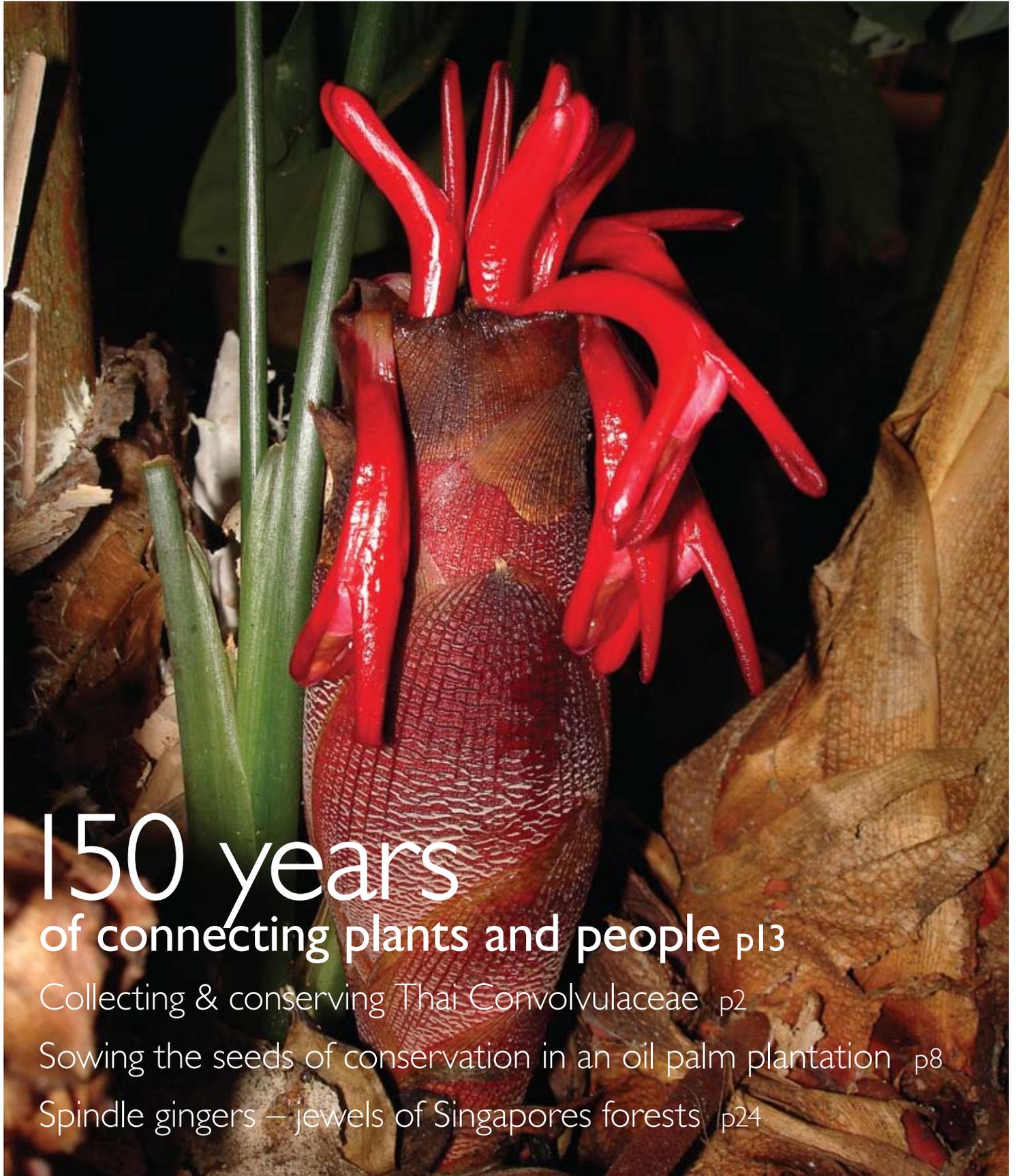


Gardenwise

THE NEWSLETTER OF THE SINGAPORE BOTANIC GARDENS VOLUME 34, JANUARY 2010 ISSN 0219-1688



150 years
of connecting plants and people p13

Collecting & conserving Thai Convolvulaceae p2

Sowing the seeds of conservation in an oil palm plantation p8

Spindle gingers – jewels of Singapore's forests p24



Cover

Hornstedtia scyphifera
Photos by Jana Leong-Škorničková

Editors

Chin See Chung
Mark Hughes
Kho Soo Pei

Production Managers

Christina Soh
Mak Sin Chang

Design

Splash Productions Pte Ltd

Message from the director

Chin See Chung

ARTICLES

- 2 Collecting & conserving Thai Convolvulaceae George Staples
6 Spotlight on research: a PhD project on Convolvulaceae George Staples
8 Sowing the seeds of conservation in an oil palm plantation Paul Leong, Serena Lee
12 Propagation of a very rare orchid, *Robiquetia spathulata* Khoo-Woon Mui Hwang, Lim-Ho Chee Len Whang Lay Keng, Ali bin Ibrahim
13 150 years of connecting plants and people: Terri Oh
The making of stars
Two minds, one theory - Wallace & Darwin, the two faces of evolution theory
I do! I do! I do!
One evening, two stellar performances
In Search of Gingers
Botanical diplomacy
The art of botanical painting
Fugitives fleurs: a unique perspective on floral fragments
Falling in love
Born in the Gardens
A garden dialogue - Reminiscences of the Gardens
Children celebrate!
Botanical party
Of saints, ships and suspense
Birthday wishes for the Gardens

REGULAR FEATURES

Around the Gardens

- 21 Convolvulaceae taxonomic workshop George Staples

What's Blooming

- 22 Upside down or right side up? The baobab tree Nura Abdul Karim

Ginger and its Allies

- 24 Spindle gingers – jewels of Singapore forests Jana Leong-Škorničková

From Education Outreach

- 26 "The Green Sheep" – a first for babies and toddlers at JBCG Janice Yau
27 International volunteers at the Jacob Ballas Children's Garden Winnie Wong, Janice Yau

From Taxonomy Corner

- 28 The puzzling bathroom bubbles plant.. George Staples

From the Orchid Species Collection

- 29 Name changes in the *Eria* group Hubert Kurzweil

Book Review

- 30 Gardens of Lanka Jana Leong-Škorničková

Beyond the Gardens

- 31 Zingiberaceae symposium in Yunnan Jana Leong-Škorničková
32 The 3rd South East Asia Botanic Gardens Network (SEABG) Meeting Nura Abdul Karim, Dina Gallick
33 Two regional meetings on ASEAN biodiversity held in Japan Benito C. Tan

Staff Publications

- 34 Publications by Gardens staff in 2009

- 36 H.M. Burkill Research Fellowship

Inside back cover

Key visitors to the Gardens

Benjamin Aw, Serena Lee

Back cover

From the Archives

Familles des Plantes, Vols I & II by Michel Adanson (1727-1806)
Paris: Chez Vincent, 1763

Christina Soh

Singapore Botanic Gardens, 1 Cluny Road, Singapore 259569
NATIONAL PARKS BOARD

nparks_sbg_visitor_services@nparks.gov.sg www.sbg.org.sg www.nparks.gov.sg

Message from the director



2009 was an exceptional year for the Gardens. It was the 150th anniversary of the founding of the Gardens in 1859. To celebrate, 14 events were planned with the full participation of the community. As the year unfolded, energy and enthusiasm grew, the momentum developed and opportunities were seized. We finally organized and held an astounding 28 events on the history and the science and art of plants and gardens. The year ended with the eagerly anticipated “botanical party”, a large public event anchored by a concert and the light-up of 150 trees.

Coincidentally, 2009 was also the 150th anniversary of the publication of Charles Darwin’s epochal book, *The Origin of Species*, where he outlined the theory of evolutionary change through the process of natural selection. On the other side of the world, Alfred Russell Wallace, then living in a hut in the Maluku islands, independently arrived at the same ideas as Darwin. We celebrated their legacies with an exhibition, “Two minds, one theory - Wallace & Darwin, the two faces of evolution theory”. The exhibition staged with the Gardens’ usual deftness and thoroughness highlighted the incredible beauty and diversity of tropical flora and fauna. It demonstrated that biodiversity provided the key that unlocked ideas and provided the evidence that explained evolutionary change.

Both Darwin and Wallace went on long journeys of exploration, documentation and collection that provided the inspiration, ideas and evidence for the process of natural selection. Wallace wrote *The Malay Archipelago*, after eight years of intensive work in Southeast Asia. Darwin, *The Voyage of the Beagle*, that documented the almost five-year expedition of HMS Beagle. Both are outstanding scientific journals and inspiring natural history travel books. They illustrate to all who work with plants and

animals that a profound appreciation and understanding can only be realized by intimate and constant immersion in the natural world. Their experiences demonstrated that the greatest teacher is nature; there is no substitute for field learning.

2009 marked another watershed for the Gardens when we announced the beginning of the development of our Tyersall extension. This is a 9.8 ha plot of land under fairly matured secondary forest at the western boundary of the Gardens separated by Tyersall Ave.

We now have the opportunity to extend our existing rain forest patch to develop a larger and truly exceptional learning forest in the centre of the city. We will display the best and most amazing flora. We will grow giant trees and display unique barks, flowers and fruits. And we will develop the forest into an important site for the ex-situ conservation of wild relatives of fruit and nut tree species of the region. There will also be a marshland for a collection of marshland plants and a water body that will complement and support Swan Lake. We will be able to provide a better arrival and departure experience for visitors who come by coach to this part of the Gardens. This resource will greatly strengthen our outreach and will provide unique opportunities for our visitors to experience and learn about plants, forest and the natural environment.

The addition of this forest patch to the Gardens is a great cause for celebration. It is an unprecedented historical event; an exceptional 150th anniversary gift to the people of Singapore. Their favourite place will get even better.

Chin See Chung

Collecting & conserving Thai Convolvulaceae



George Staples



George Staples

As a working taxonomist, I spend most of my time studying dried plant specimens in the Gardens Herbarium. One of the tasks I perform there is to write floras—scientific accounts of the plants growing in a particular country, state or region.

A flora is the first source for information about the plants in a given area; it allows you to identify, name, describe and locate the plants found there. As such, floras are the first line of defense for conservation efforts, because they provide the data one needs to decide how to manage and preserve plant diversity.

Since 1985 I've been working on an account of the Convolvulaceae for the *Flora of Thailand* Project, which is now completed and in press. The final account

identifies and describes 24 genera and 119 species of morning glory that occur in the Kingdom of Thailand. It is as complete as it can be at this time; there are some inadequate specimens that could not be identified, raising the prospect that more species will be added to the Thai flora in future, once better specimens become available. This points out one of the side effects of publishing flora accounts—they stimulate further efforts to collect and document biodiversity, as gaps in our knowledge are highlighted.

One of the gaps identified in our knowledge of Thai Convolvulaceae is that numerous species are known from rather few collections. In some cases so few herbarium specimens exist that our basic knowledge of the plants is quite incomplete. Of the total 119 species reported for the flora, 26 were known from less than five specimens—five species are known only from the type specimen, often collected long ago—an inadequate sample to make any decisions about the biology, ecology, and conservation management of such species.

The final account identifies and describes 24 genera and 119 species of morning glory that occur in the Kingdom of Thailand.

Left: Habitat for *Merremia verruculosa*, Phujong Nayoi National Park. The backpack at left gives an indication of the size for the depressions in the sandstone where plants can grow.

Right: Team Convolvulaceae in action collecting and photographing morning glories, our vehicle in the background.



Preecha Karaket



George Staples

So while the flora account is finished (and after 24 years of work, I might add, at last!) the real work now begins. With 22% of the Thai Convolvulaceae so poorly known, how can we make informed decisions about their conservation needs? It is worth pointing out that the most recent Red Data book for Thailand does not include a single member of the Convolvulaceae, despite the seeming rarity of so many species in the country. Are these species really rare, or is this an artifact due to poor sampling? If we were to go out and try to locate these rare species, what would we find? Are they still present in the country, or has land clearing for agriculture, the cutting of timber and deforestation, and the expansion of human populations in villages, towns, and cities wiped them out? If the plants survive do they require protection or propagation *ex situ* (meaning outside the native habitat) to ensure their survival? To answer these questions, it is essential to get out of the herbarium and go look at the live plants.

In October/November 2009 I had the opportunity to collect plants in Thailand in collaboration with the Thailand Department of National Parks, Wildlife

and Plant Conservation. Specifically, we went looking for the rarest species of Convolvulaceae in Thailand. Using the information gathered for the flora account we plotted out the last known sites where the rarest species had been found, and compiled the flowering and fruiting seasonality so that we could pinpoint the time of year the plants would be fertile (which makes Convolvulaceae easier to find; when there are no colorful flowers, the green leaves disappear into the background greenery of the landscape).

The first of several trips planned, this one concentrated on a wide swath across the center of the country that included Bangkok and reached from the Cambodian border in the east all the way to the Tenasserim Hills on the western border with Myanmar. Our team consisted of two Thai colleagues from the Forest Herbarium in Bangkok, Dr Somran Suddee, a botanist specializing in Lamiaceae and Orchidaceae, and Mr Preecha Karaket, professional photographer and graphics specialist, as well as a graduate student from Reading University, UK, Ana Rita Simões (see article about Ana elsewhere in this

issue of Gardenwise). In 10 days of field collecting, we drove by car almost 3,000 km in search of 12 of the rarest species of Thai Convolvulaceae.

So what did we find? Any rare Convolvulaceae? Well, yes. We had extraordinary success in some ways and some disappointments in others. We could not locate some species (such as the enigmatic *Argyreia versicolor*, collected once in Prachin Buri province and never seen since). And we were very fortunate to find the rarest genus of Thai Convolvulaceae, which had never been found bearing fruits before.

We departed Bangkok on 30 October and went east, stopping to botanize in national parks and wildlife preserves en route. Our first goal was to reach southern Ubon Ratchathani province

Left: Ripe fruits of *Remirema* with the sepals opened out (and the ants have been removed); the fruits are extremely sticky outside and the fruit walls are semi-transparent.

Right: Dr Somran Suddee atop a limestone boulder, collecting the first fruiting specimens of *Remirema bracteata*.

in the area known informally as the “Emerald Triangle” where Thailand, Laos, and Cambodia adjoin. This area is rich in biodiversity, with a line of sandstone hills (the Dongrak Range) along the boundary between Cambodia and Thailand. We spent two days collecting in the sandstone forests at Pujong Nayoi National Park and adjacent areas, where we managed to find *Merremia verruculosa*, a delicate herbaceous twiner that occupies an ephemeral habitat in this area. The sandstone substrate here is much like a tabletop, tilted slightly and pitted with depressions and holes of various sizes. Soil accumulates in the depressions and these become natural dish gardens. *Merremia verruculosa* twines through annual grasses that grow in such depressions in full sun. We arrived just at the end of the rainy season, when the moisture is drying up and the grasses are beginning to die off. The morning glories were in full bloom and had seed capsules, which were collected. This dainty species is small enough that it could be grown in the most compact urban garden and it would seem to be naturally suited for container culture.

From the easternmost point in the kingdom we turned back to the west and spent a long day driving to Saraburi province in central Thailand. Saraburi is famous for its limestone hills, which are heavily exploited by the construction industry (limestone is a building material as well as being essential to make cement and concrete). Located just north of the Bangkok metropolis, the hills of Saraburi have been leveled in many places to provide raw material for constructing the highrise buildings in the capital. The consequences for biodiversity can be imagined and while we found several species needed for Ana’s research none of the rare species that were formerly known from this part of Thailand could be located.

We pressed on further west, to Kanchanaburi province, the third largest in Thailand and one with large protected areas. Here we spent the remainder of our trip and made some spectacular discoveries as well as met with disappointments. One of the spectacular discoveries was to find *Remirema bracteata*. This species was described

from Sai Yok district in Kanchanaburi in 1943 and it is one of the rarest, and least known, Convolvulaceae in the world. Plants have only been collected 4 times, always in flower. The fruits and seeds had never been seen or described. Based on the structure of the ovary inside the flower, the species was presumed to have a type of fruit that would be unique in the Convolvulaceae. Based on the very few herbarium specimens preserved in Thailand and the UK, *Remirema* appeared to be a rare and possibly endangered species. We set out to find it, using information gathered from Thai botanists who had seen the plants alive; *Remirema* was last collected in 1998. For this we needed a local guide and we hired one from a nearby Royal Project. He directed us to an access point for a restored section of the notorious Thai-Burma railway. The history of this infamous second world war project will be well known to readers in Singapore, and need not be described here. Suffice it to say that tourists interested in history come to this part of Thailand to visit WW2 sites, and a short section of the railway line in Sai Yok district has been restored so that it is easily accessible to tour groups. We walked for about 2 km along this restored railway line, which made access in the rugged limestone hills much easier. As we walked we kept looking for large climbers on the bamboo with big heart-shaped leaves—our only clues as to what *Remirema* looked like.

And, with patient searching, we found it! Dr Somran Suddee spotted climbers on the hillside above the railway bed and we were able to climb up to them. These proved to be *Remirema*—abundantly laden with fruits in various stages of maturity! We quickly collected some and peeled back the enlarged, whitish sepals to see what the fruits looked like—to our surprise and dismay, enraged black ants came boiling out of the fruits and began biting us like fury. We had to first brush off the ants and move to a safer location to conduct our investigations lest we fall off the boulders we were perched on. We were able to document *Remirema* with photos, voucher specimens, and seeds. The fruits are exactly as hypothesized more than 65 years ago and they are indeed unique in the family Convolvulaceae. Investigation

One of the spectacular discoveries was to find *Remirema bracteata*. This species was described from Sai Yok district in Kanchanaburi in 1943 and it is one of the rarest, and least known, Convolvulaceae in the world.

of the nearby area disclosed a second population not far away, also bearing fruits. And there was abundant habitat nearby with rather little disturbance, so it is quite possible that *Remirema* is neither rare nor endangered, though more extensive survey is needed to determine this. The rugged terrain makes this part of Thailand unsuited for agriculture and works in the species favor. Now that our Thai colleagues know where to look, further investigations and conservation assessment are possible.

Finding one of the most enigmatic Convolvulaceae species in the world was the high point of the trip for me, but it was not the end of our discoveries and it was matched by equivalent disappointment. Over the next two days we drove back and forth across central Kanchanaburi province. We hoped to find a species that had been collected just once near Si Sawat in 1971; that specimen is the type collection for *Cordisepalum phalanthopetalum*. We did not find it. In the intervening years, construction of Sri Nagarind Dam flooded much of the low-lying area west of Si Sawat, creating an enormous reservoir as well as providing hydroelectric power for the kingdom. Agricultural development proceeded



rapidly as well and much of the native forest nearby has been cleared to plant fruit orchards (this part of Kanchanaburi produces fruit for domestic consumption and export to places like Singapore). Because *Cordisepalum* has tiny flowers (about 3–4 mm diameter) it is not easy to spot and the disappearance of its natural habitat does not bode well for the species survival in the Si Sawat area. We can only hope that it survives elsewhere; further collecting efforts in Thailand and Myanmar will be needed to locate it.

During our final days in Kanchanaburi we traveled up to the border with Myanmar near the old Pilok Mai, a former tin mine, and in Thong Pha Phum National Park. Here we were fortunate to discover two more of the rare species on our list. Early in the morning of 7 November we spotted the fading white blooms of *Ipomoea aspera* along the roadside. Gardeners will be familiar with the moon flower (*Ipomoea alba*) a tropical American species that has now become a global weed through escape from cultivation, but they may not realize that there are several native Asian species of night-flowering *Ipomoea*. These lovely plants could be attractive additions to gardens because they bloom at night, when working people are at home, and the large flowers are deliciously fragrant. In the case of *Ipomoea aspera*, the flowers have a spicy scent, somewhat like cloves. This species had been known from just four Thai collections and appeared to be rare; what we saw in Kanchanaburi demonstrated that this species is locally common there and is actually under no immediate threat. Several sizable

populations were sighted along the roadsides of Highway 3272 through the rugged Tenasserim Hills. Sadly, there were no ripe fruits yet and the stem cuttings that were collected did not take root.

Very near the end of Highway 3272, on a steep mountainside close to the border, we spotted some very large red-purple flowers climbing high in a tree that stretched across the road. When we managed to get some down, this proved to be yet another rarity on our target list. *Ipomoea wangii* was named from Yunnan province in China in 1965. Since then the species turned up in Myanmar and twice in Thailand (both collections in fruit). As with *Ipomoea aspera*, there turned out to be sizable populations of *I. wangii* in this mountainous area of Kanchanaburi. Likewise, the species is handsome and deserves to be introduced to cultivation. The showy red-purple flowers are 9–12 cm across and borne profusely along the vines, which can drape large trees. Unfortunately, it was too early in the season for any fruits to be ripe and the stem cuttings brought back to the Gardens did not survive.

The happy news is that we managed to locate and document four of the 12 species we set out to find, as well as many other Convolvulaceae, and our observations show that all four species appear to be under no immediate threat. While no formal conservation status has been proposed for them yet, under IUCN criteria the status of Least Concern would seem appropriate, though we really need to know more about the abundance of *Remirema* before

this is settled. We made our way back to Bangkok to process our specimens and before we parted company on 10 November we enjoyed a delicious Japanese meal as our farewell at a nearby restaurant.



Above:
Team Convolvulaceae about to set sail on a sushi adventure (L to R: Preecha Karaket, Dr Somran Suddee, the author, Ana Rita Simões).



Spotlight on research: a PhD project on Convolvulaceae



Ana Rita Simões at work in the Gardens Herbarium.

Education, research and conservation are amongst the core activities of the Gardens, and these themes are highlighted in a current project involving myself, Dr. George Staples, as part of our Senior Researcher team. I am co-supervising a PhD research project with Dr. Mark Carine, in collaboration with the University of Reading and the Natural History Museum, London. The scholar is Ana Rita Simões, who visited the Gardens and Herbarium last September-October, where she participated in the First International Working Group Meeting on Taxonomy of Convolvulaceae. This was a great opportunity to meet other researchers specialising in the family, learn how they are tackling similar taxonomic problems, and develop contacts for further collaborations. After the symposium, Ana stayed in Singapore for two weeks, where she made use of the wonderful resources of the Gardens Library and Herbarium, and where the staff were warmly welcoming and supportive.

Ana's research project is concentrated on resolving the relationships in a particular tribe – Merremieae – within Convolvulaceae. Tribe Merremieae includes the pantropical genera *Merremia*, *Operculina* and *Xenostegia*, as well as *Hewittia* (Africa and Asia) and two particularly interesting Asian genera, *Decalobanthus* and *Remirema*. This tribe is mostly characterized as twining plants, usually with 2-globose stigmas, always with non-spiny pollen grains, and usually with dehiscent capsules. In the field, these plants are often recognizable by their white, yellow, or even orange flowers. Some species are cultivated as ornamentals, like *Merremia umbellata* with its crowded masses of beautiful orangey yellow, funnel-shaped flowers. The taxonomic problem with this tribe is that there are so many exceptions (as noted above) that there are no clear-cut boundaries between genera – taxa blur into one another at the genus and tribal level. The research involves



work in the field as well as in herbaria, comparing material of a broad array of morphological types in order to get a clear idea of the variation present, and also to pinpoint better morphological characters to correct the blurry boundaries between genera. The main goal of the study is to achieve a new classification of the tribe, in terms of how the genera relate to each other and also how the tribe fits the overall classification of the family. The most important feature of this study is that it incorporates many data sources: morphological information, plus pollen characters and DNA sequences.

Ana's time in the Gardens Herbarium was spent studying our specimens of Asian *Merremia*, as well as material borrowed from several other international herbaria. Ana was able to make detailed observations on the morphology of the species and, when possible, take samples for future pollen and DNA analysis. The forthcoming analysis of all these data will provide a better understanding of how these *Merremia* species relate to each other as well as providing a more robust hypothesis about relationships between this genus and other genera within tribe Merremieae.

Following two and one half weeks of herbarium study, Ana shifted gears to field work and study of living plants. She first went off to Thailand, where she joined a collaborative Singapore-Thai project to collect rare species of Thai Convolvulaceae. Over the next 10 days Ana developed expertise in field collecting techniques, photography, and documenting her observations, during which she made collections for 20 species in her study group. One of the highlights was locating and collecting fruits for the endemic Thai *Remirema bracteata*, which had never been seen before. Then, with this new skill set under her belt, she went on to Cambodia for a further 10 days of field collecting in conjunction with a French-Cambodian project studying medicinal plants. Another 12 collections were made there for the tribe Merremieae.

Near the end of November, Ana returned to London, where the next phase of analysing and assimilating the information she gathered for her project has now begun. Her project continues through 2012 and she has a solid foundation for this due to her time spent in the Gardens Herbarium.

Top, page 6:
Dr. George Staples, Ana Rita Simões and Dr Somran Suddee in the field in Thailand.

This page, clockwise from top left:

Pressing specimens on Pulau Ubin (left, Ana; right, Dr Mark Carine of the Natural History Museum London).

Field team in action, along roadside in Saraburi province, Thailand.

Scoring herbarium specimens for morphological characters under a dissecting microscope.

Ana photographing *Merremia thorelii*, a sandstone endemic in Phu Jong Na Yoi National Park, Ubon Ratchathani province

Sowing the seeds of conservation in an oil palm plantation





Our destination is P.T. REA KALTIM Plantations, located north of the Provincial capital of Samarinda in East Kalimantan. To reach there, we have to take a flight from Singapore to Balikpapan followed by a two and a half hour drive to Samarinda. The next morning, we drove another two hours plus to Kota Bangun on the Mahakam River, to ply one of its tributaries, the Belayan, northwards for another three hours by speedboat. P.T. REA KALTIM Plantations is an oil palm plantation company encompassing 30,000 hectares (roughly equivalent to almost half the size of Singapore!) of oil palm estates. In collaboration with the Conservation department (REAKON), the reason for our trip was primarily to provide botanical inventories of P.T. REA Kaltim's Conservation Reserves, along with a herbarium collection in this less-travelled part of southeastern Borneo. Our surveys of these remnant forests within the plantation enable the company to identify and give special attention to those areas that are botanically rich, for the purpose of long-term conservation within these sprawling estates.

In our initial survey, we spent five full days botanizing the various forest types, including fresh water and peat swamp forests, a forested ridge in another swamp forest, primary forest (Luntuth Jengan), disturbed primary forest (Sg. Sengit), secondary forest (Sg. Buung) and a disturbed (previously burnt in 1997-98) swamp forest (Loa Buluh).

In total we collected 137 fertile specimens of plants in 68 families including 16 bryophytes (mosses and liverworts). Amongst the higher plants collected, most belonged to the ginger (Zingiberaceae), hibiscus (Malvaceae), macaranga (Euphorbiaceae), coffee (Rubiaceae) and cinnamon (Lauraceae) families. Of these, further studies by experts could yield 2-3 new species for this region. A sign of encouragement is that *Eusideroxylon zwageri* (otherwise known as Borneo Ironwood, Ulin or Belian) an important wood of commerce belonging to the latter family could still be encountered in the remnant forests. There is re-generation of the species as its seedlings can be found all around the parent trees, albeit growing slowly.

On the first day, after a few hours on a dirt track, we arrived at a fresh water swamp forest dominated by a *Pandanus* species about 4 m tall. We had to hack and slash with every step of the way in order to penetrate the forest. Just as we were about to concede to defeat and turn back, we stumbled upon a stand of giant *Hanguana malayana*, a curious sight among the *Pandanus* thicket. Its leaves are held upright and measure more than 2 m long. The plants were slightly atypical of *H. malayana* and DNA work is needed to establish if they really belong to that species.

Over several days we came across a peat swamp dominated by species of tall

Our surveys of these remnant forests within the plantation enable the company to identify and give special attention to those areas that are botanically rich, for the purpose of long-term conservation within these sprawling estates.



Flowers of *Tabernaemontana*

Kahang with fruits of *Tabernaemontana macrocarpa*



Lambertus with a blade of swamp *Hanguana malayan*

The expedition team



trees belonging to the genera *Artocarpus*, *Dipterocarpus*, *Parashorea*, *Ixonanthes* and *Sindora*. The swampy ground is also home to water plants such as species of *Cryptocoryne* and *Barclaya motleyi*. There is also a terrestrial orchid, *Nephelaphyllum pulcrum* found on drier ground here. Amongst the herbaceous plants, the family Araceae is well represented by terrestrials such as *Lasia spinosa*, *Homalomena rostrata*, *Schismatoglottis* species and climbers such as *Rhaphidohora beccarii* as well as an *Anadendrum* which could possibly be a new species. Other climbers of the genera *Ficus* and *Poikilospermum* abound here. One typical tree of horticultural potential that is abundant in the swamp forest is *Tabernaemontana macrocarpa*, with fragrant flowers and huge twin fruits, locally referred to as "rhino balls".

In open areas fully exposed to the sun, common pioneer plants such as *Dillenia suffruticosa*, *Clidemia hirta*, *Melastoma malabathricum* and *Dicranopteris* species, are the standard fare. Also amongst them is a ubiquitous tall and pretty grass *Miscanthus floridulus* which occasionally forms stands, characteristic of the pioneer species of Borneo. Occasionally amongst them, there is a terrestrial orchid *Bromheadia finlaysonian* waving its large white flowers in the wind. Also scrambling over these are climbers such as *Mikania cordata* and two beautiful species of Convolvulaceae, *Merremia peltata* and *M. umbellata*.

Up on the ridges, secondary forests are dominated by *Macaranga* species, while bamboos and gingers are also abundant. We collected several *Hornstedtia*, *Etilingera* and *Alpina* species. Some of these gingers form clumps covering large patches. Palms (other than the monocrop, *Elaeis guineensis*) are surprisingly not well represented. Other than several species of rattans, we encountered only sterile species of *Borassodendron* and *Salacca*. The only palm we collected is a beautiful *Licuala vallisida* in fruit. Orchids are also not well represented, both epiphytic and terrestrial. In total, we encountered only 11 species of them, and made collections of the flowering ones.

Loa Buluh (where REA Conservation now has a functioning field station and



An interesting cauliflorous *Diospyros* which may represent a new species

field laboratory) was the most interesting location with exciting species of plants including a large *Shorea* species that is more than 60 m tall and measuring 1.5 m wide and a cauliflorous *Diospyros* with fleshy flowers which could well prove to be a new species.

The days flew pass as we toiled into the night processing the plants, making notes for the specimen labels and processing pictures. During the last few days before we were due to fly off, we got to taste a local durian, *D. kutejensis*, which was sold in a roadside stall and was more expensive than *Durio zibethinus*, the common durian. Our verdict is that it is definitely an acquired taste. Its drier texture made it feel as if we were munching on a *kueh dodoh* that has gone wrong. The pungent smell that we tend to associate with durian is totally lacking! Yuck! Though you are all most welcome to try the fruit if the seeds we planted in the Gardens made it to adulthood in seven years time!



Etilingera metriocheilos

Paul Leong
Serena Lee
Herbarium

All pictures by Paul Leong
except for group by Yusuf

Propagation of a very rare orchid, *Robiquetia spathulata*



Clockwise from top left:

Flowers of *Robiquetia spathulata*.

Multiple young shoots growing in the Gardens laboratories, ready for growing on.

Plantlets of the rare orchid in pots at the nursery.

Robiquetia spathulata was first described from a specimen collected in Singapore in 1893 at Dalvey Road by the first director of the Gardens, H.N. Ridley. This specimen is still housed in the Gardens Herbarium, although since its discovery it has not been re-collected until it was rediscovered by Mark Lim, a conservation officer from the National Parks Board in mid-2006 (see *Gardenwise* 27:10-11).

This monopodial epiphyte orchid has strong leathery leaves of about 16cm long by 4cm wide. It bears attractive pendulous flowering shoots with many flowers opening at the same time. The sepals and petals are reddish-brown with light yellow margins and a unique yellow band in the middle of each. This is the only species of the genus *Robiquetia* found in Singapore. After the euphoria of re-discovery had settled, we got down to work on

conserving the plant by carrying out self-pollination in the field. Seedpods were formed but unfortunately the seeds were not viable. Undaunted, we tried propagation by tissue culture. Leaves were carefully removed from the shoot to expose the apical and axillary buds, which were then thoroughly cleaned, sterilised and excised. These buds were placed in sterile nutrient media consisting of Vacin & Went basic salt for initiation. The excised buds were closely monitored for a couple of months with constant change of fresh nutrient media. Of the six usable buds excised, only two axillary buds finally developed either into a mass of cells or multiple young shoots. From these, about 300 plantlets were sent to the nursery for growing on. Once fully grown, we will re-introduce this beautiful and locally endangered orchid species back to Pulau Ubin and other parks in Singapore.

Khoon-Woon Mui Hwang
Lim-Ho Chee Len
*Orchid Breeding and
Micropropagation*

Whang Lay Keng
National Orchid Garden

Ali bin Ibrahim
Pulau Ubin



The making of stars

The Gardens made gardening stars of over 40 students from Assumption Pathway School and Northlight School through its Gardenstars project. The project involved students from both schools coming together to design and implement a garden at Corner Green in the Gardens. The students were advised and guided by internationally recognised, award-winning garden designers - Australia's Jim Fogarty, and Singapore's very own Alan Tan.

At a celebration event to mark the successful completion of the Gardenstars project at the Gardens on 3 August 2009, Minister for National Development, Mr Mah Bow Tan, congratulated the students and teachers of both schools for their passion and commitment. "This new garden is not only a gift to the Botanic Gardens but a meaningful project that inspires a love for nature and introduces the students to the horticulture industry as a potential career path" said Minister Mah.

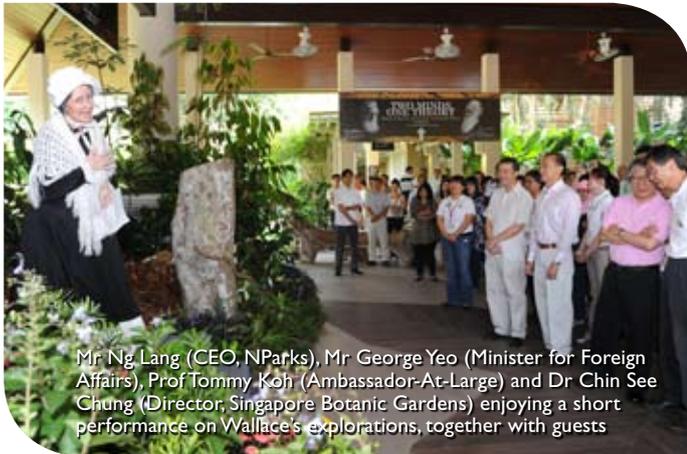
The students, who were allocated a 500 square metre plot of land in the Gardens, had a month to design and complete the garden whilst attending classes conducted by the two garden designers. Comprising four mini-gardens connected by garden pathways, their design included plants and recycled materials woven into the garden landscape.

As part of the Gardens' 150th anniversary celebrations, the Gardenstars project was aimed at cultivating the message of hope – to inspire us that with hard work, commitment and passion, one could blossom into a future "star" in the horticultural industry and have a hand in shaping Singapore's vision of a City in a Garden.

Minister Mah enjoying a guided tour by the Gardenstars



Two minds, one theory - Wallace & Darwin, the two faces of evolution theory



Mr Ng Lang (CEO, NParks), Mr George Yeo (Minister for Foreign Affairs), Prof Tommy Koh (Ambassador-At-Large) and Dr Chin See Chung (Director, Singapore Botanic Gardens) enjoying a short performance on Wallace's explorations, together with guests

Mention the term 'evolution' to anyone and instantly Charles Darwin comes to mind. Few are as familiar with the name Alfred Russel Wallace, also known as the other father of the theory of evolution. And, even fewer are aware that Singapore was Wallace's base when he was exploring the Malay Archipelago.

The Gardens recognised and paid tribute to Wallace's significant legacy by putting together a special exhibition entitled "Two Minds, One Theory: Wallace & Darwin, the Two Faces of Evolution Theory" in the Gardens from 1st to 30th August 2009. While in Singapore Wallace wrote enthusiastically in his journals of his productive explorations of local areas such as the Bukit Timah Hill forests, at a time when tigers still roamed this island.

The "Two Minds, One Theory: Wallace & Darwin, the Two Faces of Evolution Theory" exhibition also contained a uniquely Singaporean flavour, literally. For example, it revealed little-known facts such as Wallace being the first to describe the durian as "the king of fruits". In one of his journals, he waxed lyrical about the durian's unique appearance, odour, texture and flavour - "the more you eat of it, the less you feel inclined to stop".

Wallace returned to his native London in 1862 after an epic eight-year journey through our region, armed with a massive collection of 125,660 wildlife specimens, of which about 1,000 were species new to science.

Wallace came to the same conclusion on the theory of evolution at about the same time as Darwin and both great thinkers communicated and collaborated on the groundbreaking idea of natural selection. Darwin eventually published *The Origin of Species* - a book that changed forever our understanding of the nature of life. The book was published in 1859, the same year as the Gardens was established.

I do! I do! I do!

In celebration of our 150th anniversary, 168 couples said "I do" amidst the splendour of the Gardens. The event earned the Gardens a coveted place in the Guinness World Records for "most couples married in 24 hours". Set on the auspicious date of 20-09-2009, the Gardens had targeted a sign-up of 150 couples to mark the Gardens' anniversary. However, tying the knot at Singapore's best-loved icon amidst abundant greenery and air of blossoming romance proved to be an irresistible and winning attraction and the mass celebration saw 168 couples exchanging their marital vows.

The couples exchanged their vows in 22 exquisitely decorated pavilions that had been specially designed with the surrounding environment of the Gardens in mind and colour-themed accordingly. The pavilions were spread across some of the Gardens' most-loved spots, including the Band Stand, Swan Lake and Symphony Lake. The solemnisations were followed by a high-tea buffet reception and a specially arranged concert to serenade the newly-wed couples and their guests. Each couple also received a customised keepsake from the Guest-of-Honour, Mr Lim Boon Heng, Minister, Prime Minister's Office and Deputy Chairman of the People's Association, to commemorate their special day.



Over 150 couples took to the red carpet for the wedding march at the Shaw Foundation Symphony Stage

One evening, two stellar performances

In celebration of the Gardens' 150th Anniversary, the Gardens presented *One Evening - Two Stellar Performances* on 18 October 2009 at 6pm at the Shaw Foundation Symphony Stage. Featuring the much-loved Singapore Chinese Orchestra and the world-renowned New York Philharmonic Principal Brass, this highly anticipated event was an evening to remember.

The programme kicked off with the Singapore Chinese Orchestra playing *Delightful Suites* comprising the *Spring Suite* which depicts the vitality of spring and the *Carmen Suite* which comprises a series of five movements by renowned composer Bizet.

The evening ended on a high note with a rousing performance by The New York Philharmonic Principal Brass, a quintet comprising the principals of the brass section of the highly acclaimed New York Philharmonic Orchestra. This performance by the New York Philharmonic Principal Brass launched the Orchestra's visit to Singapore, during its first international concert tour under the leadership of its recently appointed maestro Alan Gilbert.



Playing to a full house

In search of gingers

A buzz of excitement filled the air on the morning of 1 Oct 2009 as guests and staff were treated to an exhibition of exquisite botanical illustrations entitled "*In Search of Gingers*" at the Gardens Library of Botany and Horticulture.

This month-long exhibition was launched with a very entertaining and knowledgeable talk by Sandy Ross Sykes, an award-winning botanical artist. She honed her artistic skills at The Royal College of Art, London, where she specialises in painting Zingiberaceae. Since 2001 her paintings have been regularly exhibited in the UK, Hong Kong and USA and she has won several prestigious awards. Sandy is also a passionate believer in the role of the botanical artist to both conserve and record botanical information for future generations.

There are currently over 1,200 known species of Zingiberaceae (gingers), flourishing mainly in Southeast Asia. The exhibition was aimed at raising public awareness of the species. Illegal logging, pollution and urbanization are three of the main problems facing this fascinating family of plants. The exhibition comprised botanical illustrations, a display of living plants and various products derived from the commonly used species of the Zingiberaceae family like ginger, turmeric and cardamom. For younger visitors, there was an interactive "Scratch & Sniff" corner to explore the smells and colours of gingers. The exhibition is particularly appropriate for our 150th anniversary, as the ginger family has been of research interest to the Gardens since the time of H.N. Ridley, our first director. The exhibition was made possible by the kind sponsorship and support of Mrs Margaret Lien.



Artist's paraphernalia



Children really enjoyed the scratch-and-sniff corner – gingers smell wonderful!

Botanical diplomacy

Spouses of APEC leaders were treated to a Garden City experience at the Gardens on 14 Nov 2009. The morning of botanical delights began with a journey of discovery at the Jacob Ballas Children's Garden where over 100 students from Nanyang Primary School, Loyang Primary School, Methodist Girls School and NUS High welcomed the spouses and shared their knowledge of the Children's Garden as well as provided a peek into the intricacies of floral arrangement and bottle gardening.

After a morning with our charming student guides, it was off to the Ginger Garden which was transformed into a stunning display of tropical diversity, forms and colours with orchids and gingers jostling for attention. Named the Uniquely Singapore display, this visual feast was a hit with our VIP visitors. This exuberant and lush floral landscape provided the perfect setting for a specially designed luncheon hosted by Mrs Lee Hsien Loong.

The event also saw Mrs Lee presenting *Trichocentrum* APEC Singapore 2009 to commemorate the special occasion. This exquisite hybrid was immortalised in 24K gold and gifted to the spouses as a keepsake of their visit to the Gardens.

Over at the Esplanade, the Gardens also weaved its magic to ensure a Garden City experience for Singapore Evening, an extravaganza showcasing Singapore cuisine and culture. The Gardens staff together with Istana staff also transformed the Istana's banquet hall, the venue for the APEC Leaders' Lunch, into a floral wonderland resplendent with stunning blooms and tropical foliage.



One for the album- Spouses of APEC leaders with Mrs Lee Hsien Loong (2nd row, right)

The art of botanical painting

The Gardens launched its much awaited 2010 Calendar on Sunday 25 October 2009. The launch of the calendar, which forms part of the 150th Anniversary celebrations, was graced by Mr. Tan Jiew Hoe, President of the Singapore Gardening Society (SGS).

The 2010 calendar features a selection of botanical paintings carefully selected from the archives of the Gardens to represent the forests of the region, and illustrates the diversity, beauty, rarity and utility of rain forest plants. The 13 chosen botanical paintings are painted in an artistic manner, with the flower or the fruit highlighted in colour to further accentuate the image. It is hoped that the calendar will enhance public awareness on the conservation of our natural forests.

The Gardens' Calendar is a community project sponsored by ExxonMobil Asia Pacific Pte Ltd, a staunch supporter of this project since 2002. All proceeds from the sale of the calendar go towards the Singapore Botanic Gardens Exhibition Fund, in support of the Garden's public exhibition programme. This programme is used to educate visitors about the appreciation of flora and fauna.

The launch of the Gardens' 2010 calendar by the President of the Singapore Gardening Society also marked the long and close friendship between the Gardens and SGS dating back to its founding in 1936.



Mr Tan Jiew Hoe, Dr Chin See Chung (Director, Singapore Botanic Gardens) and Mr Kwa Chong Seng (Chairman & MD of ExxonMobil Asia Pacific Pte Ltd) launching the Gardens 2010 calendar



A moment in time - Visitors immersing themselves in the ephemeral beauty of nature

Fugitives fleurs: a unique perspective on floral fragments

Photography can freeze a moment in time and allow one to view objects from a different perspective. By capturing floral fragments as a vector of emotion, time and identity, Joyce Wye Ho's macro portraits of flowers are a revelation of luminous colours and abstract, often ethereal forms, offering us a glimpse into undiscovered worlds and trajectories.

Over two weeks from 7 December, visitors to the Gardens had the opportunity to immerse themselves in nature's fleeting beauty through the photographic exhibition as well as talks and meet the artist sessions conducted by Joyce.

A Singaporean artist based in the UK, Joyce, tries to highlight the moment lived, rather than the sense of its loss, through her 'floral fragments' imagery. In doing so, she hopes to evoke a certain poignancy relating to the poetic transience and cyclical nature of life and allow visitors to reflect on the way they feel, perceive, remember and dream.

Falling in love

Strains of familiar favourites such as Grande Polonaise, Memory (from the Musical Cats), O sole mio and Cielito Lindo filled the air as renowned Polish talents Iwona Tober, Leszek Swidzinski, Tadeusz Szlenkier and Joanna Lawrynowicz took visitors on a musical journey at the Shaw Foundation Symphony Stage on 7 November 2009. A collaboration between the Gardens and the Embassy of Poland, the "Fall in Love with Warsaw" concert also featured Polish melodies about the city of Warsaw, transporting visitors to one of the world's most romantic cities.



Polish operatic talents serenading visitors to the Gardens



Mr Sam Tan (4th from left) and Mr Kim Joong-keun, Ambassador of the Republic of Korea (2nd from left) admiring one of the many installations in the Gardens

Born in the Gardens

Over November and December, visitors were treated to a visual feast as they meandered through the Gardens and discovered art installations in its various nooks and crannies. More than 20 pieces making up 10 installations were created by five Korean and five Singaporean artists, who were specially invited to take part in this unique exhibition to celebrate the Gardens' 150th Anniversary and Korea Festival 2009.

Centred on the interplay between Man and Nature and the evolution of what is regarded as one's natural environment, the exhibition, titled *NatureBorne*, was launched on 2 November. The artworks were varied in medium and form, but each had been specifically positioned to create a harmonious landscape, sitting within the Gardens as though born there. The event was graced by Mr Sam Tan, Parliamentary Secretary, Ministry of Information, Communications and the Arts, and Ministry of Trade and Industry. Attending the launch were over 150 guests including Ambassadors and diplomats from 20 countries.



Mr Eng with Guest of Honour Mrs Sheryn Mah

A garden dialogue - Reminiscences of the Gardens

Featuring 30 nature paintings inspired by the greenery and iconic locations in the Gardens, this exhibition captured their special essence, character and history. Adopting an impressionist style using a mix of oil and acrylic paints, award-winning artist Eng Siak Loy captured the images subtly as someone would see if they just caught a glimpse of the scene.

Eng is a well-known designer and artist. His works include the currency notes of Singapore and many stamp and coin sets. Eng's excellent work and contributions to the art and design scene have seen him receiving the prestigious UNESCO NOMA Concourse prize. He was also a recipient of Asia's Most Beautiful Stamps award while coming in 2nd in the Most Beautiful Stamp in the World award in 2003. As a fitting cap to his lifelong achievements, he won the Singapore President's Design Award (Designer of the Year) in 2007.



The big picture – Children exercising their creative juices

Children celebrate!

Children too were very much a part of the Gardens' 150th Anniversary celebrations through events specially designed to inspire a love for nature and greenery through play. Art and the rhythm of nature were the order of the day for over 1,000 participants at "The Big Draw" held at the Jacob Ballas Children's Garden on 29 November 2009. With nature as their inspiration, the children worked alongside renowned artists such as Mr Sun Yu Li to create innovative community art pieces.

Botanical party

The Minister for National Development, Mr Mah Bow Tan, joined over 5,000 members of the public at a spectacular and fun-filled botanical party at the Gardens on the evening of 5 December to mark the successful completion of the year-long celebrations to commemorate our historic 150th Anniversary.

The audience were treated to a delightful visual and auditory experience as they relaxed in the lush flora and fauna of the Gardens. To commemorate the Gardens' 150th Anniversary, 150 trees were specially decorated and lit up, illuminating Palm Valley. The "Trees of the World" light-up was designed to involve embassies, corporations, schools and community groups in the celebration of one of Singapore's best loved public spaces.

Besides experiencing Palm Valley bathed in lights, the audience were serenaded by the enchanting melody of bird songs performed by composer Robert Casteels, as he led a group of Singapore's finest jazzmen, world-music performers and the Philharmonic Youth Winds in performing jazz classics and familiar tunes such as Jimi Hendrix's Little Wings and The Beatles' Blackbird, re-interpreted and re-harmonised specially for this concert. The concert was specially conceived to celebrate the rich diversity of bird species in Singapore. There are more than 360 species in Singapore, and over one-third are known to visit or stay in the Gardens.



Minister Mah lighting up the 150 Trees of the World

Of saints, ships and suspense

The Gardens' Library of Botany and Horticulture played host the Asian launch of *Saints, Ships and Suspense* on 24 October 2009.

'*Saints, Ships and Suspense*' takes the reader on a remarkable journey through Norwegian culture, society and nature. It is authored by Miss Gertrude Marsh, intrepid explorer and a long-time partner and supporter of the Gardens, whose passion for knowledge and exploration is only rivalled by her love for the natural sciences. The highlight of the morning was a public reading by Miss Marsh, whose riveting performance kept the audience spellbound.

Speaking at the launch, our Director Dr Chin See Chung said: "Miss Marsh's journeys began in earnest after she discovered in 1997 a rare copy of *Flora Novegica* by Bishop Johan Gunnerus, published in 1776. Her first book was a journey tracing the footsteps of Gunnerus as he travelled in search of human souls and Gods' plants. *Saints, Ships and Suspense*, is companion volume. It continues her love-affair with things Norwegian. She travelled Norway in search of places and memories as a pilgrim, historian and naturalist. In this she is joined by her first Norwegian Guide and now her dearest friend, Mr Ormulf Norgard. Long may she continue her explorations".



Miss Gertrude Marsh autographing her book for guests

Birthday wishes for the Gardens

Together with her family, Sara, the Gardens' friendly Botanicosaurus rolled out the welcome mat for visitors at the Green Pavilion and Botany Centre. During the months of November and December, visitors to the Gardens were treated to an enchanting garden display titled "Sara's Garden of Wishes". Taking centre-stage at the display was a giant guest book for visitors to pen their birthday wishes for the Gardens. The displays were a hit with visitors who were only too happy to add their good wishes for posterity.

Here are some comments and good wishes penned by our visitors:

Congrats on your 150 Anni! I love the Botanic Gardens; it is one of the best places in Singapore. Thank you everyone working at the Gardens for making it a wonderful haven. You must have put in a lot of heart and hard work in maintaining and developing it. Well done!
- Loh Kah Wei

What a wonderful set of gardens! What a significant resource for citizens and visitors.
- Prof David Butt

Absolutely delightful. Probably the best Botanical Gardens we have seen in any country. Orchids were glorious. A credit to all who designed and worked in it.
- Paul and Bill Moneill.



Sara and her family welcoming visitors to the Gardens



Convolvulaceae taxonomic workshop

The First International Working Group Meeting on the Taxonomy of Convolvulaceae was held at the Gardens from 28–30 September, 2009. This first ever meeting of taxonomists and other specialists who study the morning glory family was one of the events celebrating the 150th Anniversary of the Gardens.

Although the economic downturn kept some researchers from attending due to lack of funds, those who made the trip found the chance to meet face to face with colleagues an invigorating experience. Many have worked singly for years or decades and have never before had the chance to discuss matters of mutual interest with like-minded peers. Twelve participants came from Australia, Brazil, Ethiopia, France, Germany, Malaysia, Portugal, Thailand and the UK. Three additional participants took part from afar by sending their Powerpoint presentations from Canada, the UK and USA.

In addition to the researchers—comprising active and retired scientists, faculty members, graduate students and a living collection curator—the working group was joined by a bioinformatics specialist. Lisa Walley, representing

the Encyclopedia of Life Project led a hands-on workshop that demonstrated the power of the Worldwide Web for creating electronic taxonomic platforms in real time. The potential for E-taxonomy to enhance and speed up efforts to learn about and document biodiversity is enormous and the potential was fully realized by the working group. A decision was made to proceed with creating a site devoted to Convolvulaceae using the newly forged E-taxa platform.

After three full days of presentations, discussions, and goal-setting the group spent a day exploring Pulau Ubin. Although we did not anticipate finding so many Convolvulaceae on this small and very well studied island, the expert's eyes located more species than we had been led to expect there. Mostly, after three days of talking, participants just enjoyed the chance to get outdoors and look at plants, something botanists have in common no matter where they are from! Based on the success of the first working group meeting, plans are already afoot for a second one, probably in conjunction with the next International Botanical Congress, to be held in Melbourne, Australia in 2011.

Above:

Working Group meeting participants in the Botany Centre second floor garden. Front row, left to right: Wannachai Chatan (Thailand), Syahida Emiza binti Suhaimi (Malaysia), Rosangela Simão-Bianchini (Brazil), Sebsebe Demissew (Ethiopia), Nelly Bouilhac (France); back row standing, left to right: Ana Simões (Portugal/UK), Dick Brummitt (UK), Teresa Buriel (Brazil), Lisa Walley (USA), Mark Carine (UK), Eckart Eich (Germany), George Staples (SBG), Bob Johnson (Australia).

Upside down or right side up? The baobab tree

The baobab tree *Adansonia digitata* is the most widespread of the *Adansonia* species. This genus has eight species that are native to the African continent, Madagascar and Australia. The generic name 'Adansonia' is in honour of the French botanist, Michel Adanson (1727-1806). The species name 'digitata' means hand-like, which is in reference to the leaf shape. *Adansonia digitata* is known by many common names, and is most usually simply called 'the baobab'. Its other vernacular names include boab, boaboa, upside-down tree, dead-rat tree, monkey bread tree, bottle tree and countless other African names. *Adansonia* belongs to the family Malvaceae (hibiscus family), but older literature classifies it in the Bombacaceae, which is now considered a sub-family of the Malvaceae.

It is not a particularly tall tree, usually reaching a height of 20 to 30 m; however, the trunk is massive, and the largest example alive in Limpopo Province, South Africa has a recorded circumference of 47 m. The enormous, usually squat, cylindrical bottle-shaped trunk gives rise to thick tapering sparse branches resembling a root-system. This growth form is the reason why the tree is sometimes referred to as the upside-down tree. The huge trunks are used by the tree to store water for dry periods. Trees sometimes have several trunks emerging from the ground. In its native habitat, the baobab is deciduous during dry season and usually flowers at the end of the dry season. On the other hand, in the wet tropics, we hardly see it shedding its leaves.

The baobab inflorescences are large and pendulous, and the creamy-white flowers are attractive and sweet smelling. The flowers are about 10 cm across and have waxy and crinkled petals which surround a dense cluster of stamens that reminds one of a powder puff. The inflorescences open in the evenings and senesce within 24 hours, turning brown and smelling quite unpleasant on the ground. The

The huge trunks are used by the tree to store water for dry periods. Trees sometimes have several trunks emerging from the ground.

flowers are bat pollinated, which come to feed on the copious nectar:

The pendant fruit is another oddity of the plant, and is quite a large velvety oval-shaped woody capsule, about 12 cm long. It is green when young and turns yellowish-brown when mature. From afar, and with an active imagination, these pendulous fruits look like dead-rats hanging upside down on the tree – hence one of the common names, dead-rat tree!

Besides being one of the plant kingdom's bizarre wonders, the tree is often associated with the mystique, legend and superstition of the land where it occurs. Indigenous Australians and Africans have used baobabs as a source of water and food and have used the leaves medicinally for centuries. They have also painted and carved the outside of the fruits into beautiful ornaments. People have used large baobab trees with hollow trunks for centuries for various purposes including houses, storage barns, a toilet, prisons, pubs and even bus stops! In the Sunland Farm, Limpopo Province, South Africa, a pub has been constructed in the hollow of an old baobab that is reputed to be 6000 years old. This pub can take up to about 20 people. Going 'down under', in Derby and Wyndham, Western Australia, we find another species of baobab, *Adansonia gregorii*, which was used to make prisons. The prison trees were used in the 1890s as an overnight lockup for prisoners on their way for sentencing in town. These trees are now a major tourist attraction.

Besides providing shelter, the baobab has many other uses. The young leaves are used as a vegetable throughout mainland

Africa, where they are cooked fresh or dried as powder. The fruit pulp can be eaten direct or mixed with milk or porridge, can be mixed in water to make a nutritious lemonade-like drink, and was even once used in the production of tartare sauce. It is said to have more vitamin C than oranges and exceeds the calcium content of cow's milk. The seeds can also be consumed and produce an edible oil. The fibrous bark is used to make useful items such as mats, ropes, fishing nets and lines, sacks and even clothing. In Africa, although people and elephants often heavily strip the bark, the tree does not suffer as a normal tree would from ring-barking. Baobabs have the ability to simply continue to grow and produce new layer of bark.

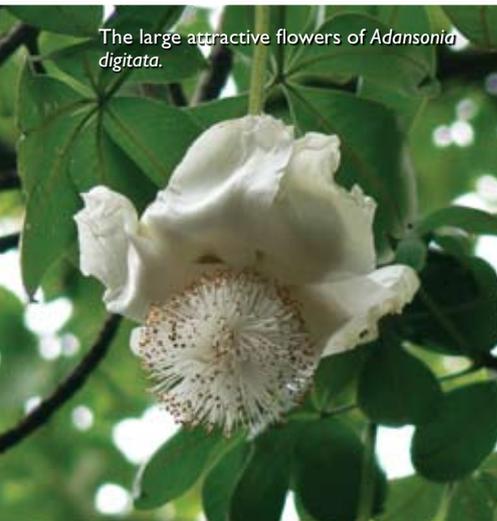
In the Gardens a tree planted near the Sun Garden recently graced us with wonderful large creamy-white blooms. The next time you are in the gardens, take a stroll along the beautifully landscaped Sun Garden and spot this upside-down tree. Find out for yourself if it is indeed the right side up; and reflect on this amazing plant that provide so much to life in the arid areas of Africa, Madagascar and Australia.

Nura Abdul Karim
Living Collections

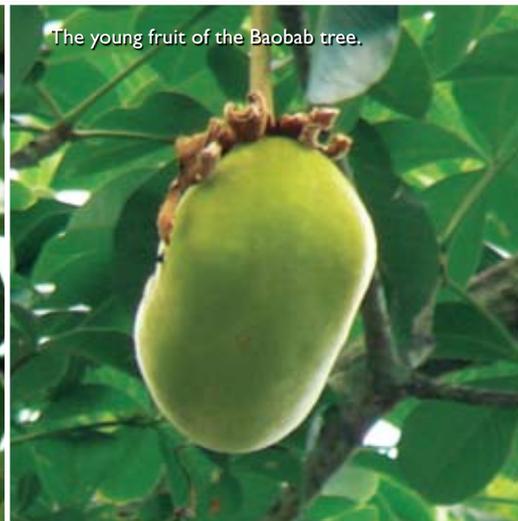
Photos by N.A.Karim, S.L. Koh, J.W.Taute



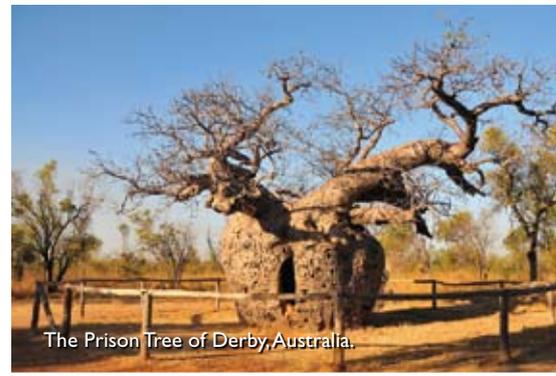
The upside down tree near the Sun Garden.



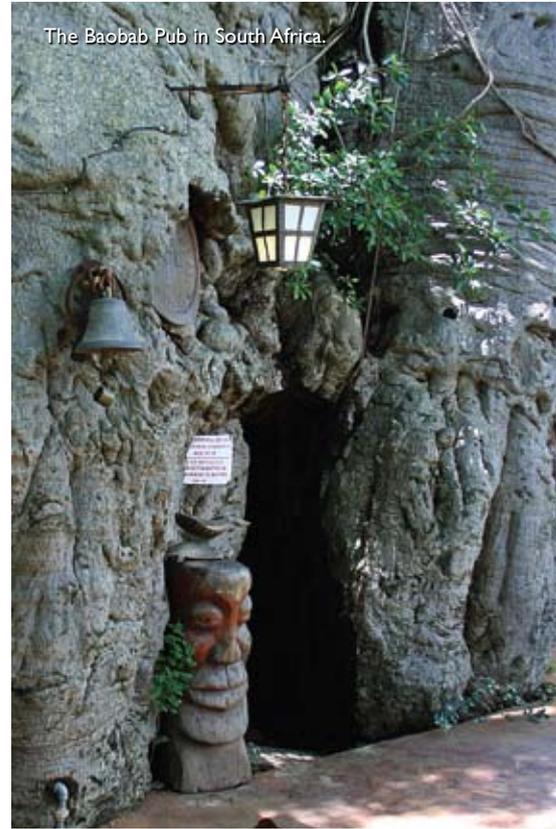
The large attractive flowers of *Adansonia digitata*.



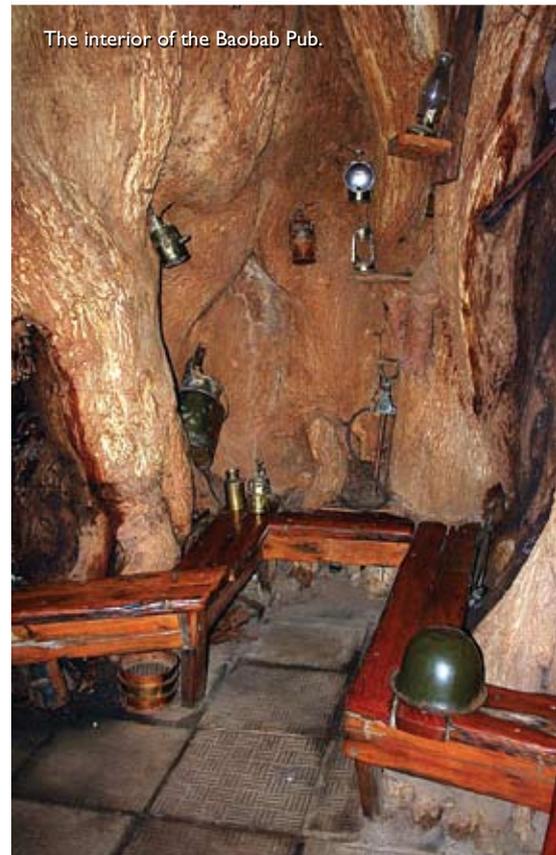
The young fruit of the Baobab tree.



The Prison Tree of Derby, Australia.



The Baobab Pub in South Africa.



The interior of the Baobab Pub.



Spindle gingers — jewels of Singapore's forests

Hornstedtia scyphifera commonly occurs at Bukit Timah and near MacRitchie Reservoir.



Inflorescence and close-up of the flower of *Hornstedtia conica*.



The pretty yellow-flowered *Hornstedtia tomentosa* is native of Java and Borneo. It thrives in the Ginger Garden.

Members of the ginger genus *Hornstedtia* are native to the forests of Southeast Asia. They are usually large plants with robust pseudostems. Some species have rhizomes just at the ground level, but others have their rhizomes well lifted above ground on stout stilt roots. Due to the spindle-shaped inflorescence, they are called spindle gingers. The genus *Hornstedtia* was named in 1791 by Swedish chemist, botanist and entomologist Anders Johan Retzius after his fellow countryman, surgeon and naturalist Claës Fredric Hornstedt, who amassed rich collections in the fields of natural history and ethnology during his journey to Java in 1783 and 1784. The total number of *Hornstedtia* species is not known and will perhaps exceed 40. The group is in urgent need of revision as there are nearly one hundred names published not only under *Hornstedtia*, but also under *Amomum* or generic names lost in history and no longer accepted like *Greenwaya*, *Donacodes* or *Stenochasma*.

Three *Hornstedtia* species are native to Singapore. The most common and also the most conspicuous is *Hornstedtia scyphifera*, known also as great spindle ginger. The specific epithet *scyphifera* has Greek roots and means cup bearing, referring to the shape of the mature inflorescence. The leafy shoots of mature plants are about 3 metres high and are often on stilt roots. The inflorescences arise from the rhizome on very short peduncles. The tightly arranged broadly ovate bracts are dark maroon-red with white transverse reticulation. The young inflorescences are spindle shaped, but as

the flowering progresses, the upper part opens up and forms the typical cups, often filled with mucilaginous liquid. The bright red flowers with anthers closely pressing against the small labellum reminds of one of duck beaks. The species is common in forests of the Malay Peninsula and has also been reported from Borneo and Sumatra, but is in decline in Singapore. *Hornstedtia leonurus* has more slender leafy shoots. The inflorescences arise at the base of leafy shoots and are partly buried in the ground. The bracts are much narrower, brownish-green, covered with golden tightly appressed hairs and the inflorescence loosens up as the flowering progresses. The dark red flowers are truly beautiful with whitish tips to the corolla lobes and a labellum with a white margin. The specific epithet *leonurus* means lion's tail. This species is sometimes referred to as the lesser spindle ginger. Both species were discovered by Danish botanist Johann Gerhard Koenig in forests near Malacca in Peninsular Malaysia during his expedition between 1778 and 1779. Koenig recognized them as members of the genus *Amomum* and in 1783 described the two species as *A. scyphiferum* and *A. leonurus*.

The third species, which is rather rare in Singapore, is *Hornstedtia conica*. The inflorescence is of similar shape and size to that of young *H. scyphifera*, but the pink-red bracts lack the prominent reticulation and instead are covered by short appressed hairs. The inflorescence of *H. conica* does not make a cup and retains the spindle shape even after flowering is

Three *Hornstedtia* species are native to Singapore. The most common and also the most conspicuous is *Hornstedtia scyphifera*, known also as great spindle ginger.

over, hence the name. When in flower, it is easy to distinguish it from the other two species by its well-developed pink labellum, which has a frilly margin. Ridley described the species in 1890 based on collections from Johor and Selangor in Peninsular Malaysia and from Bukit Pajang in Singapore. Of these, the Selangor specimen was selected as the lectotype of the species and is housed in the Gardens Herbarium.

As the latter two species are both critically endangered in Singapore, the Gardens and Conservation Division are working on a programme to conserve them by propagation and reintroduction. Although all are plants of a forest environment, it is possible that they could be suitable for planting in selected park habitats in our urban landscape.

Jana Leong-Škorničková
Herbarium

Photos by Jana Leong-Škorničková



Hornstedtia leonurus was recorded in Nee Soon and Seletar during surveys conducted by herbarium staff.

“The Green Sheep” – a first for babies and toddlers at JBCG



“The Green Sheep” by Mem Fox and Judy Horacek, directed by Cate Fowler, is a guided experience for babies, toddlers and their families. Based on the classic Australian picture book ‘Where is the Green Sheep’ by Mem Fox and performed in an interactive setting inspired by Judy Horacek’s illustrations, three puppeteers and a musician tell the tale of the search for the Green Sheep. In the process, they introduce many other sheep and wonderful concepts which include music, movement and puppetry. The Green Sheep is the first programme conducted at the Jacob Ballas Children’s Garden (JBCG) which caters specifically for children of 1 to 5 years old and gives fun, meaningful and interactive bonding with their parents or caregivers. This goes towards filling the gap in programmes for our toddler audience at JBCG.

Twelve “The Green Sheep” performances were held at the Party Place in JBCG from 8 to 13 Dec 2009. Tickets were priced at \$6 per child and \$6 per accompanying adult. In just 2 weeks, tickets were sold out. A final tally of numbers showed that we successfully reached out to more than

950 children and their families over the five and a half days.

One mother told us after the show, “The Green Sheep was great! I was skeptical that my daughter of 11 months could keep quiet or hold her attention for more than 5 minutes. Yet, my friends and I decided to give it a shot with our babies. The children were absolutely mesmerized by what was going on, sitting for half an hour on our laps, clapping their hands and laughing! The performers really knew what they were doing. It was an absolutely wonderful experience for all of us, especially the babies!”. Mrs Wong, mother of a 3-year-old boy and a 5-year-old girl, felt that the Green Sheep was a fun and educational experience. “The story is simple enough for the little ones to understand, while the props and musical instruments made the show very exciting. My two children were fascinated by the variety of sheep described. They were ecstatic when they finally found the Green Sheep! My daughter could still remember all the different sheep two weeks after the performance. This was a good bonding experience with my children.”

Clockwise from top left:

Babies and toddlers enthralled by The Green Sheep, at the Party Place of JBCG.

Loud “Yay’s!” for the Band Sheep.

Of sheep and trains...

Children eager to join the Slide Sheep.

Captivating stories about the Thin Sheep and the Wide Sheep.



3-year-old Javen Wong petting the elusive green sheep who is fast asleep.

The Gardens is proud to have hosted “The Green Sheep”, which was made possible with the support of Kids 21, the Julia Gabriel Centre for Learning and Forum The Shopping Mall.

Janice Yau
Education

Photos by Winnie Wong unless otherwise stated



Seri Hoyumi Hadi

International volunteers at the Jacob Ballas Children's Garden

On 28 October 2009, thirty-four international volunteers from Standard Chartered Bank contributed a total of 150 volunteer-hours of their time and hard work at the Jacob Ballas Children's Garden (JBCG). The group from the Corporate Real Estate Services Leadership Team of Standard Chartered Bank wanted to take some time off their international meeting in Singapore, to do something different and contribute to the community while in the country.

The international volunteers from 8 different countries (Australia, Hong Kong, Japan, Singapore, Saudi Arabia, Turkey, the United Kingdom and the United States of America) spent an afternoon in JBCG, planting, sprucing up the landscapes and making educational signages for the Children's Garden. The Gardens as

a whole took the opportunity to share knowledge and experience with the volunteers through talks and discussions as well as guided walks around JBCG. To end off a meaningful day, volunteers sampled some local flavours, snacks and desserts.

Mr Andrew Hunter, Group Head of Corporate Real Estate Services commented after the activities at JBCG, "We much enjoyed our team volunteering day at the Jacob Ballas Children's Garden. We all broadened our experience and knowledge, and greatly appreciated the energy and enthusiasm of staff from Singapore Botanic Gardens."

Winnie Wong
Janice Yau
Education

Photos by Winnie Wong unless otherwise stated



From the top:

Volunteers & Education staff showing off their handmade fun signages for JBCG.

The large number of volunteers from Standard Chartered Bank alongside Gardens staff after their hard days work

Volunteers and Gardens staff after planting shrubs around a 100 year old *Pometia*

The volunteers hard at work, adding butterfly plants to the margins of the stream in JBCG

The puzzling bathroom bubbles plant...

In February 2009 a plant from the Gardens Plant Resource Center was brought over to the herbarium for identification. Purchased from the Hua Hng Nursery, the plant was intended for use as a door prize for the Gardens' volunteers tea reception. However it was not used due to uncertainty about the plant's correct scientific name. The petite groundcover plant was growing nicely in the nursery and as part of accessioning it into the botanical records system a scientific name was needed. The plant proved easy to culture: it loves semi-shade, likes a well drained potting medium, and propagates easily by division. What was this plant?

Well, the answer turns out to be not so easy to find. As the photos show, this is an attractive herbaceous plant with glossy, dark green leaves that are in pairs, the margins are strongly rolled under, and the leaves are frequently puckered and crinkled. There were no flowers present when the plant was first brought round for identification; we hazarded a guess that this was a new cultivar of *Alternanthera*, in the *Amaranthaceae*. A request was made that one or two plants be grown on until they flowered and then brought back so the floral characters could be analyzed.

A few weeks later, in May, a pot of the plant was brought back to the herbarium with flowers present. The whip-like spikes appeared in the axils of the upper leaves; these spikes bore tiny whitish flower buds. When examined under a hand lens, the

"buds" turned out to be tiny flowers (only 2–3 mm long) that never opened fully. Dissection of a tiny blossom showed that inside the minute corolla was a fully formed pistil (female parts) and 2 fertile stamens (male parts). Based on the flower structure, especially the stamens, which had 2 anther cells that were offset, one above the other, with a broad connective tissue in between, the taxonomist had to revise his first guess: this was certainly not a member of the *Amaranthaceae*; the floral structure suggested *Acanthaceae*.

With this knowledge and some photos of the plant and its leaf and flower characters, an email appeal was made to colleagues that might recognize it. The first wave of inquiries was sent to individuals in tropical Asia who deal with cultivated garden plants. A second, later, inquiry was sent to taxonomists around the world who specialize in study of the large and diverse family *Acanthaceae*. We thank all those who replied to our inquiries; however, to date, none of those asked knew what the scientific name is for this plant. We did learn that bathroom bubble likes semi-shade, prefers a well drained potting medium, and can easily be propagated by division of established plants.

We did glean a few more bits of information about the plant: it is grown and sold in the Australian nursery trade for indoor use and terrariums under the common name the bathroom bubbles plant. A Google search on this name turned up—along with thousands of

posts about bathroom cleansers—a few inquiries from netizens asking if anyone out there knew what the proper name for this plant might be, and how to take care of it. No answers were found on the internet, only more questions.

And that is where our taxonomic quest ends, for now, until someone recognizes this plant. As we don't know where in the world it grows wild, it is difficult to know where to turn in the botanical literature (floras, taxonomic studies) for identification aids. The only guesses received agreed that the plant could belong in *Acanthaceae*, and might be a species of *Justicia*. There are an estimated 600 species of *Justicia*, found worldwide in tropical and subtropical regions, and there is no comprehensive reference that describes and illustrates them all. So once again, it proves virtually impossible to prove (or disprove) the idea that 'bathroom bubbles' is a *Justicia*, due to the sheer number of species that would have to be checked to ascertain this.

In situations such as this, it is more efficient in time and energy to ask for help than to do the job oneself, so we are asking our readers: Do you recognize 'bathroom bubbles'? Do you know what its scientific name is? Contact the Editor of *Gardenwise* if so...

George Staples
Herbarium
Aung Thame
Living Collections



Habit of Bathroom Bubbles plant.



Opposite leaf arrangement and whip-like flower spikes.



Tiny flowers less than 2 mm long.



Pinalia floribunda (synonym *Eria floribunda*), Sumatra to Bali; extinct in Singapore



Myrcanthes obliterata (synonym *Eria obliterata*): Thailand to Indochina and Indonesia as far east as Bali



Bryobium pudicum (synonym *Eria pudica*): common in Johor, a long time ago also found in Singapore where it is now extinct



Callostylis pulchella (synonym *Eria pulchella*), Indochina to Sumatra and Sulawesi; extinct in Singapore.



Trichotosia ferox, Thailand and Indonesia as far east as the Lesser Sunda islands

Name changes in the *Eria* group

Up until recently a broadly defined and extremely diverse genus *Eria* was recognized by most botanists. Those of us who go out to photograph orchids in the wild or grow *Eria* will know these epiphytic orchids with their usually small and often white, creamy or yellow flowers that are arranged in dense or lax and few- to many-flowered spikes. In contrast to many other orchids, the 'erias' mostly do not have showy flowers, and furthermore the flowers are frequently not very long-lasting. 'Erias' are nevertheless important plants as they belong to the most commonly encountered epiphytic orchids in Southeast Asia. Several species periodically flower in the Gardens.

The group comprises about 375 species which are distributed from India and the Himalayas through the whole of Southeast Asia and the Malay islands as far east as Queensland (Australia) and some of the Pacific Ocean islands. Most commonly the plants grow as epiphytes in

lowland or montane forest and only rarely as terrestrials in open swampy vegetation.

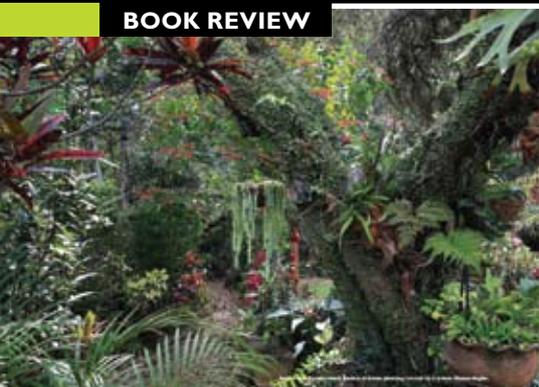
In the last few years molecular studies have shown that the genus *Eria* in its traditional circumscription is not a natural group, and because systematic botany is attempting to make classifications as natural as possible, a modification of the existing classification has become necessary. *Eria* was consequently split up into several subgroups in that some of the previously recognised sections were raised to generic rank. Among the new genera that are relevant to our region are *Ascidieria*, *Bryobium*, *Callostylis*, *Campanulorchis*, *Conchidium*, *Dilochiopsis*, *Myrcanthes* and *Pinalia*. Name changes in plants are of course always inconvenient, not only for the hobbyist who now has to learn new names for their plants in cultivation or in the forest, but also for the botanist who is often also a curator of collections. Nevertheless, in order to reflect the natural relationships of

these orchids such name changes were unavoidable. The genus name *Eria* itself which is so familiar to some of us is now restricted to several species which have short stems and widely open flowers, including the widespread species *E. javanica*. The closely related genus *Trichotosia*, widely accepted as its own genus but in the distant past also included in *Eria* as a section, differs by its strongly hairy stems and leaves.

This molecular 'revolution' has also occurred in other plant groups where it has also resulted in a large number of name changes; good examples of other orchid groups where such developments have taken place in the last few years are the *Oncidium* and the *Liparis* groups.

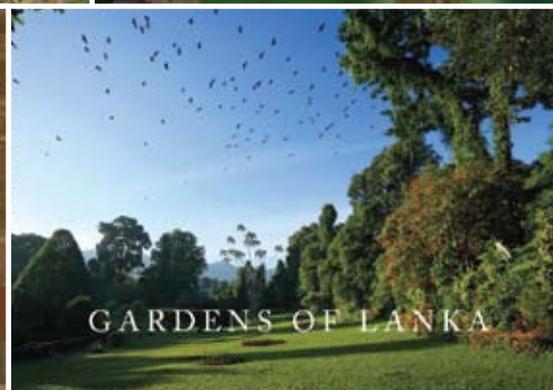
Hubert Kurzweil
Herbarium

Photos by Hubert Kurzweil



Gardens of Lanka

Edited by Sarala Fernando



Published in November 2009 by S. Fernando & L. Nadaraja. 228 pp, 175 colour and 25 b/w photographs. Price S\$ 80. Available in the Library of Botany and Horticulture and Gardens Shop.

Many people know Sri Lanka as a great tourist destination due to its beautiful beaches, cooling mountains or numerous famous archaeological sites. Fewer may know that you can find there the oldest historically recorded tree in the world or that planting auspicious plants in herbal gardens in particular directions and performing rituals to overcome the malefic influences of certain planetary movements are still widely practiced.

More than two years ago, Sarala Fernando, accompanied by well-known Lankan photographer Luxshmanan Nadaraja, embarked on an exciting journey of discovery of Sri Lanka's rich and unique gardening heritage. The duo traveled the country, and together with numerous contributions from Lankan professional landscape gardeners, botanists, archaeologists and academics, vowed to capture not only the immense beauty of Lanka's Gardens, but also guide the readers through its long history. Evidence from archives and archaeology suggests that landscape design in Lanka can be traced back for at least 23 centuries. Royal gardens, monastic gardens, urban gardens and home gardens are the four major types

to be found in Lanka and are, with several examples of each, illustrated in the book.

Lanka's landscape tradition influenced by both Buddhist as well as Hindu culture, does not try to change nature. Instead it has mastered incorporating existing trees and landscape elements like rocks and boulders into the garden designs. Water elements, be they running streams, various kinds of bathing, shallow or reflecting ponds, fountains or aqueducts or just the flow and collection of rainwater, are an indispensable part of gardens. Various footpaths and an abundance of fruit yielding or flowering trees are also typical as Sri Lanka's traditional gardens are informal and utilitarian, providing their owners with food, spices, fruits, medicines, aromatic substances, flowers for religious offerings or decorations.

The book starts with the chapter *Royal gardens* of Sygiria and Anuradhapura, both places being well known archaeological sites. Less known is the fact that Sygiria, with its features still fairly well preserved, is the oldest surviving large-scale garden in Asia. *Monastic gardens*, created as a living environment providing monks with a quiet place suitable for meditation, are naturally rather different from secular gardens. Hundreds of monastic sites were created since the 3rd century BC following the introduction of Buddhism. Five such gardens belonging to the earliest period representing various

styles are featured. The chapter *History of gardening in Sri Lanka* guides readers through the early Sri Lankan Gardens, the Portugese period, the Dutch period and the early British period. Pictures of famous Peradenyia Botanic Garden and Hakgala Botanic Gardens are the main content of the chapter *The National Botanic Gardens in Sri Lanka*. *Herbal and spice gardens* have a long tradition in Sri Lanka and it is believed that indigenous medicine existed even before an arrival of the Aurveda in about 3rd century BC. Cinnamon, pepper, cloves, vanilla, turmeric, ginger, jasmine, curry leaves, bananas, coconut palms, mango trees, sweet scented orange jasmine (*Murraya paniculata*), sandalwood, nutmegs and many other plants are often accompanied by a wide diversity of insects, birds, amphibians, adding to their attraction. Special chapters are dedicated to *Orchids* and *Birds in the Sri Lanka home garden*. Other chapters showcase the beauty of *Up country gardens*, *Traditional home gardens of Kandy*, *Gardens from the Eastern province* as well as several interesting *Private gardens*, to name a few.

The combination of large landscape format, high quality print and paper, informative and concise text and plenty of superb photographs of gardens, flowers, birds and other animals makes this a truly wonderful coffee table book.

Zingiberaceae symposium in Yunnan

The Fifth International Symposium on the family Zingiberaceae was held from 11 to 15th July 2009 in the beautiful setting of Xishuangbanna Tropical Botanical Garden, Yunnan, China. The event attracted more than 120 ginger specialists from 13 countries.

The first day of the event started with an opening lecture by Prof. Te-Lin Wu on progress in Zingiberaceae research and continued with plenary talks from various distinguished invited speakers including Dr. John W. Kress, Dr. Qing-Jun Li and Dr. Mark F. Newman to name a few. The second day of the symposium was dedicated to biosystematics, phylogeny and molecular biology in the morning and to horticulture, phytochemistry and ethnobotany in the afternoon. Each session was started by a keynote lecture by an invited specialist in the particular field, followed by eight or nine presentations.

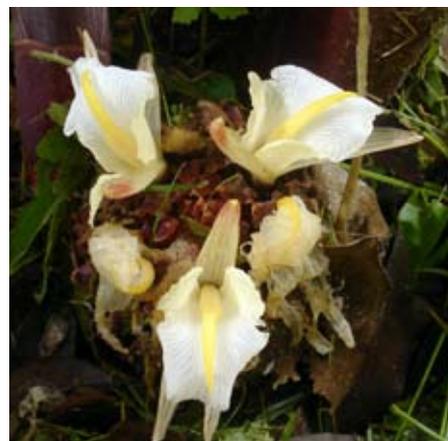
The field trip on the third day was a welcome break for all of us. An excursion was organized to the canopy walkway in Bubang protected dipterocarp forest and to the well-curated ginger research collection situated in eastern part of Xishuangbanna Tropical Botanical Garden. The fourth day of the symposium focused on morphology, cytology, physiology and ecology of Zingiberales and during the afternoon session moved onto diversity, classification and systematics of Zingiberaceae.

Thirty three posters covering various topics from taxonomy, cytology, molecular phylogeny, systematics, microproagation and use of GPS systems for curating ginger collections were displayed throughout the symposium. Best poster awards were presented to Sam Yen Yen et al. from FRIM for 'Conservation and threat assessment of *Scaphochlamys* (Zingiberaceae) in Peninsular Malaysia' and to Eliška Závěská and the team consisting of researchers from Charles University in Prague, Singapore Botanic Gardens and Calicut University in India for 'Phylogenetic studies in Indian polyploid *Curcuma* species using AFLP's and ITS sequencing'.

At the evening banquet, the venue for the 6th Ginger Symposium was announced and we look forward to the next meeting in 2012 at Calicut University in Kerala, India. The symposium was a wonderful experience for all participants. All of us were accommodated in the Gardens itself, so on top of coffee breaks, which were held in the same room as posters, we also met for breakfasts, lunches and dinners. That gave us plenty of opportunity for debating and networking. Organizers led by Dr. Qing-Jun Li are to be thanked and congratulated for the success of the event.

Jana Leong-Škorničková
Herbarium

Photos by Jana Leong-Škorničková
unless otherwise stated.



Top:
Zingiber orbiculatum in full bloom, growing in between the lecture hall and poster session room.

Middle:
Zingiber montanum is one of the many Zingiberales we could see in the ex-situ research collection at XTBG.

Bottom:
A group photo of the symposium participants.





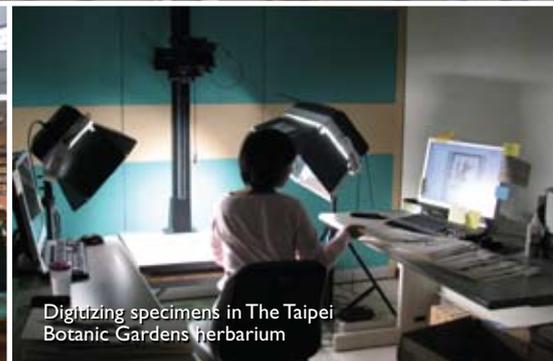
The delegates of the 2009 SEABG meeting



The orchid glasshouse at the Dr Cecilia Koo Botanic Conservation Center



Presentation during the SEABG meeting



Digitizing specimens in The Taipei Botanic Gardens herbarium

The 3rd South East Asia Botanic Gardens Network (SEABG) Meeting

Dr. Cecilia Koo Botanic Conservation Center and Taiwan Forestry Research Institute Taiwan, 17th – 20th November 2009

The South East Asia Botanic Gardens Network (SEABG) met for the third time in Taiwan in November 2009. Thirty-five participants from 20 organisations and 13 countries in the region (namely Brunei, Indonesia, Japan, Laos, Cambodia, Malaysia, Myanmar, the Philippines, Singapore, Taiwan, Thailand, Vietnam and China) were represented with observers from Australia and the United Kingdom. Nura Abdul Karim and Dina Gallick represented the Gardens at this meeting.

The participating organisations each made a presentation outlining their gardens' recent activities and plans for the future. Discussions were carried out to fulfill the network's need for regular and efficient communication and knowledge sharing between to its members. This included establishing an email distribution and online discussion group for SEABG and the possibility of creating annual newsletters for members. Since the close of the meeting, an exclusive online discussion site has been launched on

the Google Groups site under the name of SEABG2009. The site will serve as an informal discussion forum and announcement platform for all invited members of the SEABG network.

The network also discussed the need for further training within the region to strengthen capacity and the development of botanic gardens. The attending members had agreed that during the next SEABG meetings, the group could also hold training and workshop sessions for participants. A number of future workshops and training courses were generously offered and discussed at the meeting. This will promote a healthy sharing of information that is important in making botanical gardens relevant and effective as conservation areas and education and research institutions for flora of the region.

While in Taiwan, the group also visited the newly established Dr. Cecilia Koo Botanical Conservation Center and Taiwan

Forestry Research Institute's Fushan Botanical Garden, Taipei Botanic Garden and Herbarium as well as their seed bank. The study excursion was beneficial to all, as members were shown the daily work and activities of these institutions.

In short, the 3rd SEABG meeting was successful and useful. The Xishuangbanna Tropical Botanic Garden (Chinese Academy of Sciences) has offered and will host the next South East Asia Botanic Gardens Network Meeting (SEABG) in 2011. The network closed the meeting expressing a strong desire that the next meeting would focus attention on specific topics in order to strengthen the network and on developing a regional action plan for the implementation of the Global Strategy for Plant Conservation by the botanic gardens within South East Asia.

**Nura Abdul Karim
Dina Gallick**
Living Collections



The delegates at the East and Southeast Asian Biodiversity Information Initiatives meeting

Two regional meetings on ASEAN biodiversity held in Japan

The first meeting was the Asia-Pacific Biodiversity Observation Network (AP-BON), which took place from Dec 10-11, and the second meeting was the East and Southeast Asian Biodiversity Information Initiatives (ESABII), held from Dec 12-14. Both were held at the United Nations University in Tokyo with about 50 people attending each.

In addition to the East and Southeast Asian country representatives, a number of active NGOs and international organizations such as the Japan Wildlife Research Centre, International Long-Term Ecological Research Programme (ILTER), BIONET-International, Global Biodiversity Information Facility (GBIF), WorldFish Centre Philippines and the Secretariat of the Global Taxonomy Initiative (GTI) were also invited to participate.

I presented a paper entitled "Biodiversity Research in Southeast Asia: Its accomplishments, Needs and Problems", co-prepared with Prof. Peter Ng of the National University of Singapore. After much discussion at the first meeting, the AP-BON agreed to undertake the development of a digital portal to house the increasingly large body of information on Asiatic biodiversity (including endangered and invasive species) and regional conservation activities. To oversee the completion of this useful database, an interim steering committee was formed, consisting of Dr. T. Yahara (Japan) and Dr. R. Fuentes (Philippines) as co-chairs, plus four committee members who are from China, Japan, Indonesia and Korea. Furthermore, it was agreed that AP-BON

also takes the initiative to produce a book to summarize the latest facts and findings on the biodiversity in Asian-Pacific region to be published in celebration of the Year of Biodiversity 2010.

At the second meeting, the ESABII programme, fondly nicknamed "Wasabe" by the participants, was formally established to achieve two goals: (a) to complement the AP-BON programme in the development of East Asiatic biodiversity information systems, and (b) to help East and Southeast Asian countries to build their taxonomic capacity. All countries and organizations present at the Tokyo meeting of ESABII were invited to become a member of the ESABII programme.

To undertake the above stated goals, the structure of the organization of ESABII was discussed intensively for two days in both Japanese and English, with simultaneous translation. After much exchange of ideas, it was decided that the physical structure of ESABII shall consist of a secretariat office to be based in Japan for the first two years of its existence, and a steering committee to be made up of 6 elected members comprising three countries, the host country of the secretariat office, one NGO organization, and one regional or international network representative. The GTI Programme Officer of the Secretariat of the CBD will be the seventh member (*ex-officio*). The members elected to constitute the first Steering Committee of ESABII for the period of 2010-2011 are from Japan, China, Vietnam, Indonesia, ASEAN-ACB

(Organisation) and BIONET (NGO), plus a representative of the GTI. For effective liaison purposes, it was agreed further that each membered country will appoint a focal point person to represent them.

Finally, Japan was asked to hold the first tenure of the ESABII Secretariat Office and will work closely with the Steering Committee to raise funds in order (a) to hold the next general conference of member countries in a years time, (b) to develop the website of ESABII, which houses the programme activities and information of East and Southeast Asian biodiversity, and (c) to plan and organise three workshops in 2010 to help build the taxonomic capacity of the membered countries in SE Asia. Singapore has been asked to help organise one workshop intended for the building of taxonomic capacity in the region.

In closing a sumptuous western style dinner with plenty of drinks was offered to all participants in celebration of the bountiful outcomes of the two meetings and the forthcoming birth of an important digital portal of information on biodiversity and conservation in the region. A side benefit of the two meetings in Tokyo is the renewal of the camaraderie between Singapore and its neighboring countries as several of the representatives of ASEAN countries at the meetings are research staff from other herbaria or botanical gardens in the region.

Benito C. Tan
Herbarium

Photo by Dr. Susetio

Publications by Gardens staff in 2009

Articles

- Arditti, J., **Yam, T.W.** & **Kurzweil, H.** (2009). Hans Fitting's research on post-pollination phenomena in orchids and the discovery of plant hormones. In: K.Y. Paek, Hahn, E.J., Jeong, C.H. and An, Y.I. (eds.), *Proceedings of the 9th Asia Pacific Orchid Conference*. Secretariat of APOC9. Goyang City, Gyeonggi-Do, Republic of Korea. Pp. 250–279.
- Ariyanti, N.S., Gradstein, S.R., Sporn, S.G., Angelika, R. & **Tan, B.C.** (2009). Catalogue of the bryophytes of Sulawesi. Supplement 1: new species records. *Blumea* 54: 287–289.
- Hedenaes, L., **Tan, B.C.** & Chang, Y. ('2008'; 2009). Morphological and molecular data suggest different evolutionary relationships among species of *Acroporium* and closely related genera (Sematophyllaceae). In: Mohammed, H., Baki, B.B., Nasrulhaq-Boyce, A. and Lee, P.K.Y. (eds.), *Bryology in the New Millennium*. University of Malaya, Kuala Lumpur. Pp. 259–276.
- Ho, B.-C. & **Tan, B.C.** (2009). Does the moss genus, *Lepidopilum* (Brid.) Brid. (Pilotrichaceae), occur in Asia? *Gardens' Bulletin Singapore* 60: 345–349.
- Kurzweil, H.** & Burgoyne, P. (2009). Closing bodies in the capsular fruits of Ruschioideae (Aizoaceae) – a review. *Bothalia* 39: 107–116.
- Kurzweil, H.** (2009). A review of the genus *Plocoglottis* Blume (Orchidaceae) in Thailand. *Gardens' Bulletin Singapore* 61: 81–94.
- Kurzweil, H.** (2009). Notes on the orchid flora of Myanmar. *Myanmar Forestry Journal* February 2009: 29–31 (text in English language, pagination in Myanmar script).
- Kurzweil, H.** (2009). Taxonomic problems in the genus *Calanthe*. In: K.Y. Paek, Hahn, E.J., Jeong, C.H. & An, Y.I. (eds.), *Proceedings of the 9th Asia Pacific Orchid Conference*. Secretariat of APOC9. Goyang City, Gyeonggi-Do, Republic of Korea. Pp. 387–396.
- Kurzweil, H.** (2009). The genus *Habenaria* (Orchidaceae) in Thailand. *Thai Forest Bulletin (Botany), Special Issue*: 7–105.
- Kurzweil, H.**, Chantanaorrapint, S. & Buakhlai, A. (2009). A new species of *Habenaria* (Orchidaceae) from Southeast Asia. *Gardens' Bulletin Singapore* 60(2): 373–379.
- Kurzweil, H.**, Linder, H.P., Pridgeon, A., Veitch, N.C. & Grayer, R.J. (2009). *Acrolophia*. In: Pridgeon, A., Cribb, P.J., Chase, M. & Rasmussen, F.N. (eds.), *Genera Orchidacearum* 5. Oxford University Press. Pp. 94–96.
- Kurzweil, H.**, Suksathan, P. & Watthana, S. (2009). First recording of the genus *Satyrium* Sw. (Orchidaceae) in Thailand. *Natural History Journal of Chulalongkorn University* 9: 105–111.
- Leong-Škorničková J.** (2009). Fruit: Edible, Inedible, Incredible. *Edinburgh Journal of Botany* 66: 485–486.
- Leong-Škorničková, J.**, Sabu, M. & Prasanthkumar, M.G. (2009). Transfer of *Amomum fenizlii*, a Nicobar Islands endemic, to *Etingera* (Zingiberaceae). *Gardens' Bulletin Singapore* 60: 381–387.
- Leong-Škorničková J. & Nura, A.K.** (2009). The Curcuma Cultivar Registry. *Gardens' Bulletin Singapore* 60: 389–397.
- Li, F.-W., **Tan, B.C.**, Buchbender, V., Moran, R.C., Rouhan, G., Wang, C.-N. & Quandt, D. (2009). Identifying a mysterious aquatic fern gametophyte. *Plant Systematics and Evolution* 281: 1–4, 77–86.
- Linis, V.C. & **Tan, B.C.** ('2008'; 2009). Progress of studies on phytogeography and biodiversity of the Philippine moss flora from 1991 to 2006. In: Mohammed, H., Baki, B.B., Nasrulhaq-Boyce, A. and Lee, P.K.Y. (eds.), *Bryology in the New Millennium*. University of Malaya, Kuala Lumpur. Pp. 13–22.
- Song X.Q., Meng, Q.W., **Yam T.W.** & Luo, Y.B. (2009). *Thrixspermum odoratum* (Orchidaceae), a new species from Hainan Island, China. *Annales Botanici Fennici* 46: 595–598.
- Staples, G.W.** & D.F. Austin. (2009). Revision of neotropical *Calycobolus* and *Porana* (Convolvulaceae). *Edinburgh Journal of Botany* 66: 133–153.
- Staples, G.W.** (2009). *Merremia pacifica* (Convolvulaceae) recharacterized, with notes on other Pacific species. *Kew Bulletin* 64: 333–338.
- Staples, G.W.** (2009). Proposal to conserve the name *Bonamia menziesii* (Convolvulaceae) with a conserved type. *Taxon* 58: 649–651.
- Suleiman, M., Masundang, Dunstan Polus & **Tan, B.C.** (2009). A checklist of mosses from Golden Hope Oil Palm Plantation and surrounding areas, Tawau, Sabah, East Malaysia. *Journal of Tropical Biology and Conservation* 5: 53–60.
- Wang, Y.-M., Harrison, L.J. & **Tan, B.C.** (2009). Terpenoids from the liverwort *Chandonanthus hirtellus*. *Tetrahedron* 65: 4035–4043.
- Wongkuna, K., Santanachote, K. & **Tan, B.C.** (2009). Miscellaneous observations on Fissidens in Thailand with five new species records. *Cryptogamie, Bryologie* 30: 301–309.
- Yam, T.W.** & Arditti, J. (2009). History of orchid propagation: a mirror of the history of biotechnology. *Plant Biotechnology Reports* 3(1): 1–56. Korean Society for Plant Biotechnology and Springer.
- Yam T.W.**, Arditti, J. & Cameron, K.M. (2009). "The orchids have been a splendid sport"—an alternative look at Charles Darwin's contribution to orchid biology. *American Journal of Botany* 96: 2128–2154.
- Yam, T.W.**, Chow, Y.N., Avadhani, P.N., Hew, C.S., Arditti, J. & **Kurzweil, H.** (2009). Pollination effects on orchid flowers and the first suggestion by

Professor Hans Fitting (1877–1970) that plants produce hormones. In Kull, T., Arditti J., & Wong S.M. (eds.), *Orchid biology, reviews and perspectives* X. Springer Verlag, Dordrecht, The Netherlands. Pp. 35–138.

Yam T.W., Foo, J., Ang, P. & Leong, P.K.F. (2009). *Liparis ferruginea*: A critically endangered terrestrial species in Singapore. *Malayan Orchid Review* 43: 79–82, 108–109.

Yam T.W. & Lau, A. (2009). Chinese Cymbidium. *Malayan Orchid Review* 43: 43–54.

Yam, T.W. & Lau, A. (2009). Chinese Cymbidium – notes on the scholar's orchid. In: Lau, A., Chan, W. & Ho, A.A.J. (eds.), *The China Society, Singapore 60th Anniversary 1949–2009, a commemorative journal*.

Yam, T.W. & Thame, A. (2009). Breeding of Dendrobium at the Singapore Botanic Gardens. In: K.Y. Paek, Hahn, E.J., Jeong, C.H. and An, Y.I. (eds.), *Proceedings of the 9th Asia Pacific Orchid Conference*. Secretariat of APOC9. Goyang City, Gyeonggi-Do, Republic of Korea. Pp. 288–291.

Papers presented

Kurzweil, H. An orchid survey in northern Myanmar. *Fifth International Symposium on Diversity and Conservation of Asian Orchids*, Tsukuba Botanical Garden (near Tokyo, Japan), December 2009.

Leong-Škorničková J., Šída, O., Newman, M.F., Fér: T., Závěská, E. & Suda, J. Polyploidy in Ginger: what we know and what we don't. Keynote lecture, *5th International Symposium on family Zingiberaceae*, Xishuangbanna, Yunnan, China, July 2009.

Newman, M.F., Pullan, M., **Leong-Škorničková J.** & Lim Y.H. The Zingiberaceae Resource Centre and the Asian Zingiberaceae Information Centre: two resources for ginger taxonomists. *Fifth International Symposium on family Zingiberaceae*, Xishuangbanna, Yunnan, China, July 2009.

Tan, B.C. Guidance (and problems) in writing scientific (botanical) papers. LIPI/ Bogor Herbarium joint Indonesian Plant Taxonomy Workshop, Cibinong, Indonesia, November 2009.

Tan, B.C. The amazing world of bryophytes, unveiling its science and beauty. *Hortparks Horticultural Seminar*, Singapore, October 2009.

Tan, B.C. The role of Herbarium in plant research. *ACB-ASEAN Wetland Management Workshop*, Singapore Botanic Gardens, October 2009.

Tan, B.C. & Ng, P.K.L. Biodiversity Research in Southeast Asia: Its accomplishments, needs and problems. *Meeting of Asia-Pacific Biodiversity Observation Network (AP-BON)*, Tokyo, Japan, December 2009.

Tran, H.D., **Leong-Škorničková J.** & Newman, M.F. Zingiberaceae in Southeast Vietnam. *Fifth International Symposium on family Zingiberaceae*, Xishuangbanna, Yunnan, China, July 2009.

Yam T.W., Chua, J., Tay, F. & Ang, P. Conservation of the native orchids through seedling culture and reintroduction – a Singapore experience. *1st Guangxi International Orchid Conservation Symposium*, China, May 2009.

Electronic publications

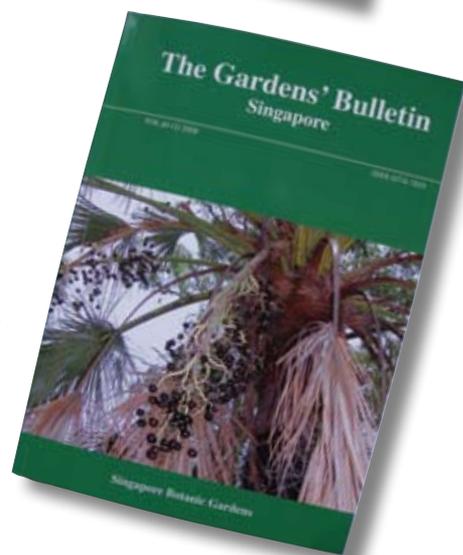
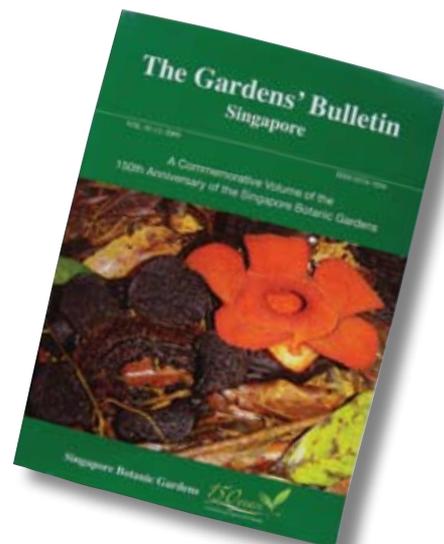
Staples, G.W., Carine, M & Austin, D.F. Convolvulaceae Pollen Atlas. http://ag.arizona.edu/herbarium/assoc/projects/convolv/Convolvulaceae_Pollen_Atlas.htm

Posters

Šída, O., Leong-Škorničková J., Newman, M.F. & Suda, J. Chromosome number variability in Zingiberaceae. *Fifth International Symposium on family Zingiberaceae*, Xishuangbanna, Yunnan, China, July 2009.

Závěská, E., Fér: T., Marhold, K., Šída, O., Sabu, M. & **Leong-Škorničková J.** Phylogenetic studies in Indian polyploid Curcuma species using AFLP's and ITS sequencing. *Fifth International Symposium on family Zingiberaceae*, Xishuangbanna, Yunnan, China, July 2009.

Závěská, E., Fér: T., Marhold, K., Šída, O., Sabu, M. & **Leong-Škorničková J.** Phylogenetic studies in Indian polyploid Curcuma species using AFLP markers. *International Symposium on Polyploidy, Hybridization and Biodiversity*, Saint Malo, France, May 2009.





H.M. Burkill Research Fellowship

The Gardens is pleased to offer an annual Humphrey Morrison Burkill Research Fellowship on a competitive basis to a qualified botanist with special interest in the flora of South East Asia.

The H.M. Burkill Research Fellowship is a generous bequest from Peter Burkill and Linda Uphill, the children of H. M. Burkill to honour their father and grandfather, I. H. Burkill. The senior Burkills were both former directors of the Singapore Botanic Gardens: I. H. Burkill (1912-1925) and H.M. Burkill (1957-1969). Its primary aim is to help promising young botanists to develop a career in tropical botany.

The yearly H.M. Burkill Research Fellowship offers the successful applicant a one-time sum of up to S\$4,500. The money is to be used for a proposed period of up to three weeks stay in Singapore to carry out research in the Singapore Botanic Gardens. The funds may be used for research related costs, including airfare, food and living expenses in Singapore.

The proposed research project submitted for consideration must be based on the resources of the Singapore Botanic Gardens including the herbarium.

Qualifications of the Applicants:

- A PhD degree in Botany, or a post-graduate student in higher degree program in Botany at a recognised university
- Preferably below the age of 30
- Demonstration of a strong interest and promising research skills/potential in tropical botany

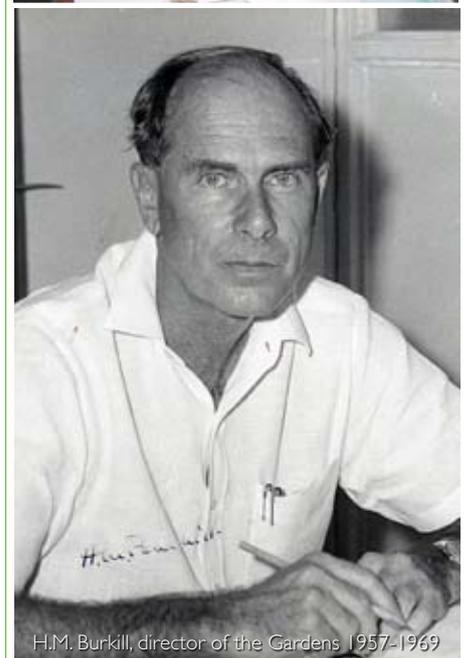
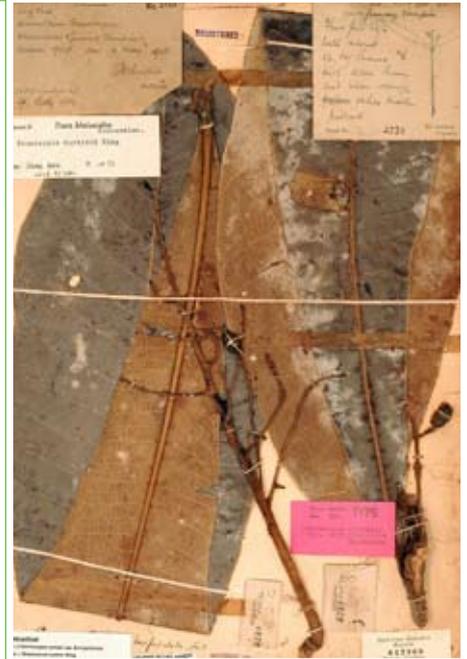
How to apply?

Interested applicants shall send their application letter, together with the research proposal and an updated cv, by email or air mail to Dr. Chin See Chung, Director, Singapore Botanic Gardens, 1 Cluny Road, Singapore 259569; email address; chin_see_chung@nparks.gov.sg

The proposal should state the proposed period of stay in Singapore and the requested amount of financial support up to a maximum of S\$4,500.

Requirements

The Research Fellow shall submit a report on the research accomplishments before departing Singapore. He/she shall acknowledge the H.M. Burkill Research Fellowship and the Singapore Botanic Gardens in any subsequent publications that use information generated during the period of the award.



H.M. Burkill, director of the Gardens 1957-1969

Key visitors to the Gardens (July to December 2009)

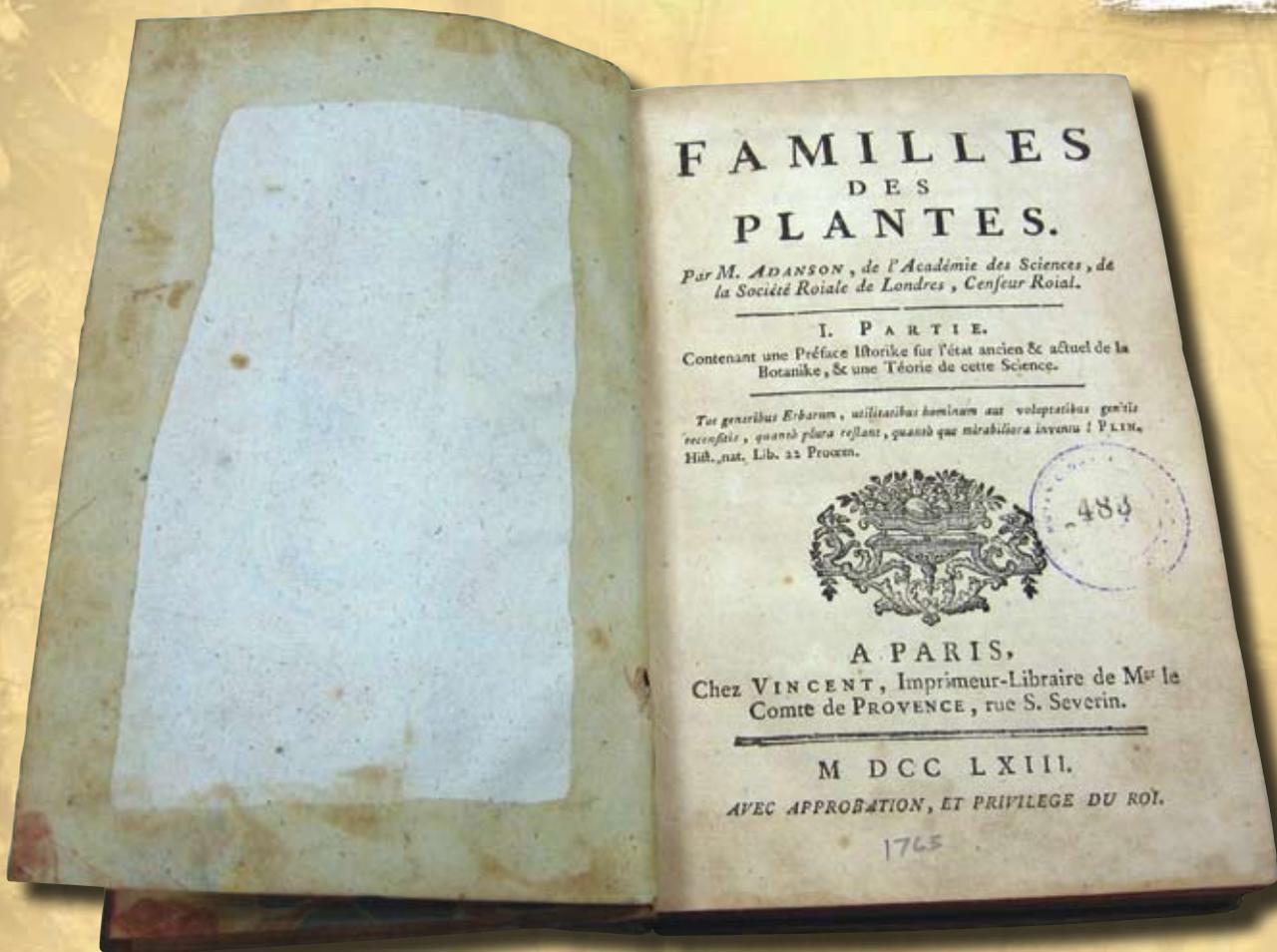
Name	From
15th Delegation of Senior Japanese Bureaucrats	Japan Ministry, Raffles Programme, Japan
Ms Adziza bte Ibrahim	Kementerian Wilayah Persekutuan, Malaysia
Dr Alexey V.F.Ch. Bobrov	Moscow State University, Russian Federation
Ms Ana Rita Simões	The Natural History Museum, United Kingdom
Mrs Ani Bambang Yudhoyono	Spouse of Susilo Bambang Yudhoyono, President of Indonesia
Dr Barry J. Conn	National Herbarium of New South Wales, Australia
Dr Bob Harwood	Darwin Herbarium, Australia
Mrs Bronagh Key	Spouse of John Key, Prime Minister of New Zealand
Mr Dawar Mohammad Bashir	Independent Directorate of Local Governance, Afghanistan
Dr Dick Brummitt	Royal Botanic Gardens Kew, United Kingdom
Dr Mark Carine	The Natural History Museum, United Kingdom
Prof Eckart Eich	Freie Universität Berlin, Germany
Mr Ernest Poh	National Community Leadership Institute, Singapore
Mdm Florfe M. Acma	University of the Philippines at Los Banos, The Philippines
Dr Francis Gurry & Mrs Sylvie Gurry	Director-General, World Intellectual Property Organisation, Switzerland
Ms Hani Halimahtun Ottman	Ministry of Federal Territories, Malaysia
Ms Ho Ching	Spouse of Lee Hsien Loong, Prime Minister of Singapore
Dr Hu Yonghong	Director, Shanghai Botanical Gardens, People's Republic of China
Mrs Jessie Ting & delegates	Deputy Secretary, Architectural Services Department, Hong Kong
Dr Juliasi Tri Hadiah	Bogor Botanic Garden, Indonesia
Madam Kim Yoon-ok	Spouse of Lee Myung-bak, President of Korea
Mr Koji Tsuruoka	Director General, Ministry of Foreign Affairs, Japan
Mr Korn Chantikavanij	Minister of Finance, Thailand
Mr Kurogi Michinori	Vice Chairman, Miyazaki City Council, Japan
Mrs Laureen Harper	Spouse of Stephen Harper, Prime Minister of Canada
Prof Leonard L. Berry & Spouse	M.B. Zale Chair and Distinguished Professor, Texas A&M University, USA
Mrs Lien Fang Yui	Spouse of Lien Chan, Chairman of Taiwan's Kuomintang party
Mr Lim Sang Jun	Director of Public Affairs & Culture, Embassy of the Republic of Korea, Singapore
Ms Lisa Walley	Marine Biological Laboratory, USA
Mr Ly Ngoc Sam	Institute of Tropical Biology, Vietnam
Mr Maeda Nobutoshi	Architect, Miyazaki City, Japan
Madam Margarita Zavala	Spouse of Felipe Calderón, President of Mexico
Ms Maria Teresa Buri	Laboratório de Morfo-Taxonomia, Brazil
Dr Mikhail S. Romanov	Main Botanic Gardens, Russian Federation
Mrs Miyuki Hatoyama	Spouse of Yukio Hatoyama, Prime Minister of Japan
Mr Mogi Osamu	Group Leader, Kikkoman Cooperation, Japan
Ms Nana Hernawati	Universitas Andalas, Padang, Indonesia
Mr Narita Hiroshi	Clair Tokyo Headquarters, Japan
HE Nguyễn Minh Triết	President of Vietnam
Ms Nelly Bouilhac	Aboretum, Chatenay-Nalaby, France
Ms Noorsiha Ayop	Putrajaya Botanic Gardens, Malaysia
Ms Noriah Mat	Perbadanan Putrajaya, Malaysia
Ms Nurainas	Universitas Andalas, Padang, Indonesia
Datin Paduka Seri Rosmah binti Mansor	Spouse of Dato' Sri Mohd Najib bin Tun Haji Abdul Razak, Prime Minister of Malaysia
Dr Pimpen Sakuntabhai	Spouse of Abhisit Vejjajiva, Prime Minister of Thailand
Dr Rhett D. Harrison	Xishunagbanna Tropical Botanical Garden, China
Dr Rosangela Simão Bianchini	Seção de Curadoria do Herbário-Instituto de Botânica, Brazil
Dr Sara Hoagland	Spouse of Mr James Leape, Director-General of WWF International, Switzerland
Prof Sebsebe Demissew	Addis Ababa University, Ethiopia
Mrs Selina Tsang	Spouse of Donald Tsang, Hong Kong Chief Executive
Mr Sergey Isaev	Moscow State University, Russian Federation
Mr Shen Xiaoying	Deputy Mayor of Suqian, People's Republic of China
Mr Shi Qizhu	CEO Luogong District, Guangzhou Development District, People's Republic of China
Ms Syahida Emiza binti Suhaimi	Forest Research Institute of Malaysia, Malaysia
Dr Takaaki Kameda	Chairman of the Board, Kameda Medical Centre, Japan
Madam Therese Rein	Spouse of Kevin Rudd, Prime Minister of Australia
Mr Trần Hữu Đàng	Vietnam National University, Vietnam
Madam Trần Thị Kim Chi	Spouse of Nguyễn Minh Triết, President of Vietnam
Dr Vincent Demoulin	University of Liege, Belgium
Dr Wannachai Chatan	Maharakham University, Thailand
Mr Youn Seong Hwan	Daedok District Assembly of Daejeon Metropolitan City, Republic of Korea
Mrs Yu Ruilin	First Secretary, Ministry of Foreign Affairs, People's Republic of China
HE Yves Leterme	Minister of Foreign Affairs, Belgium
Mr Zhi Shenghua	Vice Mayor, Tianjin Municipal People's Government Office, People's Republic of China
Mr Zhou Yawei	District Governor of Li Wan, District of Guang Zhou Municipality, People's Republic of China



His Excellency Nguyễn Minh Triết during his tour of the National Orchid Garden on 17 Nov 2009.



The Spouses of APEC leaders, who the Gardens were privileged to host during their visit on 14 Nov 2009. Image courtesy of APEC Singapore 2009.



Famillies des Plantes, Vols I & II by Michel Adanson (1727-1806) Paris: Chez Vincent, 1763

Michel Adanson, born in 1727 in Aix-en-Provence, was a French naturalist of Scottish descent. He began to study botany at the age of 14 at the Jardin Royal of Paris. As a youth Adanson experimented with biological phenomena, such as raising silkworms and studying plant growth. He studied Greek in order to read natural science works in their original language. At the age of 19 he compiled a catalogue based on 5000 species of plants grown since 1740 at the Jardin du Roi. This project caused him to compare and analyse classification systems, leading eventually to his work *Famillies des Plantes*. Adanson provided the most extensive systematic approach to classification of plants in this seminal work. Not only did he provide a thorough and an accurate natural system but he also gave the reader a detailed historical preface comparing different systems of works on botany. Adanson had wide interests in natural history and also studied electricity generation in the torpedo fish, regeneration of body parts of frogs and snails, mollusc classification and also wrote a work on the baobab tree, whose generic name *Adansonia* commemorates him.