出國報告（出國報告類別：開會）

出席第 19 屆國際植物學大會

~論文發表及維護台灣在植物學國際組織地位

服務機關：國立自然科學博物館

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派赴國家：大陸深圳

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出席第 19 屆國際植物學會研討會

~論文發表及維護台灣在植物學國際組織地位

摘要

第 19 屆國際植物學研討會（XIX International Botanical Congress, Shenzhen, China）由大陸深圳主辦，接受本館副研究員邱少婷兩篇論文海報發表，「Ecological significance of phenology and functional traits of mistletoes in Taiwan, R. O. C」及「Studies of leaf functional traits and foliar vasculature for montane and subalpine woody plants of Yushan National Park in Taiwan, R. O. C 」，出席國際植物學大會，藉此增進國際學術交流，維護台灣在植物學國際組織地位。

已超過百年歷史的國際植物學研討會，每 6 年才舉辦 1 次，包含植物多樣性與生態、陸域植物演化、氣候變遷等重要值物學相關主流議題，也涵蓋國家標本館、植物園相關單位的國際組織。此次國際植物學研討會首次在發展中國家舉辦，初見新興國家的經濟實力，台灣雖評為已開發國家，但在學術的投入和國際爭取，略見不足，希望未來六年後的第 20 屆巴西主辦國，支持更多的台灣學者參加。

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二、參與第 19 屆國際植物學大會議程及維護台灣在植物學國際組織地位

自 1993 年在日本橫濱舉辦，近來第一次亞洲學者充分被各洲國際大師矚目，促使這個研討會從國際植物學的奧林匹亞似交流，推升成聯合國似的學術論壇。逐屆越來越多不同國家的學者參加，2005 年奧地利維也納參加人數高達六千多人，2011 年澳洲墨爾本參加人數不減而增，24 年後（2017）再度在亞洲舉行，都是植物相關領域的群龍會首，可學習瞭解或參與共事未來國際展望的願景，呈現台灣學界的國際參與及維護台灣在植物學國際組織地位。

貳、過程及心得(議題重點、論文重點)

第 19 屆國際植物學研討會在大陸深圳會展中心第 2~5 區舉行，大會議程 7 月 22~29 日包含 6 大領域、7 大主題，約 220 場主題演講和口頭發表，約 2000 個海報，在 30 個講廳同步進行。開幕前註冊學者 6953 位，預估參加人數超過 7000 人，展現國際學術的魅力無法忽視。

另外還有 7 月 17~21 日的國際植物分類學會命名法規會議，會前的延伸衛星會議加計至少 44 場，包括 Sheraton Hotel(喜爾登飯店)、蘭科保種中心、仙湖植物園會場，約百家相關參展廠商的展示會場，還有開放給民眾的植物科學繪圖展場，突破歷屆國際植物學大會”量”的紀錄。

依規劃 7 月 19 日抵達深圳，參加 20-22 日的衛星會議、報到及參加會前美國院士 Peter Raven 的演講。23-29 日參與國際植物學研討會及論文海報發表，7 月 30 日-8 月 1 日參訪仙湖植物園和蘭科植物保種中心，以及廣州中科院華南植物所標本館，8 月 2 日返台。

依出席會議的議題重點及大會議程進行的過程，整理如下：

一、出席第 19 屆國際植物學會研討會論文海報發表兩篇

本屆大會由大陸深圳主辦，網路報名資料選項僅 Taiwan, China。因應方法在論文主題及通訊地址呈現並強調“Taiwan, R.O.C.”，成功展現在大會摘要第二冊第 112 頁和第 472 頁，第 472 頁，也宣導國際學者正視國籍的存在與正確性。

(一) 論文主題 1-「Ecological significance of phenology and functional traits of mistletoes in Taiwan, R. O. C」大會論文摘要第二冊第 112~113 頁

1.論文摘要集發表

dated back to some 69.77 million years ago (Mya; 95% HPD = 61.28-78.33 Mya). And the divergence time within Rosoideae was dated from10.42 to 40.02 million years (Mya; 4.73-59.08 Mya), which formed the six lineages (Potentilleae crown 45.02 (Mya, 95% HPD =38.39-50.12 Mya); Courieae crown 44.94 (Mya, 95% HPD = 28.50-59.08 Mya);Sanguisorbeae crown 40.63 (Mya; HPD = 30.42-49.16 Mya); Rubeae crown 18.37 (Mya; HPD = 9.02-32.3 Mya); Filipendulcae crown 13.47 (Mya; HPD = 5.07-26.32 Mya); Roseae crown 10.42 (Mya; 95% HPD = 4.73-19.74 Mya)). The subfamily is probably of North American origin but thrives in north hemisphere, especially in Asia.

T2

P0314

The complete chloroplast genome sequence of Five *Smilax* species (*Nemexia*): Comparative analysis, highly divergent regions and phylogenetic relationships

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2. Department of Botany, University of Wisconsin, Madison, Wisconsin 53706, USA

Smilax, the only genus in the greenbrier family (Smilacaceae), contains > 200 species of mostly woody climbers around the world. However, a clade of *Smilax* [sect. *Nemexia* (Raf.) A. DC.] are annual understory herbs with a unique eastern Asia (EA)-western North America (WNA)-eastern North America (ENA) disjunct pattern (two, one and eight species in these three areas, respectively). Previous studies revealed a sister relationship between Asian clade (*S. nipponica* + *S. riparia*) and North American clade (WNA *S. jamesii* + ENA clade), but failed to resolve the phylogenetic relationships within the eastern North American herbaceous *Smilax*. In order to reconstruct the relationships among them, here we report five complete chloroplast (cp) genomes of herbaceous *Smilax* (*S. nipponica, S. jamesii, S. herbacea, S. hugeri and S. biltmoreana*). The cp genomes of *Smilax* range from 157,049 bp to 157,656 bp in length, all including a pair of inverted repeats (IRa and IRb) separated by the large single-copy (LSC) and small single-copy (SSC) regions. The genomic comparison showed some differences located in the genomes, and IRs regions were more conservative than LSC/SSC regions. Phylogenomic analyses based on these complete cp genomes strongly support a topology of (*S. nipponica*, (*S. jamesii*, (*S. herbacea*, (*S. hugeri*, *S. biltmoreana*)))). Our findings proved the feasibility of employing cp genomes to infer phylogenetic relationships among closely related species. Besides, eight DNA markers (*psaC–ndhE*, *ndhC–trnV*, *ndhG–ndhI*, *ydf1* intron, *accD–psaI*, *ccsA–ndhD*, *petA–psbJ*, *atpI–rps2*) with number of variable sites greater than 1.0% were identified, and these may be useful for future population genetic and phylogeographic studies.

T2

P0315

Taxonomy of *Plagiochila* in China

Xiafang Cheng

East China Normal University

Plagiochila (Dumort.) Dumort. is one of the largest genera of liverworts and its diversity centers are in Southeast Asia and the Neotropics. It currently contains ca. 700 species in the world, and 80 species occur in China. Molecular studies in recent years have led to new insights into the sectional classification and distribution of *Plagiochila*. Contrary to earlier recognition, many sections are proved to have intercontinental ranges, resulting in the synonyms of some sections. *Plagiochila* are now divided into 29 sections according to recent morphological and phylogenetic analyses, in which 12 sections occur in China. However, there are only 23 Chinese species being included in former molecular studies, which may cause unreasonable sectional classification. Here we conducted phylogenetic analyses of a dataset comprising nrITS and two chloroplast markers (*rps*4, *rbc*L) from 150 species with 57 Chinese species. Combination with the morphological evidence, the results proposed a natural classification of sectional belongings of *Plagiochilla* in China, and suggested several new sections and reinstatements of some synonymized sections in this study.

T2

P0316

Ecological significance of phenology and functional traits of mistletoes in Taiwan, R. O. C.

Shau-Ting Chiu

Division of Biology, National Museum of Natural Science

Most of mistletoes in Taiwan, including 4 genera about 17 species, are dispersed by flowerpeckers and related birds. The phenology of the mistletoes are mutually affected due to the close relationship between the dispersal of mistletoes and the diet of flowerpeckers. For example, *Taxillus tsaii* S.-T. Chiu at low altitude flowers from March to July and bears fruits from June to November. Its major dispersal agent is *Dicaeum concolor* and, in a short season, *D. ignipectus* also participate in dispersal. Certain species at middle elevation, such as *T. rhododendricolus* (Hayata) Danscer., flowers from August to October and bears fruits from October to December. The foraging of their major dispersal agent, *D. ignipectus,* seemed to make for each other with concorde rhythm. In comparison, some seeds contained early emerging seedling when seed dispersal for aggressive invasion to guaranteed effective establishment on host plants. It suggests that the phenoloty, the dispersal and the seed germination in the life cycle of mistletoes are diverse because they have adapted to the different ecosystems with varying temperatures and lengths of the growing seasons. Not only are the phenology and the distribution of the mistletoes in Taiwan highly diversifies, but the hosts species the hosts are also highly varied, ranging from gymnosperms, angiosperms, trees, shrubs and lianas, to even other mistletoes as examples of hyperparasitism. The highest species diversity in Taiwan so far is 4 species per acre and 4 species per host individual. Further investigation may reveal an even higher diversity; especially, functional traits for ecological performance. Establishing morpho-physiophenological traits which impact fitness indirectly via their effects on growth, reproduction and survival, the three components of individual performance can become the foundation of ecological forensics. This study would initiate leaf functional traits about foliar mistletoes along altitudinal gradients for selected habitats. Carrying on the standard protocol of leaf functional traits can input, provide and

accumulate long-term ecological forensics data. Mistletoes which grew in distinct micro-environment and included different host functional groups living different habitat, showed varied combination of leaf traits and phenology for the strategy of fitness. It would carry on the important mission of long-term monitoring and also provide renewal conservation information for Botanical Garden's and National Park's management and long-term ecological research in conservation.

T2
P0317

Several molecular markers of chloroplast and nuclear genome reveal the origin and genetic structure of wild *P. yedoensis* (Rosaceae), endemic to Jeju Island, Korea

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2. National Institute of Forest Science, Warm-Temperate and Subtropical Forest Research Center, Seogwipo, Jeju-do, Korea
3. Jeju Biological Resources Co., Ltd., Jeju, Jeju-do, Korea

Wild flowering cherry of *Prunus yedoensis* (Rosaceae), naturally occurring on Jeju Island, Korea, has been suggested as of natural hybrid origin from two sympatric *Prunus* lineages on Jeju Island. However, its taxonomic distinctiveness from widely cultivated *P.* ×*yedoensis* 'Somei-yoshino' remains as highly controversial and enigmatic. This study aims to establish the taxonomic identity of wild *P. yedoensis* by clarifying the phylogenetic relationships among species of *Prunus* as well as to determine genetic structure of wild *P. yedoensis*. We took molecular phylogenetic and nuclear SSR genotyping approaches based on extensive sampling of both wild and cultivated *Prunus* species in Japan, Russia and Korea, including putative parental species. The phylogenetic relationships were elucidated based on nuclear (ITS, G3pdh, POLA1, and several RosCOS putative single copy genes) and chloroplast genome (7 noncoding regions and whole cp genome for two accessions). The cpDNA and nrDNA phylogeny strongly supported the previous study that wild *P. yedoensis* in Jeju Island is of hybrid origin with maternal parent of *P. spachiana* f. *ascencens* and precisely undetermined paternal parent from *P. serrulata* and/or *P. sargentii* complex. The cpDNA haplotype network suggested independent geographical contribution to the origin of wild and cultivated *P. yedoensis* in Jeju Island and Japan, respectively, which was reconfirmed by nrDNA phylogenetic analyses by ITS, POLA1, and RosCOS single copy genes. Several nuclear loci further indicated independent origin of wild and cultivated *P. yedoensis*. Nuclear SSR genotyping based on 83 individuals of wild *P. yedoensis* and 12 of *P.* ×*yedoensis* 'Somei-yoshino', revealed two genetic groups, corresponding to wild and cultivated *P. yedoensis*. Totally 171 alleles were found at 12 loci, ranging from 6 to 24 alleles per locus, and the population of wild *P. yedoensis* demonstrated much higher numbers of alleles (mean 13.222) comparing to the cultivated *P.* ×*yedoensis* 'Somei-yoshino' (mean 1.778). Of 83 presumably wild individuals, we found misidentified individuals (2), admixture (9) and unknown genetic contribution (3). We also found significantly higher genetic diversity in wild *P. yedoensis* in Jeju Island than in cultivated one. This study further corroborates our earlier finding that wild *P. yedoensis* in Jeju Island is a distinct taxonomic entity from cultivated *P.* ×*yedoesnsis* 'Somei-yoshino'. The evidence of gene flow between wild *P. yedoensis* and cultivated *P.* ×*yedoensis* 'Somei-yoshino' is also detected.

T2
P0318

Phylogenetic relationships of *Pyrrosia* species (Polypodiaceae) inferred from nuclear and chloroplast DNA sequences

Tae Young Choi, *Chong-Wook Park*
Seoul National University, School of Biological Sciences

The genus *Pyrrosia* Mirb. (Polypodiaceae) comprises about 50 species. Most species within the genus are highly variable in morphology, resulting in taxonomic confusion in determining the boundaries and relationships of the species. We analyzed nrDNA *pgi*C region and cpDNA *rbc*L gene, *trn*L– *trn*F IGS, *atp*F –*atp*H IGS sequences from 31 taxa of the genus *Pyrrosia* to elucidate their phylogenetic relationships, and to investigate the parentage of putative hybrid taxa. Maximum parsimony and Baycsian inference analyses of the nrDNA and cpDNA sequence data showed three major clades: 1) a clade containing widespread *P. porosa* and the east Asian species, 2) a clade containing *P. lingua* and species found primarily in southeast Asia, 3) a clade consisting of *P. stigmosa* and *P. costata*. These groupings, however, appear to be incongruent with the traditional infrageneric classification scheme based on blade shape and spore morphology.

T2
P0319

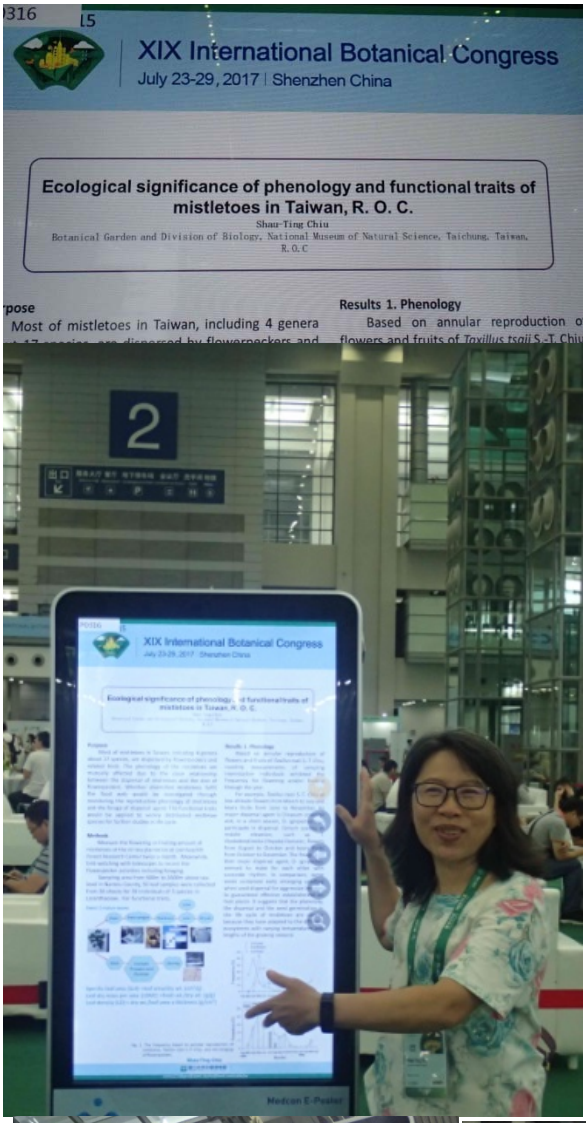
Understanding the diversification of *Eriocaulon* L. in South Asia using molecular phylogenetic approach

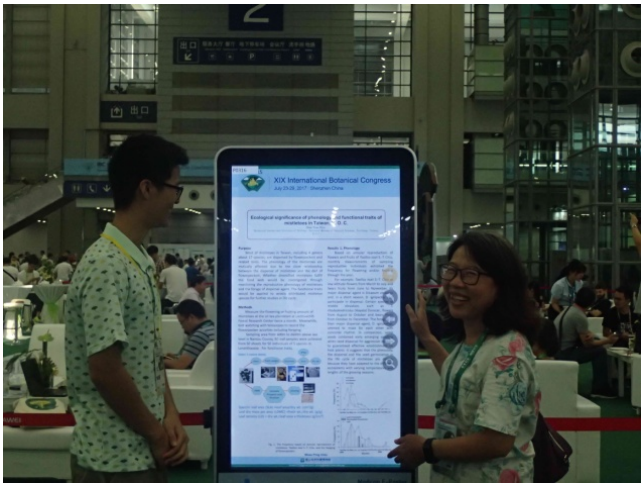
Ashwini Mukund Darshetkar[1], *Mandar Nilkanth Datar*[1], *Shubhada Ajit Tamhankar*[1], *Joongku Lee*[2], ***Ritesh Kumar Choudhary***[1]
1. Agharkar Research Institute
2. Chungnam National University

The genus *Eriocaulon* is distributed throughout tropical and subtropical regions of both hemispheres and has more than 525 taxa; about 485 species and more than 40 infra-specific taxa. South Asia harbors almost one fourth of the Eriocaulon diversity, having ca. 100 species. With its rich concentration in Asia, Africa and S America, the genus is known for its high intraspecific variability combined with the limited interspecific differences; producing big challenge to the classical taxonomists to properly identify/characterize/delimit them. Present study is a pioneer attempt to understand the diversification of *Eriocaulon* in South Asia using molecular phylogenetic approach. Further, attempts have been made to understand the pattern of morphological character evolution and phylo-geographic distribution which is an important adjunct to the molecular phylogeny of this genus. Using morphological as well as the nrDNA and cpDNA sequence data, this study has resulted in (i) unravelling the species relationships within this genus, (ii) tracing the geographic distribution pattern with special reference to the endemic and rare species, (iii) elucidating morphological character evolution in the genus (iv) testing the congruence of morphological and molecular data in systematic and phylogenetic assessment, and (v) development of possible DNA barcode of the

2.電子海報發表：

成功展現“Taiwan, R.O.C.” 在論文主題及通訊地址，並強調本館單位名稱 National Museum of Natural Science，中的“國立”呈現。





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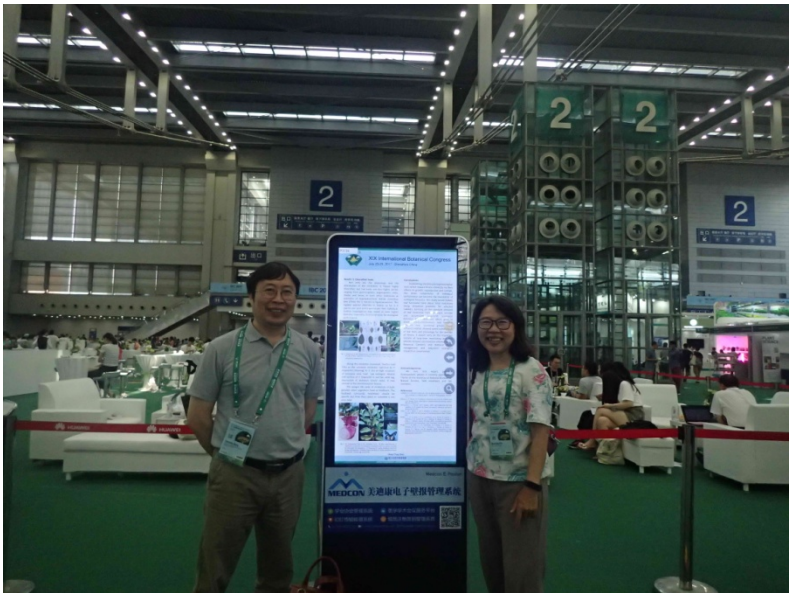

(二) 論文主題 2-「Studies of leaf functional traits and foliar vasculature for montane and subalpine woody plants of Yushan National Park in Taiwan, R. O. C 」大會論文摘要第二冊第 472 頁

1.論文摘要集發表

T6

P1334

Biological characteristics and propogative technique of *Euonymus Grandiflorus*

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1. Beijing Botanical Garden

2. Beijing Floriculture Engineering Technology Research Centre

Euonymus grandiflorus is small arbor of *Euonymus* L. in Celastraceae, which is distributed mainly in northwest and southwest area of China. *Euonymus grandiflorus* with better resistance, bright-colored and longtime autumn leaves is optimum color-leafed plant while seldom applied in urban landscape. Biological characteristics of *Euonymus grandiflorus* had been observed. The result showed that phenological periods including sprouted stage and leaf expansion stage of *Euonymus grandiflorus* in different years had the difference, while blooming stage and leaf color change were similar, early blooming stage was in the middle of June, late blooming stage was in the middle of July, the whole flower period lasted nearly one month; leaf color change started on 10th October, defoliation stage was close to late November, leaf color period from early October to late November reached more than 50 days, during that period the leaf cholorophyll content decreased while anthocyanin content rised sharply, which caused the bright amaranthine leaf. The ornamental value of *Euonymus grandiflorus* was much better than other color-leafed plants. The different methods of propogation, including sowing seeds from different provenances, cutting, grafting and tissue culture at different time were tested. The optimum way of rapid propogation on *Euonymus grandiflorus* in Beijing area was grafting before branch burgeoning in spring, stock should be 2 or 3 years old seedling of *Euonymus bungei* and scion should be one year old healthy branches of *Euonymus grandiflorus*. Cultivation technique and application of *Euonymus grandiflorus* in Beijing area were studied and discussed. The conclusion indicated that *Euonymus grandiflorus* was suitable to grow in the place with full sunlight, well-drained and loosen soil. It was better to apply *Euonymus grandiflorus* in block or group planting methods, matched with tall color-leafed arbors, evergreen trees and some low color-leafed shrubs in order to increase landscape level, enrich landscape color and extend the ornamental period.

T6

P1335

Studies of leaf functional traits and foliar vasculature for montane and subalpine woody plants of Yushan National Park in Taiwan, R. O. C.

Shau-Ting Chiu[1], *Wei Cheng*[2]

1. Botanical Garden and Division of Biology, National Museum of Natural Science, Taichung, Taiwan, R.O.C.

2. Department of Biology, National Chung Hsing University

"Functional traits" capture fundamental tradeoffs that determine species' ecological roles. Establishing morpho-physiophenological traits which impact fitness indirectly via their effects on growth, reproduction and survival, the three components of individual performance can become the foundation of ecological forensics. This study initiated leaf functional traits about Ericaceae in Nanhsi area along altitudinal gradients from Nanhsi Forest Dynamics Plot (Nanhsi FDP) to the subalpine Mount. Yushan. Carrying on the standard protocol of leaf functional traits can input, provide and accumulate long-term ecological forensics data and renewal conservation information for National Park's management and long-term ecological research. Sampling area from 1,800 m to 3,900 m above sea level in Nanhsi area, 1,210 leaf samples were collected from 242 shoots for 178 individuals of 9 species and 5 genera in Ericaceae. Laminar density of the sampling rhododendrons was usually low toward the high altitude. Leaf dry matter content (LDMA) of most rhododendrons was between 0.3 and 0.5. Only those LDMA values of *Gaultheria itoana* Hayata and *Vaccinium randaiense* Hayata increased along their enlarging leaf areas. Leaf thickness inclined along the LDMA but declined in specific leaf area (SLA), except *Lyonia ovalifolia* (Wall.) Drude. The smallest closed areoles in leaf vasculature occurred in *Rhododendron morii* Hayata and the largest ones occurred in *R. rubropilosum* Hayata. Short terminal veins with obvious bundle sheath of *R. morii* displayed probably the C4 photosynthetic pathway. On the contrary, the bundle sheath of *R. rubropilosum* was not dominant. Results are the first time to show the leaf functional traits applied to the same rhododendron species in different habitats, sun- or shade-leaves of the same individuals and the adaptation to special montane ecosystem. Nanhsi FDP with the largest plot area at the middle elevation of Taiwan had diversed of plant functional groups, including *Castanopsis carlesii - Machilus japonica* evergreen and *Alnus formosana* deciduous broad-leaved forests. Among leaf traits of four functional groups of leaf habits and growth forms, the LCC of tree growth form was significantly higher than that of shrub. Evergreen trees had the highest LDMC and LD. However, deciduous shrubs had the lowest. Deciduous trees had higher LNC, SLA and lower C:N than evergreen trees. Temperature, humidity, illuminance, and canopy openness were significantly different between deciduous forest and evergreen broad-leaved forest. LNC, C:N and LDMC significantly correlated with canopy openness. Although the elevation was the most identical environmental factors for species distribution and leaf functional traits by canonical correspondence analysis and redundancy analysis, the elevation actually reflected microclimate trend of the temperature gradient. Microclimate effect was indeed the key environmental factors. Due to leaf lifespan, leaf size, vein density and other leaf traits of different species had different invested proportion between the main and the fine veins. Leaf functional traits reflected varied plant survival strategy for adaptation. Deciduous and evergreen broad-leaved forests with different species composition display that the main effect on leaf functional traits was at the species level. The varied plant community implied the habitats of fitness that had close interaction with leaf functional traits. It would fulfill the important mission of long-term monitoring and also shows the efforts and contribution of Botanical Garden and National Park in conservation.

T6

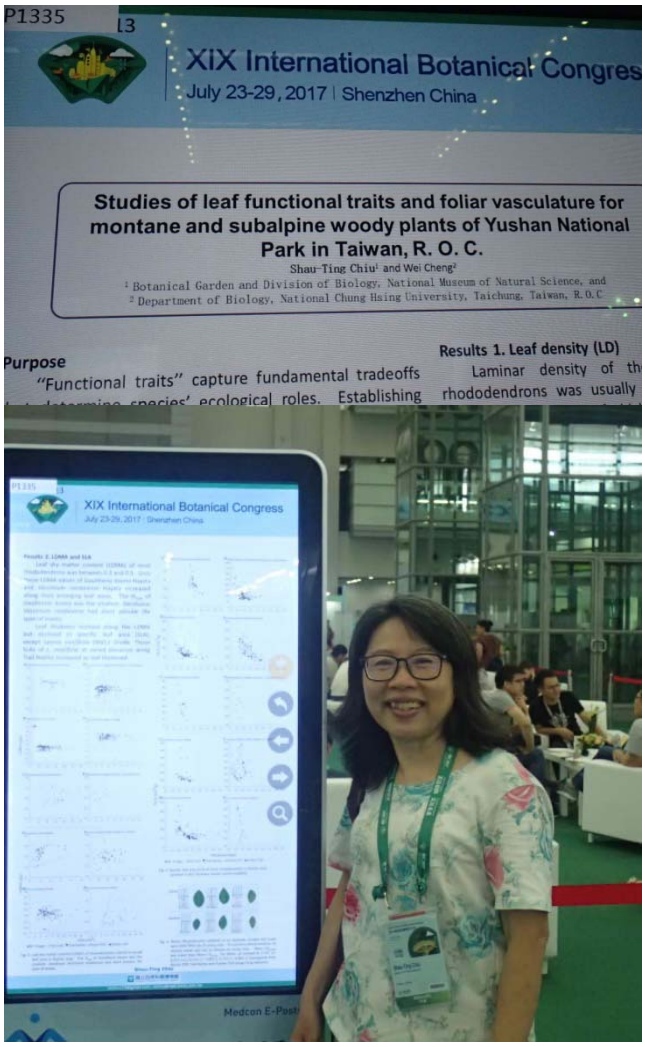
P1336

Searching for the *Podaxis* fungus on the trails of early explorers in Southern Africa with the help of rural communities

Zw De Beer[1], *B Conlon*[2], *Hh De Fine Licht*[3], *Sme Vreeburg*[4], *Dk Aanen*[4], *M Poulsen*[5]

2.電子海報發表：

再次成功展現“Taiwan, R.O.C.” 在論文主題及通訊地址，並強調本館單位名稱 National Museum of Natural Science，中的“國立”呈現。



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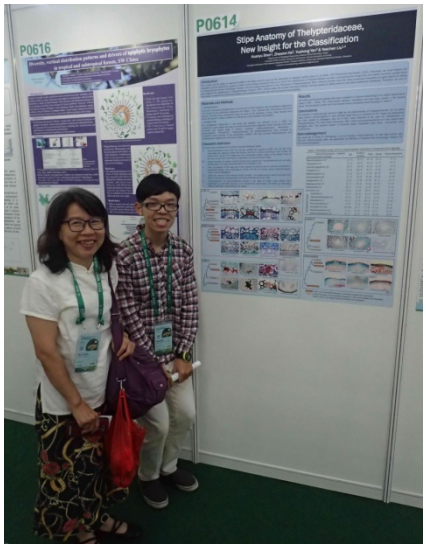
中科院華南植物所標本館館長張奠湘聽講海報

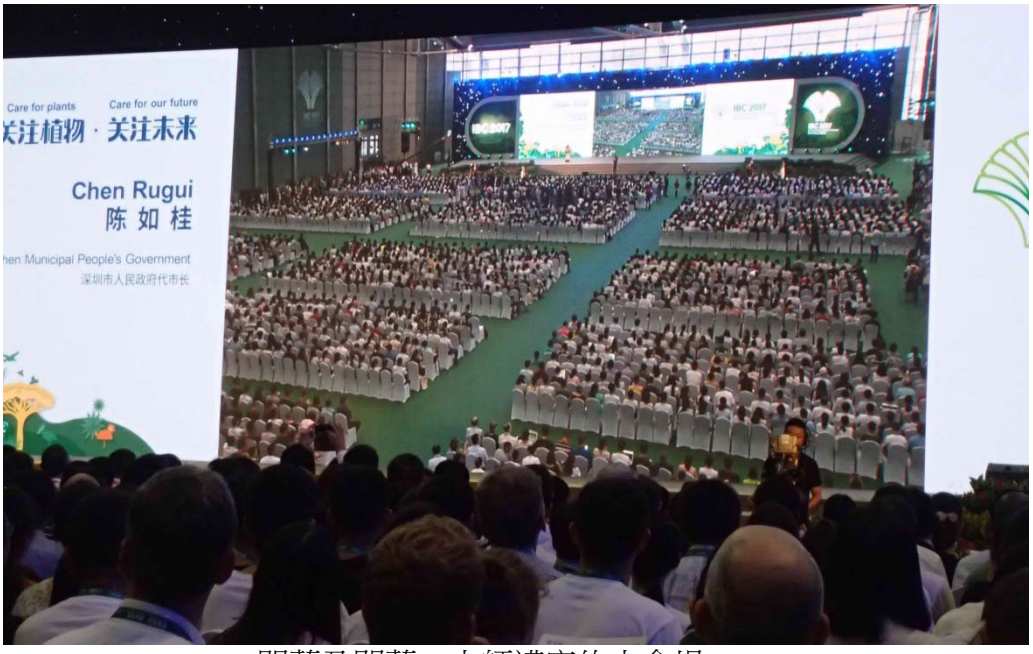
(三) 海報論文研習

提攜臺灣研究生在國際研討會中表現，也是學界重要的傳承。巧遇非常認真的嘉義大學研究生，發表主題 Stipe anatomy of Thelypteridaceae, new insight for the classification，達國際水準，已在準備發表國際期刊中。



二、第 19 屆國際植物學研討會議題及重要內容

來自全球受邀的 51 位植物學研究領域的頂尖及科學家，針對一系列植物相關主題剖析，來自 6 大洲 100 多個國家的與會學者，也針對重要議題交流思想、開展合作，進行一場國際科學交流的盛宴。



開幕及閉幕、大師講座的大會場

關注植物關注未來是本屆大會的主要標題，International Botanical Congress 歷經百年的時光，是植物學界最為專業而悠久的科學大會之一，終於來到東方古老的中國，也是年輕奮發的城市-深圳，勇於擔當注重綠色發展、生物多樣性保護等的策略。整個大會的定調都是環繞 Uniting plant sciences and society to build a green, sustainable earth~鍊接植物科學與社會共建綠色永續地球的重點，提出六大議題與植物科學宣言，整理如下:

(一)植物科學深圳宣言

因應未來世界的變化，期許全球植物學家與不斷演變的社會之間建立更緊密的聯繫，開展共建永續發展的綠色地球，因此號召 7 大優先領域：

1. To become To become responsible scientists and research communities who pursue plant sciences in the context of a changing world.
   為了應對變化和挑戰，植物科學研究者要向負責任的科學家和研究群體轉型。
2. To enhance support for the plant sciences to achieve global sustainability.
   為了實現全球可持續發展，要進一步強化對植物科學的支持。
3. To cooperate and integrate across nations and regions and to work together across disciplines and cultures to address common goals.
   為了我們共同的目標，要加強跨國家和跨區域合作、加強跨學科和跨文化合作。
4. To build and use new technologies and big data platforms to increase exploration and understanding of nature.為了增鏡對自然的探索和理解，要

建立和應用新科技以及大數據平台。

5. To accelerate the inventory of life on Earth for the wise use of nature and the benefit of humankind.
   為了明智地利用自然、為了人類的福祉，要加快地球生命的清查編目研究。
6. To value, document, and protect indigenous, traditional, and local knowledge about plants and nature.
   為了保護生物多樣性，我們要重視、記載、保護關於在地的植物和自然的知識。
7. To engage the power of the public with the power of plants through greater participation and outreach, innovative education, and citizen science.
   為了形成和立，我們要鼓勵公眾參與、廣泛開展創新教育和共眾科學活動。

雖然 7 大優先考量都是重要的、急迫的，與前兩屆的大會議題，最大差異是更強調與當地社會的整合呼籲，可見打破學術研究與社會融和的界線越來越急迫。

(二) 六大植物科學主題與研討會重要內容

植物科學六大主題，Theme (Symposium numbers)

1: Biodiversity, Resources & Conservation (T1-01~T1-38)
2: Taxonomy, Phylogenetics & Evolution (T2-01~T2-68)
3: Ecology, Environment & Global Change (T3-01~T3-26)
4: Development & Physiology (T4-01~T4-39)
5: Genetics, Genomics & Bioinformatics (T5-01~T5-33)
6: Plants & Society (T6-01~T6-15)

本屆大會特別表彰國際恩格勒獎項和深圳國際植物學獎，鼓勵致力於植物學貢獻卓越的節初學者。

IAPT's medals

In 1986 International Association for Plant Taxonomy (IAPT) established two Engler medals: the Engler Medal in Gold awarded every six years for outstanding lifetime contributions to plant taxonomy and presented since 1987 at each International Botanical Congress (IBC), and the Engler Medal in Silver awarded from 1987 to 2001 for a monograph or other work in systematic botany and presented from 1990 to 2002 at various meetings, congresses, symposia.

In 2002 the Engler Medal in Silver sensu lato was divided into three awards for outstanding publications in these areas: the Engler Medal in Silver (medal sensu stricto) awarded for monographic or floristic plant systematics; the Stafleu Medal awarded for historical, bibliographic, and/or nomenclatural aspects of plant systematics; and the Stebbins Medal awarded for phylogenetic plant systematics and/or plant evolution.

IBC 2017 Congress Secretariat

恩格勒奖

1986年，国际植物分类学协会设立了两项恩格勒奖：恩格勒金奖与恩格勒银奖。自1987年开始，恩格勒金奖每六年评选一次，用于表彰对植物分类学做出杰出贡献的植物学家，并于每届国际植物学大会期间公布。

国际植物分类学协会在1987-2001年间将恩格勒银奖授予对系统植物学专著或其它著作做出突出贡献的学者，并于1990-2001年间在各种大会、会议、研讨会等颁发。自2002年起，该奖项被授予在以下三个方面做出突出贡献的学者：专著或区系植物系统学；植物系统学的历史文献、书目和／或命名方面的工作；以及植物系统学和／或植物进化。

Shenzhen Intl. Award in Plant Sciences

The Shenzhen International Award in Plant Sciences was initiated by the Organizing Committee of the XIX International Botanical Congress (IBC 2017). The award was jointly established by the Botanical Society of China, the Botanical Society of Shenzhen and Shenzhen Tech and Ecology and Environment Co., Ltd. The purpose of the Shenzhen Award is to promote the development of the plant sciences and the implementation of the seven priorities of the Shenzhen Declaration on Plant Sciences. The Shenzhen Award is intended to recognize scientists who have conducted breakthrough research in both basic and applied plant sciences and whose outstanding contributions have impacted our understanding of the plant world.

The Shenzhen Award will be presented to one plant scientist at IBC 2017. In future congresses, the award will be announced and presented to the laureate in the closing session or at the award ceremony held later in Shenzhen. The award consists a trophy, a certificate, a monetary prize of 700,000 RMB, and travel expenses to the award ceremony. The Tech and Ecology Foundation provides financial support for the award.

The Shenzhen Award committee encourages nominations of exceptional scientists who have set a standard of excellence in their field. Anyone who has direct knowledge of outstanding contributions to the plant sciences and is able to provide clear evidence of the lasting impact of the work of an individual may nominate that individual for the award.

A selection committee composed of scholars from China and abroad is responsible for evaluating the nominations based on the information provided in the nomination package. The results of the Selection Committee will be reevaluated by a Standing Committee of the Selection Committee for the final selection of the awardee(s).

奖项简介

深圳国际植物科学奖

深圳国际植物科学奖，简称深圳奖，由第19届国际植物学大会（IBC 2017）组委会发起，中国植物学会、深圳市植物学会和深圳市铁汉生态环境股份有限公司联合设立，旨在促进全球植物科学的发展，推动植物科学深圳宣言7个优先领域行动战略的实施。深圳奖将授予在基础和应用植物科学领域取得突破性成果，以及在改变人类对植物世界认知方面产生深远影响的科技工作者。

在第19届国际植物学大会上，深圳奖将颁发给一位获奖者。此后，深圳奖将在每届国际植物学大会的闭幕式宣布并颁奖，或在深圳举行的颁奖典礼上颁奖。奖项包括奖杯、证书、70万元人民币的奖金和获奖者往返颁奖典礼的旅费。本奖项基金来源于深圳市铁汉生态公益基金会的赞助。

深圳奖旨在奖励在植物科学领域做出突出贡献的科学家。任何了解被提名人对植物科学的贡献并可以提供被提名人业绩的证明材料的个人都可以参与提名。

由中国和国际学者组成的评选委员会负责对被提名人的提名推荐材料进行初评，产生获奖候选人名单并提交常务委员会对获奖者进行终评。

我们诚挚地希望深圳国际植物科学奖成为推动科学发展的重要科学奖项。

1.大師講座(plenary lectures)

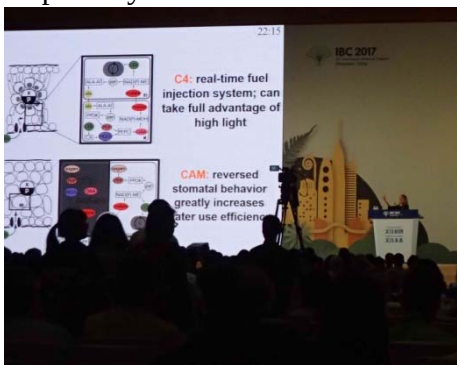
(1) Peter H. RAVEN~ Saving Plants to Save Ourselves: The Shenzhen Declaration 美國院士，終其一生致力於建置多樣性綠色地球，也是深圳宣言的公眾議題主講大師

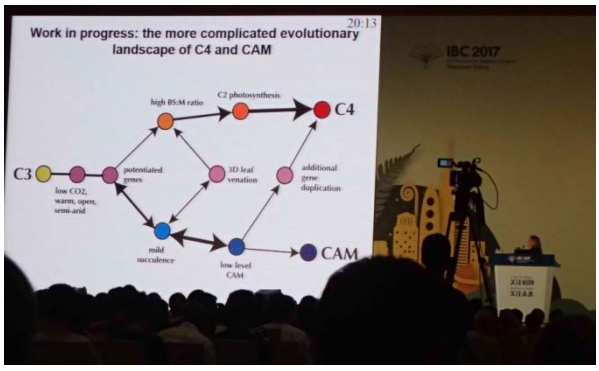
Peter H. RAVEN 開幕式頂級貴賓

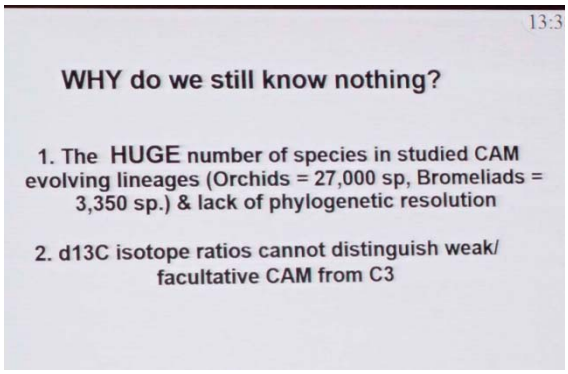
(2) Barbara SCHAAL~ Plants and People: History and Future 也是美國院士，由族群分子遺傳探索及了解植物與環境變遷、人類文明影響的自然史，以古為鏡，共創共榮的願景。

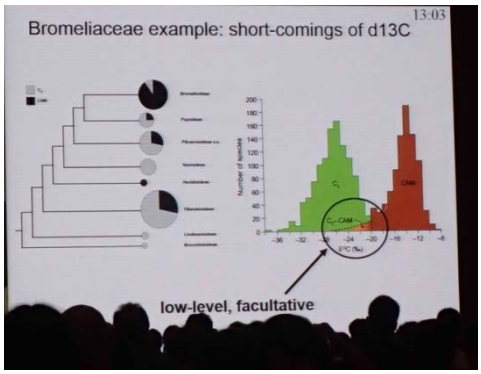
巧遇和善的 Barbara SCHAAL(右)合照

(3) Erika EDWARDS~ Distinct evolutionary dynamics of C4 and CAM photosynthesis









光合作用固碳演化 C3、C4、CAM 等研究，大量的資訊及演算分子數據，須有大師集的整合、鑑識與詮釋，給予新的觀點及繼續探索的動力。研究整合內容精彩有深度。

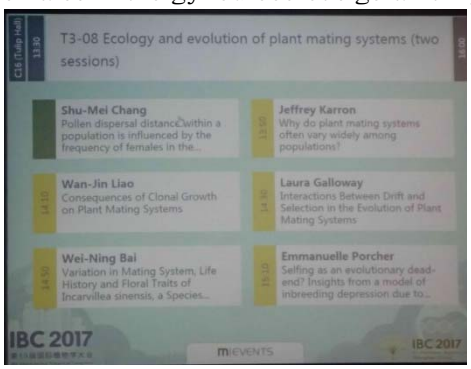
(4) John KRESS~Tropical Plant-Animal Interactions: Coevolution in the Anthropocene

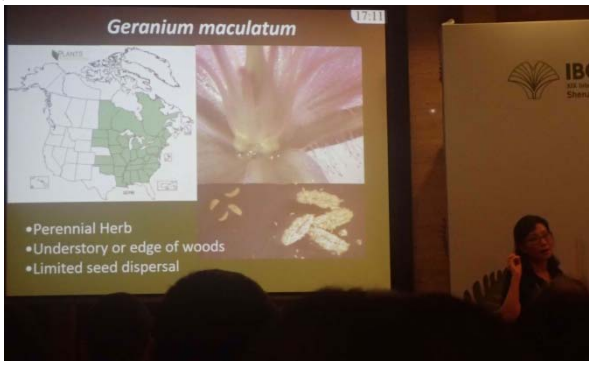
探索昆蟲與植物的共同演化相當久遠，越來越多的跨領域研究已經突顯專業的整合與剖析的重要性。本屆大會邀請的講員幾乎都是引介這類型的專家，意味著未來的科學研究不僅在各領域的鑽研，還須跨領域的整合，才能凸顯全方位的專業研究。

2.主題演講 (general symposium)

聽講了 T1-32: Traditional medicinal plants 藥用植物的口頭報告，江友中教授口頭報告 Comparative transcriptome of Gastrodia elata in response to fungus symbiosis and genomic divergence in saprophytic Gastrodia，運用分子技術在藥用植物上的鑑別研究，超越其他學者的傳統做法。

T3-08:Ecology and evolution of plant mating systems 精彩豐富的傳粉和繁殖研究，講員也有來自台大在美國任教的 Shumei Chang(University of Georgia)Pollen dispersal distance within a population is influenced by the frequency of females in the gynodioecious geranium, Geranium maculatum.





T3-08 組:Shumei Chang (University of Georgia)

另外也出席了 T1-28:The biology of mycoheterotrophic plants 與真菌共存異營植物的演講，自然仿生植物的研究T2-07: Mimicry in plants，寄生植物的生態與演化 T2-39:Ecology and evolution of parasitic plants，傳粉生物學相關的演講 T2-55: Neuro-pollination Biology。也有與都會、人類文化相關的 T6-15:Species richness of the pan-tropical genus Begonia and its conservation challenges at Internet Age 秋海棠保育相關研究，以及永續未來的植物園挑戰 T6-12:Challenges of botanic gardens for a sustainable future，非常多有趣且重要的主題，簡直分身乏術。

還有幾個衛星會議的主題也是令人心動，只能權衡挑選集中精闢研究和凸顯主題的分組會議。這也是本屆大會某些研究重疊重複，未經仔細評估整合的結果，太多並進的流行研究，也忽視了部分重要零星的類群，也顯現當代植物學發展趨勢，已不像以往的經典，但資訊豐富的 21 世紀，同型研究的競爭更趨炙熱化，未來科學人才的培育和頂尖研究的發展，似乎也在迅速轉變中，更需關注大型國際會議的研究議題風向，才不容易在學術的洪流中沒頂。

(三) 衛星會議、植物藝術畫展與相關贊助廠商展示

1. “蘭花基因組學與多樣性保護”衛星會議

ST-20: The Orchid Genomics and Diversity Conservation

此衛星會議包含兩大主題: (1) Orchid Genome Evolution and Biodiversity; (2)The Co-evolution between Orchid and Their Pollinators. The aim of the meeting is to enhance the communication and cooperation between China and international scholars of orchids, and promote the further research of orchids evolution biology, genomic and diversity conservation.議程如下:

由蘭科中心的劉仲健(Zhong-Jian Liu）主任主持，由國家林業局野生動植物保護與自然保護區管理司協辦，賈建生司長代表致詞 (Jian-Sheng Jia, Department Chief of Wildlife Conservation and Nature Reserve Administration, State Forestry Administration, China)

Theme I: The Co-Evolution between Orchid and Their Pollinators

Floral Scents in Orchids-Chemical Dimensions of a Hyper-Diverse Plant Lineage (Robert A. Raguso, Cornell University, USA）

News of the genera: *Phalaenopsis, Phragmipedium and Paphiopedilum* (Olaf Gruss, In der Au 48. 83224 Grassau, Germany）

Inaccurate Color Discrimination by Pollinators Promotes Evolution of Discrete Color Polymorphism in Food-Deceptive Flowers (Kotaro Kagawa,The Swiss Federal Institute of Aquatic Science and Technology）

Foraging Behavior of the Hawkmoth *Manduca sexta* (Markus Knaden, Max Planck Institute for Chemical Ecology, Germany）

Floral Scent Shapes Pollinator-Mediated Selection and Pollination Systems of Orchidaceae Plants (Wu-Fan Zhang, Institute of Botany, CAS）

Theme II: Orchid Genome Evolution and Biodiversity

The Importance of Whole Genome Duplication for (Orchid) Evolution

(Yves Van De Peer, University of Antwerp, Belgium）

From Orchid Genomics to Orchid Phenomics (Wen-Chieh Tsai, Institute of Tropical Plant Sciences, National Cheng Kung University）

Genome Modifications after Polyploidization during Flowering Plant Evolution (Yuan-Nian Jiao, Institute of Botany, CAS）

High-throughput Sequencing Technology Using in Orchidaceae Phylogeny and Population Genetics Research (Guo-Qiang Zhang, Orchid Conservation and Research Center of Shenzhen, China）

Studies on *Dendrobium* Species: Phylogeography, Plastome & Industrialization (Xiao-Yu Ding, Nanjing Normal University, China）

Lack of S-RNase-Based Gametophytic Self-Incompatibility in Orchids Suggests this System Evolved after the Monocot-Eudicot Split (Shan-Ce Niu, Institute of Botany, CAS/ Orchid Conservation and Research Center of Shenzhen, China）

劉仲健(Zhong-Jian Liu）主任主持開幕式及 Kotaro Kagawa 介紹模擬演化機制

2. “植物繁殖器官演化與系統發育”衛星會議 ST-20: Plant Reproductive Organ Evolution & Phylogeny

這是整合古植物、胚胎學及演化的研討會(The aim of the meeting is to enhance the communication and cooperation among Chinese and international colleagues, and promoter the further research of plant reproductive organ evolution and phylogeny.)，遺憾的是幾乎無國際學者在此分組中，儼然像中國人的研討會，討論均可以用中文。

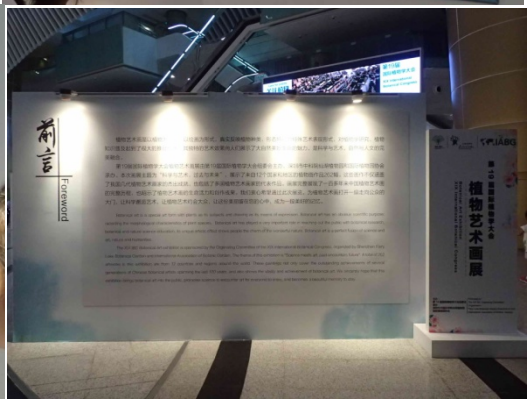
針對退流行的植物學專業，仍然挺立在國際植物學大會中得分組，似乎新興經濟的文明古國，尊重也允許多樣性專業的共存，欣然學習到學界的平衡也很重要。

3. 植物藝術畫展

強調科學繪圖的植物藝術畫展，也是本屆大會展現推廣教育的實力，雖然看過不少中西方藝術家的植物繪圖，尤其中科院植物所、植物園都因科學發表的需求培育著科學繪圖專家，不知有多少精緻的作品只能出現在書籍、植物園畫廊，無法永續地被賞識典藏。

這次集中了百幅大座，場地很大且開放給一般民眾，師生、親子參觀討論，是一個自由生動的大講堂、美術館、科學心靈的交流，很令人感動的場域。

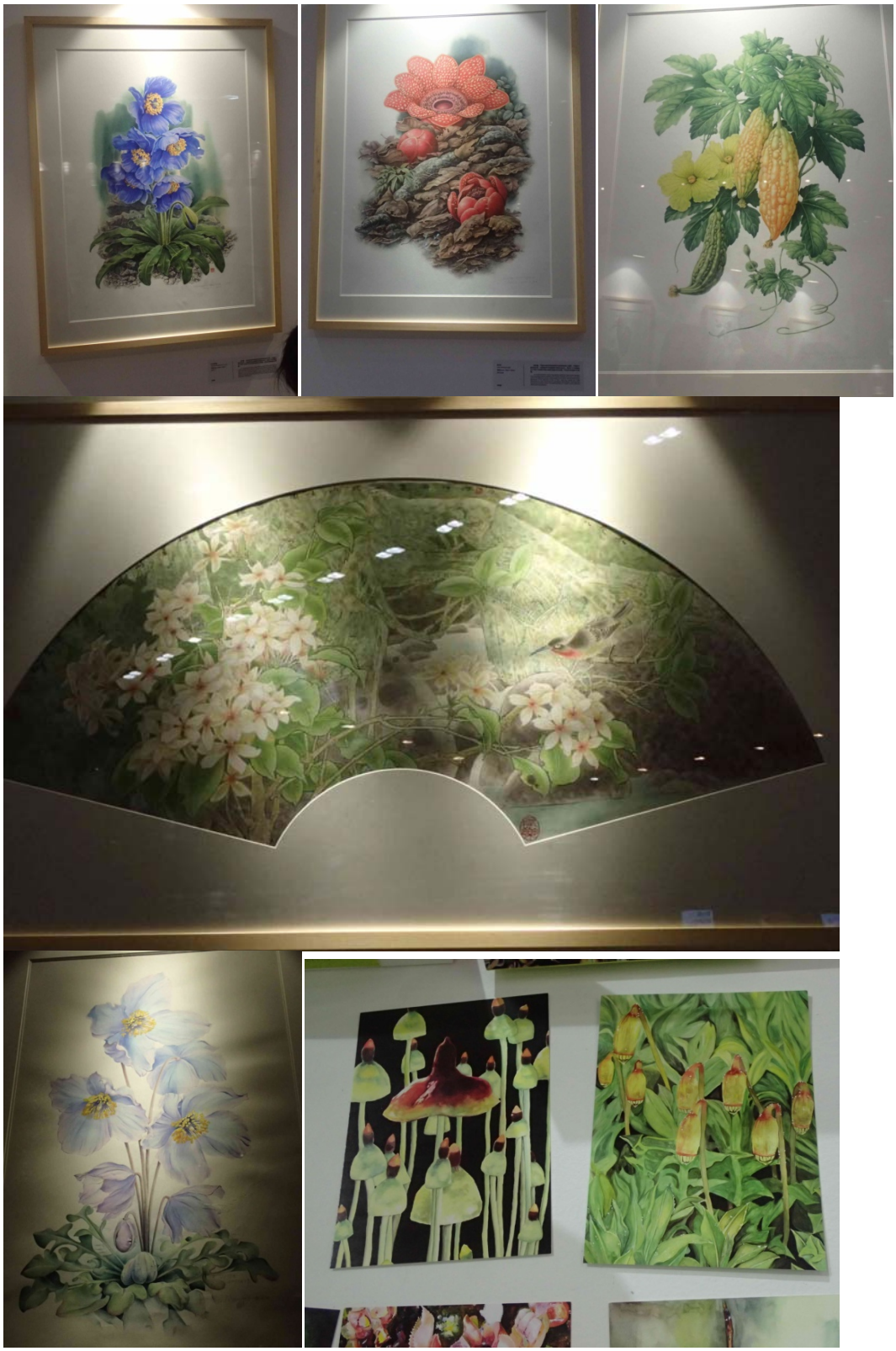




在 Sheraton 大廳設置大型畫展，植物科學繪圖如栩如生，大小朋友都看癡了。




植物科學繪圖有完整的剖析、生態造景、靜物層次，電腦繪圖也是未來趨勢。



以上都是相當傑出被評選的典藏品，右下最後一圖拍自書籍的菇、苔彩繪。

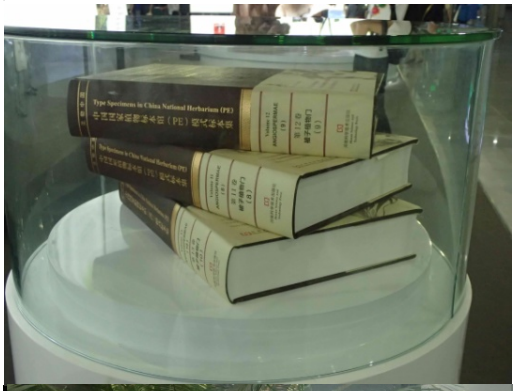
博物館雖也有展演科學繪圖，不過相較於大陸人才濟濟的競爭，這類珍稀文明專業需要機緣，才能永續傳承保留。如何驅動科學和藝術無疆界的自由發揮，應該是教育界值得深思的長遠規劃。

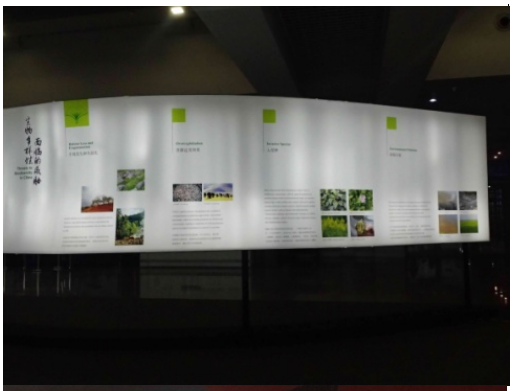
4. **相關贊助廠商展示**

(1) **入口景觀** (贊助廠商)

大會入口維安近乎以機場標準掃描，不僅園藝景觀贊助很美的綠美化，夜晚第二會場 Sheraton 的大樓夜景燈光也打著 IBC 大會標誌。

(2) **展廊多樣性保育展示**



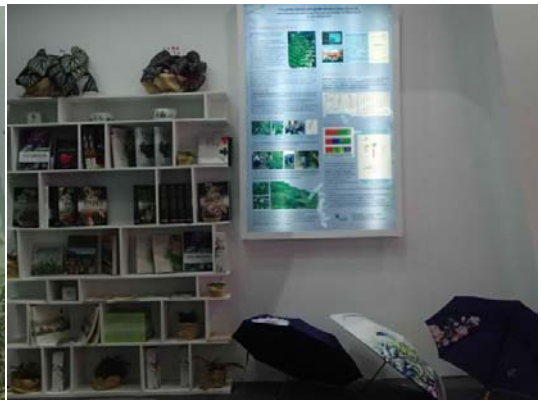


(3) **參展會場**

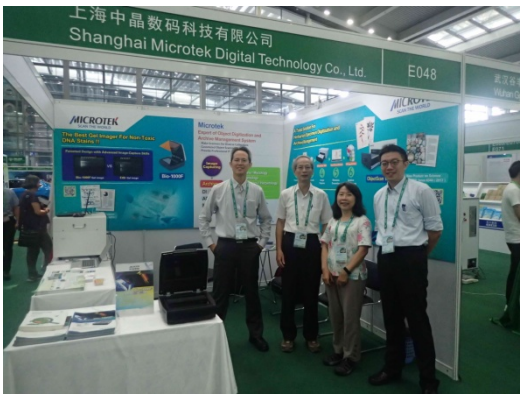
會場的展廊展出多樣性保育成效，植物誌、蘇鐵保育、、、等，最大的誤植是仙湖蘇鐵的學名是 *Cycas taiwaniana*，替台灣打知名度?

探索植物區特設為推廣教育展示，也是安親的好地方，只可惜沒有保母?


蘭科保種中心的展示設計最有美學特色，很亮眼凸顯典雅現代感。


仙湖植物園的周邊產品很多，與中科院昆明研究所的美妝科技產品量產，都是產學成效展現最多的單位。


生技綠革命生機蔬菜和國際註明書商都有展示，產業轉變的混雜似乎不衝突。

臺灣竹科的上海公司展售數碼掃描等器材。

三、參訪考察保種中心、植物園及標本館

(一)蘭科植物保種中心

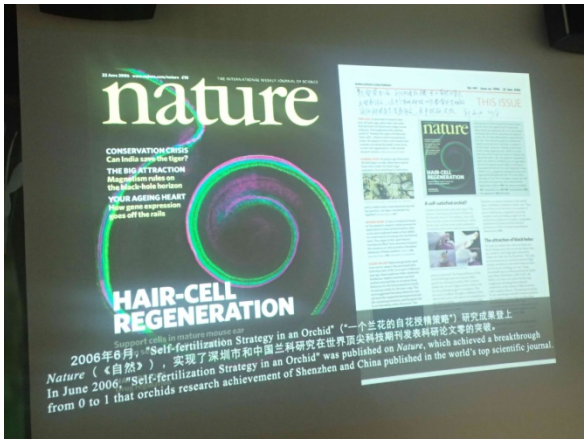
與大會開幕同時啟用的國家蘭科中心科普館，是一個蘭花的自然史博物館，以嶄新手法展現蘭科植物的親緣演化、生物地理、資源運用以及尖端研究，給予非常高的評價。也讓這原本只有苗圃園區的永續經營成效，一覽無遺，相當成功的推陳布新。
(http://news.ifeng.com/a/20170729/51525513_0.shtml#p=1)

1. 科普館

蘭科中心的科普館入口、親緣演化和生物地理的展示

蘭的文化美學、多樣性和世界分布的展示

資源保種與應用，包括園藝和藥用。



保種中心主任經營遠見包含科學研究的競爭力，學術發表和國際合作。

2. 蘭科保種的苗圃溫室園區

國家蘭科中心成立於 2006 年，全名是國家蘭科植物種質資源保護中心，在深圳梧桐山腳下，以種的苗圃園區包含溫室和大面積的雜林，蒐集 2000 多種的原生蘭花，27864 份種質資源樣本，也就是蒐藏近 3 萬份的活體標本。是警備森嚴的種質資源保護中心。

春秋季節蘭花中心一片花海，炎夏是蘭花的淡季，仍然看到不少珍稀蘭花種類，簡介如下:

蘭科中心的種質資源像世外桃源的寶庫，依適合培育棲地種植，尋蘭、夢蘭、品蘭只是園區內的區隔而已，否則在林間小路看似一樣，很容易迷路的。




附生型蘭花




地生型蘭花，包括喜普蘭或稱拖鞋蘭。


連台灣的姬蝴蝶蘭(*Phalaenopsis* equestris)也有蒐藏，以石斛蘭屬的種類最多。


鐵皮石斛(*Dendrobium officinale* Kimura et Migo)是石斛蘭屬中藥妝應用的重要資源。


用果汁機加熟水打碎鐵皮石槲的莖，製作最直接簡易的鐵皮石斛飲

石斛是中華仙草，石斛這種中藥可以養肝護肝、滋陰養顏，生吃在完全洗淨入口細嚼即可，起初味甘而微黏，待到清新爽口，余渣吞咽即可。還可以堡湯、泡茶、熬製藥膏、浸泡藥酒。也可以美食入膳，煮粥、做羹。《神農本草經》記載，鐵皮石斛「久服厚腸胃，輕身延年」，《本草內經》則稱鐵皮石斛「養胃益津，為無上妙品」，並且認為、老人脾胃虛弱，胃液不足

但又不宜進補太寒之物，鐵皮石斛是老人滋養脾胃最佳選擇。
(https://kknews.cc/health/9369mq.html)

(二)仙湖植物園

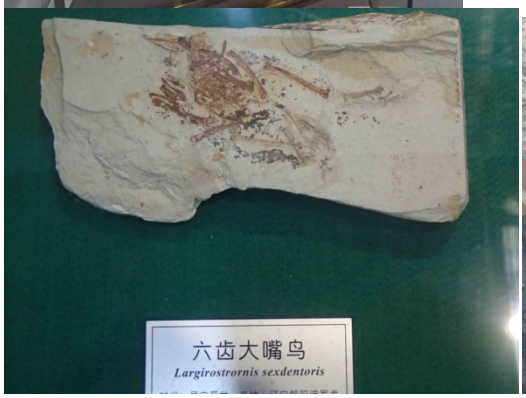
仙湖植物園(http://www.szbg.ac.cn/) 以蘇鐵蒐藏聞名，位在水庫邊的自然保育區，園區非常大，除了蘇鐵、棕梠、裸子植物、水生植物、、、，還有佛寺提供信男善女的靈修，經營管理不容易。

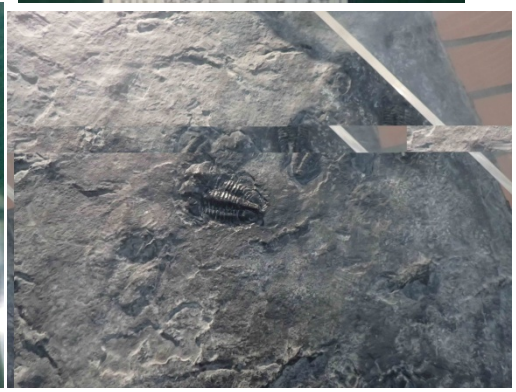
1. 蘇鐵區及蘇鐵演化館

蘇鐵區蒐藏很豐富，壹些書本上才看得到的種類，在此可以目睹比對研習。也因鐵樹此活化石代表祥瑞，因此也有以樹石盆景方式展現。

近年也才蒐集不少遼西化石，以蘇鐵為主的化石館，也放置珍貴同期出土的鳥的祖先~飛天恐龍化石，很豐富有趣的展示。

蘇鐵區蒐集世界多種類群，有的羽裂葉形，與蕨類特性相似，幼葉會卷。





蘇鐵樹石盆景價值匪淺，在這裡好像自然生成。蘇鐵與恐龍以蘇鐵和鳥的化石展示為主，相當精彩。

2. 乾旱沙漠區、化石林、棕梠區

蒐集豐富的仙人掌和多肉植物區，還依地理細分亞洲、非洲、美洲等不同區域的種類，很值得細細品味。其中毛萼葉仙人掌的花果典型，說明由枝葉繁茂到縮減頁面積至幾乎無得水的耐水構造。




球形仙人掌和毛萼葉仙人掌(Pereskia sacharosa, Cactaceae)



化石林區，除了蘇鐵，也有園藝修剪，景觀概念非常衝擊。這些不知名的矽化木大多被稱為「導木」。


植物繪圖迴廊是在戶外，不知藝術品的光害如何免除?

(三) 廣州中科院華南植物所標本館

本屆大會也巧遇馬來西亞半島植物誌主編 Rose，再邀重回 FRIM 完成海茄苳的植物誌撰寫。因此也近距離先去廣州華南植物所標本館查看 *Avincenia* 的標本。

華南植物所是中科院四大標本館之一，大會閉幕式結束後，前往檢視標本，主要以蛇菰科寄生植物標本為主，另外參考蘭科石斛署的標本比對。除了可以向丘華興退休教授請益寄生植物，還巧遇加大柏克萊分校 James Doyle 教授也去華南植物園參訪，收獲不少。

與丘華興退休教授(左)在標本館前合影，與薛斌娥博後、加大 James Doyle 教授(右)合影。

四、閉幕式、大會證書及心得

本屆大會相當多植物與動物互動演化的研究，邀請的講員幾乎都是引介這類型的專家，意味著未來的科學研究不僅在各領域的鑽研，還須跨領域的整合，才能凸顯全方位的專業研究。

參訪與大會開幕同時啟用的國家蘭科中心科普館，是一個蘭花的自然史博物館，以嶄新手法展現蘭科植物的親緣演化、生物地理、資源運用以及尖端研究，在極短的時間展示設計能夠成長如此快速，給予非常高的評價。同時也看到會展中心錯誤的展出仙湖蘇鐵的學名為(*Cycas taiwaniana*)，世界的快速轉變，有多少人記得或糾正了這些小錯或大錯呢?

歷屆在閉幕式當天或前後日子，都會頒給與會者大會證書，可能也是新興國家沒有經驗，或是參加人數過多，在倉促的時空變動中，居然依註冊名牌領取空白證書，自行填寫後再排隊蓋大會印章。填寫時沒控制好排版美觀，書寫姓名偏左，蓋完章，不知哪來的突發異想，填上了 Taiwan, R. O. C. 在右邊空間，看起來非常賞心悅目。雖然紙質不如以往證書得慎重，但承認 Taiwan, R.O.C. 值得珍藏?!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帶回的大會議程和論文摘要集電子檔，將分享給同仁。相關下載電子檔(http://www.ibc2017.cn/Download/)可自行參考。此次國際植物學研討會首次在開發中國家舉辦，初見新興國家的經濟實力，也意識到未來不僅學術無國界，設計團隊 designer、maker 自造創業的年輕世代，可能是跟著機會走的。台灣雖已評為已開發國家，但在學術的投入和國際爭取，略見不足，希望未來六年後的第 20 屆巴西主辦國，支持更多的台灣學者參加。

參、 建議事項

一、鼓勵同仁多參加國際大型研討會，可以多與國際期刊主編、學界群龍會首接觸，創造合作研究機會。

二、與年輕活力的單位建立合作計畫，或了解不同領域的需求，共同協做跨領域的學術研究或推廣教育。

三、未來規劃爭取預算支持更多的同仁參與國際植物學大型會議，以維護台灣在植物學國際組織地位