

# Gardenwise

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On 1st June, at the end of a short visit to the lovely Agricultural Park at Tenom, seven of us from the National Parks Board, started our 3-hour drive back to Kota Kinabalu. Led by our energetic host and guide Tony Lamb, we diverted for a few minutes to try our luck at well known *Rafflesia* sites. The first was in the backyard of a housing area, across a stream and in low-lying secondary forest. To our great delight, barely metres into the forest was this incredible bloom of *Rafflesia keithii*, (right) on the damp forest floor. It has the most un-flowerlike texture like some rubberised model.

Barely half an hour later, we had scrambled up a steep rise by the main road and after only a few minutes of easy walking saw our second bloom, a *Rafflesia pricei* in pristine condition (top).

*Rafflesia*, a rare tropical phenomenon that is parasitic on vines of the *Tetrastigma* plant, has flowers that last only a few days before decaying. We were very lucky indeed to encounter the blooms after so little effort. Some of us recalled having tramped the tropical rain forest for years without even a glimpse of *Rafflesia*, even decayed ones. But two species, within two hours in the same morning was unheard of. This was truly an exceptional and unexpected treat and we wondered what would have happened if we had cross-pollinated them.

Chin See Chung



# Message **DIRECTOR** from the

July 2001 marked important milestones in the history of the Gardens. This month the Gardens received confirmation of a major grant for the re-development of its southern or Tanglin Core. Cluny Road that runs along the border of the Gardens will be diverted outwards at this end, providing an additional 0.6 hectares on which most of the new construction will be sited. This project will focus on providing long overdue research and education facilities, and visitor amenities. Research and education will receive a huge boost with a new library and herbarium, laboratories and seminar rooms, to replace the existing out-dated facilities. Visitors will benefit from a 240-lot car park in a semi-basement and two basements, a designated entrance plaza, F&B outlet, function space, a public reference centre, and beautifully landscaped gardens and buildings, for recreation and enjoyment.

While this project addresses urgent needs, the products are largely mortar and bricks. The Gardens can only optimise the use of these new resources and facilities, with focused research and publications, events, programmes and a wide range of educational outreach. With the completion of this project we will have the necessary supporting infrastructure to create a horticultural and botanical hub for Singapore where the public can look

forward to a rich offering of events and educational programmes, be able to interact with horticultural and botanical professionals or seek information at the public reference centre. Of course the Gardens will have to continually develop and expand its pool of expertise and human resource before it can realise its goal for this re-development.

July also celebrated the opening of a lay-by with designated coach drop-off bays at the south end of the new Ginger Garden. Whereas in the past, visitors arriving daily from the some 150 coaches, disembarked onto the congested Tyersall Avenue outside, they now step out into a safe and pleasant landscaped garden. A stroll through Ginger Garden brings them onto the Orchid Plaza, the National Orchid Garden and the rest of the Central Core of the Gardens.


Our two new outlets, Halia Restaurant, (*Halia* means ginger in Malay) run by Java Espresso Pte Ltd and Ginger Villa, a DFS Venture Singapore store, also opened for business. Located at the top end of the main Ginger Walk and forming part of the frame for Orchid Plaza, they contribute towards the on-going transformation of the Plaza into an active garden hub by day and night. Visitors to the location now, see the continuing works but can expect a greener and more peaceful garden setting when the rawness of construction activities heals to give an interesting living tapestry of landscapes with interesting horticultural and botanical specimens.

Key to the on-going re-development plans is the fundamental awareness that the Gardens is a special destination and place. We need to constantly reflect on the role of the Gardens as a retreat for contemplation, stimulation and inspiration, as a creator of dreams and provider of mental images. The Gardens gives our visitors memories and a sense of personal place that will remain and flourish both in the mind and on the ground. This, is the soul of the Gardens. It must never be compromised by other demands, be it to accommodate revenue-

generating activities or meet research needs. All other activities must complement and support the Gardens as a special place for our visitors' experiences.

Creating such special places are major goals for all of us who have accepted the challenges of gardening. However the successful outcomes to such goals are not always easy to quantify or measure and may result in those responsible for gardens being undervalued. For instance, the value of special places that contribute to personal peace and happiness, inspire ideas and creativity and invoke a sense of identity with home and country is rather intangible. But there have been successes. In 2000, two of our staff, Yap Siow Hong and Abdul Hamid Hassan received the Model Workers' Award of the Tourism & Hospitality Industry for service excellence. And its visitors nominated the Gardens this year for the National Tourism Award.

Successful outcomes have also manifested in other forms and from across the globe. Foreign visitors have been so moved by their experiences of the place that they have made bequests to the Gardens. And recently, world-famous British milliner, Philip Treacy, presented his millennium couture collection, the creation of which was inspired by orchids. The hats were such a sensation that he was invited to show them at the French Haute Couture show in Paris — not once but twice. The second time will be this summer. He was the first milliner in decades to show his hats there. And his inspiration? It was the dazzling blooms in the National Orchid Garden, which he visited in 1999. Two months after his visit he started to draw what was to be his famous millennium collection and he was quoted as saying that the orchids would continue to provide inspiration for many more creations.

Such successful outcomes are encouragement and sustenance for all of us to remain vigilant and energetic as creative stewards of this very special place — our Gardens. 

**Chin See Chung**

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# What is this plant?

## The Herbarium's Role in Plant Identification

The Herbarium falls under the Research & Advisory Branch of the Gardens. In research, herbarium staff are active at the local and international levels conducting botanical exploration, field surveys and writing taxonomic accounts. The major advisory role that we play is in the identification of plants for members of the public, for students and the staff of NParks (Table 1).

**Table 1. Number of enquiries for plant identification in the year 2000**

Requester	No. of specimens
Members of the Public	139
Students	16
SBG staff	71
Nature Reserve staff	168
Parks Management Department staff	144
<b>Total</b>	<b>538</b>

(prepared by Mohamad Shah)

Not a week goes by but we get at least one enquiry to identify plants. It is amazing the faith that enquirers have in our staff's ability to identify plants from vague descriptions over the phone, to blurry photographs and shriveled leaves! What our staff would like to receive is a shoot with flowers and/or fruits; if not fresh, then pressed flat in newspaper; with information on whether it is a tree, shrub or herb, etc., and where it was collected. Nevertheless, our staff are so experienced that, in most cases, they can in fact identify plants from a single dried leaf.

Experience is one of the most important attributes in being able to name plants, together with a keen interest in plants, a photographic memory, ability to observe accurately, and a curiosity to learn the correct scientific names. Singapore is home to hundreds of indigenous and cultivated plants so it is a matter of decades rather than years to build up the storehouse of knowledge that enables instant identification of plants, and that is where experience counts.

Perhaps our most famous plant identifier is Che Ahmad bin Hassan, who joined the Gardens as Ridley's plant collector in 1901. He accompanied Ridley on many of his expeditions throughout Peninsular Malaysia. His abilities were so valued that he was re-employed after retirement and continued working for the Gardens until 1958, a span of over 56 years! His knowledge of plants was so well known that he has been called a 'Walking Dictionary'. Incidentally, like Ridley he lived to reach a 100 years old.

Our present staff, Mohamad Shah bin Hj. Mohd Noor and Samsuri bin Ahmad, have continued the tradition



Mohamad Shah identifies a plant brought in by the public.



Ahmad Hassan with H.N. Ridley collecting plants from the Gardens' Rain Forest.

of long service, both being re-employed after retirement because of their unmatched experience in plant identification.

Mohamad Shah comes from an illustrious line of herbarium assistants. His father, Haji Mohamed Nur bin Mohamed Ghous joined the Gardens in 1911 as a Label Printer, later promoted to Plant Collector and finally Herbarium and Museum Assistant. (The Label Printer's job was a responsible one as it involved correct identification of the plants in the Gardens using the resources of the Herbarium and seeing the labels



Samsuri Ahmad advising ground staff on the correct placement of labels.

were correctly placed in the Gardens.

Staff in the Herbarium continue with this role today). Mohamad Nur too was re-employed after retirement and worked until his death in 1958. His skills covered not only plant identification, but also plant collecting and herbarium

management. His eye for collecting new and interesting plants resulted in five plants being named in his honour — *Ardisia nurii*, *Begonia nurii*, *Cryptocoryne nurii*, *Dioscorea nurii* and *Pandanus nurii*. He collected extensively from most states in Peninsular Malaysia, as well as from the Riou Islands, Sumatra and southern Thailand. We still appreciate his systematic and meticulous work in the Herbarium, which he rearranged to follow the order of genera and species in Ridley's Flora of the Malay Peninsula. Many of the herbarium covers still bear his neat handwriting.

His son, Mohamad Shah, began work as a plant collector in 1955, rising to Herbarium and Museum Assistant in 1958. He retired in 1995, was re-employed and has now served the Gardens continuously for 46 years. In his younger days, he took part in botanical exploration throughout Peninsular Malaysia, which involved climbing many mountains from Gunung Rahong and G. Tahan in the north to G. Belumut in the south and from G. Lawit in the east to G. Bujang Melaka in the west. He was frequently accompanied by Samsuri on these trips.

During his period of service, he was involved in packing and removing the Herbarium comprising about 400,000 specimens to temporary accommodation in the then University of Malaya in Singapore when the old herbarium building became unsafe, with the



Ruth Kiew

Request for identification.

*Gynura procumbens*. In the last few years, plants of *G. procumbens* (Compositae) have regularly been brought in for identification as it has become fashionable in folk medicine as a cure for diabetes. In fact, Dr Benny Tan from the Pharmacology Department, National University of Singapore, carried out a study on rats to assess its efficacy and has deposited the permanent reference specimen for his study in the Herbarium.



Ruth Kiew

The ornamental form of *Gynura procumbens*.



H.M. Burckill Collection

Mohamed Nur (right) with Kiah Salleh (left) in 1920s.



Boo Elin

Samsuri Ahmad in the field for the Punan Busang Expedition in 1971.



H.M. Burckill Collection

Mohamad Shah in the old herbarium in 1959.

subsequent return and rearrangement of the herbarium when the new building was completed in 1965.

Samsuri bin Ahmad began work in the Herbarium in 1952 before he moved to the University of Singapore to take charge the Herbarium under Professor Hsuan Keng. After his retirement in 1996,

he returned to work in our Herbarium. He too has been involved in plant collecting expeditions, many with Mohamad Shah but most notably on the Punan Busang Expedition to Sarawak in 1971. 🌿

**Ruth Kiew**  
Herbarium & Library



*Mahillia browneoides* trees grace the edge of Swan Lake with their hanging tassels of young leaves and white inflorescences.

# Handkerchief Trees

Tom Turvey

There are several tropical species that are sometimes referred to as handkerchief trees. This is because the new leaves of these trees develop in bunches and are pale and limp at first, looking not unlike damp pocket-handkerchiefs, suspended from their centres, dangling at the ends of the branches. The Gardens has quite an assortment of handkerchief trees, all of them members of the Leguminosae (bean family) and all good-looking in their own way.

Perhaps the most beautiful of flowering tropical trees, certainly attractive enough to earn the

sobriquet Queen of Flowering Trees, is *Amherstia nobilis*. Obscure origins add to the mystique of this noble petite tree. It has only been collected from the wild a couple of times, in the forests of Burma, leading to its common name Pride of Burma. The genus is named after Lady Sarah Amherst, who collected plants in Asia in the early Nineteenth century. Not only is she commemorated in one of the most beautiful of the world's trees, she also lends her name to Lady Amherst's pheasant one of the most elegant birds.

There are *Amherstia* trees planted in several places in the Gardens. Visitors

can admire the large inflorescences of big red-and-pink flowers marked with yellow. The new leaves are produced in flaccid pale tassels that turn purplish before they green and open out.



Flower of Pride of Burma.



Lady Amherst's pheasant (*Chrysolophus amherstiae*) – a male bird.

When not in flower, *Amherstia* looks not unlike a species of *Saracca*, another Asian legume genus. *Saracca* trees do not produce new leaves in groups, so are not proper handkerchief trees, but the new leaves of *Saracca cauliflora* are large, pendent, and strikingly pink. The species is better known as *Saracca thaipingensis* in honour of the town in Perak and is much planted in the Gardens, including the long avenue from the Main Gate. The mighty orange inflorescences are borne on the main trunk as well as among the foliage making it one of the most attractive of the Malay Peninsula's native trees. Large purple pods are the products of successful pollination. Three other species of *Saracca* are also included in the Gardens' collection, but none of these has conspicuous young leaves.

Another group of true handkerchief trees is the species of *Brounea* from South America. These are low spreading trees with large inflorescences of many red flowers forming big balls hanging, not unlike Chinese lanterns, beneath the foliage. The flowers are truly spectacular, but as they are rather hidden from view many people do not notice them. At present the Gardens has four



Inflorescences of three species of *Brownea*. Bottom-left *B. grandiceps*, top, *B. capitella*, right, *B. rosa-de-monte*.

The hanging inflorescence of *Brownea grandiceps* seen from below.

An inflorescence of *Maniltoa lenticellata*.

species of *Brownea* in its collection. Superficially they are similar but can be told apart quite easily.

As one enters the Main Gate of the Gardens, there are some plantings of *Brownea* to greet you. The large spreading bushes on each side of the road are *Brownea rosa-de-monte* (often called *Brownea ariza*). This species has the flowers of the purest red of the three in the Gardens. The red of the petals contrasts with the yellow stamens and styles. The pinnate leaves have 4-9 pairs of leaflets each with a rather pronounced tip. The twigs are distinctly hairy and the pods are a velvety green when young.

As one continues along the path from the Main Gate, opposite the new location for the Gazebo is a huge tree of *Brownea grandiceps*. Its age is reflected in the breadth of its crown, not its height, for it barely exceeds 5 m. *Brownea grandiceps* is recognisable from its long pinnate

leaves with 12-18 pairs of leaflets and the pendulous bunches of young leaves are pale green, splashed and mottled in a reddish brown. The spotted handkerchieves are impressive enough, but the inflorescences are even more of a sight — dense, salmon-pink balls of 20 cm or more across.

The third species is *Brownea capitella* (sometimes considered a subspecies of *Brownea coccinea*). There are two plants on Lawn D. This species is less spreading than the other two with some branches ascending. The leaves have 5-7 leaflets and are uniformly pinky brown when young. The inflorescences, which occur on the old twigs as well as the ends of the branches, are less densely packed than the other two species, but the flowers are somewhat larger giving a more lax look to the lanterns. The petals have a more magenta hue. The dark brown pods are not hairy.

Fourthly there is *Brownea coccinea*,

which has small, bright red inflorescences and hairless green twigs. There is one old tree at the edge of the Gardens' Rain Forest on Maranta Avenue.

In contrast to the red lanterns of *Brownea*, the final group of handkerchief trees produces white ball-like inflorescences. These are the species of *Maniltoa*. The genus is native to tropical Asia and the Pacific, with the majority of the 20 or so species occurring in New Guinea. Until recently it was assumed that we only had one species of *Maniltoa* growing in the Gardens, *Maniltoa browneoides*, though the tree next to Burkill Hall, with its pink flush leaves had caused some head-scratching. Some careful observation and checking of herbarium specimens and books indicated that we have at least four species in the collection.

Most of the trees are indeed *Maniltoa browneoides*, originating from New Guinea. Undoubtedly a handsome tree, it characteristically branches low but with the main branches ascending close



Inflorescences of *Maniltoa megalocephalia*.



Inflorescences of *Maniltoa schletteri*.





John Turner



John Turner



John Turner

Habit of three *Brownea* species.  
From top: *B. rosa-de-monte*, *B. capitella* and *B. grandiceps*.



John Turner

Tree of *Saracca cauliflora* growing by Symphony Lake.



The glabrous pods of *Brownea capitella* (left) and the green velvety pods of *B. rosa-de-monte*.



All: *Brownea*

Pods of *Saracca cauliflora*.

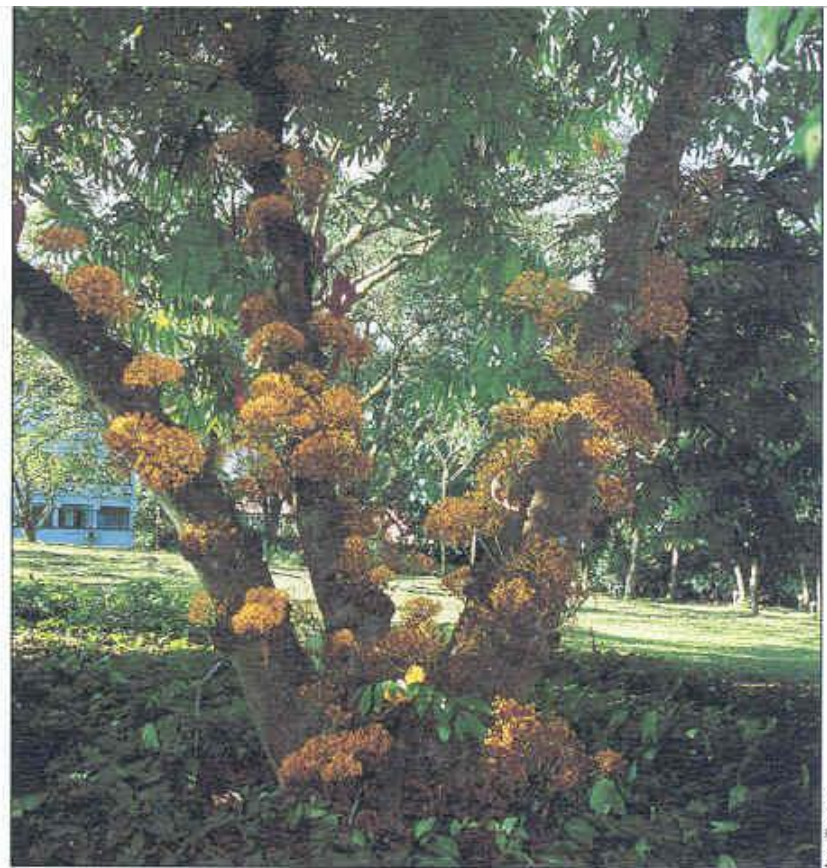
to each other to form a tight multiple-stem with a surprisingly tidy symmetrical crown. It is the handkerchief tree par excellence, the large rounded crowns being covered with evenly spaced handkerchieves of white at frequent intervals. The limp tassels of new leaves first develop within large buds covered in papery brown scales. These foliage buds are very similar to the buds that protect the developing inflorescences. New leaves and inflorescences appear simultaneously. The inflorescences are mostly held at the ends of the branches and are made up of many white flowers with papery brown bracts. When first open, the inflorescences are very attractive in their virginal white with yellow anthers, but within a few days they tend to brown where the flowers are damaged and the anthers have shed their pollen. In Singapore, the trees flush new leaves and blooms every few months and are particularly attractive in the evening twilight when the contrast between the hankies and the dark crown seems strongest.

The flush leaves of *Maniltoa browneoides* are white becoming green within a few days. The *Maniltoa* in the National Orchid Garden has distinctly pink young leaves, which sometimes cover the entire crown, and a single clear trunk. It turned out to be *Maniltoa lenticillata* which occurs in New Guinea and wet tropical Australia. We have recently obtained some saplings of the same species through the Pasir Panjang Nursery. These have flowered producing inflorescences with distinctly larger flowers than those of *Maniltoa browneoides*.



Two *Maniltoa* trees on Lawn B intrigued me because they seemed odd for *Maniltoa brownneoides*. Though the records showed that they were planted at the same time they differed from each other in size and crown shape. Close inspection of leaves and flowers led to the conclusion that they were definitely not *Maniltoa brownneoides* and that they represented two more species of the genus. The smaller tree produced little fluffy inflorescences along the distinctly zig-zag twigs. It proved to be *Maniltoa megaloccephala* (a not entirely appropriate specific name — ‘big head’ in Greek) for the species with the smallest inflorescences of those in the Gardens). Another New Guinea native, it seems to have a few blooms all the time. Its neighbour produces masses of inflorescences in a sudden burst at long intervals. It is a stunning sight for the few days when the tree is covered in white. It seems to be *Maniltoa schefferi* (Moluccas, New Guinea, West Pacific and Australia) though this is apparently one of the more poorly defined species in the genus.

Compared with *Amherstia* and *Brownea*, *Maniltoa* is poorly known in tropical horticulture but undoubtedly deserves better recognition. *Maniltoa brownneoides* has many of the qualities required for a roadside and park tree



Flowering *Saracca* tree.

Jan Turner

and is being experimented with in this capacity in Singapore already. *Maniltoa lenticillata* has one of the most stunning displays of pink flush leaves and certainly warrants consideration in any collection of tropical specimen trees as does *Maniltoa schefferi* for its spectacular display of flowers. 🌿

**Jan Turner**  
Horticulture Branch



The spotted hankerchief of *Brownea grandiceps*.

Jan Turner



*Maniltoa Schefferi* demonstrating why these are often referred to as hankerchief trees.



The link young leaves of *Brownea capitella*.

Jan Turner





# Colours in the Breeze

## Butterflies of the Gardens

In the pre-dawn hours at the Gardens, the final stage of the metamorphosis of the Common Birdwing (*Troides helena*) is taking place. High up in the canopy of an Angsana tree, an almost indiscernible wriggle starts off a series of movements in the pupa which culminate in the emergence of a female Common Birdwing. It is now 7:00 am, and as the first jogger runs past below, the adult butterfly crawls out of its now-empty pupa and hangs her wings out to dry. In a few minutes, the limp wing veins are pumped with fluids and the large black velvety wings of the butterfly take shape. As the first rays of the morning sun warm up the butterfly's wings, she begins to open and close her wings in preparation for her maiden flight.

The beautiful black-and-yellow Common Birdwing, often seen at the Bukit Timah Core of the Gardens, is one of the many butterflies which share the Gardens with us.

Butterflies are very much dependent on plants and flowers for survival. Many species' caterpillar stage feeds only on a particular host plant and nothing else. Butterfly biodiversity is therefore inextricably linked to the diversity of plant species in a particular locality. These colourful insects are also known to be essential pollinators of flowering plants.

An average of 15-20 species of



The Peacock Pansy (*Junonia almana*) is a sun-loving butterfly and usually flies in open grassy areas.



The Common Tiger (*Danaus genutia*) is an occasional visitor to the Gardens.



The Chocolate Pansy (*Junonia hedonia*) is seen in numbers in the Gardens, usually frolicking around the open grasslands and hedges.



The Plain Tiger (*Danaus chrysippus*) is a rare visitor to the Gardens. Its caterpillar host plant, *Calotropis gigantea*, is a plant with traditional medicinal uses.



The Striped Albatross (*Appias libythea*) is a common urban butterfly found in most parts of Singapore. This is the female.

butterflies can be found in the Gardens on a typical sunny day. A number are resident species, in particular, the Common Birdwing and the Common Rose (*Atrophaneura aristolochiae*), both of which feed on the Dutchman's Pipe Vine (*Aristolochia tagala*) growing in some parts of the Gardens. Amongst the species of the Papilionidae family, the Common Mormon (*Papilio polytes*), the Tailed Jay (*Graphium agamemnon*) and the Lime Butterfly (*Papilio demoleus*) are frequent visitors to flowering plants in the Gardens.

Over at the Tanglin Core, where

Cassia spp. and other Leguminosae are grown, species like the Common Grass Yellow (*Eurema hecabe*) and other *Eurema* species are often seen. The fast-flying Lemon Emigrant (*Catopsilia pomona*) and Orange Emigrant (*Catopsilia scylla*) can be seen flying around the yellow flowers of the Cassia bushes. The Painted Jezebel (*Delias hyparete*), a common urban butterfly, is almost always seen in the Gardens. Its host plant, the parasitic Loranthus (*Dendrophthoe pentandra*) is a common plant on many of the large trees in the Gardens.



Another common butterfly, the Striped Albatross (*Appias libythea*), whose caterpillar feeds on Cat's Whisker (*Cleome villosa*), is another urban butterfly which is usually seen at the flowers of the New Guinea Creeper in the Aroid House.

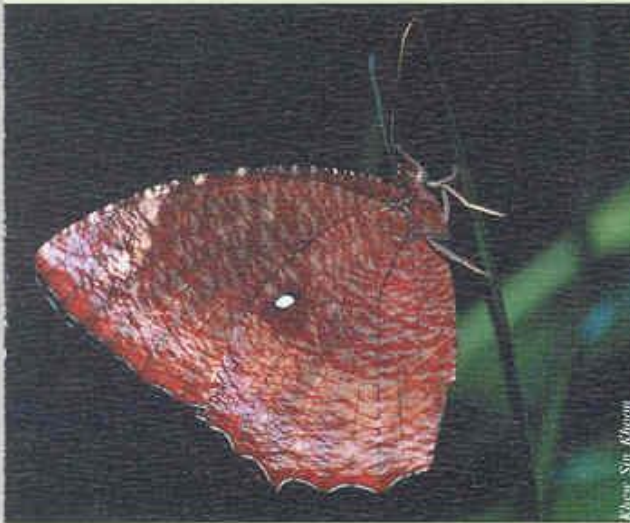
The Tiger and Crow butterflies (subfamily *Danaeinae*) are occasional visitors to the Gardens. As the caterpillars of these species generally feed on lactiferous plants of the Asclepiadaceae and Apocynaceae species, the adult butterflies are



The Lime Butterfly (*Papilio demoleus*) is a common urban butterfly which feeds on Citrus plants.



The Common Grass Yellow (*Eurema hecabe*) is a common urban butterfly which can be found in most parts of Singapore.



The Common Palmfly (*Elymnias hypermnestra*) is a common butterfly in the Gardens. Its caterpillar feeds on palms.



The pretty Blue Pansy (*Junonia orithya*) is a grassland butterfly and often seen in the company of the other Pansy species.

rendered distasteful to predators. Examples of such species which have been observed at the Gardens are the Blue Glassy Tiger (*Ideopsis vulgaris*), Dark Glassy Tiger (*Parantica agleoides*), Common Tiger (*Danaus genutia*) the Striped Blue Crow (*Euploea mulciber*) and very rarely, the Plain Tiger (*Danaus chrysippus*).

The variety of palms in the Gardens has also attracted species whose caterpillars feed on palms. Examples are the Common Palmfly (*Elymnias hypermnestra*), the Palm King (*Amathusia phidippus*) and the Palm Dart

(*Suastus gremius*). The last named feeds on the Sealing Wax Palm.

Amongst the sun-loving butterflies which are often seen frolicking in the open grass areas and hedges are the Chocolate Pansy (*Junonia hedonia*), the Peacock Pansy (*Junonia almana*) and seasonally, the Blue Pansy (*Junonia orithya*). Other Brush-footed butterflies (sub-family Nymphalinae) like the Great Eggfly (*Hypolimnas bolina*), the Courtesan (*Euripus nyctelius*) and Malay Viscount (*Tanaecia pelea*) make occasional appearances in the Gardens.



Amongst the smaller butterfly species, the Lesser Grass Blue (*Zizina otis*) and the Cycad Blue (*Chilades pandava*) are always seen in the Gardens. The latter is considered a persistent pest of Cycads, where emerging new leaves are always with attending butterflies. At the Gardens's Visitor Centre, the Cycad Blue is always present to greet observant visitors at the pair of *Cycas rumphii* palms in the courtyard immediately outside the main entrance of the Visitor Centre.

The fact that there are many butterflies in the Gardens is testimony to the environmentally



The Common Birdwing (*Troides helena*) is one of the magnificent Birdwing butterflies found in the region. It is a resident butterfly at the Gardens as its host plant, *Aristolochia tagala* is found here.



The Cycad Blue (*Chilades pandava*) laying her eggs on the young unopened leaves of *Cycas rumphii*.



The Blue-Glassy Tiger (*Ideopsis vulgaris*) is a common butterfly in Singapore and sometimes visits the Gardens.



The Painted Jazebel (*Delias hyparete*) is a common urban butterfly which feeds on Loranthus, a parasitic plant. Its bright colours are a warning to predators that it is distasteful.

friendly management of the Gardens, where there is minimal use of pesticides. Every stage of the butterfly is extremely vulnerable to the use of pesticides and even small amounts could be fatal to entire colonies of butterflies.

So when you next take a walk in the Gardens, keep a look out for these gentle butterflies as they flit from plant to plant and flower to flower. They are as much a part of the ecological web of flora and fauna as the birds, plants and other life forms in the Gardens.

**Khew Sin Khoon**  
 Architect  
 PWD Consultants Pte Ltd

It is now late afternoon, and the female Common Birdwing glides high in the treetops looking for nectar-bearing flowers to feed on. Spotting the bright red Pagoda Flower (*Clerodendrum paniculatum*), she dives down and feeds hungrily. Already laden with fertilised eggs, she takes her fill of nectar before flying up to the treetops again, this time looking for the young leaves of its host plant, *Aristolochia tagala* upon which to lay her eggs. Such is the circle of life for the butterflies in the Gardens which has become an unpolluted sanctuary for these beautiful creatures to survive in the heart of the bustling city.



The Malay Lacewing (*Cathosia hypsea*) is more commonly found in the nature reserves. It is a rare visitor to the Gardens.



The female Common Mormon (*Papilio polytes*) is an urban butterfly. Its caterpillar feeds on the Indian Curry Leaf (*Murraya koenigii*).



# Flowers in Heat

## — The Amazing Sexual Reproduction Strategy of Plants

I remember vividly a picture that I saw in the newspaper about three years ago: the *Amorphophallus titanum* (Titan arum) of the Fairchild Tropical Garden had flowered, and standing beside the huge flower (inflorescence) was a security guard wearing a gas mask. It was probably a hilarious sight to most people, but having to guard over the first recorded flowering of the most unusual flower in the US in over 60 years after the media frenzy and public interest, and withstand the odor emitted by the flower was most certainly not a laughing matter for the guard. It was also the first ever recorded flowering in Florida (no recount needed). I have not had the fortune to smell the odor, which has been likened to odors of rotting fish, carrion or dung. Believe it or not, when the same plant flowered in Kew Gardens in 1996, hundreds of people who had flocked to see the flower left very disappointed when they missed the opportunity to experience the “unflowery” smell. The flower is called “corpse flower” in Sumatra not without a good reason.

It was not until I read an article about thermogenicity, or production of heat, in some flowers, including those of aroids that I understood the functional significance of the odors, which left me amazed with the wonders of the plant kingdom. It is generally accepted that flowers produce scent, pleasant and unpleasant alike, to attract insect pollinators. The odors emitted by aroids such as *Saurauatum guttatum* (Voodoo lily), *Arum maculatum*, *Amorphophallus paenifolius* (Elephant yam) and *Symplocarpus foetidus* (Skunk cabbage), attract pollinating



Amazing flower of the *Amorphophallus paenifolius*.

insects such as beetles and flies that breed or feed on decaying matter, a pollination strategy known as sapromyophily. Not surprisingly, the constituents of the odors, such as indole, amine, skatole, and even ammonia are similar to the volatiles emitted by decomposing wastes or dung. Many flowers that emit foul odors have another interesting characteristic: the flowers produce an unusually large amount of heat over a short period of time. This is old knowledge: the French naturalist, Lamarck had in 1778 discovered that the inflorescences of many aroids produce heat. In *Xanthosoma robustum* and *Philodendron sellowii* for instance, the temperature of the spadix of the inflorescence is known to reach 42 - 44 °C, which could be 30 °C above the ambient air temperature during a short burst of metabolic activity. What is fascinating is the connection between odor, heat production and the reproductive strategy of the plants, and how plants are able to generate so much heat. The functions of heat production are thought to be ecological: heat acts as a volatilizer for the odors (think of aromatherapy) and hence aids in dispersing the odors that attract the pollinators. It has also been suggested that the warmth in the flower makes insects more active, and hence more likely to contact the pollens in the flower. In addition, the warmth and humidity in the spathe creates an ideal place for insects to mate. It has been noted, for instance, that beetles require high temperatures for activities such as flight, mating and feeding, and temperatures found in heat producing flowers are in the

same range preferred by the beetles. For the temperate skunk cabbage, the heat generated in the spadix serves to melt the ice in spring, which gives the plants a competitive edge over other species in the growing season. In arum, the timing of production of heat and release of odor are amazingly fine-tuned: they always coincide with the stage at which the female floral parts are most receptive to pollination.

The mechanism of heat production is another interesting topic. In animals and most plants, heat is generated during the process of respiration, which is basically the conversion of energy from food source to pockets of energy-rich substance called ATP. Normal respiration is sensitive to cyanide, and hence the extreme toxicity of cyanide to humans and other living organisms. Aroids that exhibit thermogenicity, however, have an alternative pathway of respiration called cyanide-resistant respiration. As the name suggests, it displays resistance to cyanide. In such a mechanism, energy from food source is not trapped in ATP, but is released as heat. Cyanide-resistant respiration is generally limited to plants and some microorganisms, and rarely occurs in animals. The exact sequence of events leading to heat production as the flower develops has yet to be fully elucidated, but a recent discovery indicated that at least in *Saurauatum*, the signal that triggers thermogenicity is salicylic acid, the active ingredient in aspirin.

In the animal kingdom, male birds go through great length to attract a potential mating partner, either with a fantastic display of plumage, songs, or love-nest. Plants, too, have a fascinating story to tell. Next time when the Titan arum or Elephant yam in the Gardens flowers, be sure not to miss this extraordinary flower in heat, all in the name of successful sexual reproduction. 🌱

**Tan Puay Yok**  
On study leave in U.S.A.

# Singapore – revisited



In April this year I received a phone call from my mate at the Adelaide Botanic Gardens asking whether I would like to have a trip to the Singapore Botanic Gardens — expenses paid — to help to identify its Bromeliad Collection. This was an offer too good to be missed but I just had to take my assistant who has been my wife for the past 43 years along. Margaret knows as much about Bromeliad names as I do but is less noisy! One can find out how the plants got to Singapore by referring to "Bromeliads in the Singapore Botanic Gardens" by Len Colgan in *Journal of the Bromeliad Society*, 1999 pp. 165-7.

Singapore is an island virtually on the equator with an average elevation of say a few metres, but is so close to Malaysia on one side and Indonesia on the other one could not say it enjoys a typical island climate! We went in during what is loosely termed the "dry" season when it only seemed to rain for 3 hours per day! Thirty degrees Centigrade and above was the norm so every Singaporean had an umbrella which alternately provided shade or protection from the rain.

And so to work. We were in what is called the "National Orchid Garden" which occupies some 3 hectares with the northern 1/8<sup>th</sup> devoted to the Bromeliaceae. Unlike in the days when Len Colgan visited in 1999, all the workers were aware of the existence of Bromeliads even though orchid workers outnumbered bromeliad workers 20 to 1.

The main problem facing bromeliad growers in Singapore is the lack of temperature change not only between night and day but seasons and therefore the triggering of flowering. Non-flowering means difficulty in identification. The plants were, in many cases, large enough to flower so they may need chemical inducement. Many Bromeliads only colour up at flowering and there was concern that the plants were too dull. But as Mr Lee — yet another Orchid Man!

— said, the pastel shadings in Orchids are just as important as the more strident ones. Plants here will never reach the vibrant colours one sees in say Florida nurseries of *Neoregelias* just before sale or in catalogues, so one should compare with what is immediately available.

Perhaps the biggest loss has been in

*Tillandsia* of the grey-leaved types over the last 6 years or so and this is to be expected. Even plants attached to the smallest piece of wood would die from excess water and it was surprising how so many had survived purely from the intuition of the horticulturist-in-attendance in having *Tillandsias* dancing on vertical stainless steel wires. While we all try to grow all plants, it may be better for Singaporeans not to spend too much time on the dry lovers especially in the outdoor.

On the other hand, there are just as many success stories by using the advantages of the climate. One is based on the variation one can get in the outside of bromeliad leaves. In Adelaide I had thrown out my *Aechmea* 'J.C. Superstar' purely because the inflorescence did not live up to its reputation. Here in the National Orchid Garden, it was planted high enough to display the delightful pink shades of its leaves.

What could be a drier place in a wet climate than a vertical wall? In the development of the Gardens' "Cool House", a wall of Bromeliads has been used to soften the concrete structure. Here again leaves have come to the fore and the clinging roots of the Bromeliads show their adaptability.

A group of *Ananas* in fruit were a great talking point, especially with the Europeans who really wondered if *Ananas bracteatus* was edible. As the pale Aussie under a coolie hat told



Before and After shots showing the rear wall of the new Cool House in the National Orchid Garden. Bromeliads have been fastened onto this bare concrete wall and they seem to have taken off immediately.

them — all bromeliad fruits are edible. It just depends how hungry one is or whether one likes one's fruit crunchy. They smiled, apparently they must have understood Aussie English.

Many really red *Neoregelia* 'Fireball' were on logs or tree stumps and one slightly larger 'Fireball' type had us stumped. It looked so much like the *Neoregelia* 'Fosters Little Gem' we grow in Australia and then we wondered if it could be Hummel's 'Rio Red'. The record of Chet Blackburn dated 1994 indicated that there were *Neoregelia* 'Hummel's Red', Hummel's Red Hybrid, and 'Red Rio' in the Sheldance Collection which we could only assume to be 'Rio Red'. That is the varied nature of the Sheldance Collection. Given the problem that the same plant may be known by different names, it is little wonder that many become easily confused!

Together we have embarked on a project to develop a computerised photo index linking all living Bromeliads to their correct names.

If you do happen to visit Singapore, look for a bit of excitement at the Singapore Botanic Gardens — you will not be disappointed — but please take an umbrella! ☔

**Derek Butcher**  
Fulham, South Australia

*The Singapore Botanic Gardens would like to express its thanks to Mr and Mrs Butcher for their help in naming many of its Bromeliads.*

The amazing Victoria lily in the Sundial Garden ponds.

# The Giant Platters of the Amazon

## Introduction

*Victoria amazonica* was introduced to England in 1849 although it was Austrian botanist, Thaddäus Haenke who first discovered it in 1801 during an expedition to the Amazon. It belongs to the same family as the water lilies — Nymphaeaceae. While *Victoria amazonica* is the largest water lily in the world, it is also one of the thorniest aquatics. The entire plant is covered with flesh-piercing spines except for the roots and upper side of the leaf. This is to deter any large water creatures from chewing it up.

## The Leaves

Of the two species grown in the Gardens, *Victoria amazonica* has much bigger leaves than *Victoria cruziana*. *Victoria amazonica* originates from the Amazon in equatorial Brazil. *Victoria cruziana*, on the other hand, is from the cooler parts of South America. The enormous, round, floating leaves of *V. amazonica* can stretch from 1 to 1.5 m wide. The platters are smooth and hairless on the upper side and reinforced with prominent veins full of giant spines on the underside. *V. amazonica* has redder pads with low rims while *V. cruziana* has greener pads and higher rims. *Victoria* 'Longwood Hybrid' is a cross between *V. cruziana* and *V. amazonica*. This hybrid was the result of the cross-pollination done by Pat Nutt of Longwood Gardens in September 1960. The plant was

therefore named after Longwood Gardens. It has the best characteristics of both parents, with leaves that are about the size of *V. amazonica* and rims like that of *V. cruziana*. The rim is notched in two places to drain off excessive water especially during a tropical downpour. The underside of the leaf reveals a well-engineered floating marvel — covered with a spider-web-like array of spongy supporting ribs, all with spines. Pockets are created to trap air that allows the leaf to float.

## The Flowers

Victoria lilies are night-bloomers. The size of the nocturnal flowers can be 30 cm across. Each flower opens only for two days. On its first night, it unfurls and the petals are gleaming, ivory white. The first-day flowers of these two species and the hybrid are similar.

Opening of the flower is triggered off by diminishing light intensity and it becomes fully opened at around 8:30 pm. On the first night, the flower functions as a female. It produces nectar that has a strong, sweet, fruity fragrance that is rather similar to that of a ripe pineapple. The flower remains opened till the following morning and by 9:00 am depending on the light intensity, the petals begin to close. By 10:00 am, the flower will be completely closed.

On the second day, the flower



*Victoria amazonica* — 1<sup>st</sup> night flower.

starts to open late in the afternoon usually around 5:30 pm but it can be earlier if the weather is overcast. The colour of the petals has changed. The male flower of *V. cruziana* has turned a light pink or slightly deeper pink while that of *V. amazonica*, a dazzling red or deep magenta and that of *V.* 'Longwood Hybrid', a mixture of deep red with some white streaks.

By dusk, the flower is fully opened again. By this time, the flower has undergone an intriguing "sex reassignment", having transformed into a functional male flower. The anthers are ready to release small grains of pollen, but only around the later part of the night.



*Victoria amazonica* – 2<sup>nd</sup> night flower.



*Victoria* 'Longwood Hybrid' – 2<sup>nd</sup> night flower.

In nature, *Victoria* is pollinated by scarab beetles when the flower opens on the first night, attracting the beetle by the sweet aroma of its nectar that the beetles feed on. When the flower closes the next morning, the insect is trapped within. On the second evening, the beetle is freed when the flower re-opens. While seeking food, it may end up in another first-day flower thus fertilising the latter. Self-pollination seems to be difficult as the flower's sex change limits its capability to self-fertilise. In the Gardens, when our *Victoria* first flowered, most of the flowers were not pollinated. Hand-pollination was therefore necessary.

On the third morning, the flower sinks back into the water when the flower stalks begin to turn down. If pollination is successful, seeds about the size of peas will form in a pod of up to 10 cm in diameter held at the end of the flower stalk underwater. It usually takes 5 weeks or more for the seeds to mature. The pod will rise very close to the surface of the water when it is fully matured.

#### THE SEEDS

Seeds are about 1 cm in length and are edible, often roasted or ground to a flour. The Indians of

South America valued such seeds as nutritious food and its Indian name means "Maize of the Water". Farina made from these is considered superior to the finest wheat flour. *Victoria* lilies are by nature, perennial. But in most temperate regions, they are grown as annuals. In their natural habitat, due to the unfavourable water levels during the course of the year, they tend to grow as an annual too. In Singapore, they are grown as perennials. This means that we do not have to grow a new *Victoria* every year to enjoy its flowers throughout the year.

All three can now be viewed at the Sundial Garden ponds in the Heritage Core of the Gardens. 🌿

**Andrea Kee**

*Plant Resource Centre*



*Victoria cruziana* – 2<sup>nd</sup> night flower.

## The Cross

I must say any kind of aquatics fascinates me. But, when I first encountered the *Victoria* lily, I was completely bowled over by its sheer size and magnificence. To me, this is the queen of all water lilies and seeing it itself is a treat. It is both my privilege and challenge to be able to grow them and produce the Gardens' own 'Longwood Hybrid.'

The opportunity arose when the Director of the University of Helsinki's Botanic Garden, Dr Timo Koppoén visited us in Feb 2000. He generously donated some seeds of *Victoria cruziana*. When germinated the first leaf came out like a thread expanding at the end to form a blade. At the two-leaf stage the seedlings were sown in 4-inch clay pots with a potting mix of one part topsoil and one part sand. The pots were placed in water about 10cm from the water surface. The early leaves very soon reached the surface of the water to form the first floating leaves. This was also the most crucial period as the seedling was rather tender and sensitive. It took less than four months for the first seedling to grow to a mature plant producing its first flower in late May 2000.

Motivated by the success of growing *Victoria cruziana*, I attempted to cross our existing *V. amazonica* with *V. cruziana*.

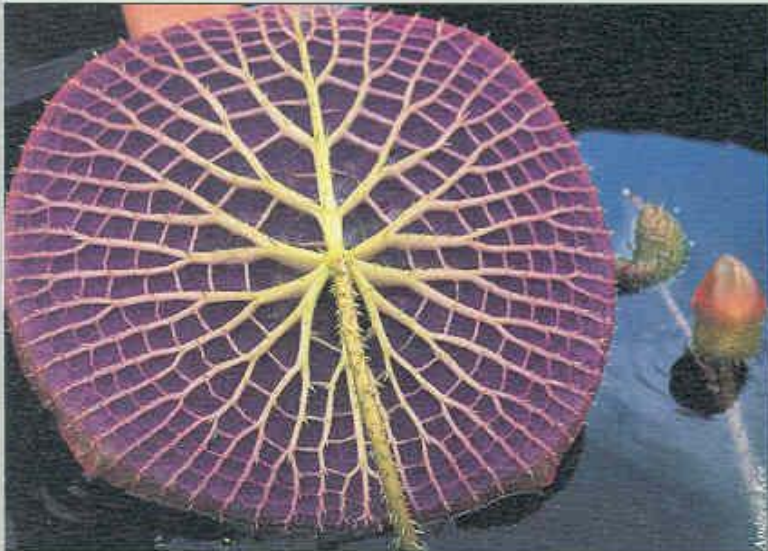
Apart from gleaning relevant information on the subject from literature, many evenings were spent observing the flowering patterns of these two species. Later I extended my observation to early mornings. Initially, I had difficulties getting the pollens of *Victoria amazonica* as it does not flower that frequently. While waiting for it to flower, I practised my techniques on





Andrea and Yati checking on a *Victoria amazonica* in the Sundial Garden Pond.

Ary Cahya



The intricate veins on the underside of a *Victoria* leaf.



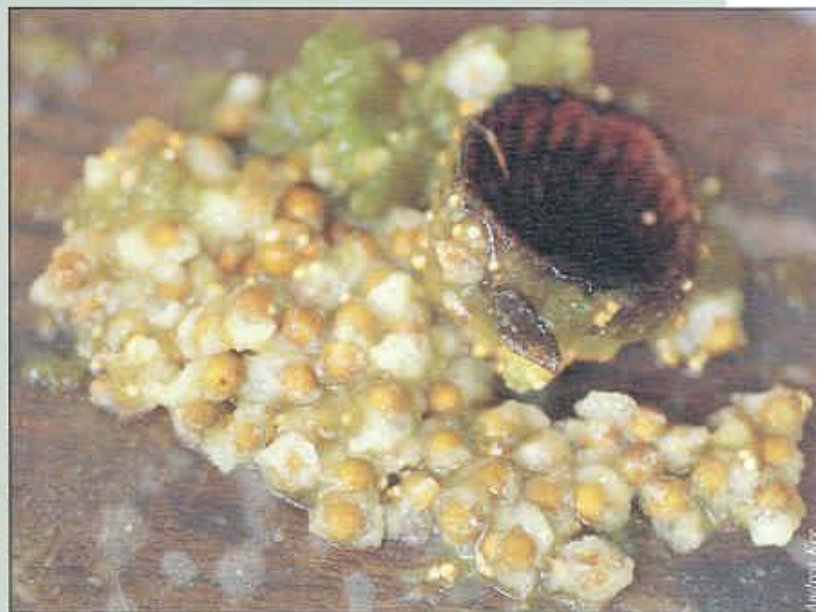
A seedpod (similar for all three species).

Kellora Ari

*Victoria cruziana* in the month of July, pollinating flowers with pollens from another flower of the same species.

Finally, I had my first opportunity in August 2000. I collected pollens from the second-day flower of *Victoria amazonica* from the Sundial Garden pond and dust them into the cup of the *Victoria cruziana* flower. I carried out the pollination at 6:45 am on the second morning as the flower was still functionally female.

On the third morning, the flower closed and sank beneath the surface of the water. It began to decay and about two weeks later, I could see the seedpod beginning to swell. The seedpod grew very big, almost to the size of a baby's head upon maturity. At this time, the pod was just 4 to 5 cm from the surface of the water. Within the next few days, it reached the surface and then burst. The whole process took a mere 34 days and 72 seeds were obtained from this pod. Seeing the seeds of the 1<sup>st</sup> *Victoria* 'Longwood Hybrid' for the first time was a most gratifying experience. Cultivating and nurturing them successfully into mature plants was yet another delightful experience that will be recounted later.



The ruptured seedpod filled with seeds.

Ary Cahya

# 4<sup>th</sup> Skyrise Gardens Exh

The Skyrise Gardens Exhibition is an initiative of the Garden City Action Committee (GCAC) under the Ministry of National Development (MND), held every three years to promote gardening to highrise dwellers as an enhancement to the environment and gracious living. The 1<sup>st</sup> Skyrise Gardens Exhibition was held in 1992 at the Marina Square Shopping Mall over a 3-day period. The 2<sup>nd</sup> Exhibition was held as a National Day Event from 4<sup>th</sup> - 9<sup>th</sup> August 1995 at Takashimaya Square, Ngee Ann City along the theme "Plants for Apartments" while the 3<sup>rd</sup> was held at the Tropics Atrium of Suntec City from 28 - 31 May 1998 along the theme "A Tropical Paradise in every Home".

The 4<sup>th</sup> Skyrise Gardens Exhibition was held from 26<sup>th</sup> June - 1<sup>st</sup> July 2001 at the Singapore International Convention and Exhibition Centre, Suntec City. It was organised as the Singapore Pavilion in the Landscape 2001 Exhibition of the 38<sup>th</sup> International Federation of Landscape Architects (IFLA) World Congress. The Singapore Pavilion/4<sup>th</sup> Skyrise Gardens Exhibition Committee was comprised of the National Parks Board (NParks), the Agri-Food & Veterinary Authority of Singapore (AVA), the Urban Redevelopment Authority (URA), the Housing & Development Board (HDB) and the Jurong Town Corporation (JTC). Preparatory works were



Opening of the Singapore Pavilion by the Prime Minister.



The Garden City Story.

initiated in 2000, a year in advance under the Design, Education, Publicity & Sponsorship, Logistics, Show Management, Competition and Finance Sub-Committees.

Developed along the theme "City in a Tropical Garden", in addition to promoting skyrise gardening, the 4<sup>th</sup> Skyrise Gardens Exhibition focused on encouraging public and private concerns to incorporate landscaping as an integral plan of their developments, in particular, highrise developments. At the launch of the 38<sup>th</sup> IFLA World Congress and Singapore Pavilion on 26<sup>th</sup> June 2001, the Prime Minister announced the

Government's new initiative to further enhance the Garden City by the provision of vertical and rooftop greenery.

Two competitions were organised as precursors leading to the main event. The "Gardens City Awards" (GCA) competition was held for the first time to motivate the public and private sectors to landscape Singapore's skyline by recognising and highlighting the joint efforts of the owner/developer, landscape architect/designer and managing agent for well-landscaped projects. The competition was open to six categories: (a) commercial office/shopping, (b) hotel, (c) private residential, (d) public housing, (e) institution and (f) industrial (including business parks). A total

of 50 entries were received. The nine GCA winners received the award from the Prime Minister at the opening ceremony. Winning entries received generous press coverage and were on display at the Singapore Pavilion over the duration of the Exhibition. A representative from Site Concepts International, a Garden City Award winner, commented that the willingness of developers to invest in landscaping was due to the increased awareness that it would help to provide a total environment - one that extends beyond the boundaries of an apartment.

A Computer Art Competition was

# Exhibition – A City in a Tropical Garden



Vertical greenery.

organised for secondary schools in Singapore. Based on the theme "My Vision of Singapore as a Garden City", it sought to evoke young Singaporeans' visions of our future Garden City through creative computer artworks and to instill a sense of responsibility for our environment. Interestingly, images of skyscraper greenery came through in many of the entries coinciding with the key message of the 4<sup>th</sup> Skyrise Gardens Exhibition. A total of 35 entries were received with Crescent Girls' School clinching top honours. In describing their creation, members of the Crescent Girls' School's top team has these words of wisdom: "We want to show that even in hectic Singapore, nature can co-exist with a high-tech city".

Occupying an area of about 600 m<sup>2</sup>, the Singapore Pavilion took 3 days to assemble. There were anxious moments when on-site adjustments and critical decisions had to be made. Nevertheless, it became the anchor display of the Landscape 2001 Exhibition. The Singapore Pavilion comprised three key components: (1) the Garden City Story – its past, present and future, (2) a 3-tier focal display showcasing living and working spaces enlivened with plant decors, water gardens/features, rooftop ornamental and vegetable/fruit gardens and vertical greenery, and (3) an interactive/

display area housing the Plant Clinic, displays by NParks, JTC and HBD and the stage for gardening talks, demonstrations and competition.

The outreach activities/programmes and fringe activities were very popular with the public. The Plant Clinic tended by specialist "doctors", handing out instant remedies/advice for plant pests – diseases and insects, nutrition, tree maintenance/surgery, and with its display of plants afflicted by various disorders, was a big draw. Talks cum demonstrations such as "Plant Propagation", "Plant Care & Maintenance", "Water Gardens in Containers", "Herbs & Spices", "Orchid Growing", "Hydroponics", "Terrarium", "Container Gardening" and "Bonsai Appreciation" saw some 100 – 150 in attendance per session, with later comers having to stand through sessions as seats were quickly taken up. The on-the-spot Children's Dish Garden Competition opened for registration by primary students on 27<sup>th</sup> June 2001, was fully subscribed by 30<sup>th</sup> June 2001. At about 2.00 pm on 1<sup>st</sup> July 2001, 30 budding gardeners gathered at the stage of the Singapore Pavilion vying to pit their creative skills against one another. After a short demonstration by the instructor, they were on their way. Two hours later, the winners emerged. Professor Leo Tan, Chairman of the National Parks Board, presented prizes to winners



3-tier focal display.



NParks' display – "New & Interesting".



Rooftop vegetable garden.



Proud winner of Children's Dish Garden Competition.



GCA winner for the hotel category - Shangri-La Hotel.



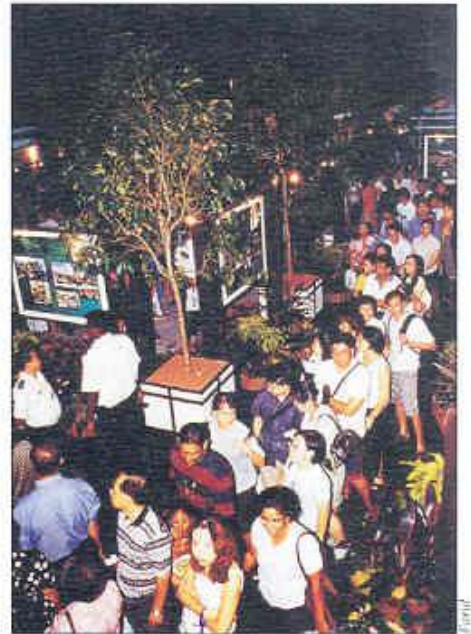
A Talk cum Demonstration on "Designing with Plants".



VIPs drop in.

Gardens Exhibition. 1,285 copies of the two books were snapped up at the Exhibition.

The Exhibition received widespread and sustained publicity through the major media. Daily coverage in newspapers from 23<sup>rd</sup> June till 1<sup>st</sup> July 2001 informed the public and drew them to the event. Survey results indicated that 62% of visitors learned about the Exhibition through the press. Media publicity was supplemented by other promotional channels such as newspaper advertisements, daily radio commercial



Weekend crowd.

of the Computer Art Competition as well as the Children's Dish Garden Competition witnessed by proud principals, teachers and parents.

Two publications were launched to mark the event and as testimony to NParks' continued efforts to educate the public on greenery. "Trees of Our Garden City", featuring some 80 trees and palms planted in Singapore, is an informative guide for the layperson, plant enthusiasts as well as the professionals. It even has a segment on trees suitable for rooftop gardens. First published in 1995 to coincide with the 2<sup>nd</sup> Skyrise Gardens Exhibition, "Skyrise Gardening for Highrise Homes", a practical guide for skyrise gardeners, was well received and reprinted in 1996. The 2<sup>nd</sup> edition was published in 1998 for the 3<sup>rd</sup> Skyrise Gardens Exhibition. The expanded 3<sup>rd</sup> edition with three new chapters on aquatic plants, orchid growing and terrariums was befitting for the 4<sup>th</sup> Skyrise

blitz, banners at major parks/open spaces, bunting lining routes to Suntec City and posters at Suntec City Mall. Also, invitations were sent to all Community Clubs and Centres to encourage visitation from the heartland. Schools were encouraged to visit the Exhibition as a key chapter of National Education via electronic booking for better crowd management.

Despite initial concerns over the venue for the event, the Exhibition turned out to be a crowd-puller. It was very well attended since opening up to the public in the afternoon of 27<sup>th</sup> June 2001, particularly so over the weekend. 1<sup>st</sup> July 2001, Sunday alone witnessed over 41,000 visitors making a beeline to the exhibits. Based on the visitorship of 109,000, compared with 50,000 for the 2<sup>nd</sup> and 3<sup>rd</sup> Skyrise Gardens Exhibitions, the overwhelming public interest and participation in the outreach

activities and exhibits, and the positive feedback from local and foreign visitors alike, the Exhibition was irrefutably a resounding success. Unlike the previous Skyrise Exhibitions, visitors to the 4<sup>th</sup> Skyrise Gardens Exhibition came specifically to look at the Singapore Pavilion. Most if not all had only kind words and praises for the organisers and the Exhibition.

The Singapore Pavilion was graced by several Cabinet Ministers including Senior Minister and Mrs Lee, Deputy Prime Minister Dr & Mrs Tony Tan, Minister for Health Mr Lim Hng Kiang, Minister without Portfolio Mr & Mrs Lim Boon Heng and Minister of State for Defence and MITA Mr & Mrs David Lim, and Permanent Secretaries Mr Eddie Teo and Mr Goh Kim Leong. 🌿

**Foong Thai Wu**  
**Nashita Mustafa**  
**Janice Yau**  
**Cheryl Goh**  
*Education Branch*

## AROUND THE GARDENS

# Volunteer Tour for the Public Launched

The Gardens in conjunction with the Green Volunteers Network and the Singapore Environment Council launched the first volunteer tour for the public on 8<sup>th</sup> April 2001. This pioneering tour of the Gardens' Rain Forest proposed by Keith Hillier, an active volunteer, is conducted by volunteer guides, many of whom are avid naturalists with an abundance of information and experience to share. The Gardens' Rain Forest shelters 314 plant species of which 10 are extinct elsewhere in Singapore and many of which are endangered, rare or vulnerable.

Starting off at the Ranger Station at the Tanglin Core, the tour begins with an introduction to the fabulous history of the 142 year-old Gardens. Even before the rainforest is sighted, one is already conveyed into a world of interesting stories and little known facts. Be introduced to the *Curculigo* — used in traditional medicine for a variety of ailments; the ripe fruits are sweetish and edible and leave an after effect in the mouth such that any liquid drunk soon after tastes sweet; the leaves are a source of fibre and can be twisted into a rough string in the field. Be impressed by the potential of the *Koompassia excelsa*, which can grow to over 80 metres, the height of a 30-storey building, making it the tallest tree in South East Asia. Matured trees are distinctive by their massive buttresses and smooth bark. Their branches emerging at almost right angles from the trunk, are preferred home of wild honey bees. Forest dwellers scale such mighty trees to collect the honey. Identify the *Heritiera elata*, with its artistically sculptured trunk and whose seeds are reputed to be edible.

As the rainforest draws near, a feeling of awe inevitably descends and a sense of anticipation wells up.



A volunteer guide with her enraptured audience in the heart of the Gardens' Rain Forest.

With an almost closed canopy of foliage which blocks out most sunlight, and a moist, cool feel in the air, one is almost in another world. A profusion of quick-growing forest plants can be found where streams of sunlight filter through the green canopy. The diversity of plant life here is staggering — wild bananas (forest weeds in this part of the world), *Knema latericia* (a relative of the nutmeg), *Arenga pinnata* (sugar palm, a source of drink, sugar, fibre and edible fruit — the semi-translucent "attap" of commerce is the endosperm of the fruits of this palm) are picked out by the knowledgeable guide and become interesting talking points. Come face to face with the "giants" — trees which tower high above, examine plank buttresses and learn all about them. If one is lucky, one may even chance upon some of

the forest's secretive birds and animals.

The guided Rain Forest Tour is truly a relaxing and informative way to spend an hour on a Saturday. One will come away feeling invigorated and awed by this wonderful asset of the Gardens right in the heart of Singapore. So, do put on your walking shoes, pack your drinking water and make a date in your diary for the Rain Forest Tour.

The Rain Forest Tour is conducted on the second Saturday of every month at 9 am, 10 am, 11 am and 4 pm. The tour starts off from the Ranger Station in the Gardens and ends at the Visitor Centre. Just turn up at the Ranger Station on the day of the tour and register on-the-spot. 

**Camille Foo**  
Visitor Services

## NEW AND EXCITING

# Cerbera manghas

Grown from a seed brought back from New Caledonia by Mr Tan Jiew Hoe, this small tree with its pink-and-white flowers has attracted attention regardless of growing in one of the more obscure corners of the Gardens. Despite its obvious membership of the Apocynaceae (the periwinkle family), it was not clear to which species it actually belonged. The genus *Cerbera* was suggested and an opinion was sought from the expert, Dr Toon Leeuwenberg in Wageningen, the Netherlands. He confirmed from specimens sent that it is *Cerbera manghas*. This was somewhat surprising as *Cerbera manghas* is native to Singapore and the native plant differs from the New Caledonian introduction in several ways. The local form has pure white flowers with a red eye. The inflorescences and flowers are distinctly smaller than the New Caledonian plant and they lack the red veins and margins to the leaves. It is not clear whether the new introduction represents the typical form for New Caledonia, or is a line selected for ornamental planting. It is certainly very attractive with its glossy dark foliage touched with red and the candy-striped blooms. *Cerbera manghas* is a seashore tree, particularly associated with the high-tide line of sandy beaches and back mangroves. Its inherent salt tolerance will make this plant an obvious choice for coastal parks and gardens.

Ian Turner  
Horticulture Branch



## AU JARDIN LES AMIS

### The Friends In The Gardens

An ideal setting for that well-needed respite, Au Jardin retains a marked colonial character that complements the elegantly restored EJM Corner House. Hidden by lush greenery, towering palms and lost in the soothing sounds of water, the black and white peeps above falling cascades at the Visitor Centre of the Gardens. The restaurant is however far from being forgotten.

Since its opening, the culinary "star" has seen its fair share of VIPs and celebrities, including UN Secretary-General, Mr Kofi Annan, Hollywood actor and actress Chow Yun Fatt and Jodie Foster. In the year 2000 alone, it clinched awards like "Asian Fine Dining Hall of Fame", "Singapore's Top Restaurants", "Best Award of Excellence" and was even voted as one of the "60 Hot Tables Around the Globe".

Just as it had created a stir when it opened at the height of the Asian financial crisis, Au Jardin was in the limelight again



EJM Corner House, the former residence of Mr Edred John Henry Corner, Assistant Director of the Gardens (1929-46).



Au Jardin was created to resemble top-rated "Relais et Chateaux" restaurants found in Europe.

when it bagged the "Best New Restaurant" at the inaugural World Gourmet Summit recently held in April. This wine-and-dine Oscars was the first national award for chefs and restaurateurs here in Singapore. Tasting also sweet success was the restaurant's culinary expert, Mr Justin Quek, who was bestowed the "Best Chef" title.

The winning formula for Au Jardin is definitely the ultimate dining experience created here, a combination of delicate French cuisine, exquisite wines and a breathtaking view, in the heart of the Gardens.

\*The Gardens would also like to congratulate Au Jardin's sister restaurant, Les Amis for winning the "Best Restaurant", "Best Sommelier" and the "Best Wine List" awards at the World Gourmet Summit.

Yap Siow Hong  
Visitor Services





# KEY VISITORS TO THE GARDENS (Jan – Jun 2001)

NAME	FROM
Prof A P van der Kloet	Acadia University, Wolfville, Canada
Mr Abdul Rahim Rashid	Universiti Putra Malaysia, Serdang, Malaysia
Mr Akira Suhara	Assembly Democratic Club, Nagoya City, Japan
Mr Fumihiko Okumura	Assembly Democratic Club, Nagoya City, Japan
Mr Kohei Kuno	Assembly Democratic Club, Nagoya City, Japan
Mr Nobumi Yamauchi	Assembly Democratic Club, Nagoya City, Japan
Mr Yoshiyuki Hayakawa	Assembly Democratic Club, Nagoya City, Japan
Dr Alan Yen	Harvard University, USA
Mdm Azadsurengiin Oyunbileg	First Lady of Mongolia
Mr Christopher Samuel "Kit" Bond	Senator, Missouri, USA
Dr Fazakas Szabolcs	Former Minister for Trade and Industry, Hungary
Dr George Argent	Royal Botanic Garden, Edinburgh, UK
Dr Peter Wilkie	Royal Botanic Garden, Edinburgh, UK
Tuan Haji Zulkifli Ayob	Botanic Garden, Putra Jaya, Malaysia
Mr Hyosig Won	University of Missouri, St Louis, USA
Mdm Im Paurika	Spouse of Secretary-General, Ministry of Economy and Finance, Cambodia
Dr Ivan Schanzer	Main Botanic Garden, Moscow, Russia
Mrs Jeanie Hayden	Spouse of Chief of US Military Agency, USA
Mr John Sugau	Forest Research Centre, Sabah Forest Department, Sandakan, Malaysia
Mr Joseph Tangah	Forest Research Centre, Sabah Forest Department, Sandakan, Malaysia
Mr Robert Ong	Forest Research Centre, Sabah Forest Department, Sandakan, Malaysia
Prefecto General Juan Jose Beltritti	Commandant, Argentine Coast Guard, Argentina
Mrs Kay Loy	Spouse of Commandant of the US Coast Guard, USA
HM King Abdullah II	King of the Hashemite Kingdom of Jordan
HRH Prince Faisal Bin Al Hussein	Prince of the Hashemite Kingdom of Jordan
Mr Lawrence Lim	Former Honorary Consul General, Papua New Guinea
Prof Liu Peigui	Kunming Institute of Botany, China Academy of Sciences, People's Republic of China
Mr Mah Bow Tan	Minister for National Development, Singapore
Mrs Marie Job	Spouse of Chief of Air Staff, France
Dr Niels Jacobsen	Agriculture University, Copenhagen, Denmark
Ms Pam Opie	Trinity College, Dublin, Ireland
Prof Paul Bridge	Royal Botanic Gardens, Kew, UK
Dr Paul J A Kessler	National Herbarium Holland, Leiden University, Holland
Dr Paul Quek	International Plant Genetic Resources Institute, Selangor, Malaysia
Prof R D Hill	Department of Ecology, University of Hong Kong, Hong Kong
Prof Rei Rasmussen	Oregon Graduate Institute, USA
Prof Dr S Rob Grandstein	Georg-August-Universitat Gottingen, Germany
Dr Samrit Yossomsakdi	Burapha University, Thailand
Mr Shinya Kuwaduru	Flower Park Kagoshima, Japan
Mr Tadashi Tominaga	Flower Park Kagoshima, Japan
Mr Song Shuyin	Biotechnology Bureau, China Academy of Sciences, People's Republic of China
Prof Tong Fengqin	Biotechnology Bureau, China Academy of Sciences, People's Republic of China
Prof Zou Shouqing	Biotechnology Bureau, China Academy of Sciences, People's Republic of China
Mr Stetan Ungricht	CNRS, CEFE Montpellier, France
Mr Sun Dallang	Vice Mayor, Jiangsu, People's Republic of China
Mrs Teofisto Guingona	Spouse of the Vice-President of the Philippines
Dr Tim Whitmore	Cambridge University, UK
Dr Xu Zaitu	Xishuangbanna Tropical Botanical Garden, China Academy of Sciences, Yunnan, People's Republic of China



An attractive pink orchid was named after the First Lady of Mongolia on the occasion of her visit on the 16<sup>th</sup> of February.

Rebecca Oh



His Majesty King Abdullah II naming his orchid during his visit to the Gardens on the 20<sup>th</sup> of June.

Rebecca Oh

## FROM THE ARCHIVES

Humphrey M. Burkill's  
Gift to the Archives

Wire cages protect young palms from damage by monkeys (1959).



Sunusi bin Sareh sows orchid seeds on sterile nutrient agar (1959).



The laboratory for flask culture of orchid seedlings (1959).

Living as we do in the present, it is easy to overlook the importance of making records for posterity and as we catalogue our library archives we are only too aware of the gaps in our records.

The gift from Humphrey M. Burkill is therefore particularly welcome. Humphrey Burkill was born in the Director's House (now called Burkill Hall) on 8<sup>th</sup> December 1914 when his father L.H. Burkill was the second Director of the Singapore Botanic Gardens (SBG). Humphrey followed his father's footsteps becoming the sixth Director between 1957 and 1969.

His gift includes postcards of the

Singapore Botanic Gardens Office Staff (April 1969, H.M. Burkill centre front).



Gardens and scenes of Singapore, an index with biographic notes on persons who visited or were connected with SBG, and about 500 black and white photographs (both prints and negatives). Many of these photographs are captioned and dated (most falling within the period 1959-1969) and so are particularly valuable. They include not only vistas, visitors, plants and activities in SBG, but also scenes and trees in Singapore, seashores and seaweeds both in Singapore and Peninsular Malaysia (Humphrey's field of specialisation was algology), some vegetation types

in Peninsular Malaysia and various animals, including pests of plants in SBG. The photographs of SBG also span a wide range of subjects. Some remind us that important activities have their roots in the past, like those of the flask culture unit that was pioneered in SBG in the 1930s and has continued to play a crucial role in the orchid hybridisation programme for which SBG is well-known.

Others look to the future, like the scene of night lighting in the cactus garden. After a lapse of many years, night lighting has been restarted and the Central Core of SBG will be ready for night viewing next year.

Still other photographs record events and situations that have passed into history. Like the cages to protect plants from the ravages of the long-tailed macaques. Who now remembers that SBG had a monkey problem that became so severe that in the 1970s the Veterinary Department was called in to deal with the situation? The photograph of the composting of contraband tobacco under police supervision is a quaint cameo from the past.

The draining of Swan Lake in 1961 produced a bonanza catch of fish and turtles, the only effective way to



Draining Swan Lake in 1961 produced a catch of snakeshead fish (*Channa* species).



Seven tons of contraband tobacco was dumped on the Gardens by court order and composted under police supervision (1961).

remove the turtles and terrapins that infest our lakes and nibble away at the water lilies. However, draining the lake produced an unexpected result as refilling the lake spawned an epidemic spread of lotus.

This collection of photographs vividly illustrates both the timeless aspects of the Gardens over the years, in particular the historic collection of trees and familiar landmarks, while on the other hand recording events and scenes that have passed into history. Humphrey M Burkill's collection of photographs and other items is indeed a valuable addition to our archives. 🌿

Ruth Kiew  
Herbarium & Library