
Tarikh: 31 Julai 2018
Masa: 10.00 pagi hingga 12.00 tihari


4. Working Group On Planting Materials - Landscape (WG/A/15-5) Untuk Penyediaan Malaysian Standard - Amenity Trees And Palm: Pruning

Tempat: SIRIM dan Herbarium, DBKL
Tarikh: 1 – 2 Ogos 2018, 2 Okt 2018
Masa: 9:30 pagi hingga 4.30 petang

5. Landscape Expo 2019 (LEX' 19)

Tempat: Kuala Lumpur Coventional Center
Tarikh: 27 hingga 29 Ogos 2018
Masa: 9.00 pagi hingga 6.00 petang




6. Malaysia Hari Ini (MHI) TV3 : Di Pokok - Arborist

Tempat: Sri Pentas , Bangsar, KL
Tarikh: 18 September 2018
Masa: 8.30 pagi

7. International Tropical Arboriculture Conference (INTAC KL 2018)

Tempat: Hotel Sunway Putra
Tarikh: 25 – 27 September 2018
Masa: 8.00 pagi hingga 5.00 petang



8. Malaysia Tree Climbing Competition (MTCC)

Tempat: Botanical Garden Kuala Lumpur
Tarikh: 28 – 30 September 2018
Masa: 8.00 pagi hingga 5.00 petang


9. INTAC KL 2018 Appreciation Night

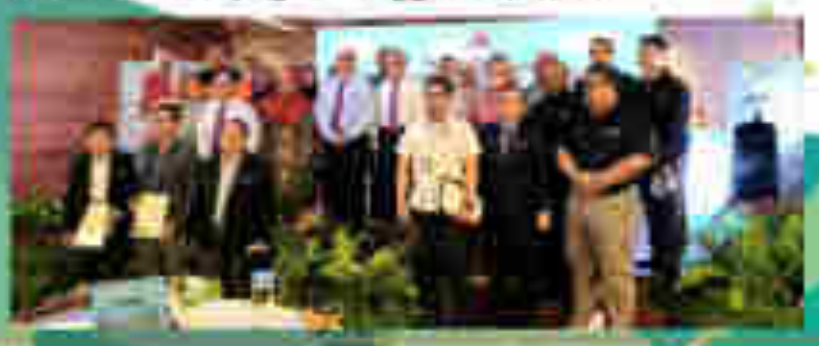
Tempat: Majestic Hotel, KL
Tarikh: 12 Januari 2019
Masa: 7.30 malam - 10.00 malam

10. Hari Landskap Negara 2019
Tempat: Taman Botani Putrajaya
Tarikh : 1 – 3 Mac 2019
Masa : 8.00pagi hingga 5.00 petang

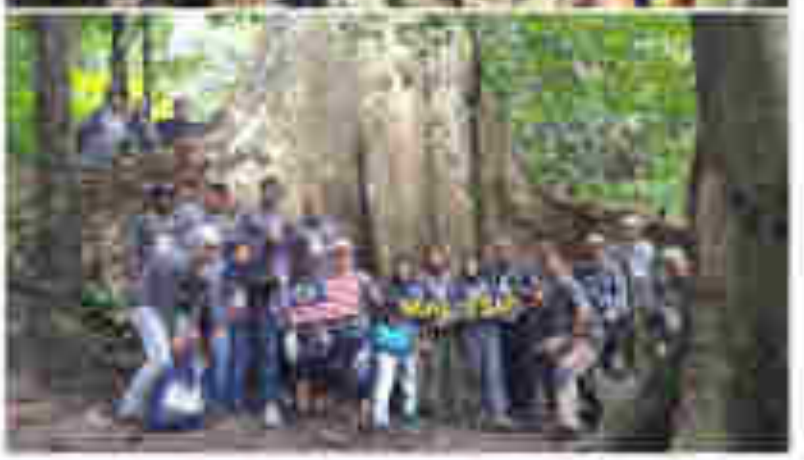
11. Asia Pacific Tree Climbing Championship (APTCC) 2019
Tempat: Christchurch, New Zealand
Tarikh : 5 -7 April 2019

12. PArM Technical Visit BOGOR
Tempat: Bogor Indonesia
Tarikh : 8 – 12 April 2019

13. Majlis Pelancaran Pelan Pengurusan Pokok Rendang Kuala Lumpur
Tempat: Biro Pelancongan Kuala Lumpur
Tarikh : 30 April 2019
Masa : 11.30pagi sehingga 1.00 t/hari



14. PArM Technical Visit 02
Tempat: Royal Belum, Perak, Malaysia
Tarikh : 24 – 25 Ogos 2019



15. PArM Camp Royal FLORIA Putrajaya 2019
Tempat: Taman Botani Putrajaya
Tarikh : 31 Ogos - 8 September 2019

ABOUT PArM

membership of PArM

FARIZA FIRDAUS MOHD SALLEH CA.
Persatuan Arborist Malaysia (PArM)

MEMBERSHIP INFORMATION

Membership in PArM shall provide many benefits to its members. It provides saving on money value for association's merchandise purchase and having a good marketing on your services and being listed as to verify your credential status by others and your future clients. It will help keep you up-to-date on the latest industry news and practices. It connects you to a network of other Certified Arborists (CA) and arboriculture professionals for you to work with and learn from.

Joining PArM serves you as an individual by advancing your career, but it also serves the profession on a global level by promoting proper tree care and research to consumers around the world. Being a PArM member, you can feel good knowing that you are helping yourself and making the world a better place, one tree at a time.

The society's membership is open to all Malaysian citizens and those who resides in Malaysia aged 18 years and above.

The membership is categorized as follows :

Professional Member
Ordinary Member
Corporate Member
Veteran Member
Lifetime Member
Student Member

CATEGORIES OF PArM MEMBERSHIP	REGISTRATION FEE	YEARLY FEE
1) Professional Member	RM 50.00	RM 100.00
2) Ordinary Member	RM 50.00	RM 100.00
3) Corporate Member	RM 50.00	RM 500.00
4) Veteran Member	RM 50.00	[illegible]
5) Lifetime Member	RM 50.00	RM 1000.00
6) Student Member	RM 10.00	RM 25.00

CATEGORIES OF PArM MEMBERSHIP

1) Professional Member :
Open to all individuals actively engaged in the arboriculture field including scientist, researcher, manager or administrator and anyone interested in planting or preserving trees. Applicant must possess atleast experience of five (5) years in arboriculture or related field.

2) Ordinary Member :
Individuals who are interested in tree management.

3) Corporate Member :
Open to all private commercial firms and organizations with three (3) nominees who interested to uphold and support PArM's goals, visions, objectives and welfares of PArM and intends to make contributions.

4) Veteran Member :
Open to all members who have been retired (55 years) and has been a professional for ten (10) years previously with good performance and reputations.

5) Lifetime Member :
Open to all Ordinary Members who made payment of lump sum RM1,000.00 for once in a lifetime.

6) Student Member :
Limited to full-time students who are studying for at least two (2) years in arboriculture, urban forestry, forestry, landscape architecture, botanical science and agriculture in recognized institutions at entry level certificate or higher level education.

Every application for the membership must have an application form filled together with payment made for registration fee and annual membership fee for a year and must be proposed and supported by one current valid member. To qualify for PArM student membership, the applicant must submit a copy of his/her students's card.

The application must be sent to PArM Secretary and shall be presented to council and committee for approval. Each approved applicant shall made their registration fee and their first year of annual fee as imposed and stated in PArM membership rates and eligible to receive benefits as a member.

All members are advised to be an ISA member to International Society of Arboriculture (ISA).