

Botanic garden profile: Rimba Ilmu (the ‘Forest of Knowledge’) at 50

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Abstract

Established in 1974 within the Universiti Malaya campus, the Rimba Ilmu Botanic Garden is Malaysia’s first university botanic garden. Occupying nearly 60 ha in the Klang Valley, Malaysia’s most populated metropolis, Rimba Ilmu has evolved from an abandoned rubber plantation into a garden of 1,300 planted species, with many more spontaneously established. Unusually for a botanic garden, it eschews a formal flower garden aesthetic in favour of a tropical forest one: natural processes shape the Garden and its inhabitants alongside human-directed curation. As one of the last large green lungs in the Klang Valley, Rimba Ilmu provides essential ecosystem services to the city. The site houses the oldest and largest university herbarium in Malaysia, Universiti Malaya Herbarium (KLU), where 81,000 specimens are stored. Since the late 1990s, Rimba Ilmu has played a role in public environmental education, supported by facilities such as its Rare Plants & Orchid Conservatory and *Rain Forests & Our Environment* permanent exhibition. Rimba Ilmu has a community-oriented ethos. It has long supported the participation and development of volunteers, and continues to welcome collaborations with diverse partners. Holding on to a mission of research, conservation and education, Rimba Ilmu is part of the United Nations University’s Regional Centre of Expertise on Education for Sustainable Development Central Semenanjung. In 2024, Rimba Ilmu celebrated its 50th anniversary with a series of public events and a specially commissioned exhibition, *Belukar dah jadi Rimba*.

Introduction: history and ethos

Founded in 1974, the Rimba Ilmu Botanic Garden⁷ is Malaysia’s first university botanic

garden, situated within Universiti Malaya’s⁸ (UM) main campus in Kuala Lumpur (Wong & Mohamad, 1997; Sugumaran, 2005). The name ‘Rimba Ilmu’ (Malay for

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⁸ Universiti Malaya is Malaysia’s oldest and flagship university. Founded in Singapore in 1905 as the King Edward VII College of Medicine, a merger in 1949 resulted in the University of Malaya (Singapore) (MNJ). Following a division, the University of Malaya relocated to Kuala Lumpur in 1959. In the decades since, it has been known as Universiti Malaya (Malay) and the University of Malaya (English). ‘Universiti Malaya’ is the official name.

‘Forest of Knowledge’) was given by UM’s Vice-Chancellor, Royal Professor Ungku A. Aziz (Wong *et al.*, 2021), and this is reflected in the Garden’s forest-like aesthetic, as opposed to that of a more formal flower garden.

The Garden was pioneered by UM’s then Head of Botany, Professor W.R. Stanton, and Reader Dr B.C. Stone. Established to study and conserve some of the immense diversity of plant life found in the Malaysian tropical rain forest (Mohamed, 2000), Rimba Ilmu’s principal mandate was to ‘build up a representative collection of Malaysian and other plant species for scientific research, conservation and education’ (Wong & Mohamad, 1997). Rimba Ilmu started out with a scholarly mandate of research and teaching for experts and students, where proximity to students was a key consideration for its establishment: ‘A stroll round a properly labelled group of plants arranged in some phylogenetic, ecological, or geographical order provides a subliminal learning-exercise which no amount of book-work or lecturing can achieve’ (Universiti Malaya, 1970). Considered ‘Malaysia’s only true botanic garden in the late twentieth century’ (Reisz, 2003), Rimba Ilmu has evolved from being an inward-facing teaching facility for biology and medical students and a living laboratory for staff research in the 1970s. Since the 1990s it has been accessible to the public for education and enjoyment while retaining its original mandate (Mohamed, 2000; Wong *et al.*, 2021).

Initially spanning 40 ha of a secondary forest complex encompassing hills, slopes, valleys and small natural streams, Rimba Ilmu was expanded to cover 80 ha – a quarter of UM’s total area – in 1999 (Nejim Al-Asedi *et al.*, 2024). According to UM’s Estates Department, Rimba Ilmu now occupies 57.3 ha (Fig. 1). The Garden’s curated and publicly accessible

areas measure approximately 13 ha, housing over 1,300 plant species in living collections that include medicinal plants, palms, wild fruit trees, citrus and citroids, wild orchids, bamboos and ferns (Wong & Mohamad, 1997; Sugumaran, 2005). Besides its living collections and herbarium, Rimba Ilmu also has a 70-seat auditorium, a Rare Plants & Orchid Conservatory, research laboratories, plant houses and a permanent exhibition, *Rain Forests & Our Environment*, which is accessible to the public and operates as a self-guided learning facility (Mohamed, 2000; Sugumaran, 2005). Situated between the nation’s capital, Kuala Lumpur, and the satellite city of Petaling Jaya, Rimba Ilmu is an important green lung for the Klang Valley (or ‘Greater Kuala Lumpur’) metropolitan area (Sugumaran *et al.*, 2018).

From 1974 to 2022, the Garden was managed by the Department of Botany (later absorbed into the Institute of Biological Sciences); in the last two decades, the team typically comprised two academic staff members assisted by one or two science officers, a receptionist, an artist/illustrator and a small team of approximately ten ground staffers (Sugumaran, 2005). A change in management structure placed Rimba Ilmu under the direct purview of the Vice-Chancellor’s office, and in August 2024, the Garden was brought into joint administration with two other UM research facilities – the Glami Lemi Biotechnology Research Centre in Jebebu and the Smart Agrosience Centre in Gemas – under the oversight of a group director.

Geographical and historical context

Malaysia is hot and humid. Temperatures tend to remain constant, with daily highs of 30 °C to 32 °C and lows of 22 °C to



Fig. 1 Drone aerial image of the Rimba Ilmu Botanic Garden taken in January 2019. Photo: The Rimba Project.

23 °C. Rainfall is substantial, with mean annual precipitation exceeding 3,000 mm (World Bank, 2021). Malaysia is one of 17 megadiverse countries, home to 210 mammal species, 620 bird species, 250 reptile species and 14,500 plant species (Purton, 2024). More than a quarter of all lowland forest tree species in Peninsular Malaysia are endemic. Within terrestrial ecosystems, forests are the major repository of biological diversity: over 90 per cent of Malaysia's terrestrial biological species – most of these rare – occur within natural forests (Wong & Mohamad, 1997; Mohamed, 2000).

However, numerous challenges present themselves in a developing tropical country. Wong *et al.* (2021) note the following:

- Landscapes can change faster than people can take proper stock of flora or fauna
- Many forest plants produce flowers or fruit irregularly or sparsely, limiting opportunities to verify their taxonomy
- The science and significance of conservation is not widely understood
- The pool of conservation professionals is small, and the complementary tasks of developing scientific knowledge and advocating for habitat protection often pull in opposing directions.

Malaysia's emergence from British colonial rule beginning in 1957 brought its own set of challenges: in 1963, the Federation of Malaya merged with Sarawak, North Borneo

and Singapore to form Malaysia, only to split from Singapore two years later. These political changes meant that the Singapore Botanic Garden was no longer available as a resource for Malaysia. Meanwhile, colonial botanic gardens (British and Dutch) in the region were declining for administrative and economic reasons (Universiti Malaya, 1974).

Against this backdrop of a fledgling nation with an immense biodiversity and few scientific institutions, Rimba Ilmu was born. Other notable gardens in West Malaysia, such as the Penang Botanic Gardens and Perdana Botanical Garden, were recreational gardens not used much for research (Stone, 1974). Rimba Ilmu was thus the first of several university botanic gardens, to be followed by the botanic gardens of Universiti Kebangsaan Malaysia and Universiti Pertanian Malaysia (Stone, 1974).

The 1970s was dubbed the ‘Decade of Development’ in Malaysia, and at Rimba Ilmu’s official opening the founders cited the Garden’s ‘urgent role especially with degradation and exploitation of Malaysian rainforests, and to maintain the existence of plant species and genetic material’ (Universiti Malaya, 1974). Many plant habitats have been altered or damaged since then, and so Rimba Ilmu continues to be an important and convenient site for scientific research and for learning about the natural heritage of the Malaysian region (Mohamed, 2000).

Development of Rimba Ilmu through the years

The Garden was officially opened on 26 August 1974 by the University’s Chancellor and queen of Malaysia, Her Majesty the Raja Permaisuri Agong, Sultanah Bahiyah. Initially led by botanists W.R. Stanton and B.C. Stone, Rimba Ilmu was gradually transformed – with the help of the country’s most experienced

botanists and the support of other botanic gardens in the region – from an abandoned rubber plantation over several decades. The 1970s and 1980s were intense periods of expansion and consolidation for the Garden, with various core collections established (Sugumaran *et al.*, 2018). In 1986, the Garden was made a part of the International Board for Plant Genetic Resources’ (IBPGR) global network of conservation centres for crop gene pools; it served as a genebank to collect, propagate and conserve wild citrus relatives from Southeast Asia (Wong & Santiago, 1997; Mohamed, 2000). In the next decade, Rimba Ilmu was appointed by the IBPGR’s successor, the International Plant Genetic Resources Institute, to develop its collections as national research and conservation centres for citrus germplasm and bamboos respectively (Wong *et al.*, 2021).

In 1992, the Malaysian government allocated a US\$2 million grant to build a dedicated herbarium and plant houses in Rimba Ilmu. Officially opened in 1997, this new multi-purpose complex included administrative offices, the Herbarium, teaching facilities, research laboratories and the *Rain Forests & Our Environment* permanent exhibition – all of which are housed in an iconic red-brick main building enclosing a courtyard, adjacent to plant houses and the Rare Plants & Orchid Conservatory (Mohamed, 2000). In front of the main building stand two *Borassus flabellifer* (lontar or palmyra palms) (Fig. 2), the leaves of which were traditionally used as parchment, and which appear on UM’s coat of arms.

Overview of the Garden

The first thing a visitor might notice about Rimba Ilmu is that it is not a formal flower garden, and that it has quite a dense canopy.



Fig. 2 *Borassus flabellifer* in front of the Rimba Ilmu building. Photo: Benjamin Ong.

From its beginning, Rimba Ilmu was designed and curated with a forest garden aesthetic, and its living collections have been planted in a fairly organic way to mimic plant growth habits in their natural environments. The Garden's topography offers a variety of planting sites and allows a collection of diverse species from lowland dipterocarp forest, hill forest, beach forest and even swamp forest (Stanton, 1974b; Wong & Mohamad, 1997).

Setting, surrounding environment and biodiversity

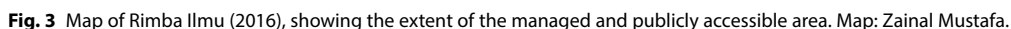
Perhaps the most striking feature of Rimba Ilmu is the proportion and size of unmanaged habitat for an urban botanic garden on prime land. Of the 57.3 ha enclosed by Rimba Ilmu, approximately 40 ha is undeveloped secondary forest. Prior to the 1950s, the UM

campus was an abandoned rubber estate, so overgrown that many days of clearing – by workers equipped with parangs (cutlasses) – were needed to set up the Garden (Stanton, 1974b). In order to maintain a sizeable protective buffer around a comparatively small central area of lawns and open-area displays, existing trees were not clear-felled (Wong & Mohamad, 1997; Wong *et al.*, 2021). Despite the potential of exploiting this reserve forest, the boundary of the managed area (Fig. 3) has barely changed in 50 years. This is due in part to factors that have held true since the 1970s, such as topographical challenges, limited financial resources and a small labour force (Stone, 1974), and also to UM's far-sighted policy of retaining the forested areas (Wong *et al.*, 2021). As a result, Rimba Ilmu offers a singular opportunity to experience the regeneration of a tropical forest from an early post-independence rubber plantation (Fig. 4).

On-site flora – presumably spontaneously established – recorded at the Garden's foundation included hardy secondary-forest species such as *Dillenia suffruticosa* and others that may have dated from before the rubber planting, *Elaeocarpus*, *Streblus*, *Rhodamnia*, *Eugenia* (now *Syzygium*), *Pithecellobium* and *Garcinia*. The ground flora had a small number of Zingiberaceae, *Bromheadia* orchids, Cyperaceae (*Mapania*), *Pandanus* and *Dianella*. There were indigenous lianas including *Dioscorea* (yams), *Millettia*, *Smilax* and Menispermaceae, as well as adventive species and some exotic weeds (Stone, 1974). In the second half of the 20th century, the rubber-tree stands received 'seed rain' from the surrounding areas that, in parallel with the Klang Valley's development, were becoming increasingly reduced in extent and impoverished in species diversity. This seed dispersal into Rimba Ilmu helped grow



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Although Rimba Ilmu has some 1,300 planted species on record, the full extent of its biodiversity remains unknown (Fig. 6). It can be assumed that, as the largest

forested area in UM, it is home to most of the plant, animal, fungal and microbial species found on campus (Yong, 2023). Sightings in the last five years or so include the Rajah Brooke and other birdwing butterflies (Fig. 6A) – probably feeding on plants of the Aristolochiaceae (including a spontaneously growing *Thottea*) (Wong & Mohamad, 1997) – langurs and hornbills. The lilac-flowered herb *Codonoboea platypus* was discovered in Rimba Ilmu's stream gully, having survived land clearance for rubber planting and possibly being among the last few elements



Fig. 4 **A** New growth among old: the secondary-forest trees established after the abandonment of the rubber plantation have matured into the largest non-rubber trees on the site. **B** Tapping scars on a remnant *Hevea brasiliensis* (rubber) tree. Photos: Benjamin Ong.



Fig. 5 Slow-growing lianas, among other locally dispersed species, have established themselves in Rimba Ilmu. Photo: The Rimba Project.



Fig. 6 Animal biodiversity of Rimba Ilmu: **A** *Troides* sp. (birdwing butterfly). **B** *Ahaetulla prasina* (oriental whip snake). **C** *Caprimulgus macrurus* (large-tailed nightjar) mother and chick. This ground-nesting bird has been observed to roost in and around the car park – with its attendant precarities – perhaps attracted by fallen leaves that have been retained in the Garden rather than swept away. **D** *Nephila* sp. (orb-weaver spider). **E** *Scutigera* sp. (cave centipede). **F** *Macaca fascicularis* (long-tailed macaque) in Rimba Ilmu's Bambusetum. Photos: **A & B** Yong Kien Thai; **C** Nurul Fitrah Marican; **D–F** Benjamin Ong.

from an early primary rainforest of the Klang Valley (Wong *et al.*, 2021). With its specially planted landscapes and regenerating tree stands, Rimba Ilmu is a biodiverse sanctuary, home to a plethora of small animals, including monitor lizards, geckos, squirrels, macaques, an interesting array of invertebrate and stream life, woodpeckers, kingfishers, orioles, drongos and even a resident, natural breeding population of the red junglefowl (Rimba Ilmu Botanic Garden, n.d. b).

The 13-ha managed area occupies a narrow valley separated from the larger secondary forest by a loose boundary of steep slopes and streams. Most of the living collections are planted on a horseshoe-like raised area of ground around a central wetland irrigated by a small but permanent stream, which feeds into a freshwater swamp and filters out through the Garden's easternmost boundary (Stanton, 1974b; Stone, 1974; Mohamed, 2000). When the new Rimba Ilmu building complex of 1997 was erected north of the Garden, a walkway was created as the Garden's new main entrance (with the original entrance retained for service access). Today, this corridor (since known as the 'front terrace') has transformed from strips of lawn into a tunnel-like entrance showcasing tropical Malaysian trees – having matured since their planting in the late 1990s – and transporting the visitor from the open expanse of the car park into the canopy-lined shade of the Forest of Knowledge (Fig. 7).

Living collections

The Garden is divided into nine zones (Fig. 3), classified as follows:

- Medicinal Plants
- Palms



Fig. 7 *Firmiana malayana* greets visitors at the entrance to the Garden's front terrace. Photo: Benjamin Ong.

- Citrus and Citroids
- Fern House
- Fruit Trees (collection of common and wild fruits)
- Central Wetlands (also known as the Sago Swamp)
- Shade House (collection of mosses)
- Bambusetum
- Kingham Arboretum (collection of timber and rare forest trees)

The zones also include other plants established there as cover or those that have spontaneously established over the years. Rimba Ilmu has generally applied a 'light touch' maintenance approach, and spontaneous establishments have been allowed to grow as long as they do not adversely affect the health and integrity of the planted collections. Furthermore, many

plants are 'uncategorised' in that they are planted in areas outside of, and in between, designated zones.

Rimba Ilmu's living collections include local fruit and vegetables (durian, mangosteen, rambutan, the *Stenochlaena* fern, *Gnetum gnemon*, bananas and *Parkia speciosa*), plants of industrial importance (rattan, bamboo, the rubber tree, sago palms, timber species including dipterocarps) and plants that have lent their names to towns in Malaysia (*Phyllanthus emblica*, the melaka tree, after which the historic city of Melaka is named; *Areca catechu*, the pinang or betel nut palm, after which the island of Penang is named; and *Ochanostachys amentacea*, the petaling tree, a valuable timber species, after which Petaling Jaya, the satellite city adjacent to UM, is named). Rimba Ilmu also features plants from regions beyond Southeast Asia, including the Americas (the *Hevea* rubber tree, *Roystonea regia* the royal palm), Africa (the cycad *Encephalartos hildebrandtii*, *Dypsis lutescens* the cane palm), Australia (the wattle genus *Acacia*) and the Pacific Islands (*Artocarpus altilis* breadfruit). There are also numerous fig species which, although not all producing fruit fit for human consumption, act as keystone species supporting Rimba Ilmu's plant and animal diversity (Wong & Mohamad, 1997).

Noteworthy citrus and citroid species include *Merrillia caloxylon* and *Burkillanthus malaccensis*. *M. caloxylon* is a remote citroid with lemon-like fruits; an exceedingly rare species distributed naturally from South Thailand and Sumatra to Peninsular Malaysia and Sabah, it seems to occur only as scattered, solitary trees in lowland forest. *B. malaccensis*, the Malay ghost-lime or limau hantu, is considered a primitive citrus and known only from exceedingly

sparse records in lowland forest in northern Sumatra, Peninsular Malaysia and Sarawak (Wong & Santiago, 1997). The Garden is also home to at least 300 species of medicinal interest, many of which await further scientific investigation before they can be recommended for use in treatments. Examples of the better-known plant species in herbal medicine in the Malaysian-Indonesian region include *Andrographis paniculata* (hempedu bumi), *Tinospora crispa* (petawali), *Morinda citrifolia* (mengkudu or noni) and *Eurycoma longifolia* (tongkat ali). The curation of Rimba Ilmu's medicinal plant collection has drawn on studies conducted with various rural and indigenous communities in Peninsular Malaysia, Sabah and Sarawak (Wong, 2001).

Rimba Ilmu is a repository for rare and endangered plants, as well as plants that may be threatened due to habitat destruction and may become rare or endangered in the near future. The Garden is home to all four species of the unusual palm genus *Johannesteijsmannia*, lowland palms of the forest undergrowth (Fig. 8). These palms have large undivided leaves arranged in a huge rosette, superficially resembling giant shuttlecocks that funnel nutrient-bearing dead leaves and twigs from the tree crowns above to the base of the palms below (Wong & Mohamad, 1997). Examples of hyper-endemic species include *Maingaya malayana*, a rare tree in the witch hazel family (Hamamelidaceae), not known to occur naturally outside a few localities in the states of Penang and Perak in Peninsular Malaysia (Wong & Mohamad, 1997), and the dipterocarps *Vatica yeechongii* and *V. flavida*. In contrast to other gardens that may have maintained one or a few specimen trees of *M. malayana*, the population at Rimba Ilmu has been obtained through multiple



Fig. 8 The addition of *Johannesteijsmannia perakensis* in 2024 completed Rimba Ilmu's collection of all four species. Photo: Yong Kien Thai.

introductions and today has given rise to a spontaneously regenerating population. *Dinochloa scabrada* (Bornean climbing bamboo) has been established in the patch between the Stanton Nature Activity Centre and the Fern House (Fig. 9). Recently added hyper-endemic species include *Richetia kuantanensis*, a 'long-lost' dipterocarp that was considered extinct until its rediscovery in 2014. This species is represented by only a few living trees in the wild, confined to a small forest area on the eastern coast of Peninsular Malaysia.

Research and conservation

Complementing Rimba Ilmu's living collections is its Herbarium, a flagship asset dating back to the 1960s. The turn of the millennium brought two major developments: the Rare Plants & Orchid Conservatory and the Kingham Arboretum.

Herbarium

The Universiti Malaya Herbarium (KLU) is the oldest and largest university herbarium in Malaysia. Although collections had been made for teaching and research since the UM Botany Department was established in 1959, it was only in 1969 that a proper herbarium with attendant facilities was established and registered with the International Association for Plant Taxonomy. Over the years, collections were built up by staff and students carrying out taxonomic and ecological studies, by visiting researchers and through specimen exchanges (Mohamed, 2000).

A new herbarium was set up in the new Rimba Ilmu building in the late 1990s and officially opened in March 2000. It now consists of 81,000 accessions including 51,000 angiosperms, 700 gymnosperms, 6,000 pteridophytes, 20,500 bryophytes and 3,000



Fig. 9 **A** *Dinochloa scabrida* (Bornean climbing bamboo) is a twining-climbing bamboo that has developed a strong – and visually stunning – growth in the specimen plants maintained near the Garden's Activity Centre. **B** Close-up of *Dinochloa scabrida*. Photos: Yong Kien Thai.

algae. Important angiosperm collections include the Pandanaceae, Rutaceae, Araliaceae, Bambusoideae, Zingiberaceae, the flora of the Danum Valley (Sabah) and Ulu Kali (Peninsular Malaysia), and the Malayan limestone flora. The seaweed and seagrass herbarium has about 4,500 accessions, including 55 type specimens. The Herbarium maintains close ties with major herbaria; to this day, on average, more than 1,000 duplicates and reprints are sent annually to more than 25 institutions all over the world (Mohamed, 2000).

Advances in digital technology have recently led Rimba Ilmu to confront some gaps in its records, including the rediscovery of some specimens decades after their initial field collection. On 10 April 1957, near a riverine forest in Baling, Kedah, Malaysia, botanist Chew Wee-Lek saw a 25-ft (7.6 m) tall fig tree with grey-white bark and a straight stem with yellow hairy figs. At the Singapore Botanic Gardens Herbarium, Chew's PhD advisor E.J.H. Corner determined the specimen as *Ficus fulva* Reinw. (Steenis-Kruseman, 1974). The specimen was eventually deposited in

Rimba Ilmu, where it sat in the KLU cabinets for decades. Since starting the digitisation of the Herbarium in July 2024, several similar cases have been encountered: specimens with no official stamp or registration number, fragile leaves breaking off from the glue and information missing in our accession books. Herbarium curator Dr Yong Kien Thai is overseeing efforts to maintain records, including restoration and the manual and digital registration of information (Fig. 10). With two new staff dedicated to digitisation, and further aided by volunteers, Rimba Ilmu aims to enrich and maintain the KLU collection as a reference centre, including recording more new (old) information.

Rare Plants & Orchid Conservatory

The brainchild of Dr Wong Khoon Meng, the Rare Plants & Orchid Conservatory was established in 2000 and occupies one of two large plant houses behind the Rimba Ilmu building; it is surrounded by unusual landscaping choices such as *Baeckea frutescens* lining the stairway leading up

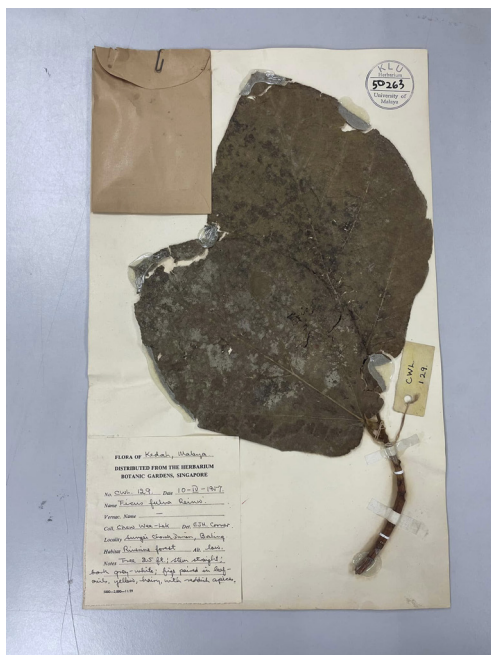


Fig. 10 *Ficus fulva*, an example of a restored 'long-lost' herbarium voucher. Photo: Ilyana Hassya.

to it. The Conservatory features rare and threatened species, including endemic species (labelled EN); species with a relatively wide distribution outside Malaysia, but which are infrequently encountered in the country (RM); and species that were once much more common, especially in lowland forests, but whose range and population have decreased due to habitat loss (LF) (Sugumaran, 2005) (Fig. 11A). Examples include *Musa beccarii*, the endemic Bornean dwarf banana, *M. gracilis* and *Barringtonia corneri* – both endemic to southern Peninsular Malaysia – and *Alocasia melo* (Araceae), a species restricted to only one particular rock type in northern Borneo (described in 1997, the epithet 'melo' referring to the melon-skin texture of the leaves).

The Conservatory has since transformed from a collection of plants on 'clean' surfaces to a dense and thriving enclave of plants reminiscent of the lowland tropical rain forest.

The Conservatory has accessioned over 1,800 plants from all over Malaysia, including 32 families, among which are the dicotyledon families Begoniaceae and Gesneriaceae, and the monocotyledon families Araceae, Orchidaceae, Palmae and Zingiberaceae. Some 235 species in 72 genera of wild orchid are represented in the Conservatory, including species of *Calanthe*, *Corymborkis*, *Paphiopedilum*, *Phaius* and *Spathoglottis*. Popular species include *Paphiopedilum rothschildianum* and *Phalaenopsis bellina*. The former has flowered on three or more occasions at the Conservatory – quite a feat, given that private growers are elated when their pot-grown plants bloom after much care and attention. On the other hand, Rimba Ilmu's plants are established in shallow broad beds of substrate, which better resemble natural conditions. Humidity in the Conservatory is maintained by regular misting throughout the day (Fig. 11B), and by moisture retained in mosses planted in the building. Several highland orchids, difficult to maintain in lowland facilities, have adapted to the regularly misted environment. These include species of *Bulbophyllum* (Fig. 12), *Crepidium* (*Malaxis*) and *Trichotosia*. In the absence of a resident orchid taxonomist, the work of collecting and preserving flowering specimens is undertaken by students and research assistants (Sugumaran & Low, 2009).

The Kingham Arboretum

In the late 1990s, the late James Kingham, a retired planter who grew forest species to diversify options for park and urban planting, donated specimens to the UM Herbarium in return for species identification. In 2002, Rimba Ilmu staff led by Dr Wong Khoo Meng and Dr Sugumaran Manickam verified 260 species of native Malaysian trees in Kingham's holdings. In gratitude, Kingham sent



Fig. 11 **A** *Tacca integrifolia* (black lily), an example of a lowland forest plant once common in the Klang Valley, but whose range and population have decreased due to habitat loss. **B** Sprinklers on! – ‘rain’ in the Conservatory. Photos: Benjamin Ong.



Fig. 12 Wild orchid *Bulbophyllum virescens*, known for its foul-smelling ‘dead fish’ fragrance. Photo: Benjamin Ong.

lorry-loads of sizeable saplings to Rimba Ilmu free of charge, several times a year for years, bearing the cost of transport and additional workers. The Garden’s staff, students and volunteers, aided by Kingham’s workers, planted these trees into the secondary-forest matrix at the northern end of the Garden. The newly enriched woods were then named the Kingham Arboretum (Wong *et al.*, 2021). In 2016, the K.M. Wong Botanist Trail was developed by student volunteers to explore

this area, document the maturing trees and provide some measure of public access during guided walks.

Today, Rimba Ilmu continues to be actively involved in tree planting within and beyond the Garden. Seedlings are typically obtained through exchange programmes or donations from NGOs, government agencies (for example, the Forest Research Institute Malaysia) and friends. Rimba Ilmu staff and students also frequently carry out field collection work to obtain seeds and seedlings. Beyond the Garden, Rimba Ilmu supports corporate social responsibility programmes and initiatives undertaken by NGOs and UM’s student bodies. Between 2021 and 2024, Rimba Ilmu supplied seedlings and seeds of native tree species that had established in the Garden, such as *Firmiana malayana* (Fig. 7), *Sterculia macrophylla*, *Scorodocarpus borneensis*, *Eusideroxylon zwageri* and *Barringtonia asiatica*. Beneficiaries have included the Free Tree Society, Rimba Jiva, the Tropical Rainforest Conservation & Research Centre, Badan Warisan Malaysia and the Putrajaya Botanical Garden.

Learning and public engagement

If Rimba Ilmu is the Forest of Knowledge, how has this knowledge been developed and shared? The combination of the Garden's unorthodox planting aesthetic with unique and valuable living and preserved collections has enabled diverse and innovative learning and public engagement opportunities over the years.

Reaching a wider audience: the Rain Forests & Our Environment Exhibition and the Environmental Education Programme

Established in 1997, the *Rain Forests & Our Environment* permanent exhibition was at its opening the first and biggest permanent biodiversity exhibition in Malaysia. Occupying 500 square metres in the Rimba Ilmu building's exhibition hall, the Exhibition's themes include: what rain forests are and where they are found; rain forests as a source of natural products, genetic opportunities and ecological services; biodiversity and tropical species richness; threats to the continued survival of rain forests; and environmental conservation and sustainable management of natural resources. Richly illustrated with exhibits and bilingual text panels in Malay and English, the Exhibition has a walk-in library feel and is designed to be a source of repeated consultation (Mohamed, 2000; Sugumaran, 2005). Since its opening, the Exhibition has been Rimba Ilmu's most consistent and publicly accessible educational asset, supporting interpretation of the tropical rain forest – where it is easy to miss the forest for the trees!

The relatively static Exhibition was complemented by a dynamic Environmental

Education Programme (EEP) that sought to promote environmental awareness and an understanding of the relationship between people and nature through experiential, participatory learning. To overcome a shortage of professional education staff, the Malaysian Nature Society – Malaysia's oldest and largest NGO – came onboard to run the EEP for Rimba Ilmu (Mohamed, 2000; Sugumaran, 2005; Wong *et al.*, 2021; Rimba Ilmu Botanic Garden, n.d. a) (Fig. 13). Angela Hijjas, sometime chairperson of the Selangor branch of the Malaysian Nature Society, was a key figure in the development of Rimba Ilmu's EEP, which officially started in July 1997. Leading monthly guided walks in the late 1990s and 2000s, she helped Dr Wong Khoon Meng begin Rimba Ilmu's volunteer movement.

With the relocation of Rimba Ilmu's administrative functions to the new building, the original administrative building in the Garden was repurposed as an activity centre for environmental education (Jones, 1985; Mohamed, 2000) (Fig. 14). In 2016, it was renamed the Stanton Nature Activity Centre in honour of one of Rimba Ilmu's founding botanists. While the Rimba Ilmu building is easily accessible owing to ample parking and its location on the public bus route, the Activity Centre's location deep in the Garden provides convenient access to its living collections and an excellent view across a stream valley to the regenerating forest reserve.

Legacy of the EEP: volunteerism, imagination and experimentation

Given its limited staff numbers, Rimba Ilmu has benefited considerably from the efforts of volunteers and staff going beyond the call of duty. Volunteers supported the establishment of the Conservatory and



Fig. 13 Malaysian Nature Society then-education staffer (later executive director) I.S. Shanmugaraj leads a school visit in 2004. Photo: Sugumaran Manickam.

Exhibition, and the installation of plant labels in the Garden and Conservatory. However, volunteer engagement is time-consuming, and the volunteer workforce is transient and often unreliable. By around 2010, the EEP had considerably slowed down and regular programmes for the public were no longer offered, although private tours could still be booked. The EEP nevertheless left a legacy that continues to influence Rimba Ilmu's approach to education and public engagement. In the post-EEP years, Rimba Ilmu continued to partner with education service providers such as EduTREE and the Urban Biodiversity Initiative (Ubi).

In 2014, UM allocated funds to raise awareness of and interest in Rimba Ilmu, and to explore new frontiers and approaches in biodiversity conservation and education.

Under the oversight of then-coordinator Dr Sugumaran Manickam, a small team of UM alumni designed and ran what would be known as The Rimba Project, a living lab with the aim of conserving and highlighting the biodiversity of the campus. Working with key living labs such as UM's Water Warriors and Zero Waste Campaign, and serving as a 'spiritual' successor to the EEP between 2014 and 2020, The Rimba Project increased Rimba Ilmu's capacity to host visitors and run education programmes and public events. It also assisted UM's Estates department in the conservation and management of UM's landscape and green spaces, established a conservation nursery to enhance Rimba Ilmu's living collections and initiated transdisciplinary partnerships with researchers, volunteers, local communities



Fig. 14 **A** Youth environmental advocates at the Stanton Nature Activity Centre in 2022; the roof construction incorporated *Eusideroxylon zwageri* (belian) timber gifted by the Sarawak government in the 1970s. **B** An outdoor class at the Activity Centre. Photos: Benjamin Ong.

and municipal authorities (Ong, 2019; Ong *et al.*, 2019; UM+, 2021). In rapidly urbanising Malaysia, The Rimba Project put urban biodiversity on the map. Findings from The Rimba Project's landmark biodiversity study of UM's abandoned staff quarters in 2014 and 2015 were published in a short documentary *Bats in the City* and a book *The Backyard Before You*, which led to public demand for education programmes focusing on urban habitats and biodiversity (The Rimba Project, 2016; Ong, 2017; Ong & Adikan, 2018). In 2019, The Rimba Project's co-founder and manager Benjamin Ong was awarded the Marsh Award for Education in Botanic Gardens (Marsh Christian Trust, 2025).

The Rimba Project's most meaningful impact has arguably been the development of student volunteers who were provided opportunities to develop fieldwork,

communication and leadership skills through participation in biodiversity surveys and co-leading education programmes (Ong, 2019) (Fig. 15). A noteworthy volunteer-led initiative was the expansion of Rimba Ilmu's artistic horizons through art workshops, exhibitions and festival-like programmes such as *Buluh in the City* (The Rimba Project, 2020) and *ImagiNasi* (Kampung City, 2022). The 2017 theatrical production *CREATURES* was led by former volunteer and later project officer Siti Syuhada Sapno. It featured characters based on the different frog species found in Rimba Ilmu's courtyard pond (around which it was performed), with the sounds of the frogs giving a natural sound effect to the play. W.R. Stanton (1974b) himself used a theatrical metaphor to describe Rimba Ilmu at its foundation: 'The primary object of our new garden has been to



Fig. 15 Rimba Project volunteer Loo Yong Xin guides visitors through the Kingham Arboretum. Photo: Benjamin Ong.

provide the stage on which we may continue to act out the drama of Malaya's plant life for the benefit of the community.'

As a result of the COVID-19 pandemic, Rimba Ilmu was closed from 2020 to 2022. The reopening of the Garden was followed by new administrative oversight under UM's Sustainable Development Centre (UMSDC) and a partnership with The Habitat Foundation (THF), which came onboard to support education and site development projects.

Rimba Ilmu at 50: celebration and reflection

Rimba Ilmu turned 50 in 2024. At the Garden's opening in 1974, acting Vice-Chancellor Professor Ahmad Ibrahim said in his inaugural remarks, 'The growth of plants cannot be hurried. In fact, it might be said that a garden is just coming into its own at its half-century celebration' (Wong & Mohamad, 1997). Over the last half-century Malaysia has significantly changed as its urban population has increased from 37 per cent of the total population in 1974 to 79 per cent in 2023 (World Bank, 2025). Is Rimba Ilmu still relevant and, if so, how? What might a mission for the next 50 years look like?

Visitors to UM and Rimba Ilmu continue to be surprised by the biodiversity that can be found in urban areas (UM+, 2021), and Rimba Ilmu, through its Exhibition and collections, remains a valuable interpretive resource and showcase of disappearing species and habitats. The Garden's proximity and ease of access continues to attract visitors who may not have the opportunity to visit Malaysia's more distant forests, while maintaining its original mission as a resource for researchers and students from diverse disciplines (Sugumaran *et al.*, 2018).

Today, contemporary ecological concerns such as urban heat islands, sponge cities and flood mitigation have made substantial inroads into policymaking and into the public consciousness in Malaysia (Ong & Ong, 2022). Rimba Ilmu functions as a green lung, improving air quality, moderating urban heat and storing carbon. The water in Rimba Ilmu's stream is still classified as Class I, as it was 50 years ago (Stanton, 1974b). Having an unpolluted waterway in the heart of the city is almost unthinkable, and the opportunities this provides for learning about watershed ecology and principles of healthy ecosystems cannot be overstated (Fig. 16). In the last two years, Rimba Ilmu has become part of *Rantaian* Urban Green Spaces, a conservation project that aims to safeguard, rehabilitate and connect fragmented green spaces within the Klang Valley (Malaysian Nature Society, 2023). Visitors to the Garden are able to connect with nature, with the attendant benefits for health and well-being increasingly appreciated in a post-COVID/lockdown world (Sugumaran *et al.*, 2018; UM+, 2021; Ong & Ong, 2022).

If, however, this sounds like a runaway success story, it is not. Sitting on nearly 60 ha of prime land, Rimba Ilmu has always led a somewhat precarious existence. Not only are its collections endangered, but the Garden itself is a habitat at risk of destruction. It is to the credit of UM's and Rimba Ilmu's administrators that they have had the foresight to grow back green cover and preserve this space over the last 50 years – all the more so considering the 1970s was a decade of rapid urban and infrastructural development in Malaysia (Wong *et al.*, 2021). Today, we reap the benefits, the emergent forest garden rising to meet new and developing societal needs.



Fig. 16 The natural stream that flows through Rimba Ilmu's central wetland, one of the last unpolluted waterways in the heart of the city. Photo: Benjamin Ong.

The circle of life

A memo by W.R. Stanton in 1974 conveyed a desire for Rimba Ilmu to have about 5,000 species in 40 years (Stanton, 1974a). While that did not happen, the Garden has undeniably matured and a casual visitor would be hard pressed to see the rubber plantation for the trees. There remain plenty of opportunities for tree planting to further enrich the forest garden, an increasingly urgent concern in the wake of recent storms – the latest and most severe on 25 May 2024 – that have thinned many of the tree stands. While the felling of many a carefully planted and nurtured tree has been cause for mourning, it has also provided an opportunity to acknowledge and be attentive to changing weather patterns, to experience natural processes in action and to remember

the ethos of working with and not against nature (Frediani, 2023). The aftermath of the storms has presented an educational opportunity to demonstrate ecological succession, as, for example, in Ubi's Backyard Explorers module on decomposers (Urban Biodiversity Initiative, 2025).

The centrepiece of Rimba Ilmu's 50th anniversary celebrations was a specially commissioned exhibition, *Belukar dah jadi Rimba* (Malay: 'the undergrowth has become a wilderness') (Fig. 17). Through five artworks celebrating everything from ecological succession and biodiversity to the Garden's founding and its evolving community of staff and volunteers, one message echoed: there is life, death and rebirth, and this cycle is necessary for the forest and the community around it to mature, be resilient



Fig. 17 Rimba Ilmu staff, past and present, reminisce and reflect under the 'Rimba Ilmu Fellowship Tree', one of five artworks commissioned for the 50th-anniversary commemorative exhibition, *Belukar dah jadi Rimba*. The exhibition was created under the artistic direction of Huda Nejim Al-Asedi and Nazreen Abraham Stein, and embedded within the Garden's permanent *Rain Forests & Our Environment* exhibition. Photo: Benjamin Ong.

and thrive (Jacobs, 2024; Nejim Al-Asedi *et al.*, 2024). The exhibition was accompanied by talks, a panel discussion, workshops and a 50th-anniversary heritage guided walk, celebrating the people who have made Rimba Ilmu what it is over the years (Yap, 2024). In a nod to Rimba Ilmu's long-standing partnerships with NGOs and civil society, local conservation bookseller Sunda Shelves curated a series of talks featuring local environmental NGOs and conservationists. The talks were extremely well attended, with Rimba Ilmu's 70-seat auditorium at capacity and many standing guests. Widespread public engagement was a priority for the events, recognising that Rimba Ilmu's sustainability depended on 'a high measure

of publicity, visibility and popularity' (Mohamed, 2000).

The foreseeable future looks promising. Rimba Ilmu is about to embark on an unprecedented public-private partnership with The Habitat Foundation to address some long-standing issues, such as staffing, funding and maintenance challenges. We make hay while the sun shines, in the spirit of plants that grow not knowing what will happen tomorrow. Rimba Ilmu's story is one of semi-organic growth, cultivated with partners and donors over seasons that come and go; the Garden has seen plenty of community involvement over the years and maintains that ethos. It is a story of resilience and faithfulness; of working with friends

and partners, making the best of political, financial and infrastructural winds wherever they may blow. May Rimba Ilmu be ever as enterprising and opportunistic as the forest that envelops and nourishes the Garden.

Acknowledgements

The authors would like to thank:

Everyone who has been part of Rimba Ilmu's story, formally or informally – you have made possible the good work at the Garden over the last half-century.

All who have written about the Garden over the years; it is hoped that by highlighting and referencing those works, keen readers may be able to further explore Rimba Ilmu's story.

Several entities that have made possible the work of the last ten years – during which the authors worked most closely together – in particular: UM's Board of Directors and Higher Management for continued interest in, and support of, Rimba Ilmu; UM's Institute of Biological Sciences; Jabatan Harta Benda, UM's Estates Department; UMCares, the Sustainability Science Research Cluster, and the Office of the Deputy Vice-Chancellor (Development) for supporting community engagement and outreach through the Living Lab Research Grant; and UMSDC for convening the trial partnership with The Habitat Foundation in 2023.

The *Belukar dah jadi Rimba* exhibition and associated events were made possible through generous funding from the Royal Geographical Society (with IBG)'s Albert Reckitt Award and Postgraduate Appeal Fund, UMSDC's Rimba Project fund and the University of St Andrews' postgraduate research Fieldwork Bursary Fund.

Benjamin Ong would like to acknowledge funding from the Scottish Alliance for Geoscience, Environment and Society 13th

call Small Grants Scheme, which enabled his participation in the 8th Global Botanic Gardens Congress (2024) in Singapore, resulting in a connection with the *Sibbaldia* team and subsequent invitation to contribute this article. With thanks to them and anonymous reviewers for constructive input towards the formation of this article.

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