



Annual Report 2011



**Xishuangbanna Tropical Botanical Garden
Chinese Academy of Sciences**



Cover photos, anti-clockwise:

1. Strangler fig with a host palm;
2. DNA barcode;
3. XTBG new research center;
4. Signboard of the national 5A Tourist Attraction
5. Commemorate Prof. TSAI Hsi-Tao's 100th birthday;
6. XTBG sign MoU with Jingdong county;
7. The new Edible Wild Plants Collection.

Photo by MO Xiaoxue



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Chinese Academy of Sciences

February 29, 2012



Photo by DUAN Qiwu

Xishuangbanna Tropical Botanical Garden (XTBG), Chinese Academy of Sciences is a non-profit, comprehensive botanical garden involved in scientific research, plant diversity conservation and public science education, affiliated directly to the Chinese Academy of Sciences.

XTBG's vision:

Desirable base for plant diversity conservation and ecological studies.
Noah's Ark for tropical plants.

XTBG's mission:

Promote science development and environmental conservation through implementing scientific research on ecology and plant diversity conservation, horticultural exhibition, and public education.



Photo by DUAN Qiwu

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Science



Photo by DUAN Qiwu

In 2011, XTBG received 42.65 million Yuan in research funds from 65 new projects:

- 18 projects funded by the National Natural Science Foundation of China;
- 2 projects supported by the Ministry of Science and Technology;
- 2 projects supported by other Ministries in China;
- 5 projects funded by Yunnan Provincial Fund for Natural Sciences;
- 15 projects supported by the Chinese Academy of Sciences;
- 6 projects funded by the CAS “Light in Western China” program;
- 15 projects funded by local government, enterprises and international agencies;
- 2 international projects.

Also this year, XTBG researchers have achieved the following:

- 107 research articles published on internationally peer-reviewed scientific journals (Source Journals of ISI Web of Science);
- 61 research articles published on CSCD (Chinese Science Citation Database) refereed journals;
- 1 monograph published;
- 11 patented inventions;
- 2 registered new plant variety.



Project Development

DNA barcoding databases of tree species in Xishuangbanna and Ailaoshan, Yunnan

Accurately species identification and classification is the fundament of biological protection and utilization. DNA barcoding is a technique in which short DNA sequences can be used for species identification. Supported by the special national basic research project of the Chinese Ministry of Science and Technology, based on various vegetation types in two natural reserves: Xishuangbanna and Ailao Mountain, Prof. LI Jie and his colleagues choose about 1,500 important tree species to construct DNA databases in the two rich biodiversity regions by using standard DNA barcodes. Their work provides a strong data support for plant identification, especially lack of flower organ and fruit, and the development of ecology, botany and other related subjects.



Field survey to Ailao Mountain

Response of epiphytes in montane cloud forest to climate change

Montane cloud forest, with well-developed epiphytes, is a mountain forest ecosystem which is very sensitive to climate change. It is considered as one of ideal “natural laboratory” for studying the effect of climatic change on terrestrial ecosystem. Due to less interference by the matrix, epiphytic plants are more sensitive to micro environmental choice and response. This research project, a key project supported by Joint Fund of NSFC-Yunnan, will study species diversity, physio-biochemical characteristics, biomass and phenology of epiphytic plants, and physical and biochemical properties of canopy humus under different climatic conditions. The influence of simulated N deposition on growth and distribution of epiphytes will be also carried out. The response mechanism of climate change and N deposition affecting epiphytes will be revealed from changes in the growth and

physio-biochemical characteristics of epiphytic plants under different climatic conditions. The empirical models of the response of epiphytes to climatic change will be established. The methods and related techniques of early identification of climate change affecting montane cloud forest will be discussed by using typical epiphytic plant groups to monitor climate change. The information generated from this project will provide scientific basis for developing measures of the relevant departments of the state to address climate change.



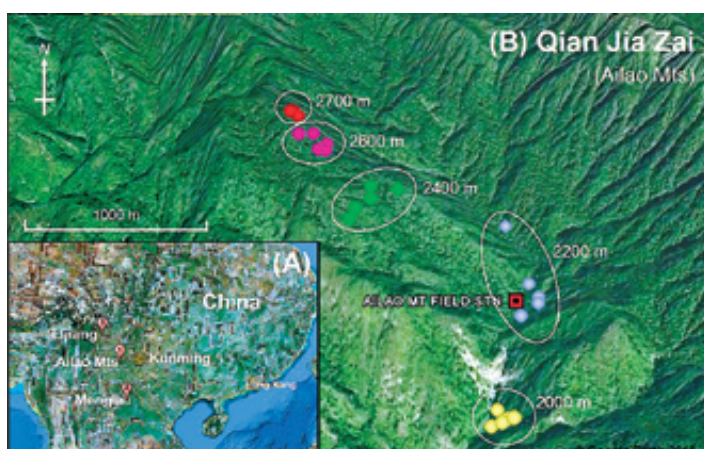
How will biodiversity and ecological process respond to environment gradients: monitoring and prediction of global climate change

How will plant and animal diversity in forests respond to a changing climate? This is the ‘big’ question being tackled by a collaborative research project between a group of Queensland Institutions and the Chinese Academy of Sciences. Funded by the Queensland Government’s Joint Biotechnology granting scheme and led by Griffith University and XTBG, the project got under way a little less than a year ago. Essentially the collaborating scientists have set out to

establish a set of altitudinal tran-sects in different forest types in south-western China and Queensland. Work in China is envisaged to cover subtropical and tropical rainforest and high elevation cool forest, all within Yunnan province. In Queensland existing transects in subtropical and tropical rainforest will be advanced through the participation of Chinese colleagues.

The underlying philosophy of the project is that they can only predict the likely results of global warming on biodiversity by studying, in the here-and-now, how selected groups of animals and plants respond to adjacent climates at increasing altitudes.

The first major activity within the project has been the establishment and sampling of a new transect in subtropical rainforest in China in the Ailaoshan mountain in central Yunnan. This activity was completed in August.



(A) Map of south-eastern China showing Kunming, capital city of Yunnan Province, and approximate locations of the three altitudinal transects (1) subtropical Ailao Mountains; (2) tropical Mengla; (3) subalpine Lijian; (B) Ailao Mountains transect, showing five survey sites at each of four levels of altitudes (and three extra sites at ca. 2700 m).

Certification of carbon budget and relevant problems addressing climate change

The CAS strategic and preclusive scientific project, “Certification of carbon budget and relevant problems addressing climate change”, will examine regional differentiation of carbon emission in main living fields. They aim to reveal the causes, distribution characteristics, change process and prospect, which can provide

parameters and academic basis for realizing goals for mitigating carbon emissions to 40%-45% though regional decomposition till 2020 within the country. Meanwhile, they will explore accounting methods and



construct databases of carbon footprint in Chinese export products through relevant research.

In this project, XTBG will carry out several subprojects, “Study on carbon fixation situation, rate and potentiality in tropical seasonal rain forests and rain forests”, “Formulating standard of carbon fixation potentiality and rate investment in terrestrial ecosystem and multi-source data integration”, “Observational study on carbon-

nitrogen-water flux in subtropical forest ecosystem and tropical rainforest ecosystem in Ailaoshan mountain”, “Experiment and demonstration study on technology for carbon fixation and sink enhancement in rubber plantations”, and *et al.*

Restoration of tropical limestone rain forest in Xishuangbanna

The project “Restoration of Tropical Limestone Rain Forest in Xishuangbanna” funded by Botanical Gardens Conservation International (BGCI) was carried out by XTBG research group of *Ex Situ* Conservation and Reintroduction of Endangered Species in May 2010, aiming to set an example of restoration of tropical limestone rain forest in the Green Limestone Forest Park through reintroducing native plant species in 1 ha pilot plot, and to raise awareness of the importance of plant conservation in local communities through workshops, training courses, and dissemination of public outreach materials. Until now, thirty species of dominant endemic tree seedlings have been planted to facilitate community



ABOVE One ha pilot plot

BOTTOM LEFT Discussion in the workshop



succession. In addition, workshops, training courses, and dissemination of public outreach materials have been developed to raise awareness of the importance of plant conservation. Two species of orchids are being cultivated in laboratory for reintroduction in the next step.



Research Progress and Outreach Highlights

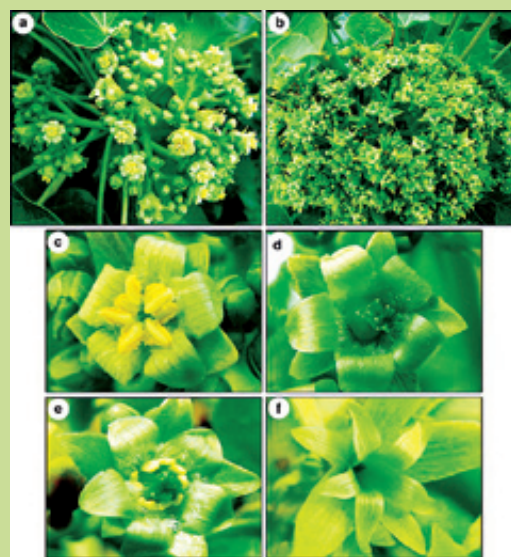
Increasing the seed yield of *Jatropha curcas* by 6-benzyladenine treatments

Jatropha curcas is a perennial deciduous shrub belonging to the family Euphorbiaceae, and is widely distributed in the tropics and subtropics. The *Jatropha* seed contains about 30–40% oil, which is an ideal feedstock for producing biodiesel. However, it has few female flowers, which is one of the most important reasons for its poor seed yield. Increasing the number of female flowers seems critical for the improvement of *Jatropha* seed yield.

In order to find ways to increase the total number and/or the proportion of female flowers of *Jatropha*, which may result in increased seed yield, XTBG PhD candidate PAN Bangzhen and her supervisor Prof. XU Zengfu investigated the effects of exogenous applications of the plant growth regulator 6-benzyladenine (BA) on the flower, fruit, and seed development of *Jatropha*.

The study found that exogenous application of BA significantly promoted floral development and feminizing effects in *Jatropha*. BA treatment significantly increased seed yield per inflorescence of *Jatropha* by increasing the total number of flowers and the proportion of female flowers and the induction of bisexual flowers.

The study indicates that the seed yield of *J. curcas* can be increased by manipulation of floral development and floral sex expression. The study entitled “Benzyladenine



Effects of BA treatments on flower development and sex expression of *Jatropha*. a Inflorescence from control plants. b Inflorescence from BA-treated plants. c-f Flowers of different sexual types from BA-treated plants. c Male flower. d Female flower. e Induced bisexual flower. f Induced asexual flower

Treatment Significantly Increases the Seed Yield of the Biofuel Plant *Jatropha curcas*” has been published in *Journal of Plant Growth Regulation*. Concerning this study, Chinese invention patent and international patent filed under the PCT (PCT/CN2010/001376) are applied.

Production of biodiesel from *Jatropha* oil with high-acid value in ionic liquids

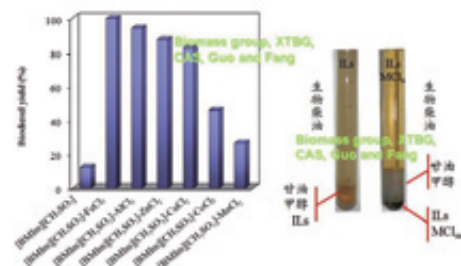
As one of the alternatives for fossil diesel, biodiesel has gained significant attention in recent years. Transesterification is by far the most common method to produce biodiesel oil from plant and animal oils. Due to their limited supply and high cost, food-based biofuels are banned in China. *Jatropha*

oil is an option of great potential for producing biodiesel.

With an aim to optimize the variables for the esterification process of *Jatropha* oil, Prof. FANG Zhen and



his colleagues have done many experiments. In their experiments, Catalytic conversion of un-pretreated *Jatropha* oil with high-acid value (13.8 mg KOH/g) to biodiesel was studied in ionic liquids (ILs) with metal chlorides. Several commercial ILs were used to catalyze the esterification of oleic acid. It was found that 1-butyl-3-methylimidazolium tosylate ([BMIm][CHCalibrisO₃]; a Brønsted acidic IL) had the highest catalytic activity with 93% esterification rate for oleic acid at 140°C but only 12% biodiesel yield at 120°C. When FeCl₃ was added to [BMIm][CH₃SO₃], a maximum biodiesel yield of 99.7% was achieved at 120°C. Because metal ions in ILs supplied Lewis acidic sites, and more of the sites could be provided by trivalent metallic ions than those of bivalent ones. It was also found that the catalytic activity with bivalent metallic ions increased with atomic radius. Mixture of [BMIm][CH₃SO₃] and FeCl₃ was easily separated from products for



Effect of metal chlorides on transesterification of crude *Jatropha* oil with methanol

reuse to avoid producing pollutants. This “One-step production of biodiesel *Jatropha* oil with high-acid value in ionic liquids” has been published in *Bioresource Technology*.

Analysis of Sundaland biogeography in PNAS

The marked biogeographic difference between western (Malay Peninsula and Sumatra) and eastern (Borneo) Sundaland is surprising given the long time that these areas have formed a single landmass. A dispersal barrier in the form of a dry savanna corridor during glacial maxima has been proposed to explain this disparity. However, the short duration of these dry savanna conditions make it an unlikely sole cause for the biogeographic pattern. An additional explanation might be related to the coarse sandy soils of central Sundaland.

To test these two nonexclusive hypotheses, Prof. Ferry SLIK and his colleagues performed a floristic cluster analysis based on 111 tree inventories from Peninsular Malaysia, Sumatra, and Borneo. The researchers then identified the indicator genera for clusters that crossed the central Sundaland biogeographic boundary and those that did not cross and tested whether drought and coarse-soil tolerance of the indicator genera differed between them.

The major findings indicate that the marked biogeographic difference between western (Malay Peninsula and Sumatra) and eastern (Borneo) Sundaland was more related to plant



Research team led by Prof. Ferry SLIK

species with coarse-soil tolerance rather than drought tolerance, suggesting that exposed sandy sea-bed soils acted as the major dispersal barrier in central Sundaland, not a savanna corridor. This finding makes it clear that proposed biogeographic explanations for plant and animal distributions within Sundaland, including possible migration



routes for early humans, need to be reevaluated. The research entitled “Soils on exposed Sunda Shelf shaped biogeographic patterns in the equatorial forests of Southeast Asia” has been published in *Proceedings of the National*

Academy of Sciences of the United States of America.

Evolutionary association of hydraulic traits with growth form divergence in figs

Fig species are one of the most important components of tropical lowland rain forests globally with additional ecological significance due to their interactions with many plant and animal species. There are about 800 *Ficus* species, including shrubs, climbers, and small-to-large trees of which about 500 species have hemiepiphytic habit.

During his Ph.D studies at XTBG, Dr. HAO Guangyou and his supervisor Prof. CAO Kunfang conducted studies to compare ecophysiological traits between woody hemiepiphytic species (Hs) and non-hemiepiphytic tree species (NHs) in an evolutionary context, using common-garden plants of the genus *Ficus*. The aim of the study was to determine the evolutionary association of functional traits, especially hydraulic traits, with growth form divergence in hemiepiphytic (H) and non-hemiepiphytic (NH) tree species of *Ficus* to provide a new model for understanding the hemiepiphytic life-form. In their study, the researchers examined the correlated evolution of 18 ecophysiological traits related to xylem water transport and leaf physiology among 14 *Ficus* species by applying phylogenetic independent contrast analyses with explicit phylogenetic information.

The researchers found substantial differences between hemiepiphytic and non-hemiepiphytic *Ficus* species grown in a common garden, in important traits relating to ecological performance, including xylem hydraulic conductivity, leaf water use, and carbon economy. The hemiepiphytic species had xylem with significantly smaller vessel lumen diameters and lower hydraulic conductivity than non-hemiepiphytic species based on both ahistoric and phylogenetic analyses, despite the relatively large variation within each growth form.



LEFT Strangler fig with a host palm

RIGHT Strangler fig with the host tree now gone

The findings support a new model for the evolution and ecology of hemiepiphytism, based on drought tolerance, at the expense of rapid hydraulic transport and gas exchange under well watered conditions as found for non-hemiepiphytic species. *Ficus* species of the two growth forms showed contrasting clusters of ecophysiological traits, providing an evolutionary model for the specialization.

The study entitled “Ecology of hemiepiphytism in fig species is based on evolutionary correlation of hydraulics and carbon economy” has been published in *Ecology*.



Invasive *Ageratina*: a quicker return energy-use strategy

Prof. FENG Yulong and his research team have previously found that invasive *Ageratina adenophora* plants increase nitrogen allocation to photosynthesis and reduce allocation to cell walls compared with native *Ageratina* plants, suggesting a shift from defence to growth in invasive populations. Carrying their previous work forward, Prof. FENG Yulong and his team designed another study to determine if construction costs and benefits in terms of photosynthesis at light saturation are different among plants from populations in the native and non-native ranges. They hypothesized that invasive *Ageratina* populations might employ a quicker return energy-use strategy by increasing light-saturated photosynthetic rates and photosynthetic energy-use efficiency (PEUE) and by decreasing leaf construction costs. This study is the first to compare plants from invasive and native populations of an invasive plant in terms of energy-use strategy. The results suggest that *Ageratina* plants from invasive

populations have a distinct quick return energy-use strategy, which, combined with low-respiration cost for photosynthesis and high nitrogen-use efficiency, may provide a potential mechanistic explanation for the commonly observed increase in growth when plants are introduced to new parts of the world. The research entitled "A quicker return energy-use strategy by populations of a subtropical invader in the non-native range: a potential mechanism for the evolution of increased competitive ability" has been published in *Journal of Ecology*.

Antioxidant activity of young leaves of 7 *Ficus* species in Xishuangbanna

The use of *Ficus* species as food or pharmacological agents to improve human health has a history of about ten thousand years. Xishuangbanna in southwest China, bordered with Laos and Myanmar, is one of the biodiversity hotspots for conservation priorities. The local ethnic groups have traditionally used young leaves of many *Ficus* species as vegetables. Prof. HU Huabin and his research team have been keeping on ethnic botanical studies for many years. Over the past few years, they chose seven *Ficus* species as their study objects and have evaluated the antioxidant effects of the edible young

leaves for the first time. The young leaves of seven *Ficus* species including *F. virens* var. *sublanceolata*, *F. auriculata*, *F. vasculosa*, *F. callosa*, *F. virens* var. *verins*, *F. racemosa* and *F. oligodon* are traditionally consumed by local people in Xishuangbanna. The researchers studied the dry young leaves for their total phenolic and flavonoid contents. The 90% ethanolic extracts of the young leaves were



creened for potential antioxidant capacity by employing different *in vitro* assays including ABTS•+ and DPPH• radical scavenging capacities, ferric reducing power and lipid peroxidation inhibition properties.

The research results concluded that the edible young leaves of the seven *Ficus* species possess abundant antioxidants at various concentrations, and the ethanol extracts of *F. virens* var. *sublanceolata* and *F. auriculata* showed considerable high antioxidant potential compared with other species tested.

The research entitled “Preliminary assessment of antioxidant activity of young edible leaves of seven *Ficus* species in the ethnic diet in Xishuangbanna, Southwest China” has been published in *Food Chemistry*.

Research advances in Lauraceae

The *Persea* group (Lauraceae) has a tropical and subtropical amphi-pacific disjunct distribution with most of its members, and it includes two Macaronesian species. The relationships within the group are still controversial, and its intercontinental disjunction has not been investigated with extensive sampling and precise time dating.

XTBG PhD candidate LI Lang, his supervisors Prof. LI Jie from the Plant Phylogenetics and Conservation Group (PPCG) and Prof. Jens G. ROHWER from University of Hamburg, conducted a phylogenetic analysis of the *Persea* group. ITS and LEAFY intron II sequences of 78 *Persea* group species and nine other Lauraceae species were analyzed in their study.

Based on the results of the study, *Persea* can be retained as a genus by the inclusion of *Apollonias barbujana* and exclusion a few species that do not fit into the established subgenera. A major revision is recommended for the delimitation between *Alseodaphne*, *Dehaasia*, and *Nothaphoebe*. The *Persea* group originated from the Perseeae-Laureae radiation in early Eocene Laurasia. Its amphi-pacific disjunction results from the disruption of boreotropical flora by climatic cooling during the mid- to late Eocene. The American-Macaronesian disjunction may



Persea americana

be explained by the long-distance dispersal. The report of this study, entitled “Molecular phylogenetic analysis of the *Persea* group (Lauraceae) and its biogeographic implications on the evolution of tropical and subtropical Amphi-Pacific disjunctions”, was published in *American Journal of Botany*.



Impact of seed tannin concentrations on the scatter-hoarding behavior of rodents

Dr. WANG Bo and his supervisor Prof. CHEN Jin have previously studied the effects of seed size, nutrient and tannin content on rodent caching behaviors. To further explore how seed tannin concentrations influence rodent foraging behavior, the researchers manipulated seed abundance and the tannin content levels of background seeds by using an artificial seed system. Furthermore, to better understand how tannin concentrations in food affect rodent physiology and health, they fed 2 dominant rodent species (*Apodemus latronum* and *Apodemus chevrieri*) diets containing different tannin concentrations. The study was carried out in a pine forest in Shangri-La Alpine Botanical Garden (27°54'N, 99°38'E, altitude 3,456 m), Hengduan Mountains, Yunnan, southwestern China. The research results clearly demonstrate that scatter-hoarding rodents prefer slightly 'astringent' food. In the co-evolutionary arms race between plants and animals, their results suggest that while tannins may play a significant role in reducing general predation levels by the faunal community, they have no precise control over the

behavior of their mutualistic partner. Instead, the two partners appear to have reached an evolutionary point where both parties receive adequate benefits, with the year-to-year outcome being dependent on a wide range of factors beyond the control of either partner.

The study was supported by the National Basic Research Program of China (973 Program-2007CB411603) and the National Natural Science Foundation of China (31100315). The study entitled "Scatter-hoarding rodents prefer slightly astringent food" has been published in *PloS ONE*.

Relative effects of taxonomy and environmental factors on leaf concentrations

Prof. ZHANG Shibao and Prof. CAO Kunfang analyzed the concentrations of 10 leaf elements of 702 terrestrial plant species from 66 families in 30 orders across terrestrial biomes in China. Their study was aimed to determine how leaf element concentrations are linked to taxonomy and the environment.

The study comprehensively characterized the relative effects of taxonomy and environmental factors on the latitudinal patterns of leaf K, S, SiO₂, Fe, Al, Mn, Na and Ca concentrations in China.

The research found that leaf element concentrations were affected by the environment, taxonomy and their interactions. But overall, the environment had a stronger effect than taxonomy on leaf element concentrations, with the exception of S and SiO₂. Therefore, changes in temperature and precipitation will directly affect the spatial patterns



in leaf element concentrations via changes in vegetation composition and subsequently affect the associated ecosystem nutrient fluxes and functioning.

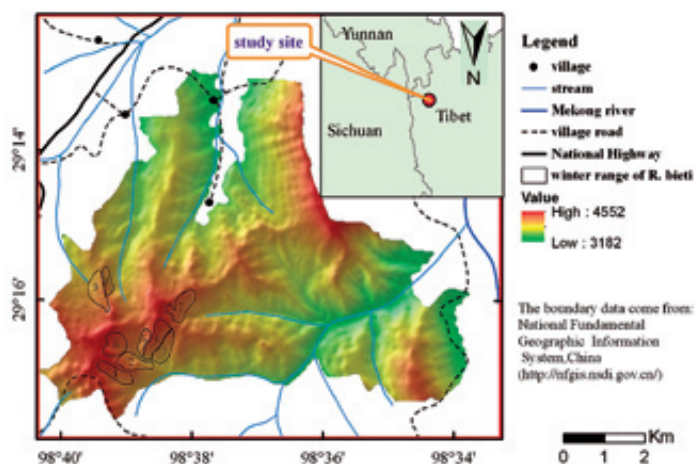
The study entitled “Leaf element concentrations of terrestrial plants across China are influenced by taxonomy and the environment” has been published in *Global Ecology and Biogeography*.

Sunshine influence winter range using of Black-and-white Snub-nosed monkey

The black-and-white snub-nosed monkey (*Rhinopithecus bieti*) is a “flagship” species endemic to the Trans-Himalayas between Yunnan and Tibet, bounded by the upper Yangtze and Mekong Rivers. It was categorized as Endangered (C1) by the 2010 IUCN red list. The monkey prefers high elevation range in winter; however previous hypothesis/environmental factors, such as resource availability, temperature, and the risk of predation that use to explain spatiotemporal distribution patterns of animals can’t explain the counterintuitive preference of high elevation range in winter *R. bieti*.

Dr. QUAN Ruichang and his colleagues proposed a sunshine hypothesis – whether variation of sunshine along with

elevations is the key driving force – to explain the winter distribution pattern of *R. bieti*. Their study was carried out at the southeastern Tibetan Plateau (98°34′–40′E, 29°13′–18′N) with an elevation range between 3,200 m and 4,500 m. Finally, researcher concluded that sunshine was the main factor that influences *R. bieti* range selection in winter. Since some other endotherms in the area exhibit similar winter distributional patterns, they developed a sunshine hypothesis to explain this phenomenon. In addition, their work also represented a new method of integrating GIS models into traditional field ecology research to study spatiotemporal distribution pattern of wildlife. The study entitled “Why does *Rhinopithecus bieti* prefer the highest elevation range in winter? a test of the sunshine hypothesis” has been published in *PloS One*.



Study site located in southeast Tibetan Plateau, China

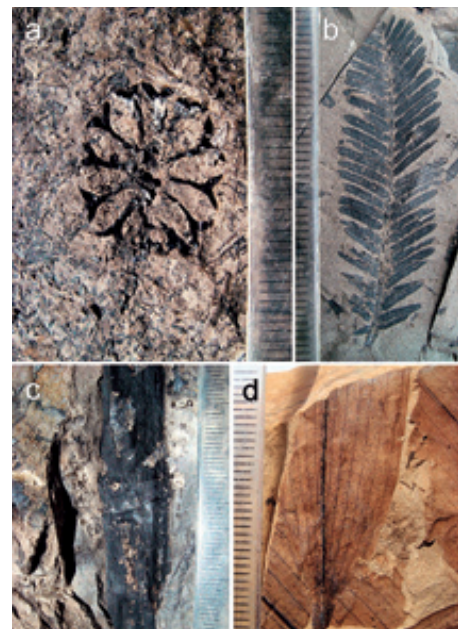
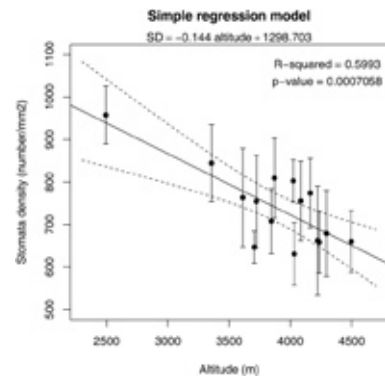


Important progress in Paleoecology Research

Fossil floras can be used to understand the evolution of plants, vegetation history, paleoclimate and paleoenvironment. Leading by Prof. ZHOU Zhekun, the Paleoecology Research Group is developing new methods to explore topics that are essential for understanding changing environments and how best to manage vegetation both natural and agricultural. In particular they have devised novel models for paleoclimate reconstructions based on modern monsoon-influenced vegetation in China and applied them to Neogene floras from Yunnan Province. The following examples demonstrate the nature of their work.

1) Models based on Leaf Margin Analysis for Chinese floras (LMA-China) and a new Climate-Leaf Analysis Multivariate Program (CLAMP - PhysgAsia1) have been developed. These improve significantly the predictive capability of fossil floras for quantifying paleoclimates of the Chinese Cenozoic. Additionally, models for paleo- pCO_2 and paleo-elevation have been explored during this year based on the observation that changes in atmospheric CO_2 partial pressure lead to changes in stomatal frequency and provide proxy to reconstruct paleo-elevation in geological time. *Quercus pannosa* has been identified as the nearest living relative of some evergreen oak fossil species, which are quite common in the sediments of Neogene of Himalayas. Stomatal frequency decreases with altitude in *Q. pannosa* over an altitudinal range from 2,500 m to 4,160 m. They presented these results at the 18th International Botanical Congress.

2) A new Miocene flora from Zhenyuan County, SW Yunnan Province was discovered last year. This flora contains well-preserved fossils, such as ferns, *Metasequoia*, *Pinus*, *Actinidia*, *Alangium*, *Acer*, Lauraceae and Bambusoideae, etc. The fossil *Metasequoia* is the first occurrence of the genus in SW China and the southernmost among all the fossil records and so has critical biogeographical significance. Further research will provide insights on its



TOP The correlation between leaf stomata and elevation in *Quercus pannosa*

ABOVE Fossil *Metasequoia* and bamboo in Yunnan: a. Female cone of fossil *Metasequoia*; b. Simple leafy shoot of fossil *Metasequoia*; c. Part of culm of fossil bamboo; d. Leaf base with petiole of fossil bamboo

conservation biology and paleo- CO_2 . Occurrences of fossil bamboo are extremely rare and our discovery will help people to understand the phylogeny of this economically important group.



Studies on the Tropical Forest Vegetation and Flora of Yunnan

Studies on the tropical forest vegetation and flora of Yunnan conducted by Prof. ZHU Hua that supported by National Natural Science Foundation of China were given the second class award of the Natural Science Award of Yunnan Province.

The following main scientific findings were achieved:

- 1) Biodiversity and distribution patterns of the tropical forest vegetation and flora of Yunnan were uncovered in detail, and their relationships with the tropical vegetation and flora of Southeast Asia were revealed. It is concluded that the tropical flora of Yunnan is of the northern margin of Indo-Malesian flora.
- 2) The distribution patterns of the present vegetations and frequent savanna elements in tropical Yunnan implied a drier climate and vegetation in the region in the past.
- 3) It is suggested that the tropical rain forest and its flora in southern Yunnan has developed since late tertiary or early Quaternary.
- 4) It is also supported by ZHU's studies that Yunnan should be a region with tropical areas as the horizontal



TOP Dipterocarp forest in Xishuangbanna
ABOVE Field survey in the tropical rain forest

base because almost all areas of lower elevation are tropical in nature regardless of their latitudinal location.

Read the Nature --- Geological Wonder and Vegetation Geography of the Three Parallel Rivers Region in Northwest Yunnan

Authored by Prof. ZHU Hua, the book “*Read the Nature - Geological Wonder and Vegetation Geography of the Three Parallel Rivers Region in Northwest Yunnan*” won the 2nd Prize of China’s Popular Science and Innovation in Environment Protection Award.

This popular science book introduces the wonderful geology, vegetation, and biodiversity of the World Heritage ---Three Parallel Rivers Region in northwest Yunnan, China.



Certificate of Award



Improvement of Research Facility

Comprehensive Platform of Bioenergy & Conservation Biology (XTBG new research center)

The construction project of Comprehensive Platform of Bioenergy & Conservation Biology has been granted the 2011 National Investment Projects Excellence Awards by the Investment Association of China. It is one of the 37 award winners nationwide.

Initiated in 2006, the project construction area is 27,762 m². The total investment is RMB 87.46 million. Spanning a period of about 3 years (June 16, 2008-October 1, 2010), the platform started operation on January 1.

The Comprehensive Platform of Bioenergy & Conservation Biology, commonly known as the XTBG new research center, was designed by Mr. Alain HAYS of France. XTBG based its new research center design on the "eco-cultural" concept which respects the existing forest on the building site and expresses local cultural values in a modern and functional way. Considering bioclimatic aspects, the architect skillfully blended the research center into the background landscape of the garden, avoiding imposing rigid design. He also tried to optimize the internal functional areas and minimized any waste in space. The design integrated natural ventilation visual "transparency" among all the laboratories and offices with plenty of windows, using wide corridors and verandas to protect the buildings against the tropical heat.



 Ribbon cutting ceremony

The construction map was finished by Architecture & Engineering Design Institute of Yunnan Province.

Thanks to the collaborative efforts of all parties involved in this project, the construction of XTBG new research center was completed smoothly according to schedule. With its scenic, natural setting and well-equipped laboratories, the new scientific research center provides a comfortable and conducive work environment for XTBG staff and students.



XTBG Center Lab improvement

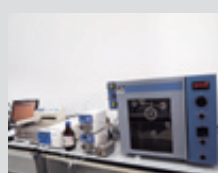
Set up in 2010, XTBG Center Lab was completed and put into use on January 1, with a total area of 5,325.85M²

As a member of the Kunming Regional Center for Biodiversity Large-scale Exactitude Apparatuses, Chinese Academy of Sciences, XTBG will construct Experimental System for Ecological Process Research. Being supported a grant of RMB 7.16 million Yuan, 30% of which was from CAS, 70% of which was self-prepare capital, XTBG purchased a stable isotope mass spectrometer, MAX CN-Vario TOC tube, plasma emission spectrometer, and combined multiple factors artificial climate simulating system. After testing and debugging, these facilities have been put into use till December.

"Studies on ecological process and mechanisms of species coexistence in tropical and subtropical forests" is one of the key breakthrough projects in XTBG's strategic plans from 2012-2017. Being supported a grant of RMB 8.08 million Yuan from the Central Financial Fund for repair and purchase, XTBG purchased 6 apparatuses, including water purification systems, liquid nitrogen preparation systems, multi-channel automated soil CO₂ flux measure system, GC-MS, HPLC-MS, and HSCCC. These enhanced the supporting platform construction for observation, analysis and artificial control experiments in ecological process research, supporting a variety of studies on the effects of climate change

and human disturbance on ecological processes.

Meanwhile, XTBG Center Lab also got RMB 0.3 million Yuan by a CAS tech-innovation project "Determination of stable isotopes of water in soil and plants by isotope mass spectrometer". It was the first time for XTBG to get the CAS tech-innovation project on scientific apparatuses function developments. Referring to the national standard (GB/T 15483.1-1999), Soil branch of CERN carried out a program of quality control and used blind samples in 35 CAS field stations. XTBG Center Lab was the first to accomplish the 100% qualification as well as excellence standards.



Ailaoshan Station celebrate its 30 years anniversary

The year of 2011 was the 30th anniversary of Ailaoshan Station for Subtropical Forest Ecosystem Studies of XTBG, marked by a series of celebrations.

On September 16, senior scientists, leaders, and young



LEFT Prof. ZHANG Yiping introduces Ailaoshan Station

RIGHT Academician SUN Honglie delivers a lecture

students were invited to put forward suggestions for future development of Ailaoshan station.

On September 19, a celebration ceremony was held in Renmin Hall of Jingdong County. Scientists and officials gathered together to celebrate the event. Academician WU Zhengyi and some other scientists sent their congratulation letters. For the

celebration, Ailaoshan station displayed its research achievements over the past 30 years.

Academician SUN Honglie, former vice president of Chinese Academy of Sciences, attended the event. He



LEFT Developing Ailaoshan Station for Subtropical Forest Ecosystem Studies

RIGHT Displaying Ailaoshan Station's research achievements over the past 30 years



delivered a lecture to the local students at Jingdong Vocational Middle School. He also inscribed the school motto. Prof. CHEN Jin, director of XTBG, delivered a lecture entitled “Botanical gardens and plant resources conservation and use” to over 800 civil servants of Jingdong County. Concerning the construction of Jingdong subtropical botanical garden, CHEN answered questions raised by the audience. Twelve XTBG graduate students also gave popular science lectures to the local students in Jingdong. Altogether, more than 7,600 secondary and primary students participated in the event.

In addition, a “CERN symposium on forest ecosystem” was held on September 21. Representatives from 10 forest research stations of China participated in the symposium. The Ailaoshan Station for Subtropical Forest Ecosystem Studies, founded in 1981, is a national field station and an important supporting platform for scientific research of XTBG.

Bubeng substation of Xishuangbanna Station for Tropical Rainforest Ecosystem Studies

Bubeng substation of Xishuangbanna Station for Tropical Rainforest Ecosystem Studies was inaugurated on September 23. Prof. CAO Min, deputy director of XTBG, unveiled the nameplate of the new substation at the ceremony. Bubeng substation will mainly act to provide logistical and technical

support for scientists and students conducting field works in the 20-ha tropical forest dynamics plot and its neighboring forests.



Representatives for the nameplate unveiling ceremony



Yuanjiang Station for Savanna Ecosystem Studies start to operate

The inauguration of the Yuanjiang Station for Savanna Ecosystem Studies was held in Yuanjiang County on September 18.

The unveiling ceremony was presided over by Prof. CAO Min, deputy director of XTBG, and attended by officials and leaders from Yuxi municipal government, Chinese Academy of Sciences (CAS), and CAS Kunming Branch.

After the ceremony, a consultation seminar on development and planning of Yuanjiang Station was held. The participating experts provided suggestions for the future development of the station to be a long-term monitoring, research, demonstration, and cooperation base for Savanna ecosystem studies in China.



The nameplate unveiling ceremony

Union of Field Stations for Ecosystem Studies in Southwestern China founded

The Union of Field Stations for Ecosystem Studies in Yunnan and Guizhou, southwestern China, was founded on March 18. The mission of the Union is to help member stations enhance their effectiveness in supporting critical research, education, and ecosystem management. The founding ceremony of the Union was held at XTBG.

The founding ceremony was joined by representatives from seven field stations, including Xishuangbanna Station for Tropical Rainforest Ecosystem Studies, Ailaoshan Station for Subtropical Forest Ecosystem Studies, Yuanjiang Station for Savanna Ecosystem Studies, and four other field stations affiliated to Kunming Institute of Botany, Institute of Geochemistry, and Guizhou Academy of Sciences.

Prof. CAO Min, deputy director of XTBG, presided over the founding ceremony. Mr. LI Hongwei, CPC secretary of XTBG, delivered a warm welcome speech. Prof. WANG Qingli, president of CAS Kunming Branch, emphasized the significance of uniting field stations in SW China.

The Union is a non-profit organization dedicated to providing a platform for staff of field stations to exchange experiences, and cooperate in data collection, management and sharing, with special emphasis on long-term and comprehensive ecological research in SW China.



Conferences and Symposia

Centenary of Prof. TSAI Hsi-Tao's Birth

The centenary of Prof. TSAI Hsi-Tao's birth fell on March 12, 2011. In this landmark year, XTBG organized a series of events in memory of this eminent Chinese botanist and founder XTBG.

On March 12, the relatives, former students and colleagues of Prof. TSAI Hsi-Tao gathered together in Kunming to commemorate his life and contributions in China's botanical research. In his speech, Prof. CHEN Jin, director of XTBG, expressed his respect for TSAI's pioneering spirit and perseverance. The participants at the gathering expressed respect and gratitude for the influence Prof. TSAI brought to them.

An exhibition about Prof. TSAI Hsi-Tao was held at the headquarters of XTBG, showing the life and work through the medium of photography.

A symposium for commemoration of Prof. TSAI Hsi-Tao's 100th birthday was held on March 13-15 at XTBG. It's a celebration of TSAI Hsi-Tao's academic ideology and its impact, giving new insight into his devotions to botanical research. The symposium also brought together more than 100 botanists and students of China to talk about the most recent advances in plant resources use, including plant genetic resources, research and development of natural products, development of energy plants, etc.



TOP Symposium for commemoration
ABOVE Colloquium of commemoration



Prof. TSAI Hsi-Tao

A movie night reflecting TSAI Hsi-Tao was held on March 14. The party was hosted by Mr. LI Hongwei, CPC secretary of XTBG. The participants in the Symposium and XTBG staff and students watched a film entitled *Remotest Ocean of Greenery*.



Fourth SEABG Director's Meeting

Renowned botanists and directors of botanical gardens travelled from across South East Asia to XTBG to discuss major tasks of botanical gardens: regional ecological restoration and biodiversity conservation from November 14 to 18.

More than 30 botanists and directors from botanical gardens in 12 countries and regions attended the fourth meeting of the South East Asia Botanic Gardens (SEABG), more commonly known as 4th SEABG Director's Meeting. They came from as far as the United States, the United Kingdom, Singapore, Thailand, Indonesia, Cambodia, Laos, Vietnam, Myanmar, Philippines, Brunei, and China.

The 5-day meeting included presentations and group discussions covering a variety of topics such as how botanical gardens can support restoration ecology, collection based research in botanical gardens, public education programs, biodiversity and conservation, reintroduction of threatened species, plant diversity studies, opportunities and challenges for botanical gardens, etc.

In addition to the discussion sessions, the representatives visited the rich living collections, the herbarium, seed bank, museum, and tropical rainforest within XTBG. They also had a tour to the 20-ha tropical rainforest dynamics plot in Xishuangbanna.

The meeting was welcomed by the attendees as an opportunity to share knowledge and information between botanical gardens, to discuss and refine to provide updates by members on their activities, and bring up topics of common interest and benefit for discussion.

“South East Asia Botanic Gardens (SEABG)” is a regional network of botanical gardens in South East Asia, which was formed in 2004. The general aims of the network are to assist member gardens in capacity building; to make use of the resources in the region; and to improve their overall standards.



CLOCKWISE FROM TOP RIGHT
Dr. Joachim GRATZFELD - Director of
BGCI Regional Programmes delivers an
opening speech; Prof. CHEN Jin delivers
a welcome speech; Visit 20-ha plot;
Visit XTBG Herbarium



The 3rd Symposium on Plant Reproductive Ecology and Plant-animal Interrelationship Training Course

To foster national interaction among researchers in plant reproductive ecology, the 3rd symposium on plant reproductive ecology, organized by XTBG and Institute of Botany, the Chinese Academy of Sciences (IB, CAS) was held in XTBG during March 27 -29.

A total of 90 researchers and students from 30 universities and institutes participated in the symposium and training course. Prof. LI Qingjun, deputy director of XTBG, addressed the welcome speech. Prof. ZHANG Dayong reviewed the development in recent plant reproductive ecology, and predicted the trends and problems in this field. Thirty six presentations were made by the researchers on the topics including “Flower character and pollination”, “Orchid pollination”, “Alpine plants and reproduction”, “Reproduction, evolution and adaptation”, “Breeding and mating system”.

Training course targeting students and young scientists was held after the symposium during March 30– April 2. Prof. Amots DAFNI (Haifa University, Israel) and Dr. Nicolas J. VERECKEN (Brussel University, Belgium) gave the courses on pollination syndromes, flower structures, advertisement and reward, bee ecology, evolution, pollination and conservation. Field activities were organized after each lecture to help participants’ gain better understanding.



ABOVE Prof. ZHANG Dayong reviews the development of reproductive ecology
LEFT Observe the pollen on the flowers



Workshop on Tropical Biodiversity and Genomics

The first workshop on Tropical Biodiversity and Genomics (commonly known as WTBG@XTBG 2011) was held in XTBG during June 27 to July 1.

WTBG@XTBG 2011 was a great start to an exciting new era in tropical biodiversity research in XTBG. The workshop was organized into a series of excellent research talks presented by leading scientists and participants. Several working groups focused on transcriptomics, comparative genomics, reference-free analysis, and the detection of selective elements. The participants also discussed future directions, possible collaborations, and the structure of upcoming proposals. Invited speakers included Mike ARNOLD (Kunming Institute of Zoology and University of Georgia), Jeff BOORE (Genome Project Solutions and University of California at Berkeley), Charles CANNON (XTBG and Texas Tech University), David GALBRAITH (University of Arizona), Rhett HARRISON (XTBG), Chai-Shian KUA (XTBG), Christian LEXER (University of Friborg, Switzerland), Hendrik-Jan

MEGENS (Wageningen University), and Yann SURGET-GROBA (University of California, Santa Cruz). Three participants also gave presentations one evening: RUAN Jue (Beijing Institute of Genomics), YE Chengxi (XTBG), and YE Sun (South China Botanical Garden).



 WTBG-group photo



XVIII International Botanical Congress

Seven faculty and students from XTBG attended the XVIII International Botanical Congress, IBC in Melbourne, Australia. They presented oral presentations in special symposiums on “Historical biogeography of Malaysia and its effects on current patterns of plant diversity”, “Environmental adaptation”, “Botanic gardens and their role in the time of climate change”, “Ecology, Environmental Change & Conservation” and “Plant hydraulic systems: structure and function”.

The International Botanical Congress is held every six years and is one of the biggest botanical meetings in the world. Almost two thousand people participated in the meeting and twenty concurrent symposia ran each afternoon.



ABOVE Prof. ZHOU Zhekun (middle) and Dr. SU Tao (left) participate the XVIII International Botanical Congress
LEFT Dr. SU Tao presents on the XVIII International Botanical Congress



Advanced Fieldcourse in Ecology and Conservation – XTBG 2011

The Program for Field Studies in Tropical Asia (PFS-TropAsia) organized its third Advance Fieldcourse in Ecology and Conservation - XTBG (AFEC-X) on October 22 – December 3. Twenty-five participants from twelve countries attended AFEC-X 2011. They were from Thailand, Vietnam, Cambodia, Laos, Malaysia, Indonesia, Philippines, India, Sri Lanka, United States, DPR Korea and China. Four MSc students from XTBG were among the Chinese students

who participated in the course. Building on the success of AFEC-X 2009 and 2010, this year's course was extended to six weeks to help the participants gain more from the training. It was especially useful to have a longer period in the field site at Bulong Nature Reserve, Yunnan, so that participants could collect more comprehensive field data, which led to better results of their research projects. The most valuable asset of the field course is, as always, the resource staffs who volunteer their time. Sixteen researchers taught in the course, including Richard CORLETT (National University of Singapore), Douglas YU (Kunming Institute of Zoology), Jeremy MILLER (Netherlands Centre for Biodiversity Naturalis), Jacob WICKHAM (Institute



CLOCKWISE FROM TOP LEFT
AFEC-X symposium; AFEC-X Group photo



of Chemistry, CAS), Kathryn BUSHLEY (Institute of Microbiology, CAS), Bosco CHAN (Kadoorie Farm & Botanic Garden, Hong Kong), and David ROUBIK (Smithsonian Tropical Research Institute, Panama), as well researchers from XTBG: CAO Kunfang, Ferry SLIK, Charles CANNON, XU Zengfu, Rhett HARRISON, Doug SCHAEFER, FAN Zexin and SHI Lingling.

XTBG Director CHEN Jin visited the field course in Mengsong. With much delight, he attended the progress presentations and a fun-packed traditional Hani dinner held in a local village house.

The course symposium was held on Dec 1, marking the completion of the six-week intensive training course. Course participants presented the findings from their independent research projects conducted in Bulong Nature Reserve. The Best Research Project prize went to “The Effect of the Gravity on the Architecture of the Trees” (by XI Xinqiang, Pichani SAENGTHARATIP, and U UNJONG). The Second Prize went to “Prey capture efficiency and movement behaviour in *Nephila clavata* in tea plantation in Mengsong, Yunnan, China” (by DANG Viet Dai, Ashoka RANJEEWA, KIM KwanHyok and YAN Yan). Members of the best project group were offered a surprise prize - fellowships to attend the Association for Tropical Biology and Conservation Asia-Pacific Chapter Meeting 2012 to be held at XTBG.

PFS-TropAsia is hosted by XTBG, with partners from

the region including the World Agroforestry Centre (ICRAF) and King Mongkut's University of Technology Thonburi, Thailand. The program runs training activities, including workshops and field courses aimed at strengthening education and research in tropical biology and conservation. PFS-TropAsia was founded to provide leadership in education, research and the responsible use of natural resources in the tropical Asia-Pacific region. It is the program's vision that the capacity of countries to meet the challenges wrought by global change and manage their natural resources prudently will depend on having new cohorts of well-trained local scientists, in both academic and managerial positions, motivated to develop research projects, apply findings to environmental problems, and engage in environmental issues. The AFEC-X course received accreditation from the Graduate University of the Chinese Academy of Sciences in May. The courses are currently generously supported by the leaders of XTBG, the Key Laboratory of Tropical Forest Ecology, and the World Agroforestry Centre (ICRAF).



Annual Meeting of Science Education Network of Botanical Gardens and Herbaria of CAS

Science Education Network of Botanical Gardens and Herbaria of CAS, held its annual meeting at XTBG in April. More than 60 delegates from Ministry of Science and Technology, China Association for Science and Technology, Academic Divisions of CAS, botanical gardens and research institutions participated in the meeting. Delegates discussed the 12th five-year plan of Science Education Network. Other topics included capacity-building, science education academic research and staff training. Some well-known experts were also invited to give talks during the meeting, such as Prof. CHEN Jin from XTBG, presenting on relationship between science research and science education, Prof. WEI Xinbei from Beijing University of Aeronautics & Astronautics on new media, Prof. ZHANG Shuyi from East China Normal University on his research in Amazon, and Dr. FANG Zhouzi on the key questions in science education.



Annual meeting of science education network



WCPS 2011

The World Conference on Paleontology and Stratigraphy (WCPS 2011) was held during November 28 to December 2 in Thailand. The conference brought together more than 270 participants from 33 countries. Prof. ZHOU Zhekun, deputy director of XTBG, headed a 3-person group to the meeting. Prof. ZHOU Zhekun made an oral presentation entitled “Stomata frequency of two oaks change over altitudinal gradient in Himalayas”. The other two XTBG participants Dr. Frederic M.B. JACQUES and Dr. SU Tao talked about “Fossil plants as indicators of palaeomonsoons” and “The late Pliocene Longmen flora from Yunnan Province, Southwest China” respectively.



LEFT Prof. ZHOU Zhekun presents on the WCPS 2011

RIGHT Dr. Frederic M.B. JACQUES presents on the WCPS 2011

Third Symposium on Tropical Forest Ecology

A hundred and twenty scientists and students from XTBG, Hainan University, Guangxi University, Guangxi Institute of Botany, and Guangxi Normal University gathered together at XTBG during August 21-23, to participate in the 3rd Symposium on Tropical Forest Ecology.

The theme of the symposium was “Chinese tropical forests – response and adaptation to the changes of environmental factors”.

Prof. CAO Min, deputy director of XTBG, presided over the opening ceremony on August 22. Mr. LI Hongwei, CPC secretary of XTBG, delivered a warm welcome speech. During the Symposium, 25 presentations concerning “Species patterns and ecosystem processes of tropical forests” and 26 reports concerning “Response and adaptation of tropical forests to the changes of environmental factors” were made.

Afterwards, leaders of the participating institutions held a colloquium on expanding the influence of Symposium on Tropical Forest Ecology and increasing the research development of tropical forest ecology in China.



Prof. CAO Min presents on the 3rd Symposium on Tropical Forest Ecology



National Botanical Gardens Conference & Academic Meeting 2011

Themed “Botanical Gardens: Moving Forward to the Future”, the National Botanical Gardens Conference & Academic Meeting 2011 opened on September 5 in Xi'an, capital of Shaanxi Province. Over 400 representatives of botanical gardens and international organizations gathered there. Prof. CHEN Jin, director of XTBG, headed up a 13-person group to attend the meeting.

The meeting covered topics such as how to implement China Biodiversity Conservation Strategy and Action Plan, plant diversity and urban ecological construction, protection and utilization of plant resources in the future 20 years, how to construct modern botanical gardens scientifically, plants and human life, tourism economy and development of botanical gardens, popular science display and dissemination in botanical gardens, etc.

Prof. CHEN Jin delivered a keynote speech entitled “Botanical gardens should conduct more scientific research on living

collections”, providing suggestions on studies of living collections.

Prof. XU Zaifu, emeritus professor and former director of XTBG, presented the academic thoughts of Prof. TSAI Hsi-Tao – pioneer of plant resource science, through his works and practice.

The meeting was organized by the Chinese Association of Botanical Gardens, International Association of Botanical Gardens (IABG), Botanical Gardens Conservation International (BGCI), Xi'an Botanical Garden, etc. After the meeting, Prof. LI Qingjun, deputy director of XTBG, led XTBG participants on a field tour to Qinling National Botanical Garden.



LEFT Prof. CHEN Jin delivers a keynote speech
RIGHT Prof. XU Zaifu talks about TSAI Hsi-Tao's academic thoughts



XTBG presented at Shanghai Green Building Seminar

The Shanghai Green Building Seminar, entitled "Green Building Design, Construction and Monitoring" was held from August 29 – September 2. XTBG was invited to present its construction work of the New Research Center, which was awarded "2011 Chinese National Investment Projects Excellence Award".

The Seminar was organized by the Grande Ecole of Civil Engineering Works for the French State (ENTPE), the University of Savoy (POLYTECH) in partnership with Lyon University, Shanghai Jiaotong University and Tongji University.

On August 29, Mr. Alain HAYS, chief designer of XTBG New Research Center presented a lecture entitled "Eco-

Cultural Design and Green Building: The Scientific Research Center project of the Xishuangbanna Tropical Botanical Garden - XTBG (CAS) – "2011 Chinese National Investment Projects Excellence Award".

The XTBG Research Center Project presentation was highly appreciated by the French and Chinese participants and was referred to as a model of tropical bioclimatic building design which integrates Culture and Nature in a functional and modern way. The event was a great opportunity to share experiences around the theme of "Green Building", at national and international levels.



Horticulture



Photo by DUAN Qian

New plant collections

Tropical Energy Plants Collection

In October the new Tropical Energy Plants Collection was officially open to the public. This new exhibition is created from a former nursery, currently displaying 600 widely cultivated tropical and subtropical energy plant species with great potential for exploitation. The 6-ha collection includes fuel plants, starch plants, fiber plants, oil yielding plants, hydrocarbon plants, consisting of 5,500 plant individuals of 410 species in 50 families.



Tropical Energy Plants Collection



Medicinal Plants Collection

The expansion work for the Medicinal Plants Collection is underway. XTBG horticultural team has constructed the site with new trails and irrigation system and a Dai style pavilion. Shortlisted ethnic medicinal plants have been propagated for planting. A total of 700 plant individuals were displayed in this new expansion area.

Liana Collection

As the demolition of the disused residential buildings was completed, the construction of new Liana Collection had commenced. XTBG horticultural team reformed the topography, cleaned the site, introduced and propagated liana plants. A total of 5,000 pots of liana plant for displays are being cultured in the nursery.



Clean site



Propagate liana plants



Edible Wild Plants Collection

Construction of the new Edible Wild Plants Collection started in 2008, and was close to completion in 2011. With a total area of 10 ha and over 500 edible wild plant species, this collection is one of the largest living edible plant collections in the world.



Entrance to the new Edible Wild Plants Collection

Enhancing the Capability for Plant Conservation

In order to enhance the capability for plant conservation, XTBG horticultural staff devised new construction plans and selected contractor by competitive tendering. Their plans consist of a glasshouse in the nursery, a simple shaded greenhouse for plantlets hardened transplanting, a greenhouse for cutting propagation, spraying cooling system, water purification system and road systems. To date they have constructed a 1,150 m² simple shaded greenhouse for plantlets hardened transplanting, a 640 m² greenhouse for cutting propagation, spraying cooling system, and water purification system.



TOP A glasshouse under construction

ABOVE Greenhouse for cutting propagation



LEFT A simple shaded greenhouse

RIGHT Spraying cooling system



Scientific assessment to introduced plant resources

XTBG staff made scientific assessment for 6,200 species of introduced plants in 303 families, which provides theoretical basis for plant introduction and conservation in XTBG. They collected and synthesized data on plant phenology, usage, growth status, monotypic or oligoclonal species, original range and distribution of introduced plant species in XTBG.



Ms. HU Jianxiang makes scientific assessment for introduced plants



Data management and digital garden system

The project “Plant Introduction and Conservation Database” passed the final assessment and evaluation successfully. This overall database includes 11 sub-databases with 167,199 records with a file size exceeding 34.3GB.

They created an interior database of XTBG Horticulture Department, which will improve the work efficiency.

The two projects, “Checklist of *ex situ* Conservation Plants in XTBG and Information Standardization”, “Botanical Garden Subject Databases – XTBG sub-database”, are well underway.



A website for Plant Introduction and Conservation Database.



Public Education



Photo by HE He

Facts:

Total annual visits to the Garden: 540,678

Total annual visits to the museums: 278,007

Special educational programs: 24

Total annual hits to the Garden websites: 2,996,846



National 5A Tourist Attraction

On July 6, XTBG was certificated officially as a national 5A Tourist Attraction by National Tourism Administration, thereby becoming currently the only 5A Tourist Attraction in Xishuangbanna. XTBG has been making continuous efforts in obtaining the 5A certification since 2006, the highest title for Tourist Attractions in China. Over the years XTBG has been striving to improve its infrastructure, integrated management, advertisement, tourist service, shopping area, environmental health, environmental conservation, safety, postal service, etc.. After preliminary evaluation, unannounced visits and final evaluation by the certification authority, XTBG eventually earned it's much anticipated 5A title. XTBG's excellence in scientific research, international reputation, and public outreach programs on tropical rainforest conservation are among the important areas that gave XTBG extra points during these evaluations. On July 22, XTBG celebrated this significant achievement with one day of free admission, which attracted more than 20,000 visitors on a single day.

"5A" is a normative standard of quality grading system. The standard for "5A" is the highest grade of the standard of Rating for Tourist Attractions – the current standard in



Signboard of the national 5A Tourist Attraction

the National Tourism Administration. It put forwards comprehensive and detailed requirements in such aspects as transportation, sightseeing, tourist security, health, postal services, tourist shopping, comprehensive management, environmental protection, customer satisfaction, etc.



Photo by DUAN Qiwu

Record-breaking Funding in Environmental Education

In 2011, XTBG made its new record on funding support for environmental education. Two books, *Stories of Tropical Forest* and *Dialogue between Fig Tree and Fig Wasp* gained support from special science education sector of National Natural Science Foundation of China. China Association for Science and Technology funded two other projects, including Youth in West China Training Plan and Education Materials on Rare Plants Project. SWAROVSKI OPTIC sponsored the first XTBG Bird Fair, which was the first funding support from the private sector. The Bird Education Project in Local Communities around XTBG obtained funding from Hong Kong Bird Society. Together these funds in environmental education amount to more than half a million RMB.



 Prof. CHEN Jin talks to tourists as a tour guide



The First XTBG Bird Fair

XTBG's first Bird Fair was held during the Spring Festival in February, joined by more than 12 bird organizations from across China, including representatives from Taipei Wild Bird Society, Taiwan. It turned out to be a very special occasion for visitors to the garden and attracted hundreds of thousands of tourists in two days. They were introduced to



The first bird fair attracts birders all over the country

bird watching and bird conservation through various fun activities. The kids, especially, enjoyed themselves playing games in which they could learn about birds and win prizes. Bird drawing for kids from the local schools were sold out. XTBG is rapidly becoming a bird watching hotspot in China and the XTBG Bird Fair will continue as an annual event here.

Gourd-shaped Island Love Published

The XTBG has been well-known as the gourd-shaped island from the time of Prof. TSAI Hsi-Tao. In order to promote our unique tourism centered around environmental education, a book named *Gourd-shaped Island Love* has been published. The book has four chapters, including more than 30 essays and 120 beautiful photos of landscapes, plants, insects and birds found at XTBG. In the book, the stories of plants are told by staff, graduate students, journalists and tourists. They share their experiences from different angles, about the interesting work and life in XTBG, or as visitors here. The books are now available in all hotels (four-star and above) in Kunming and Jinghong.



The cover of Gourd-shaped Island Love



Let's Enjoy Orchid

In order to raise public awareness on rare plants conservation, we chose orchids as a group of flagship species in our education program. A national photography competition on tropical orchids was announced at the beginning of the year. In total, XTBG received more than 500 orchid photographs from all over the country. The award-winning photographs have been exhibited in the museum for three months. Along with the theme of orchid conservation, the visitors to the museum can appreciate the orchid seeds – the smallest seeds in the world - under a microscope. They learn about the structure of an orchid flower and how to tell it apart from other flowers. Interestingly, many people didn't realize that some plants that are called "Lan", which means orchid in Chinese, actually are not orchids. *Rainforest Story*, the E-magazine of XTBG, also had a special issue on orchids. A rare plants education kit was designed, including memory game cards, posters, bingo, brochures, exhibitions, puzzles and a video on stigma movement of *Alpinia mutica*.



Orchid Photos Exhibition

Students Explored the Rainforest in Summer and Winter Camps

Summer and winter camps at XTBG were just as popular this year as always. Hundreds of middle school and high school students from Beijing, Kunming, Xishuangbanna, and Macau visited the garden and from XTBG's researcher and graduate student volunteers, they learnt about the ecosystem in tropical rainforests, as well as what ecological research was about, including obligate mutualism between figs and their specific pollinators, invasive plant species, structure of flowers and pollination biology. Senior scientists at XTBG gave students talks on their recent research and the students also enjoyed a good discussion with XTBG's foreign researchers in English fun activities around XTBG were lined up for the students, including forest trekking, night walks in the garden and ethnic culture tours to local villages.



Researcher explains the structure of a flower





Partnership

Photo by TAN Yunhong

Domestic

Jingdong, Yunnan

A cooperation framework agreement for co-establishing a subtropical botanical garden was signed between XTBG and Jingdong County Government on September 21. As representatives of the two parties, Prof. CHEN Jin of XTBG and Mr. LI Chunrong of Jingdong Government signed the agreement.

According to the agreement, XTBG will play the key role in establishing the Jingdong Subtropical Botanical Garden while Jingdong local government will provide the land and in-kind support.

Jingdong County has rich subtropical plant resources and ecological habitats. The establishment of the subtropical botanical garden will help preserve many important subtropical plant species in the families of Theaceae, Lauraceae, Fagaceae, and Magnoliaceae, *etc.* In addition, it is expected to give Jingdong County a boost for its eco-tourism.

The construction of Jingdong Subtropical Botanical Garden is to start in June 2012.



Signing ceremony




Chenggong, Yunnan

On September 15, XTBG, Chenggong Bureau of Landscape and Forestry, and Yunnan Lue Tai Landscape Co. Ltd., signed a cooperation agreement on the establishment of cultivation and demonstration bases for Yunnan's native landscape plantlets.

As representatives of the three parties, Mr. DENG Jiwu, head of XTBG Experiment and Extension Station for Economic Plants, Mr. ZHAO Wenqing, deputy director of Chenggong Bureau of Landscape and Forestry, and Mr. LI Hong, head of Landscape Planning and Design Department, Yunnan Lue Tai Landscape Co. Ltd., signed the agreement.

With the scientific and technological expertise of XTBG, and guidance from Chenggong Government, three parties will assess, select and cultivate Yunnan's native plant species with high adaptability and growth characteristics for landscape planning and ornamental purposes. They will establish leading cultivation and demonstration bases for Yunnan's native landscape plantlets.



 *Signing ceremony*



Shilin, Yunnan

A cooperation agreement entitled “Studies on karst rocky desertification control in Stone Forest” was signed between XTBG and Stone Forest Scenic Area Administration, Shilin, Yunnan, on April 20.

As representatives of the two parties, Prof. CAO Min, deputy director of XTBG, and Mr. LI Zhengping, director of Stone Forest Scenic Area Administration, signed the agreement. Upon signing of the cooperation agreement, XTBG scientists will work to make a systematic summary of the accumulated experience gained in tackling karst geological problems in Yunnan and Guizhou and determine effective measures to restore the degraded ecosystems in Stone Forest. While restoring the vegetation, scientists will take account of natural environmental protection and sightseeing.

Karst rocky desertification refers to the processes which transform a karst area that was covered by vegetation and soil into a rocky landscape almost devoid of soil and vegetation. It is a process of land degradation involving serious soil erosion,

extensive exposure of basement rocks, drastic decrease of land productivity and the appearance of a desert-like landscape.

Yunnan province is located in the center of rocky desertification area and is one of provinces with wide karst regions in China. Rocky desertification is a serious ecological problem and it leads to progressive impoverishment of the local residents in Yunnan. Scientists from Restoration Ecology Research Group of XTBG have gained much experience in controlling rocky desertification in karst areas in Yunnan and Guizhou provinces.



Signing ceremony



Abroad

Indonesia

XTBG and Mulawarman University signed a Memorandum of Understanding (MoU) on October 5, 2011. According to the MoU, the two parties will collaborate in academic exchanges, student training, jointly hold academic conferences and exchange scientific materials and information. Both parties are to share academic journals and data of field stations. Any other agreed activities of mutual benefits to improve tropical forest ecosystem studies, field platforms, and staff training will be encouraged.

During the visit in Indonesia from October 1-6, XTBG delegation also visited Gadjah Mada University. A MoU was signed between XTBG and the Faculty of Forestry, Gadjah Mada University. The two parties are to conduct comprehensive cooperation in holding field course training, student exchanges, scientific research, and information sharing.

The two MoUs will be in effect from 2012 to 2016.

The XTBG delegation to Indonesia was headed by Prof. CAO Min, deputy director of XTBG. Prof. Ferry SLIK, Dr. Rhett HARRISON, and Dr. YANG Qing accompanied the visit.



Prof. CAO Min signs the MoU between XTBG and Mulawarman University, Indonesia



Laos

In May, Prof. CHEN Jin headed up a 4-person delegation to Laos. The visit aimed at seeking cooperation opportunities in industrialization research on biofuel species.

During their stay in Laos, Prof. CHEN Jin met Mr. Somkeo MANIVANH, head of Department of Agriculture and Forestry, Oudomxai, Laos. The two parties exchanged ideas on the industrialization of *P. volubilis*, urban gardening and green landscaping, and establishment of a botanical garden in Oudomxai.

Prof. CHEN Jin also held colloquium with Mr. Kham NAMMIXAY, Deputy Chief of Environment Monitoring Quality Center, Environmental Research Institute, Science Technology and Environment Agency. They discussed research advances in *J. curcas*. The two parties may cooperate to provide technical assistance for the large-scale cultivation of *J. curcas*.

The XTBG delegation was composed of Prof. XU Zengfu, Dr. YANG Qing, and Mr. DENG Jiwu.



XTBG delegation investigates the *Jatropha* plantation and demonstration bases in Laos.





Talent Training and Team Building

Photo by LIN Hun

Postgraduate Education

XTBG has enrolled more than 550 graduates from 1986 and more than 350 graduates got their degrees here. There are 200 graduates in the garden in 2011, among whom 66 are PhD candidates, including 7 foreign students, and 144 are master students, including 5 foreign students. Furthermore there are 20 graduates co-supervised by XTBG and universities. XTBG offers programs in two major academic fields: plants and ecology. Until end of 2011, 47 scientific researchers of XTBG are qualified to supervise graduates in botany (16) and ecology (31), including 8 foreign supervisors, in whom, Prof. Ferry SILK were promoted from Master student supervisor to PhD student supervisor for his excellent research accomplishment in 2011. In 2011, 41 students, including 29 master candidates and 12 PhD candidates, accomplished their study and graduated.

Talent Training

Tropical Horticultural Training

September 11, leaders of XTBG and Simao Normal College celebrated 10 years Tropical Horticulture Training Cooperation, and signed another 10 years cooperative contract in Simao Normal College.

In cooperation with Simao Normal College, a personnel training base for tropical horticulture has been established at XTBG since 2001. A total of 38 college students began their one-year training courses at XTBG to improve their knowledge on tropical horticulture technique in the year 2011.



Annual Training Course in Gardening and Horticulture

The 17th Annual Training Course in Gardening and Horticulture was held by XTBG Horticultural Training School and the No. 68 Institute of Yunnan Provincial Professional and Technical Ability Appraisal on Horticulture at XTBG. The 31-day (August 1 -31) curriculum consisted of lectures, field practice, demonstration, study tours, discussion and final test. A certificate was awarded to each participant upon his or her successful completion of the curriculum. 81 participants from south Yuannan accomplished the training course. The No. 68 Institute of Yunnan Provincial Professional and Technical Ability Appraisal on Horticulture at XTBG was designated by the Department of Labor and Social Security of Yunnan Province in 1997. Since then, XTBG has hosted training course on gardening and horticulture each

year, making full use of its advantages in the knowledge and skills on landscape planning and designing, horticultural cultivation, seed storage, plant protection, forest science. From then on, more than 1,100 gardeners have been trained and awarded Horticulture Professional Certificates at XTBG.

TEAM BUILDING

New Recruitment and Promotion

In 2011, more than 20 interview meetings were held by Human Resource and Education Department for recruiting new staffs to meet the expanding needs of XTBG. Three principal investigators have been appointed for setting up new scientific research groups, Prof. ZHOU Zhekun for Palaeoecology Research Group, Prof. MA Yongxing for Landscape Ecology Group and Prof. ZHANG Yiping for Global Change Group. Moreover, 30 new staffs were newly recruited, in whom 23 are joined XTBG in 2011, and 7 remains to come in 2012. Among those 23 new staffs, including two associate professors Dr. Frédéric JACQUES from France, graduated from National Museum Natural History and International Young Scientist of CAS, and Dr. LAN Tiange, graduated from Göteborg Universitet in Sweden and postdoctoral Research Scholar of Institut National de la Recherche Agronomique (INRA) France, and 21 of them are newly-graduated students, including 6 Ph.D, 15 Msc. Prof. Richard CORLETT from National University of Singapore who will take the position of director of Center for Integrative Conservation and principal investigators of Biodiversity Study Group and two associate professors, Dr. Michael MCLEISH from



Frédéric JACQUES

Australia for Plant geography lab and Dr. Yann SURGET-GROBA from France for Ecological Evolution Group, with other 4 new staffs will join XTBG in 2012. Eighty four staffs obtained their promotion from XTBG in Annual Promotion of XTBG 2011.



Honors

Prof. YU Diqu and Prof. ZHANG Yiping were awarded Government Subsidies of the State Council of China and Yunnan Government Subsidies respectively.

Four professors, Prof. LIU Aizhong and Prof. FANG Zhen, Prof. XU Zenfu and Prof. Charles CANNON have been awarded “Yunnan Special Grant for 100 Selected Outstanding Personnel from Overseas” by Yunnan Provincial Party Committee Organization Department. Prof. ZHANG Shibao has been honored “CAS WANG Kuancheng Award for Outstanding Achievements to Western Scholars” by “WANG Kuancheng Education Fund” and Postdoctoral Fellow, Dr. XING Yaowu was awarded “CAS WANG Kuancheng Award for Outstanding Achievements to Postdoctoral Fellows”.

Prof. LIU Wenjie was assessed as “Excellent” in Appraisal of Performances of 2007 CAS West Light Foundation. Moreover, 5 staffs were sponsored by new projections of West Light Foundation, including one general project, 3

projects for newly graduated Ph.Ds, and 1 project for Ph.D candidates who are the scientific staffs of XTBG. Personnel Archive was honored “Excellent” by CAS in CAS Personnel Archive Assessment 2011. Fifty four XTBG staffs was honored “Excellent” in XTBG Annual Staff Assessment 2011. XTBG Human Resources and Education Department, Project Management and Foreign Affair Department were honored “Excellent” in XTBG Annual Administrative Departments Assessment 2011.

Postdoctoral Researchers and Visiting Scholars

In 2011, five postdoctoral researchers, Dr. Marie Julie FOUGERE-DANEZAN from France, Dr. Mareike Ursula Martha ROEDER from Germany, and Dr. Joeri Sergej STRIJK graduated from Netherlands. Dr. LI Fei, and Dr. WANG Li from China, joined XTBG. In total, 10 postdoctoral researchers were working at XTBG in 2011.

Three senior visiting scholars, Prof. Robert Andrew SPICER from Open University (UK), Associate Professor Jonathan Miles Adams from Seoul National University (Korea) and Prof. Dr. Stephen G. A. COMPTON from University of Leeds (England), were sponsored by XTBG for doing cooperative studies at XTBG.



LEFT Mareike Ursula Martha ROEDER
RIGHT Joeri Sergej STRIJK





Visits

Photo by CHEN Wenyou

BAI Chunli

Prof. BAI Chunli, President of the Chinese Academy of Sciences (CAS) made an inspection tour to XTBG on December 24.

BAI firstly inspected the nursery and the cultivation base of star oil nut and physic nut tree (*Jatropha curcas* L.). He was briefed on the research planning and progress relating the two oil plants.

Afterwards, BAI visited the living collections and planted a tree of *Vatica odorata* (Griff) Symington in the Commemorative Plant Garden.

BAI also inspected the Central Laboratory of XTBG. Ms. FU Yun, director of the laboratory introduced the scope and management of the laboratory.

Prof. CHEN Jin, director of XTBG, presented a report on the garden's development since the "Innovation Phase III", including scientific research, team building, infrastructure construction, innovation culture, species conservation, scientific popularization, and the cooperation between XTBG and local authorities. He also introduced the 12th five-year plan and "Innovation 2020" of XTBG.

BAI gave a high appraisal on the achievements made by XTBG over the past years. He pointed out that XTBG should strive to become a pioneer in regional conservation and a research hub for national strategic tropical plant resources.



At the cultivation base



President BAI Chunli

He also encouraged XTBG to position itself among world-class botanical gardens by 2020.

During the inspection, BAI also held talks with XTBG's administrative leaders and professors, including Mr. LI Hongwei, Prof. CAO Min, Prof. LI Qingjun, Prof. XU Zaifu, etc.

BAI inspired XTBG staff by autographing the XTBG's spirit "responsibility, reality, sincerity and harmony".

Accompanying the visit were Ms. LI Ting, head of CAS General Office, Prof. SU Ronghui, deputy director of CAS Bureau of Life Sciences & Biotechnology, Prof. WANG Qingli, president of CAS Kunming Branch, and Mr. LI Lei, CPC secretary of CAS Kunming Branch, etc.



LU Yongxiang

Prof. LU Yongxiang, Vice-Chairman of the Standing Committee of the National People's Congress (NPC), together with other officials of Yunnan province and Xishuangbanna, paid an inspection tour to XTBG on June 18.

Looking around the Flower Garden, Palm Collection, and other living collections, LU spoke highly of the landscape optimization of XTBG over the past five years. He found that the memorial *Dracaena* tree he planted in the Commemorative Plant Garden in 1999 has become luxuriantly green.

LU subsequently visited the new scientific research center, and was introduced to the ongoing research work by a number of XTBG scientists. While listening to the reports, LU had cordial exchange with research staff asking questions and giving comments.

During the inspection, LU also held talks with administrative leaders and some research professors.

Prof. CHEN Jin, director of XTBG, made a brief report concerning XTBG's development since the Phase III of Innovation Project,

including the progress of scientific research, regional biodiversity conservation, and infrastructure construction. He also talked about the 12th five-year plan of XTBG.

LU gave a high appraisal to the achievements of XTBG over the past years. He also expressed confidence for the future development of XTBG. He urged the scientists here to continue their excellent work in applied botany, resource plant development, and biodiversity conservation. He encouraged XTBG to initiate seed exchange with Latin America, Southeastern Asian, and African countries, and establish more research collaborations.

Accompanying the visit were Mr. YANG Baojian, vice chairman of the People's Congress of Yunnan Province, Mr. JIANG Pusheng, CPC Secretary of Xishuangbanna, Prof. ZHANG Zhibing, director of CAS Bureau of Life Sciences & Biotechnology, Prof. WANG Qingli, president of CAS Kunming Branch, etc.



*At the cultivation base of *Jatropa curcas* L.*





HE Guoqiang (middle) in palm collection

HE Guoqiang

Mr. HE Guoqiang, who is a member of the Standing Committee of the Political Bureau of the Communist Party of China (CPC) Central Committee and secretary of the CPC Central Commission for Discipline Inspection, made an inspection tour to XTBG on February 26.

In the company of Prof. CHEN Jin and Mr. LI Hongwei, HE visited the living collections and tropical rainforest within XTBG.

Prof. CHEN Jin reported the master planning and achievements in scientific research, species preservation and public education.

While learning about that XTBG has been keeping good cooperation ties with Xishuangbanna government and made contributions to local development, HE encouraged XTBG to further its effort in promoting the economic development of Xishuangbanna and protecting the tropical rainforest in the region.

In the Commemorative Plant Garden, HE planted a *Pometia tomentosa* tree for memory, which is a dominant uppermost canopy tree and a characteristic species of riparian forest in Xishuangbanna's tropical rainforest.

Yunnan Governor QIN Guangrong and other officials of local government accompanied the inspection tour.



LI Jianguo

Mr. LI Jianguo, vice-chairman and secretary-general of the Standing Committee of the 11th National People's Congress (NPC), China's top legislature, paid an inspection tour to XTBG on June 25.

Prof. ZHOU Zhekun, deputy director of XTBG, made a brief report on the development and future planning, and accompanied a tour within the garden.



LI Jianguo inspects XTBG

LI showed much interest in the preservation and utilization of plant resources and the beautiful landscape of XTBG.

LI planted a *Chukrasia tabularis* to mark his visit in the Commemorative Plant Garden.

Isma'il Tiliwaldi

Mr. Isma'il Tiliwaldi, vice chairman of the Standing Committee of the National People's Congress of China, paid an inspection tour to XTBG on May 21.

Mr. LI Hongwei, CPC Secretary of XTBG, accompanied the officials a tour to some elite living collections like Flower Garden, Distinctive Plant Collection, and Palm Garden, etc. Mr. Isma'il Tiliwaldi planted a *Swietenia mahagoni* in the Commemorative Plant Garden.



Isma'il Tiliwaldi in Tropical Brilliant Flower Garden



LIU Ping

Mr. LIU Ping, vice governor of Yunnan province, paid an inspection tour to XTBG on March 6. His tour aimed at instructing the third-phase construction of XTBG.

LIU made field visit to Flower Garden, Palm Collection, and the New Research Center. The tour was accompanied by Mr. LI Hongwei, CPC secretary of XTBG.

Prof. LI Qingjun, deputy director of XTBG, reported the achievements of campus construction in the second phase and planning for the reconstruction of Green Stone Forest (limestone forest).

LIU encouraged XTBG to attach more importance to plant breeding and cultivation, improving landscape design, and attracting more visitors. He affirmed the feasibility of reconstructing the Green Stone Forest. He also said that the provincial government will give continuous policy and funding support to XTBG.



LIU Ping inspects XTBG

SONG Tao

Vice Foreign Minister SONG Tao paid a visit to XTBG on April 28. Prof. LI Qingjun, deputy director of XTBG, accompanied the vice minister on a tour to the Flower Garden, Exotic Plant Collection, Palm Garden, the Commemorative Plant Collection, and the Tropical Rainforest Ethnic Culture Museum within XTBG.

In front of the Memorial of Prof. TSAI Hsi-Tao, founder of XTBG, SONG paid his respect to the eminent Chinese botanist. He also encouraged the younger generation of XTBG to carry forward the spirit of TSAI in contributing to regional biodiversity conservation and economic development in the region.

SONG expressed appreciation for XTBG's active participation in S&T cooperation with countries of GMS subregion.



SONG Tao (left) inspects XTBG



Chinese ambassador to UK

Mr. LIU Xiaoming, Chinese ambassador to the United Kingdom of the Great Britain and Northern Ireland, paid a visit to XTBG on August 29. His tour within the Garden was accompanied by Prof. LI Qingjun, deputy director of XTBG.

Seeing the *Shorea wangtianshuea* planted in the Commemorative Plant Garden in 1984 by His Royal Highness The Prince Philip of UK, the then Chairman of the World Wide Fund, LIU showed much interest. The tree is a symbol of lasting friendship between China and UK.



Mr. LIU Xiaoming and his wife in front of the towering tree planted by Prince Philip of UK

Chinese ambassadors and diplomats to foreign countries

A delegation consisting of 61 Chinese ambassadors and diplomats to foreign countries paid a visit to XTBG on April 19. The delegation was headed by Mr. LUO Linquan, Chinese ambassador to Greece.

During their inspection tour, the delegation visited the new scientific research center and living collections within XTBG. During the visit, they exchanged ideas with staff in charge of foreign affairs and program management. They suggested ways and means for expanding international cooperation. They spoke highly of XTBG's efforts to help regional development and biodiversity conservation.

The diplomats, especially Chinese ambassadors to Peru, Ireland, and Costa Rica, said that they would assist XTBG in promoting exchange and cooperation with institutions in those countries.



Visit XTBG new research center



National Science Foundation officers of USA

Dr. William Y. CHANG, director of the NSF Beijing Office, headed a delegation of American National Science Foundation (NSF) to visit XTBG during August 1-5. The visit was accompanied by Dr. LIU Yinghui of National Natural Science Foundation of China (NSFC). Prof. CAO Min, deputy director of XTBG, showed the guests around the living collections, scientific research center, and the 20-ha tropical forest dynamics plot.



Colloquium of cooperation among XTBG, NSF and NSFC

On August 2, the delegation of NSF and NSFC officials held a colloquium with some XTBG scientists. Prof. CHEN Jin, director of XTBG, introduced the garden's history, research areas, achievements, future planning and international collaborations to the guests. Dr. James WANG and Dr. Alan TESSIER of NSF introduced the cooperation between NSF and China and guide to international cooperation programs. Afterwards, the NSF, NSFC and XTBG exchanged ideas on topics such as international cooperation programs.

Vietnam

A 6-member delegation of Vietnam Academy of Science and Technology (VAST) and Cat Tien National Park (CTNP) paid a visit to XTBG upon the invitation of Prof. CHEN Jin during April 3-8. The delegation was headed up by Dr. VU Ngoc Long, vice director of Institute of Tropical Biology (ITB), VAST. During their visit in Xishuangbanna, a MoU was signed among XTBG, ITB, CTNP, and Xishuangbanna National Nature Reserve Administration (XNNR).

Prof. CAO Min, deputy director of XTBG, accompanied the guests on a visit to the 20-ha forest plot in Bubeng, Mengla. He gave a detailed introduction to the establishment of the 20-ha forest dynamics plot in Xishuangbanna. The Vietnam delegation also visited the laboratories, herbarium, library, museum, and living collections of XTBG. On April 6, the delegation gave presentations entitled "An overview of the study of Bio-resources in Vietnam",



Prof. CHEN Jin (front right 2) signs the MoU among XTBG, ITB, CTNP, and XNNR

"Demand for permanent forest plots in Vietnam", and "Introduction on the Cat Tien National Park: Regarding on the forest protection and effectively management".



Other Visitors

January

- 10th Pirkko POUTIAINEN, Embassy of The Republic of Finland in The People's Republic of China.
- 11th Steve COMPTON, Institute of Integrative and Comparative Biology, University of Leeds, UK.
- 14th Jonathan ADAMS, Seoul National University, Korea.
- 14th YANG Xiaoyan, ZHANG Dan, Institute of Geographic Sciences and Natureal Resources Research, Chinese Academy of Sciences, China.
- 17th Yann Surget-Groba, University of Geneva, Switzerland.

February

- 5th LONG Jiang, Director, Yunnan Provincial Science and Technology Department, China.
- 8th WANG Xiaotao, Director, Department of Fixed Assets Investment, National Development and Reform Commission, China.
- 13th WANG Xueqin, Ministry of Science and Technology, China.
- 15th XU Zhihong, Peking University, China.
- 22nd Douglas W. YU, Kunming Institute of Zoology, Chinese Academy of Sciences, China.

March

- 8th Alexia STOKES, National Institute of Agronomy of France.
- 11th Kit H. LEUNG, McGill University, Canada.
- 11th Raymond ARCHAMBAULT, Curator of the Fungarium, Biodiversity Center of Montreal, Canada.
- 21st MA Longlong, GuangZhou Institute of Energy Conversion, Chinese Academy of Sciences.

- 22nd Jason M. TYLIANAKIS, University of Canterbury, New Zealand.
- 29th Michael MCLEISH, University of Stellenbosch, South Africa.
- 29th LIN Kui, College of Life Sciences, Beijing Normal University, China.

April

- 5th Rodrigo A. S. PEREIRA, University of San Paulo, Brazil.
- 12th Hans CORNELISSON and William K. CORNWELL, Free University Amsterdam, The Nethewrlands.
- 14th Achim Bräuning, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany.
- 20th A 60-person delegation from Core Environment Program and Biodiversity Conservation Corridors Initiative in the Greater Mekong Subregion (CEP-BCI program)
- 26th Finn KJELLBERG, Centre d'Ecologie Fonctionnelle et Evolutive, France.
- 28th Fred PINTO, Ontario Ministry of Natural Resources, Canada.
- 28th Paul COOPER, Sean THOMAS, and a 20-person delegation of University of Toronto, Canada.

May

- 3rd David ROUBIK, Smithsonian Tropical Research Institute, Panama.
- 7th A 28-person delegation of Chiang Mai University, Thailand.
- 17th Tohru NAKASHIZUKA, Tohoku University, Japan.
- 21st A 5-person delegation of University of Strasbourg, France.
- 31st Heather ERICKSON, The Long Term



Ecological Research (LTER) Network.

June

- 8th Hong LIU, Fairchild Tropical Botanic Garden, USA.
- 17th Hong YANG, Bryant University, USA.
- 20th Yusheng LIU, East Tennessee State University, USA.
- 26th Somkeo MANIVANH, and a 14-person delegation of Department of Agriculture and Forestry, Oudomxai, Laos.
- 28th Hendrik-Jan MEGENS, Wageningen University, The Netherlands.

July

- 1st Taylor F. LOCKWOOD, Internationally nature photographer, USA.
- 1st Peter ALPERT, University of Massachusetts, USA.
- 5th CHEN Xi, Texas Tech University, USA.
- 19th Peter MORTIMER, World Agroforestry Centre (ICRAF).
- 26th Richard T. CORLETT, National University of Singapore, Singapore.
- 27th Juerg STOCKLIN, University of Basel, Switzerland.

August

- 2nd David J. LOHMAN, The City University of New York, USA.
- 4th Hugh W. PRITCHARD, Royal Botanic Gardens, Kew, UK.
- 10th Hugh POSSINGHAM FAA, The University of Queensland, Australia.
- 16th Jonathan ADAMS, Seoul National University, Korea.

September

- 13th Xuemei HAN, Yale University, USA.

October

- 11st 24 Arab diplomats in China.
- 11st Sandrine ISNARD, UMR AMAP, France.
- 18th Dharmalingam MOHANDASS, University of Pondicherry, India.
- 25th Mareike ROEDER, University of Göttingen, Germany.

November

- 1st Katheryn BUSHLEY, Oregon State University, USA.
- 4th Bosco CHAN, and a 3-person delegation of Kadoorie Farm & Botanic Garden, Hong Kong.
- 4th Nathan G. SWENSON, Michigan State University, USA.
- 9th Marcel HOLYOAK, University of California, USA.
- 15th Jeremy Miller, National Museum of Natural History, The Netherlands.
- 22nd Ida THEILADE, University of Copenhagen, Denmark.
- 27th Michael PHILLIPS, Centre for Research in Agricultural Genomics, CSIC-IRTA-UAB, Spain.
- 29th 20 diplomats in China from Central and Eastern European countries.

December

- 6th Alexander VALENTINE, University of Stellenbosch, South Africa.
- 8th XIANG Qibai, Nanjing Forestry University, China.
- 8th Can DAI, University of Virginia, USA.
- 13th Robert A. SPICER, The Open University, UK.
- 13th Dietrich SCHMEIDT-VOGT, Asian Institute of Technology.





Financial Review

Photo by TAN Yunhong

Income and Expenditure (Million Yuan)

	Categories	FY2009	FY2010	FY2011
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INCOME

	Government Grants	37.706	30.155	31.803
	Infrastructure	27.800	0	0
	Admissions & Services	30.179	31.919	36.692
	Grants for research	31.772	31.506	55.217
	Miscellaneous	0.195	0.526	1.236
	Sum	127.652	94.106	124.948

EXPENDITURE

	Staff costs	43.139	52.590	67.303
	Maintenance	0.807	0.220	0.139
	General and Admin. Expense	2.403	1.581	1.872
	Infrastructure	33.540	0	4.631
	Equipment	20.559	25.211	23.326
	Research & Horticulture	29.488	24.195	32.020
	Miscellaneous	0.027	0.080	0
	Sum	129.963	103.877	129.291



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