

## IPPS Singapore Symposium 2019

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### INTRODUCTION

At first glance, Singapore might seem to be an odd choice to hold an IPPS symposium. With a population density of 7800 people per square kilometre (New Zealand has 18), one would wonder if there was any room to grow plants. Add in the tropical climate of being located one degree off the equator, one would wonder what would actually grow in such a climate?

But horticulturally, there is a bit happening in Singapore despite the challenge of being a city state. In 1967, the vision of a city in a garden was introduced putting greening initiatives at the forefront of future development. Almost 10% of the land area has been set aside for parks and reserves. Recent developments like Gardens by the Bay have also lead to Singapore becoming a horticultural hotspot in Asia.

So after months of planning by Eddie Welsh and Philip & Janine Smith, Paul Fisher from the University of Florida and Gardens by the Bay staff in Singapore, the IPPS Singapore Symposium was underway. 34 members of IPPS New Zealand joined others from Australia, Thailand and India for five days of

visits, lectures and sightseeing around Singapore.

The first day was an all-day field trip around Singapore. The first visit was to Hua Hng Trading Co Ltd, one of the largest general nurseries in Singapore which has an extensive selection of plants sourced from all over the world. The idea that plants were brought in from overseas and sold was of course interesting for us from New Zealand but then I guess with so little room to grow things in Singapore, it helps to widen what is available. Plants come from Malaysia, Thailand, China and Australia with a small percentage grown on site. Hua Hng sells direct to the public as well as garden centres, landscapers and other nurseries. Being in the tropics, there were many plants found you would not see in New Zealand on display and there tended to be large numbers of each line, rather than the usual 10 or less you typically find in New Zealand. The most expensive lines were bonsai large grade specimens of Casuarinas at over S\$13000! It was also interesting to see potted watermelon plants for sale complete with ripening fruit!



**Figure 1.** Potted watermelon plants for sale, complete with ripening fruit at Hua Hng Trading Co Ltd.

Our next visit was to Woon Leng Nursery, a specialist orchid nursery which specialises in the production of Phalaenopsis orchids. Woon Leng were the first to do these in Singapore and buy the plants in via tissue culture from Taiwan, then grow them on in climate controlled greenhouses before being sold. Producing them this way keeps the cost down and also reduces the damage that can be done to flower spikes during transport. It is a very labour intensive operation with 40 staff employed in the business. The orchids are sold all around Singapore to private customers as well as for displays in public areas. They looked stunning in bloom in the nursery.



**Figure 2.** Phalaenopsis Orchids, a specialist but labour intensive crop for Woon Leng Nursery.



After lunch, we visited the Kampung Admiralty. This is a unique development which integrates housing for the elderly with a range of social and commercial services including childcare, so there is somewhere for the grandkids to go. On the roof of the 11 story complex is a community garden which is terraced. This provides space for people to go, meet up with others and also to tend the

community garden. At times it was hard to believe you were on the top of a building in one of the most densely populated cities on earth. The development will be the prototype for similar developments in the future and has already won several international architecture awards.



**Figure 3.** Part of the rooftop garden of the Kampung Admiralty development.

We then visited the green wall at the Heeren Shopping Centre just off Orchard Road. The six-story high green wall was developed by Greenology and is a substrate panel system with an aluminium backing. The panels were planted and grown in a nursery before being installed on the wall. Once up, it basically looks after itself with minimal maintenance required.



**Figure 4.** The six-story high green wall at the Heeren Shopping Centre.

The next day was spent at Gardens by the Bay where we were very kindly hosted by CEO Felix Loh and his team. Opened in 2012, the gardens had 12 million visitors in 2018 and is one of the most popular tourist attractions in Singapore.

The first part of our visit was a guided tour around the gardens, fortunately we were driven around the 101-hectare site. We were able to take in the Skyway, a 128 metre suspended walk between two of the large super

trees which are another feature of the gardens. At 22 metres high, it gave users great views over the park and surrounds, including the magnificent Marina Bay Sands Hotel with its three columns, topped with a large platform. We also visited the Floral Fantasy, the latest attraction opened at Gardens by the Bay. It has been designed to cater for those that don't have time to visit the larger conservatories but still want to see a floral display on a smaller scale. There are four separate themed areas which you walk through and then you can end your time with a 4D ride 'Flight of the dragonfly' through the gardens.

We also had time to explore both the Flower Dome and the Cloud Forest conservatory and marvel at the displays inside both. The Flower dome has nine gardens inside ranging from the stunning Baobab trees from Africa through to an Australia garden and an olive grove with centuries old trees growing. At the centre is the flower field which is changed on a regular basis. For our visit, there was a Christmas themed display of Poinsettias on show – I never knew how many different types there are, and it certainly looked magical for Christmas.



**Figure 5.** The spectacular display of Poinsettia in the Flower Dome



The Cloud Forest conservatory features a 35-metre-tall 'mountain' which you take a lift to the top and then walk down via a series of elevated walkways and internal stair. The inside of the mountain also has things to see and do including a display of crystals and interactive displays. At the top of the mountain is a display of carnivorous plants (complete with Lego® versions) and then as you wander down, you get to fully appreciate the complexity of the planting on the side of the mountain and what it must take to keep it looking good.



**Figure 6.** The 'mountain' inside the Cloud Forest Conservatory

After lunch, it was the start of the lecture program which were all grateful it was being held in an air-conditioned room. Mr Felix Loh, CEO of Gardens by the Bay welcomed everyone and spoke fondly of his time studying in New Zealand at Massey University. He then spoke about the challenges of maintaining Singapore's reputation as a garden city and how Gardens by the Bay helps with this. Philip Smith on behalf of the IPPS New Zealand Region presented Felix with an IPPS plaque

Dr Puay Yok Tan from the National University of Singapore spoke about the motivations, benefits and challenges of greening Singapore. There have been remarkable results from greening Singapore over the last five decades and one quote he used from the founding Prime Minister of Singapore Mr Lee Kuan Yew "Greening is the most cost effective project I have launched". He spoke of the environmental, social and cultural benefits that greening has brought but also of some of the challenges ahead, especially the loss of secondary forests in Singapore.

Chris Dalzell, originally from South Africa, but now with Gardens by the Bay wowed us with beautiful photos of many South African plants suitable for the tropics. He spoke of the diverse and unique flora of South Africa which makes up 9% of the worlds plant species but also of the threats including the unlimited ability for people to collect plants from the wild for traditional medicine.

Following dinner hosted by Felix and his team, we enjoyed the light and sound show under the Supertrees – an amazing experience and not to be missed as a part of a visit to Gardens by the Bay.

A visit to the Singapore Botanic Gardens started the next day off. Celebrating its 160<sup>th</sup> year, the 82-hectare gardens are the only tropical garden to be designated a UNESCO World Heritage Site. The gardens started off as a public park developed by the Singapore Agri-Horticultural Society and in the late 1800's, played an important role in research into rubber production. In recent times, the garden has played an important role in the development of Singapore as a garden city. In 2009, another 18 hectares was added to the gardens and this has been developed into a number of different attractions.

During our visit, we saw the giant palm *Lodoicea maldivica* which blew us away with its giant fronds. The curtain of roots from the Curtain Ivy *Cissus verticillata*

were also very impressive to see as were some of the bonsai on display. An area of tropical rainforest older than the gardens themselves also gave an insight into what Singapore looked prior to human settlement.



**Figure 7.** The giant palm *Lodoicea maldivica*.

We were also able to look around the National Orchid collection which contains over 1000 species and 2000 hybrids. Part of the collection is the VIP Orchid collection where orchids have been named for famous visitors to the gardens which range from Princess Diana to Nelson Mandela. It was surprising to see orchids named for two former Governor Generals of New Zealand – Sir Anand Satyand and Sir Jerry Mataparae on display. A very impressive collection of orchids and well presented in a garden situation.

We left the gardens just as the heavens opened to head back to Gardens by the Bay and an afternoon of presentations. Thomas Seo spoke about the three main areas of research and development at the gardens: Orchids including the breeding program at Gardens by the Bay, Flower Trials and production which involves controlling of flowering and longevity; and sustainability which is becoming an important aspect of how the gardens are operated.

Mei Leng Lim spoke on the orchid program at the gardens which includes managing them in displays, trialing them for

flower longevity and breeding new hybrids. Breeding focuses on creating hybrids between highland and lowland species but also those with better colours, more flowers and compact habits.

Carly Anderson spoke on growing spectacular hanging baskets. A display of 100 baskets is planned for the Flower dome in September and since established baskets are difficult and costly to freight, they are being grown in house. Carly ran through some of the considerations for baskets from what substrate to use to plant material and managing pests and diseases.

Dex Chen spoke about sustainability at the gardens including making better use of resources and minimising waste. One example was the use of old Christmas trees (real) which were sent to Singapore Zoo and used in enclosures as a tool to keep the animals amused.

Dr Sladana Bec then presented on Disease Diagnosis in Plants. This included the interaction between the host, pathogen and environment in diagnosing diseases and differences between fungal, bacterial and viral infections. It was also good to have a refresh course on differences between signs and symptoms of disease and that not all symptoms are caused by disease. This was followed by a hand on workshop where various options were used for diagnosing diseases.

The final day of the Symposium started with the final session of presentations. Dr Nura Abdul spoke about Mr. Lee Kuan Yew's vision of a city in a garden and how this has been achieved. Dermot Molloy from the Royal Botanic Gardens in Melbourne spoke on the development of the Oman Botanic Gardens, an exciting development underway in the Middle East. The gardens will cover 423 hectares and will be one of the largest in the world. It will also house almost all of Omans flora from deserts to monsoon forests. Dermot spoke about some of the

unique plants found in Oman and of the challenges in setting up an onsite nursery at the Botanic Gardens.

Fellow Australian David Hancock from Western Australia spoke on developing a nursery for a wetland revegetation project in Oman. Large quantities of water are produced from the oil fields of Oman which is separated out but still contaminated with residues. Previous practice has been to pump this back underground, but an engineering solution was sought to develop a wetland to treat the water. 250 hectares was required to be planted in four species so a nursery was set up. This presented numerous challenges which David and his team had to overcome in the successful delivery of the project. One of the takeaway points David made was that horticultural skills can make the difference between success and failure.

Paul Fisher then spoke on Phosphorus and the ins and outs of how it affects plant growth including what deficiencies look like and its use in nurseries vs landscape production. Yours truly then spoke on Roses of New Zealand featuring some of the more prominent breeders and their creations. Eddie Welsh brought the presentations to a close by speaking on the ‘Spirit of IPPS’ and why he thinks it has been so successful around the world.

The afternoon saw more visits, first up to Khoo Teck Puat Hospital. No, no one needed to see a doctor from the group but rather we were here to see this green hospital. As many were to remark during our time here, it did not feel like we were in one. The hospital has extensive plantings including a large area between two of the buildings landscaped like a park, complete with water features. The roof of one of the buildings

features a roof top garden where vegetables and fruiting plants are grown with produce given to volunteers and staff. There was also a medicinal garden with plants that “heal, thrill and kill”, coloured coded of course by the end outcome.



**Figure 8.** The rooftop garden at Khoo Teck, Puat Hospital

It was then onto Changi Airport to visit Jewel Changi. This is a nature themed entertainment and shopping complex located between three of the passenger terminals. Starting at the top, there are numerous activities to do including a maze, slides and a glass floored walkway out over the edge. The centre is dominated by a large waterfall cascading from the roof which is surrounded on the outside by plantings of thousands of trees and shrubs making it feel like a tropical rainforest. We were treated to a light and sound show complete with falling fake snow. This certainly makes visiting an airport and enjoyable experience – take note Auckland, this is how it can be done.





**Figure 9.** Changi Jewel.

With that, the rest of the tour boarded the bus back to the hotel while I went and checked in for my flight home to New Zealand. Five days went by very quick but visiting Singapore was a fantastic experience, even if the heat made things hard going at times (thank goodness for air conditioning and a hotel swimming pool).

A big thank you must go to all of those who hosted us on visits in Singapore, you all made us feel very welcome and nothing was ever a problem. Thank you also to the Gardens by the Bay staff and especially Chad Davis and Mihkaali Ng for ensuring everything went smoothly for our visits.

Also, a big thanks to Eddie Welsh who did a lot of behind the scenes work that made everything come together so well for the symposium.

And lastly a big thank you to IPPS New Zealand whose assistance through a Plant Production Scholarship enabled me to travel to Singapore for this event.