XTBG

Annual Report 2009

Xishuangbanna Tropical Botanical Garden
Chinese Academy of Sciences

XTBG

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March 31, 2010

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.

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Celebration of the 50th anniversary

The 50th anniversary of the Xishuangbanna Tropical Botanical Garden was celebrated with a grand gathering on January 1st at the headquarter.

The celebration ceremony was presided over by Prof. CAO Min, with cheerful attendance of officials from the Chinese Academy of Sciences and government departments, prestigious scholars from home and abroad, representatives from cooperating institutions, as well as faculty, staff and students of XTBG.

Prof. CHEN Jin, director of XTBG, delivered a keynote speech entitled "Looking back over XTBG's tumultuous but steadfast development, and looking forward to greater adventures through harmonious and unified effort". Prof. CHEN Jin recalled a history of XTBG full of hardships, successes, and vicissitudes in fortune, and the sound and all-rounded development of XTBG since the implementation of the CAS Knowledge Innovation Program. In his speech he also briefly described how XTBG was embarking on another journey that would enable XTBG to become a world class botanical garden in the future.

Ms. DAO Linyin, the governor of Xishuangbanna Dai Autonomous Prefecture, expressed her warm congratulations to the 50th birthday of XTBG, and highly praised the contributions of XTBG to the development of Xishuangbanna over the past half a century, and wished it a brighter future.

Representatives from CAS Kunming Branch and CAS Bureau of Life Sciences & Biotechnology also delivered speeches respectively at the ceremony. Prof. HE Shan-an, a senior botanist and formal president of International Association of Botanical Gardens, spoke highly of XTBG. He expressed his heartfelt praise and respect to XTBG's pioneers for their hard work and was full of confidence for the future development of the garden.

Recalling his experiences of cooperating with XTBG scientists over many years, Dr. W. John KRESS described the great changes in XTBG that he had witnessed. As representative of XTBG faculty and staff, Prof. LI Qingjun spoke at the gathering. Having been working in XTBG for 22 years, Prof. LI witnessed many of the vicissitudes in fortune and revivals of XTBG over the years and has himself become a prestigious scholar.

A student representative also made remarks.

Many people who have been caring for and supporting the development of XTBG sent congratulatory letters.

Prof. LU Yongxiang, CAS President and Vice Chairman of the Standing Committee of China's top legislature, the National People's Congress, sent his congratulatory message which read "Striving to build up a treasure store of tropical plant resources, and exploring the secrets of ecosystems through scientific development".

Chinese Health Minister CHEN Zhu, CAS Executive Vice President BAI Chunli, NSFC President CHEN Yiyu and former President XU Zhihong of Beijing University all sent congratulations to XTBG.

To celebrate this festive occasion, a campfire party was held on December 31 at XTBG headquarter.










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1. The celebration ceremony of XTBG 50th anniversary.
2. Prof. CHEN Jin.
3. Prof. CAO Min.
4. Ms. DAO Linyin.
5. Prof. SU Ronghui.
6. Mr. XI Jianxun.
7. Dr. W. John KRESS.
8. Prof. HE Shan-an.
9. Mr. LI Hongwei.
10. Prof. LI Qingjun.
11. Campfire party in commemoration of the 50th founding anniversary of XTBG
12. Participants from home and abroad.

Xishuangbanna International Symposium II - Biodiversity Conservation:
Research Imperatives for Scientific Institutions

In order to commemorate the 50th year anniversary celebration of XTBG, an international symposium on biodiversity conservation was convened on January 1-2, 2009. The event was attended by 120-plus prestigious scholars and administrators from home and abroad.

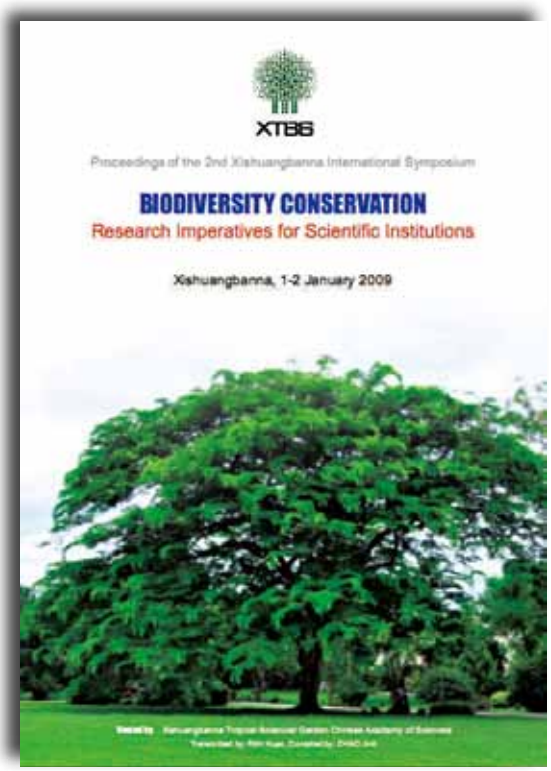
Prof. CAO Min presided over the opening ceremony. Prof. CHEN Jin delivered a warm welcoming address. Dr. Joachim GRATZFELD, representative of Botanical Gardens Conservation International (BGCI) and Prof. Priya DAVIDAR, the president of the Association for Tropical Biology and Conservation (ATBC) made remarks.

Themed with "Biodiversity Conservation: Research Imperatives for Scientific Institutions", the Xishuangbanna International Symposium invited twelve world-renowned experts to give presentations on emerging issues in their fields.

The twelve invited talks were diverse and insightful, and covered both new angles and on-going concerns. After each presentation, informative comments and questions were aired by the audience. Evidently, the workshop provided a good forum for exchange of information and experience among both lecturers and the audience.

At the closing ceremony, Dr. Peter Wyse JACKSON, director of National Botanic Gardens of Ireland and former secretary general of BGCI, and Prof. Sir Peter CRANE, former director general of Royal Botanical Gardens in Kew made summary speeches respectively.

All information regarding this particular symposium was well documented and electronically published at:
(http://english.xtbg.cas.cn/ic/ic/200912/t20091210_48321.html).



Proceeding of the Xishuangbanna International Symposium II.

Conference hall.

Chairmen and invited speakers.

Discussions and visits.

Participants to the conference.

International Consultation for XTBG

In addition to the above international symposium, Prof. CHEN Jin, Director-General of XTBG, invited an Expert Committee to take part in a one-day Consultation Session to advise him on future directions of the Garden in its programs of research, education and display.

The Expert Committee convened on January 3. The session began with a welcome and introduction to the members of the Committee by XTBG Deputy Director Dr. CAO Min, which was followed by a short address by SHI Bing on behalf of Dr. PAN Jiaofeng, CAS Director of the Bureau of Strategic Planning. The XTBG Director then provided a General Report of the 50 Years' Growth and Future Perspectives of XTBG (including a short video: XTBG – A Blossoming Tropical Botanical Garden).

Dr. W. John KRESS chairing the consultation.

Conference hall.

The discussion points and questions for the XTBG Director and Staff by members of the Committee were grouped around the following themes:

1. Administration and organizational structure;
2. Horticulture and garden design;
3. Public education and professional training; and
4. Research.

The final recommendations ("the Final Report") were formulated by the expert committee three months later and submitted to XTBG in April.

Members of the Committee and Observers

Chairman:

Dr. W. John KRESS, Curator and Research Scientist, National Museum of Natural History, Smithsonian Institution, USA

Members:

Prof. Dr. Carol BASKIN, University of Kentucky, USA
Dr. David ROUBIK, Smithsonian Tropical Research Institute, Panama
Dr. Hugh PRITCHARD, Research Section, Royal Botanic Gardens, Kew, UK
Dr. IRAWATI, Director, Bogor Botanic Gardens, Indonesia
Prof. Dr. Jerry BASKIN, University of Kentucky, USA
Dr. Joachim GRATZFELD, Director, Regional Programmes, BGCI, UK
Dr. Michel CONAN, Garden and Architectural Designer, France
Prof. Dr. Noel HOLBROOK, Harvard University, USA
Dr. Peter Wyse JACKSON, Director, National Botanic Gardens of Ireland, Ireland
Prof. Priya DAVIDAR, Pondichery University, India
Prof. Dr. Richard CORLETT, National University of Singapore, Singapore
Prof. Dr. Roger KITCHING, Griffith University, Australia
Prof. Dr. Sir Peter CRANE FRS, The University of Chicago, USA
Prof. Theodore FLEMING, University of Miami, USA
Dr. CHIU Sein Tuck, Kadoorie Farm and Botanic Garden, Hong Kong
Dr. HE Shan'an, IABG & Nanjing Botanical Garden Mem. Sun Yat-Sen
Dr. LI Shaohua, Deputy director, Wuhan Botanical Garden, CAS

Observers - Chinese Academy of Sciences:

SHI Bing, Division Director, Bureau of Strategic Planning, CAS
GUAN Zhongcheng, Professor, Center for Evaluation on CAS Institutions, CAS

Summary and Conclusions of the Committee

The development of the Xishuangbanna Tropical Botanical Garden under the leadership of Director CHEN Jin is highly impressive and much progress and important advances have been made over the last few years.

The openness of his approach to the Expert Committee was clear and his frank responses to questions were appreciated. The Director demonstrated an exceptional connection with and understanding of the entirety of activities at the Garden, with little need to seek clarification from colleagues on facts and figures about the institute. It was also clear that he has a good understanding of the roles, actions, and potentials of botanic gardens worldwide, which he has evaluated well in the development of the Garden's long-term vision and immediate priorities. Dr. CHEN Jin clearly wishes to build a world class institute and has taken great strides to date to achieve that goal. His desire to continue on the right path is evident from his guidance through the Expert Committee process.

As outsiders to the Garden, members of the Expert Committee learned a considerable amount about the Garden from the consultation process as it was conducted. One difficulty was understanding the drivers of research, other than the goals of high impact scientific papers and germplasm resource conservation. Background information (variable in its detail) was presented on 20 research groups, but the Committee would have benefited from listening to short presentations from each group, plus focused discussion. However, it was recognized that this was impossible in the time available. The wish was expressed that the public education program be reviewed at a later date and the same approach should be taken for the research programs.

Within each of the three clusters of research (forests, conservation, germplasm resource) the connections, and thus opportunities to bring added value to the institute, were not obvious in some cases and each would benefit from having a clearly articulated strategic direction. The development of a framework for the three clusters individually (activities, outputs, outcomes, and goal) would help, particularly if they were then used as the basis of a collective (upper tier) framework. The ensuring framework for approaches, milestones, means of verification and risks (assumptions) would enable management to monitor performance (and intervene where necessary). Similarly, the drawing up of a responsibility matrix, which highlights the relationships between the three clusters, would be insightful. Notwithstanding all this, there is evidence of a number of very active research groups, with a positive attitude to securing competitive grants and a good throughput of students. More information on the graduate school would also have been helpful.

In summary, XTBG should consider all of the specific and focused recommendations made by members of the Expert Committee during the discussion. Based on these individual recommendations the Expert Committee also provides the following key actions to be implemented in a cross-cutting fashion:

- XTBG should develop, publish and implement a broadly based institutional Strategy that outlines priorities, specific measurable targets, and milestones. This Strategy should seek to integrate all aspects of the Garden's work in research, biodiversity conservation, horticultural display, environmental education, and sustainability into a clear and coherent integrated policy to guide the development of the institution over the coming decade;

- XTBG should take steps to revisit its collections policy to ensure that living collections, plant displays, and educational

functions are more closely integrated with its research and biodiversity conservation priorities;

- XTBG should review and revisit the structure of its research division to ensure that added value is gained from implementing a multi-disciplinary and cross-cutting approach to its research activities;

- XTBG should seek to develop itself as a model institution in sustainability, ensuring not only that it provides leadership in promoting the wise and sustainable use of biological resources, but also that it monitors and reduces any detrimental environmental impacts of the Gardens' own activities;

- XTBG should work to become the leading regional centre for biodiversity and biological resource conservation, acting as a centre for applied research, data management and dissemination, monitoring, protecting and restoring species and ecosystems, and providing expert guidance for policy makers both in China and in the wider South-east Asian region.

The Committee understands and accepts that not all of the above specific and key recommendations will be implemented at the same time. With the need for prioritization in mind, the committee requests that a draft Action Plan be drawn-up within one year by Director CHEN Jin and his senior management staff. This plan should rank and justify the steps to be taken as well as provide a brief rationale for action or inaction on each recommendation. Such an Action Plan will provide the basis for the future strategic growth and development of Xishuangbanna Tropical Botanical Garden.

SCIENCE

In the year 2009, there are altogether 62 newly established research projects with total contract fund 31 million Yuan, of which:

- 11 projects funded by the National Natural Science Foundation of China;
- 1 project supported by the Ministry of Science and Technology;
- 4 projects supported by the other respective Ministries;
- 7 projects funded by Yunnan Provincial Fund for Natural Sciences;
- 15 projects supported by the Chinese Academy of Sciences;
- 5 projects funded by the CAS "Western Light " talent traing program;
- 12 projects funded by local government, enterprises and international agencies;
- 2 international projects.

In the year 2009, XTBG researchers have achieved the following:

- 98 research articles published on internationally peer-reviewed scientific journals (Source Journals of ISI Web of Science);
- 60 research articles published on CSCD (Chinese Science Citation Database) referred journals;
- 30 research papers/presentations presented on international conferences and symposia;
- 4 monographs published;
- 4 patented inventions;
- 2 new plant varieties.

Project Development

Development of carbon market and conservation financing mechanisms for multifunctional landscape bio-corridors in the Upper Mekong:
an international program granted by World Agroforestry Centre

World Agroforestry Centre has launched an international program, "Development of carbon market and conservation financing mechanisms for multifunctional landscape bio-corridors in the Upper Mekong", which will carried out from March 2009 to February 2012. XTBG is one of the project partners.

The detailed tasks include:

1. Establish stepping stone sites in Mengla County (10x10km^2) of Xishuangbanna based on criteria agreed during kick-off meeting;
2. Developing a methodology for valuing biodiversity assets;
3. Characterization of a selected stepping stone (biophysical and socio-economic conditions), and assess the biodiversity and carbon asset value;
4. Write research reports and case study papers;
5. Engaging internal communication (3-monthly phone conference with WP and country leader.

Dr. HU Huabin is principal investigator of the project (No.08.7860.3-001.00). The total fund granted to XTBG is Euro 78,180.

The World Agroforestry Centre is to choose 6 pilot sites in China (two sites in Xishuangbanna), Thailand, Laos, Vietnam, and Myanmar to carry out the project. By having investigations on biodiversity and carbon increment in upper Mekong regions, the project aims to discuss financing mechanism of biodiversity conservation.

Integration and demonstration of key-techniques on the restoration of degraded ecological environment in Karst mountain areas:
a national S&T program

XTBG has completed mid-term evaluation on "Integration and demonstration of key-techniques on the restoration of degraded ecological environment in Karst mountain areas", a national S&T project granted by the Ministry of Science and Technology (MOST). Bringing together the project members and related officials, including Prof. CHEN Jin, Prof. CAO Min, etc. a workshop on the project progress was also held on April 12.

On the evaluation meeting, principal investigators, Prof. LIU Wenyao, presented a progress report, including vegetation restoration of ecological environment, framework of land use, cultivation and development of medicinal natural resources, and ecological animal husbandry development.

30 research articles were contributed to the workshop proceedings.

With total fund of 45.95 million RMB, the project was the largest one ever carried out by XTBG. Taking Bijie district of Guizhou Province, a typical Karst area in southwest China, as study area, the project is aimed to provide scientific basis for the restoration of degraded Karst environment.

5 projects granted by CAS "Western Light" Talents Training Program

In 2009, 5 research projects have been granted to XTBG by the CAS "Western Light" Talents Training Program. The fund is 900,000 RMB in total.

Assoc. Prof. GAO Jiangyun of XTBG, among 18 key researchers from Yunnan, was selected as a recipient of the "Western Light" visiting scholar program which was jointly launched by CAS, CPC Central Organization Department, Ministry of Science & Technology and Ministry of Education. The visiting scholars were selected for training at the research institutions and key universities under the related ministries and commissions of the central government.

28 XTBG research fellows have been supported by the CAS "Western Light" Talents Training Program since 1996.

Research consortium on energy plants

In order to boost studies on energy plants, a research consortium on energy plants was established and become operational within XTBG. Several research faculties, including Prof. XU Zengfu, Prof. FANG Zhen, Prof. LIU Aizhong, and Assoc. Prof. YANG Qing, etc. and their groups who have been engaged in molecular breeding, engineering, and screening of energy plants, have been working together as a research consortium headed by Prof. XU Zengfu.

This consortium of researchers focus their activities on developing molecular breeding technology for high yield and adversity resistance (drought, salt, arid land, etc.) of energy plants, especially *Jatropha curcas* L. Establishment of the consortium will provide opportunities for researchers to collaborate and optimize the use of laboratory instruments, while at the same time to share useful data for the research and development of energy plants for biofuels.

4 projects sponsored by Garnier Community Plant Protection Fund

On February 19, a meeting for the donation of Garnier Community Protection Fund was held in Jinghong, capital city of Xishuangbanna. Four XTBG research projects were approved to be sponsored by the Fund.

In cooperation with non-governmental organization (NGO) Shanshui Conservation Center, the skincare brand Garnier has initiated the "Care for Green, Care for Nature" program engaged in protecting rare plants and the environment in southwestern China. The Fund is the first ever corporate sponsored program in China.

With a donation of 1 million Yuan in total, the Fund is to sponsor a series of environmental protection program and promote long-term and effective protection of Southwest China's rich and precious plant resources. The program focuses on promoting exchange and communication among governmental departments, non-governmental organizations (NGOs), research institutions and green organizations and enhancing public awareness of environmental protection.

Research Progress and Outreach Highlights

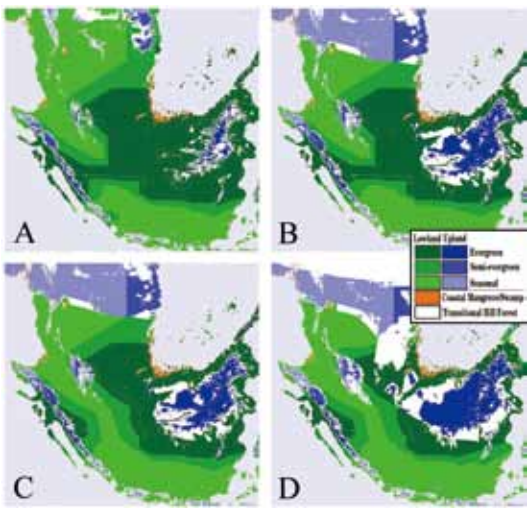
The history of rainforest in Sumatra, Borneo, Java, and Malaysia

Prof. Dr. Chuck CANNON is lead author on a publication in *Proceedings of the National Academy of Sciences* of the United States of America that presents a spatially explicit model of rainforest distribution through the last million years in Sundaland. Sundaland is the 'sub-continent' of the major islands of Indonesia and Malaysia which were joined during previous ice ages but much of which is now submerged due to the higher sea levels after the ice melted.

During most of the last million years, the islands were all joined in a single and much larger landmass. Paleoclimate models strongly indicate that much of this landmass would have been covered with evergreen rainforests, forming an Amazon-like basin. With the onset of the current climate conditions, with a much warmer globe and higher sea levels, forests have been forced to retreat onto the islands, becoming much smaller and more fragmented than they have been in the past.

These dynamics are widely recognized and well understood in North America and Europe but Prof. CANNON's publication demonstrates that the dynamics in Sundaland are exactly in the opposite phase as those in the northern latitude. This means that during the ice age, rainforest is at its greatest extent, while during the warm periods, like now, rainforest is at its lowest extent and exists only in refugia. While Prof. CANNON could explain the expansion of populations out of refugia, he could not explain how refugia were formed. This is a critical question confronting ecologists and biogeographers in Southeast Asia and the work led by Prof. CANNON provides a powerful tool for exploring these dynamics.

Finally, the results of this model have major conservation implications. Much has been written about the decline and degradation of Southeast Asia's rainforests. The rate of conversion from natural forests to intensive plantation forest has remained high for many years. This conversion reduces and fragments the rainforest, leaving little habitat for endangered species like orangutans and gibbons and sun bears and clouded leopards. What this model highlights is the critical fact that the human conversion of Sundaland's forests is occurring only a few thousand years after a major natural reduction and fragmentation of forest area occurred due to changing climate and rising sea levels. So, all of these endangered species were already at probably historical lows in their population and already highly vulnerable to population extinction.



Distribution of 3 distinct forest types at the Last Glacial Maximum, given different model parameters. (A) Maximum lowland evergreen rainforest (LERF) extent; (B) median LERF extent with "closed corridor"; (C) median LERF with "open corridor"; (D) minimum LERF. White areas represent transitional "hill" forests.

Nitrogen allocation in invasive *Ageratina adenophora*

In cooperation with international colleagues, Prof. Dr. FENG Yulong's research team has studied the mechanism of nitrogen allocation in *Ageratina adenophora*, a noxious invasive plant throughout the subtropics. The paper, entitled "Evolutionary tradeoffs for nitrogen allocation to photosynthesis versus cell walls in an invasive plant", was published in *Proceedings of the National Academy of Sciences* of the United States of America.

Many studies have shown that individuals from invasive populations of many different plant species grow larger than individuals from native populations and that this difference has a genetic basis. This increased vigor in invasive populations is thought to be due to life history tradeoffs, in which selection favors the loss of costly defense traits, thereby freeing resources that can be devoted to increased growth or fecundity. Despite the theoretical importance of such allocation shifts for invasives, there have been few efforts to understand apparent evolutionary shifts in defense-growth allocation mechanistically. Reallocation of nitrogen to photosynthesis is likely to play a crucial role in any growth increase; however, no study had been conducted to explore potential evolutionary changes in N allocation of introduced plants. In this publication, FENG show that introduced *Ageratina adenophora* appears to have evolved increased nitrogen allocation to photosynthesis (growth) and reduced allocation to cell walls, resulting in poorer structural defenses. Prof. FENG's results provide a potential mechanism behind the commonly observed and genetically based increase in plant growth and vigor when plants are introduced to new ranges.

An anonymous reviewer has commented this research as "…the research reported in this manuscript takes the investigation of mechanistic causes for invasiveness to a new level…"

Dr. FENG Yulong and *Ageratina adenophora* plants grown in a hill.

Rodents cache seeds of "ideal" size

Scatter-hoarding rodents play an important dispersal role for many large-seeded plants. Seed traits affect foraging behavior; however, it is difficult to isolate their effects because of the covariance among traits. XTBG PhD candidate WANG Bo and his supervisor Prof. CHEN Jin developed a series of experiments using artificial seeds to isolate the effects of seed size, nutrient and tannin content on rodent caching behavior.

With a careful design of the artificial seed, they tested the following predictions: (1) rodents would exhibit a significant and consistent response to each independently tested trait and (2) the seeds with the best combination of traits should have the highest removal rate or greatest dispersal distance. The results indicate that scatter-hoarding rodents choose seeds to cache primarily based on an "ideal" seed size, and larger seeds were likely to be dispersed farther.

The study was carried out during September to November in 2006 and 2007 in a pine forest in Shangri-La Alpine Botanical Garden, Hengduan Mountains, Yunnan Province, Southwestern China (27°54'N, 99°38'E, altitude 3456 m). The study was granted by the National Basic Research Program of China (973 Program—2007CB411603).

Entitled with "Seed size, more than nutrient or tannin content affects seed caching behavior of a common genus of Old World rodents", the publication has been published in the prestigious journal *Ecology* in November 2009.

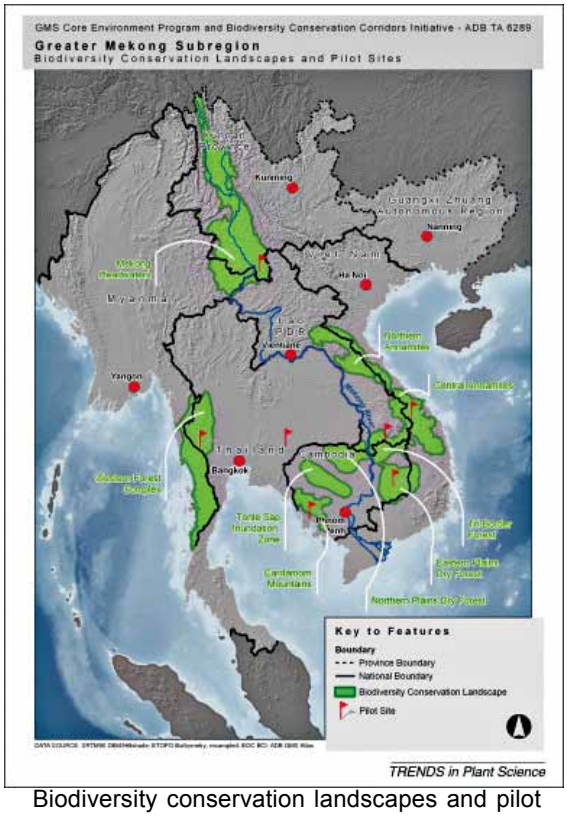
Artificial seeds made from clay, peanut powder and tannin. A 15 cm tin steel thread with a small red plastic tag was connected to each artificial seed.

Apodemus latronum and *Amodemus chevieri*, the two most abundant rodent species in the pine forest, acting both as seed predators and seed dispersers

Tropical botanical gardens: at the *in situ* ecosystem management frontier

Tropical botanical gardens (TBGs) should have a leading role in in situ conservation by directly promoting several initiatives, including the reintroduction of important or valuable native species, focused habitat restoration, 'assisted migration' of species that are vulnerable to climate change, and creative local collaboration with governments, NGOs and indigenous peoples. Compared with temperate gardens, TBGs face heightened challenges for ex situ conservation, including greater absolute amounts of biodiversity, need for resource mobilization, risk of introducing invasive species and potential genetic introgression within living collections. Meanwhile, the ecosystems surrounding TBGs have undergone widespread and rapid conversion. Here, we provide several illustrations of the effectiveness of TBGs in achieving their mission of preserving tropical biodiversity at the frontier of *in situ* ecosystem management.

The publication was been published with Prof. CHEN Jin as a lead author in *Trends in Plant Science*, a special issue edited by Peter R. CRANE and several distinguished scientists to commemorate the bicentenary of the birth of Charles DARWIN and the tercentenary of publication of his most important book - *The Origin of Species.*



Biodiversity conservation landscapes and pilot sites in the Greater Mekong Subregion (Asian Development Bank TA 6289 GMS Biodiversity Conservation Corridor Initiatives). The XTBG is one of the partners and focal points for China's part in the Biodiversity Conservation Corridors Initiative.

Examples of TBGs involving in *in situ* conservation programs. (a) A piece of unique tropical rainforest has been proposed by XTBG scientists and accepted by local government to be preserved as a protected area, increasing the total protected area in Xishuangbanna from 14 to 16%. (b) Scientists and horticulturists from Fairchild Tropical Garden performing a successful reintroduction program. Within the past two decades, the garden has conducted 32 reintroductions of 11 species, in collaboration with land managers at its partner agencies. (c) With the help of technical and financial support from Kadoorie Farm and Botanic Garden, the ecosystem and species status of the Hainan gibbon (*Nomascus hainanus*), the world's rarest ape, both significantly improved.

Disturbance results in assemblages of closely related species

Ecological communities subject to severe or repeated disturbance are typically low in diversity and contain only stress tolerant species. Disturbance can be thought of as an environmental filter that selects for community members with key traits.

Dr. Matthew HELMUS, a postdoctoral researcher from XTBG, made a hypothesis that disturbance should result in community assemblages of closely related species. The publication entitled "Communities contain closely related species during ecosystem disturbance" has been published in *Ecology Letters*.

The authors tested the hypothesis with 18 disturbed and 16 reference whole-lake, long-term zooplankton data sets. When disturbed, communities generally contained more closely related species, regardless of disturbance type. They also discovered that the effect was independent of species richness, evenness, and abundance. Species sensitivities to specific disturbances were phylogenetically conserved, were independent of body size, and could be predicted by the sensitivities of close relatives within same community.

Thus, the authors propose phylogentetic relatedness could act as an effective proxy for missing trait information when predicting community and species responses to disturbance.

Advances in forest fragmentation studies

Prof. Dr. CAO Min's research team has been long engaging in the studies on the dynamics of subtropical and tropical forests in Yunnan province, SW China. They hypothesized that fragmentation of continuous forests significantly increases both the richness and the size of nonconstituent species in soil seed banks. They also found that forest edges do not act as good barrier for the penetration of non-forest species seeds into the interior forest. The research team has set up a primarily index measurement system for human disturbance based on different species groups.

Parts of their research results have been published in *Canadian Journal of Forest Research* and *Forest Ecology and Management.*

Forest fragmentation leads to more forest edges which increase the risk of invasion of nonconstituent species.

Research advances in Dipterocarp physiology

Dipterocarps are keystone species in the forest of Southeast Asia. As useful timbers of high commercial value, Dipterocarp stands have been logged on a large scale, leading in some areas to a serious decline of forest resources. Therefore, it becomes urgent to protect its germplasm. With 34 Dipterocap species protected, XTBG boasts the largest collection of its kind in China.

Based on the Dipterocap collection within XTBG, Prof. CAO Kunfang's research team has made important research advances in the physiological ecology of Dipterocarp species.

These results suggest that stem hydraulics mediates leaf water status, carbon gain, nutrient use efficiencies, and growth rates across the dipterocarp species. The wide variation in functional traits and growth rates among these dipterocarp species along with the trade-offs mentioned above provide a possible explanation for their co-existence in tropical forest communities.

Their research observations have been published in *Tree Physiology* and *Functional Ecology*.

Net effect of internally ovipositing parasite in the fig-wasp mutualism

For years, XTBG has focused much attention on the interactions of fig and fig wasps and the research results are rewarding. Under the guidance of Prof. YANG Darong, Ms. ZHANG Fengping has made some new advances.

Recent study and others suggest a relatively limited mutualistic role for internally ovipositing fig wasps from non-pollinator (non-Agaonidae) lineages. By collecting the data of fig wasp community and conducting controlled experiments, the experimental evidence shows that reproduction in Diaziella depends on the presence of agaonid pollinators, and whether internally ovipositing parasites can act as pollinators depends on the host fig's pollination mode (active or passive).

The publication, entitled "Host pollination mode and mutualist pollinator presence: net effect of internally ovipositing parasite in the fig–wasp mutualism", has been published in *Naturwissenschaften.*

Environmental correlates for tropical tree diversity and distribution patterns in Borneo

This study aimed to identify environmental correlates for tropical tree diversity and composition, Prof. Dr. J. W. Ferry SLIK from XTBG and his collaborators carried out research in Borneo, Southeast Asia.

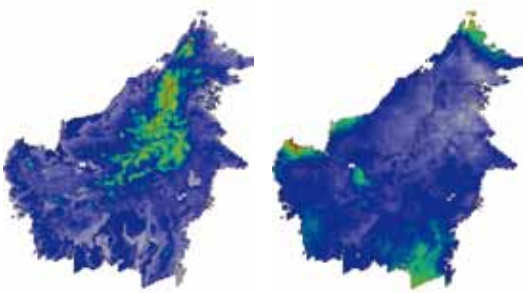
A GIS-environmental database with 5 arc minute (c. 10×10 km) resolution was combined with tree inventory data. Tree diversity, phylogenetic diversity (PD) and the two main compositional gradients were determined for 46 tree inventories. Akaike's information criterion and a data jackknifing procedure were used to select 50 explanatory models for diversity and composition gradients. The average of these models was used as our final diversity and compositional model. We applied Moran's I to detect spatial autocorrelation of residuals.

SLIK found that tree diversity, PD and the two main compositional gradients in Borneo were all significantly correlated with the environment. Tree diversity correlated negatively with elevation, soil depth, soil coarseness (texture) and organic carbon content, whereas it correlated positively with soil C:N ratio, soil pH, moisture storage capacity and annual rainfall. Tree PD was correlated positively with elevation and temperature seasonality and was largely determined by gymnosperms. However, angiosperm PD also correlated positive with elevation. Compositional patterns were strongly correlated with elevation but soil texture, cation-exchange-capacity, C:N ratio, C and N content and drainage were also important next to rainfall seasonality and El Niño Southern Oscillation drought impact.

Although elevation is the most important correlate for diversity and compositional gradients in Borneo, significant additional variability is explained by soil characteristics (texture, carbon content, pH, depth, drainage and nutrient status) and climate (annual rainfall, rainfall seasonality and droughts). The identified environmental correlates for diversity and composition gradients correspond to those found in other tropical regions of the world. Differences between the regions are mainly formed by differences in the relative importance of the environmental variables in explaining diversity and compositional gradients.

Their publication, entitled "Environmental correlates for tropical tree diversity and distribution patterns in Borneo", has been published in *Diversity and Distributions*.

Extrapolated tree diversity patterns for Borneo (assuming complete undisturbed forest cover for the whole island), with white-blue indicating low diversity and orange-red high diversity.



Extrapolated tree composition patterns for Borneo (assuming complete undisturbed forest cover for the whole island), with different colours indicating shifts in species composition. a) Main compositional shifts related to elevation, b) secondary composition patterns mainly related to climate factors (rainfall and temperature seasonality).

How do changes in plant above- and below-ground carbon allocation alter soil organic carbon

When the phloem (a shallow layer of conductive cells under the tree bark) is severed, sugars from photosynthesis can no longer be exuded by the roots and "feed" soil microbial respiration.

As the largest continent on Earth, Asia has the most diverse climates, and the Asian monsoon dominates climates over a large part of Asia. Potential effects of global climate change on the above- and below-ground allocation of plant photosynthates and its potential feedback on the climate system remain largely unexplored, particularly under the footprint of the Asian Monsoon.

Within Asia and globally, the subtropical evergreen forest type has largely been converted to human use. The Ailaoshan Forest Reserve in fact represents the largest intact example of this forest type in Asia. Therefore it is a unique resource for studying interactions among climate, plants, and soil ecology. Previous studies in managed forests have manipulated supply of plant-derived carbon to soils by stem girdling or root trenching, and thereby have provided extensive information about below-ground interactions between plants and the soil community. At Ailaoshan, Dr. Douglas Allen SCHAEFER from XTBG combined these techniques with manipulations of above-ground plant litter input to study interactions between the plant community and the forest carbon cycle.

In February 2004, eight 20 by 20 meter square plots were permanently surveyed and established on a forested hillslope near the Ailaoshan Field Station, with their perimeters trenched to a depth of 40 cm to exclude effects of external tree roots. Half of the eight major plots were randomly selected for tree girdling, with more than 400 tree stems girdled with a 10 cm band at approximately 1.5 meters high. This stops the supply of photosynthetic carbon from the stem to the roots, without immediately affecting root uptake of water and nutrients.

Within each of the eight major plots, 4 rectangular subplots of 2 by 3 meters were established. They were randomly assigned to control (untreated), root trenching, leaf litter removal, or a combination of the last two treatments. This yielded 8 treatments with 4 replicates each. The 8 treatments were un-manipulated control and the 3 manipulations (girdling, trenching, and litter removal) applied singly and in combination.

Results of the first three years of this project have already been published (three papers in *Soil Biology & Biochemistry*; one in *Biogeochemistry*), and several additional manuscripts are currently being prepared.

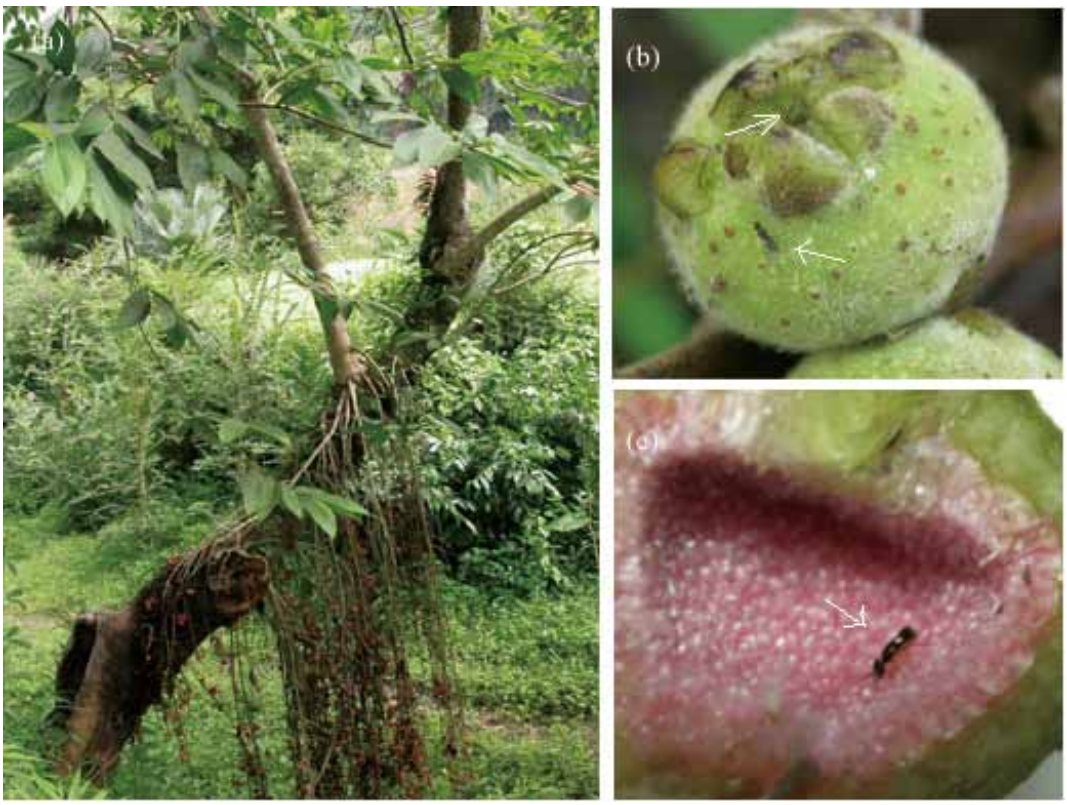
Dr. SCHAEFER's experiment demonstrated that shifts in plant carbon allocation can substantially alter the dynamics of soil organic carbon. Their results suggest that global warming alone can not predict future soil organic carbon and changes in plant litter and root inputs can profoundly influence the temperature sensitivity of soil respiration.

Species-specificity: 4-methylanisole assures specific fig/fig wasp mutualism

In cooperation with French colleagues, XTBG PhD candidate CHEN Chun and her supervisor Prof. SONG Qishi have analyzed the emissions of volatile compounds by figs of *Ficus semicordata* and tested its pollinator's behaviors, which results provide evidence that olfactory cues play a central role in allowing pollinating wasps to locate their specific host plant at the appropriate stage of fig development.

The study suggested that 4-methylanisole is the main signal compound in the floral scent of Ficus semicordata that attracts its obligate pollinator to the host figs at the precise stage required for pollination and oviposition. 4-methylanisole may thus function as a private channel (species-specificity) in this specialized obligate mutualism.

The publication entitled "Private channel: a single unusual compound assures specific pollinator attraction in *Ficus semicordata*" has been published in *Functional Ecology.*



(a) *Ficus semicordata* (male tree) in Xishuangbanna Tropical Botanical Garden. (b) fig at receptive stage; (c) pollinating fig wasp, *Ceratosolen gravelyi* within the fig cavity. White arrows indicate the pollinating fig wasp.

New progress in measurement of tree DBH in 20-ha plot

Installation of field instruments.

In order to monitor tree woody increment and measure plant growth yield, metal dendrometer bands have been installed on a sub-sample of 2,762 trees in 285 species within the 20-ha tropical rainforest dynamics plot in Xishuangbanna. The equipment is aimed at better estimating diameter at breast height (DBH) of trees, so as to provide data for studies on tropical rainforest and biodiversity monitoring.

The equipment installation was trained by Dr. Shirley Xiaobi DONG from Harvard University.
The dendrometer bands wrap like a belt around a tree at breast height. A spring secures the ends and two measuring points are punched where the band overlaps. An initial diameter at breast height is recorded for each tree. As the tree grows, the spring stretches, and the measuring points are pulled apart. By measuring this increasing distance between points, we can accurately determine the increase in the tree's diameter.

The trees in 5cm<DBH<255cm are chosen to be equipped with dendrometer bands, among which almost all trees with DBH>80cm are included. A systematic census is planned to be carried out every quarter. Changes of the biomass of trees will be recorded.

DBH is a standard method of expressing the diameter of the trunk of a tree. It has traditionally been the "sweet spot" on a tree where measurements are taken and a multitude of calculations are made to determine things like growth, volume, yield and forest potential.

New records of plant in Yunnan, S. W. China

Doing a botanical expedition in Pu'er district, Yunnan, Mr. WANG Hong, executive curator of XTBG Herbarium, collected the specimen of *Rhododendron bachii* H. Lév which was considered to be a new record in Yunnan Province.

The plant was found in a montane rainforest at about 1,800 m a.s.l. The specimen (WANG Hong 8776) is kept in the Herbarium of Xishuangbanna Tropical Botanical Garden (HITBC).

Rhododendron bachii H. Lév is naturally distributed in Zhejiang, Anhui, Jiangxi, Hubei, Hunan, Guangdong, Guangxi, Sichuan and Guizhou provinces. It was recorded in Yunnan for the first time in March 2009.

Mr. WANG Hong and Mr. ZHOU Shishun also collected the specimens of *Nothapodytes nimmoniana* (J.Graham) Mabb. (WANG Hong 6890 and ZHOU Shishun 2028) in a very broad area close to Laos and Burma in Xishuangbanna and Lincang, which was also considered to be a new record in mainland China. The specimens are kept in the HITBC. According to records, *Nothapodytes nimmoniana* (J.Graham) Mabb. is naturally distributed in Taiwan, Cambodia, India, Japan, Myanmar, Philippines, Srilanka and Thailand.

Nothapodytes nimmoniana (J.Graham) Mabb. is an endangered medicinal tree. The wood-extract of this tree is used in the treatment of cancer. The active component of the wood-ccamptothecin (CPT) is known as a potent drug that breaks single-strand DNA in the mammalian systems and is found to be useful in the treatment of tumours.

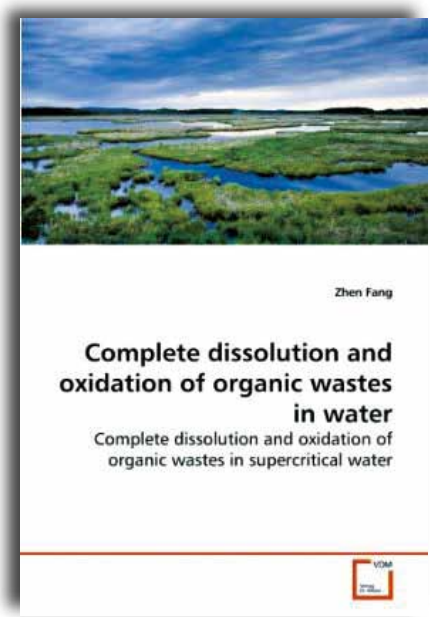
Because of destructive harvesting and habitat loss, the population of this species is declining.

Rhododendron bachii H. Lév.

Nothapodytes nimmoniana (J.Graham) Mabb.

New books published

Complete Dissolution and Oxidation of Organic Wastes in Water: complete dissolution and oxidation of organic wastes in supercritical water



"*Complete Dissolution and Oxidation of Organic Wastes in Water: complete dissolution and oxidation of organic wastes in supercritical water*" authored by Prof. FANG Zhen has been published by VDM Verlag Dr. Müller GmbH & Co. KG in April 2009.

This 192-pages book is about using supercritical water (SCW) process to dissolve organic wastes, and subsequent using oxygen to completely destroy the wastes by homogeneous oxidation.

It was found that all organics in the sludge could be almost completely oxidized. The heavy metal salts were effectively removed by precipitation to insoluble oxides and salts with little leachability.

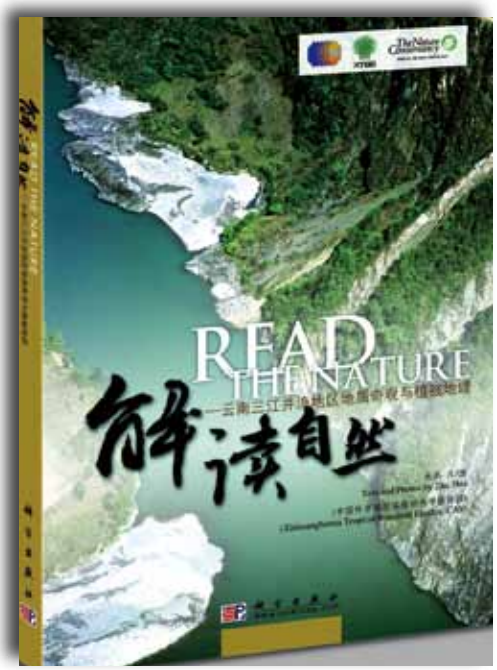
List of Seed Plants in Ailao Mountains of Yunnan Province, China

"*List of Seed Plants in Ailao Mountains of Yunnan Province, China*" compiled by Prof. ZHU Hua has been published by Yunnan Science and Technology Press in December 2009.

2,242 native species and 206 varieties (including subspecies) belonging to 199 families and 956 genera of Ailao Mountains are described and documented in the monograph. Scientific names, common names, brief descriptions, habitats, and distribution areas of the plants are available in the list.

The monograph, analyzing the floristic composition and characteristics of Ailao Mountains, is a comprehensive inventory of the biodiversity of plant species.

Read the Nature

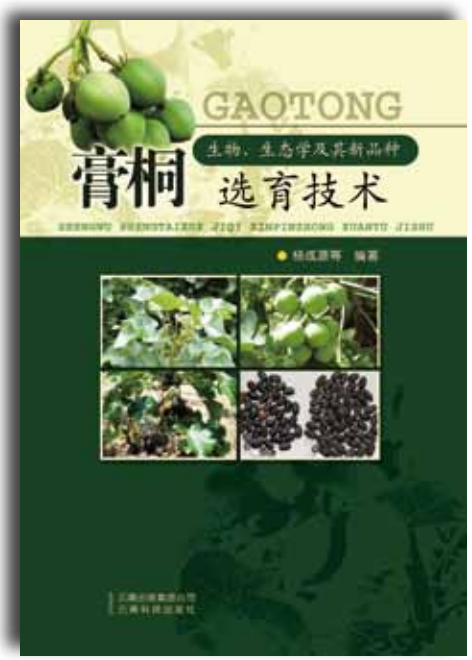


Prof. ZHU Hua has been studying the vegetation geography in the three parallel rivers for many years. With an aim to disseminate knowledge, ZHU has compiled a monograph on the basis of his investigation.

"*Read the Nature—Geological Wonder and Vegetation Geography of the Three Parallel Rivers Region in Northwest Yunnan*" by ZHU Hua has been published by Science Press in May 2009. Illustrated with beautiful pictures, the book gives readers a deep impression. The book may lead the readers to understand the wonder of nature.

In the high mountains of Yunnan Province, three rivers (the Jinsha, Nujiang and Lancang-Mekong) originated from the Qinghai-Tibet Plateau run roughly parallel, north to south, through steep gorges. The Three Parallel Rivers of Yunnan is regarded as an epicenter of Chinese biodiversity and also one of the richest temperate regions of the world in terms of biodiversity.

Biology, Ecology and New Varieties Breeding Techniques of *Jatropha curcas*



Biology, Ecology and New Varieties Breeding Techniques of Jatropha curcas L. edited by YANG Chenyuan, TANG Jianwei, PENG Daiping, LIU Gang, LI Bo, was published by Yunnan Science and Technology Press.

YANG Chenyuan and his colleagues had collected *Jatropha curcas* L. from different geographical provenances from provinces of China, and SE Asian countries. By using seeds and twig cuttings, they erected a nursery of 2 ha within XTBG. Meanwhile they had evaluation on the biological and agricultural characteristics of different geographical provenances.

In addition, they had carried out studies on the screening and breeding of elite species. By using mutant, they had bred a new cultivar – black winkle-leafed *Jatropha curcas* L. They also found groups of high flowers and high oil content in domestic *Jatropha curcas* L.

Improvement of Research Facility

CAS Key Laboratory of Tropical Forest Ecology approved

Opening ceremony and the first academic symposium for the CAS Key Lab of Tropical Forest Ecology.

The Chinese Academy of Sciences approved the Xishuangbanna Tropical Botanical Garden's proposal to establish a Key Laboratory for Tropical Forest Ecology in 2009. With a special focus on forest ecology, the new key laboratory will promote research on the structure, function and dynamics of tropical and subtropical forest ecosystems under the influence of both human being and climate change. Meanwhile, XTBG's scientists are developing long-term practicable and effective collaborations with world renowned research teams and optimizing its talents structure, so as to boost development of the Laboratory.

The Laboratory aims to explore key fundamental issues in tropical and subtropical rainforest ecosystems research and management, to serve for the development of forestry science, both for the country as well as open to Southeast Asian countries.

Opening ceremony for the Key Lab was held on March 1, 2009 in the garden.

XTBG Biogeochemistry Laboratory renewed its Metrology Accreditation Certificate

The Metrology Accreditation Certificate to the Biogeochemistry Laboratory of XTBG renewed after comprehensive evaluation by the Quality and Technical Supervision Bureau of Yunnan Province in December 2009.

Following the procedures of application and review, the Quality and Technical Supervision Bureau of Yunnan Province ratified that the XTBG Biogeochemistry Laboratory met all requirements and issued an accreditation certificate to it.

Equipped with up-to-date analytical tools, the Biogeochemistry Laboratory provides analysis data of soil, plants, and water to research scientists and students from both XTBG and other institutions. It has become a provincially certified analytical laboratory.

The Metrology Accreditation Certificate to the Biogeochemistry Laboratory of XTBG.

XTBG field stations officially named national field station

Since 2005, Xishuangbanna Tropical Rainforest Ecosystem Station and Ailaoshan Station for Subtropical Forest Ecosystems Research have been accredited as national field stations by Ministry of Science and Technology of China (MOST).

At the tablet awarding ceremony of the First Congress of Field Stations Nationwide held in Beijing in June 2009, the two field stations of XTBG were officially named as National Field Station for Ecosystem Research at Xishuangbanna and National Forest Ecosystem Research Station at Ailaoshan.

State Councilor LIU Yandong conferred the Name Tablet of Xishuangbanna Station to Prof. Dr. CAO Min, deputy director of XTBG at the Awarding Ceremony.

Tablet awarding ceremony in Beijing.

Conferences and Symposia

Fifth International Symposium on Zingiberaceae

The Fifth International Symposium on Zingiberaceae has been underway at the Xishuangbanna Tropical Botanical Garden from July 6-9.

More than 139 renowned biologists and botanists from 14 countries and regions traveled from across the world to the Xishuangbanna Tropical Botanical Garden, to take part in the Fifth International Symposium on Zingiberaceae, from July 6 to 9.

With the support of the Chinese Academy of Sciences (CAS), Xishuangbanna Tropical Botanical Garden (XTBG) has hosted this symposium.

This series of symposia highlighted recent researches in the Zingiberaceae and related groups in the Zingiberales as well as providing the venue for researchers to meet and discuss their work. The four-day symposium includes 95 oral presentations and posters covering such diverse fields as taxonomy & systematics, molecular studies & phylogeny, phytochemistry & pharmacognosy, diversity & conservation, horticulture & hybridization and all aspects of their biology.

XTBG's collection has more than 200 species of ginger, which provide a unique opportunity for its own scientists to conduct research in collaboration with international partners.

Xishuangbanna Dai Autonomous Prefecture, Xishangbanna is one of the major centers for ginger species and a place with richest biological diversity in China. At present, 17 genera and more than 110 species of gingers have been recorded in the region. Its 12 local ethnic minority groups have a long history of recognizing and using the ginger plant.

"I believe that the symposium will provide a good platform for all of us to communicate with each other and promote study, utilization and conservation of ginger plants," said TANG Jiahua, vice-governor of Xishuangbanna Dai Autonomous Prefecture.

Co-chaired by CHEN Jin, director of XTBG and W John KRESS from the Smithsonian Institution, USA, the academic committee was composed of such leading biologists as, Mark NEWMAN from the Royal Botanic Garden Edinburgh, UK, Ray BAKER from Harold L Lyon Arboretum, USA, WU Telin from South China Botanical Garden, CAS, Jana SKORNICKOVA from the Singapore Botanical Garden, Mamiyil SABU from the University of Calicut, India and Piyakaset SUKSATHAN from Queen Sirikit Botanic Garden, Thailand.

The International Symposia on the Family Zingiberaceae are fora for the exchange of ideas and new research progress made in the family of Zingiberaceae among biologists who are interested in Zingiberaceae and some related research fields. The symposia have been held successfully for four times.

Advanced Field Course in Ecology and Evolution - Xishuangbanna (AFEC-X)

The Advanced Field Course in Ecology and Evolution - Xishuangbanna (AFEC-X), sponsored by XTBG, was started on July 9, 2009 in Kunming. The course brings together advanced undergraduates and graduate students from many different universities and institutions in China plus international students from India, Indonesia, Malaysia, Nepal, Philippines, Sri Lanka, Uganda, Thailand, and Vietnam. Instructors participating in the course come from several countries and institutions as well: China (XTBG, Kunming Institute of Zoology, and Kunming Institute of Botany), Thailand (Chiang Mai University), the Netherlands (Museum Naturalis), Indonesia (Flora and Fauna International), Switzerland (EHT), and the USA (Univ. of Oregon St.).

The AFEC-X was composed of lectures and field exercises. The lectures took place in Kunming and the long-term monitoring projects in and around the headquarters of XTBG, Menglun.

A wide variety of topics were covered, focusing on the design and implementation of field projects, such as tropical ecology, eco-physiology, taxonomy, evolutionary ecology, plant and animal interactions, biodiversity, conservation biology, invasive species and more.

With guidance of experienced professionals, the participants designed and presented research proposals, collected field based data. They gained experience in independent project design, tackled new topics and concepts, and developed their own analyses.

The final symposium for the AFEC-X was held on August 6, 2009. Ten student groups presented their independent research projects, demonstrating a lot of hard work and improvement. Many of them tackled new topics and concepts, developed their own analyses and interpretations. They obviously made a great deal of progress and overcame a lot of challenges in four short weeks.

2009 AFEC-X Paticipants.

Workshop on Challenges of Rubber Plantation to Regional Development

In order to exchange ideas on the current status, ecological risks and future development trends of rubber plantation in tropical China, a workshop on "Challenges of Rubber Plantation to Regional Development" was held in Kunming on August 11, 2009. The workshop brought together 30 participants involved in ecological research of rubber plantation.

Based on detailed scientific data and study results, the presentations made comprehensive analysis on the development of rubber plantation in China, especially in Xishuangbanna.

Rapid expansion of rubber plantations in Xishuangbanna over the past years has led to growing environmental risks. Participants of the workshop had warm discussion on the topic, with Prof. CAO Min as chairman. Mr. LI Qingyou, head of Office of Rubber Industry of Xishuangbanna, said that the local government determined to promote sustainable development of Xishuangbanna through ecological protection. He proposed to set up environment-friendly rubber plantations as demonstration plots. Prof. CHEN Jin suggested further cooperation between the two sides and urged clear planning.

The robust development of rubber industry is a main impetus of Xishuangbanna, whereas it brings ecological problems. It is important for XTBG and Xishuangbanna government to carefully address all potential effects of this (both positive and negative), and develop adaptive strategy to balance economic development and ecological protection.

Discussion on the sustainable development of rubber plantations in tropical China.

Haikou Forum on Forest Ecology

Haikou Forum on Forest Ecology crew.

Co-sponsored by Hainan University and XTBG, the Haikou Forum on Forest Ecology was held during September 15-16, 2009 in Haikou, capital city of Hainan Province. The forum brought together 100 scientists and postgraduate students. Prof. WANG Song and Prof. PENG Shaoling were invited as keynote speakers.

The forum themed on "Pattern, Process and Response of China's Tropical Forest" and "Conservation, Exploitation and Utilization of Tropical Plant Resources".

Thirty-six scholars, including Prof. CHEN Jin and Prof. CAO Min, presented their research findings at the forum. The forum covered topics focusing on restoration ecology, plant physiological ecology, biodiversity conservation, plant-animal interactions, land use change, climate change, carbon and nutrient cycle, etc.

XTBG participants made a field investigation on the vegetations of Hainan Province after the forum.

XTBG and Hainan University have reached common grounds to hold forest ecology forum periodically, to cooperate in research and program application, and to encourage more exchanges.

Sino-Lao Expert Workshop on Sustainable Development of Rubber Plantation

Sino-Lao Expert Workshop on Sustainable Development of Rubber Plantation was held in Xishuangbanna during December 24-25, 2009. The workshop was aimed at seeking an effective way for the sustainable development of rubber industry in Laos.

The workshop was jointly organized by Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences (XTBG) and the United Nations University (UNU). It brought together experts from Lao National Agriculture and Forestry Research Institute (NAFRI), Blue Moon Fund, Global Environmental Institute (GEI), Kunming Institute of Botany, and XTBG.

China's experience with rubber cultivation in Yunnan is being widely used as a blueprint for rubber plantations in northern Laos. However, rubber plantation in Yunnan had resulted in large-scale loss of forest resources, watershed destruction, and severe erosion, which would severely affect the long-term ecological sustainability of the area. Similar environmental problems also emerge in Laos.

Participants to the workshop had field investigations of the man-made rubber-tea community established over 30 years within XTBG. They also visited rubber based agroforestry models, demonstration plots of new techniques for drought-resistance rubber plantation, and high-quality natural rubber seedlings production base in Jinghong.

Training Course on Latin language

With the aim to improve the gardeners and students' ability in the application of Latin in botanical research, XTBG has organized a 13-day Latin training course at the headquarters during March 22 and April 3. Prof. SU Zhiyun from CAS Kunming Institute of Botany (KIB) was invited as the keynote teacher.

About 50 young researchers and graduate students attended the training course. The course was designed to give students an introduction to basic Latin for plant taxonomy. During the total 39 teaching hours, Latin pronunciation, grammar, syntax and its applications in plant description were taught.

As an experienced teacher in Latin training, Prof. SU Zhiyun conducted the language lesson very well and attached importance to interactions with students.

Teaching and learning.

Training Course on Latin language crew.

Training Course on Botanical Gardens' Management

Cambodian trainees and their teachers.

XTBG hosted a one-month training course on botanical gardens' management for 3 selected staff members from Cambodian Ministry of Environment during March 1-29, 2009. The aim of the training was to expand the knowledge of botanical gardens and actively implement the foreign aid program (Cambodian National Botanical Garden).

At the opening ceremony of the training course, Prof.CHEN Jin warmly welcomed the trainees and encouraged both the trainers and trainees to cooperate well with each other, so as to make it a full success.

The three trainees were Mr. Khum THOEUM, Mr. Mao KUNTHEA and Mr. Sen SOPHEAP from Cambodian Ministry of Environment.

The training covered topics focusing on an overview of worldwide botanical gardens; gardening and horticulture; collection, classification and identification of plant specimens; botanical gardens and public education; tourism management in botanical gardens; and raising of program funds, etc.

The closing ceremony for the three Cambodian guests was held on March 29, 2009.

Twentieth Anniversary of CERN

On May 11, 2009, the Chinese Ecosystem Research Network (CERN) held a ceremony to commemorate its 20th anniversary in Beijing, which brought together 150 scientists and officials nationwide. Prof. CAO Min, member of the CERN Science Committee and deputy director of XTBG, attended the celebration.

Established in 1988, the Chinese Ecosystem Research Network (CERN) consists of 40 field research stations for various ecosystems, including agriculture, forestry, grassland and waterbody, 5 disciplinary centers and one synthesis center. It is now well placed to address important issues, serving as a functional network to meet the needs of both the national and international ecological research.

The two research stations of XTBG (Xishuangbanna Tropical Rainforest Ecosystem Station and Ailaoshan Station for Subtropical Forest Ecosystems Research) are among the 36 national field stations of CERN.

Prof. FENG Yaozong and Prof. ZHANG Jianhou, who are pioneers having made great contributions to the development of the two XTBG research stations, were also present at the commemoration ceremony of CERN.

ATBC Asia-Pacific Chapter Annual Meeting

XTBG scientists and students participated in the 3rd annual meeting of the Asia-Pacific Chapter of the Association for Tropical Biology and Conservation, held in Chiang Mai, Thailand on Feb 12-15 2009.

Prof. Chuck CANNON gave a plenary presentation on “Genomics and tropical biology: diving into the deep end”. Prof. CHEN Jin and Prof. CANNON also co-chaired a symposium on “The conservation endgame: what is the best strategy for success?”

Other scientists and students presented session presentations and posters.

Commemoration ceremony of twentieth anniversary of CERN.

GEF training course

On March 29, 2009, Prof. CHEN Jin was invited to deliver a lecture for the Global Environment Facility (GEF) training course on sustainable management of forest resources and biodiversity conservation.

In his lecture, CHEN talked about ecotourism in Xishuangbanna, landscape optimization of XTBG and ecotourism in nature reserves. He put forward three suggestions on the ecotourism in nature reserves: protecting natural and cultural heritage resources to the maximum extent possible; avoiding large-scale capital input; and taking the interests of indigenous people into account.

Hosted by Yunnan Provincial Department of Forestry, the GEF training course on sustainable management of forest resources and biodiversity conservation is under way from March 27-31, 2009 in Jinghong, capital city of Xishuangbanna.

The course is aimed to increase the capacity of Nature Reserve management staff and improve management effectiveness of nature reserves.

Prof. CHEN Jin delivering a lecture for GEF training course.

CAS Botanical Education Network Meeting

During February 19-20, 2009, representatives from the CAS Botanical Gardens and Herbaria Education Network met at South China Botanical Garden (SCBG), Guangzhou. Prof. CHEN Jin, chairman of the CAS Botanical Gardens Education Network, presided over the meeting.

Mr. TIAN Ming, deputy director of CAS Bureau of Planning & Strategy delivered an important speech. He urged the botanical gardens and herbaria to attach importance to capacity building and make strategic contribution to knowledge popularization. The conference participants relished the opportunity to gather and share experiences about the various botanical education activities in which their institutions are involved. The attendees also discussed planning for the work in 2009.

Deputy director SU Ronghui of CAS Bureau of Life Sciences & Biotechnology was also present at the meeting.

Celebratory Scientific Conference for Kew's 250th Anniversary

The Royal Botanical Gardens, Kew held a celebratory scientific conference to mark its 250th anniversary during October 12-16, 2009. With theme on "Plant Conservation for the Next Decade: A Celebration of Kew's 250th Anniversary", the conference showcases Kew's conservation research and lectures from leading international research scientists.

At the event, Prof. CHEN Jin talked about the management of botanical gardens and the role of biodiversity conservation XTBG plays.

XTBG and Kew have been keeping good cooperation ties for many years. Some young scientists have been trained at Kew and academic exchanges are frequently engaged. Prof. Sir Peter CRANE, former director of Kew, is an adjunct professor of XTBG.

HORTICULTURE

Collections

In 2009, an accession of 1,858 species from domestic and abroad were added up to XTBG's living collections, of which 1,675 from China and 183 from abroad.

Since April 2009, XTBG has been creating new Wild Edible Plant Collection and Energy Plant Collection.

More than 150 species of wild edible plants were propagated and grew for display in the new wild edible plant collection. Over 200 species of wild edible plants were investigated and introduced in Xishuangbanna for this new collection. Road systems were also constructed.

About 200 species of energy plants were added to the new energy plant collection. Road systems and exhibition hall were under construction.

Victoria 'Longwood Hybrid' was introduced to XTBG

Victoria 'Longwood Hybrid'

Plants of the genus *Victoria*, belonging to the family of Nymphaeaceae, are collectively known as *Victoria regia*. As large ornamentals, they have large individuals, and their new leaves grow out quickly. High temperature, high humidity, abundant sunlight and adequate nutrients are needed for their growing. There are two species belonging to the genus, "V*ictoria amazonica*" originated in Amazon area and "*Victoria cruziana*" originated in Paraguay watershed.

In 1961, Longwood Garden cultivated the first hybrid variety, *Victoria* 'Longwood Hybrid', which is the filial generation of *Victoria amazonica* as male parent and *Victoria cruziana* as female parent. It shows some characteristics both of its male and female parents, and is more like *Victoria cruziana*.

This May, XTBG introduced *Victoria* 'Longwood Hybrid' from Sun Yat-sen Botanical Garden, Nanjing. It grows well and shows good adaptability in XTBG. Until now, XTBG has successfully collected the three species of *Victoria: Victoria amazonica, Victoria cruziana* and *Victoria* 'Longwood Hybrid'.

Phenological observation

Phenological information of 2,426 species were monitored and documented weekly. Annual growth of 4,428 plants (1,641 species) were observed and documented.

New Nursery Construction

In the nursery, gardeners propagated and grew 32,052 individuals of 648 species for display across the garden.

Internal (above) and external (below) view of the new nursery.

Data management and digital garden system

Positions of 6,069 plants and 252 location points of roads and buildings in 5 collections have been mapped and added to the database.

Over 2,250 specimens of 899 species were mounted and 2,815 specimens were attached with digital photos. The digital photos were also added to the database.

Digital garden system has been updated with ArcGIS Server to support fast map based database manipulation.

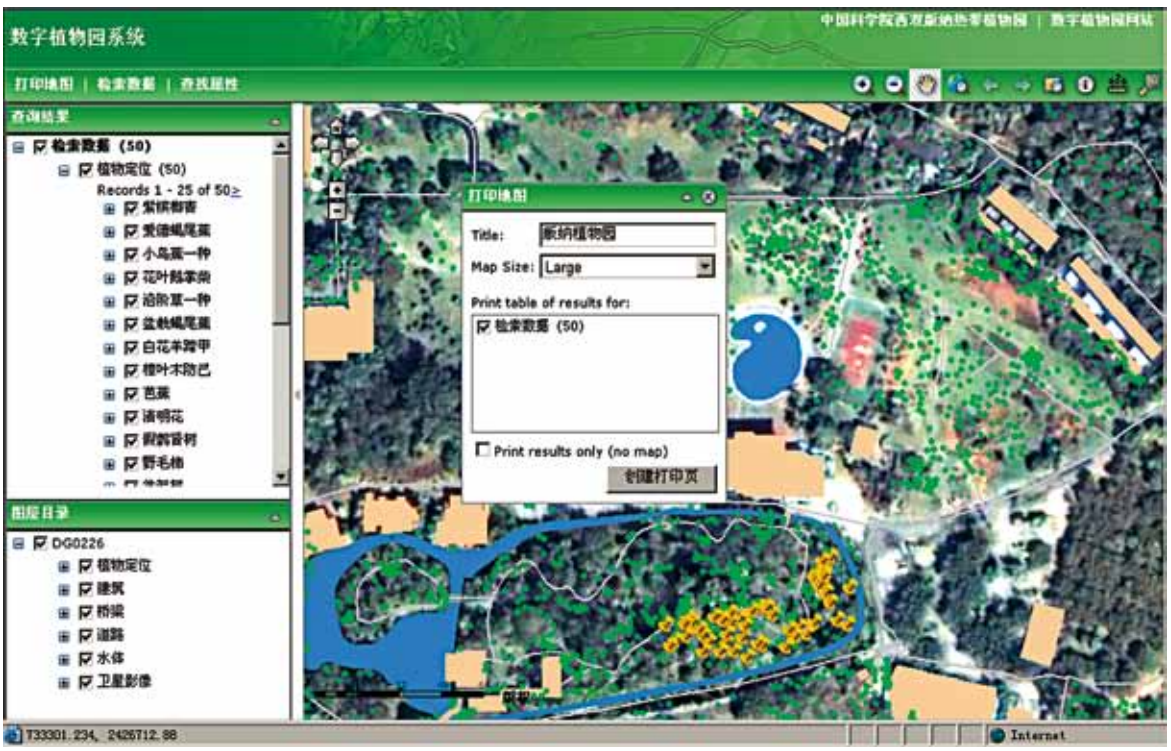


Illustration of web-based digital garden system.

Largest Dipterocarp Garden in China

Dipterocarp Plants Collection in XTBG.

Xishuangbanna Tropical Botanical Garden (XTBG) started to establish a Dipterocarp Plants Collection in 1981. Through 28 years' development, it has become the largest of its kind in China in terms of number of species it holds.

During the development of the garden, XTBG botanists have collected many individual plants from other regions of the country and foreign countries, including Thailand, Laos, Singapore, Viet Nam, Sri Lanka and Indonesia. Covering an area of 7 hectares, the garden is now home to 34 species in 7 genera of dipterocarp plants.

Within the collection, *Vatica diospyroides* Sym. introduced from Thailand and *Vatica odorata* (Griff) Symington from Laos came into blossom in March 2009 for the first time.

Dipterocarpaceae is a pantropical family, with 17 genera and approximately 500 species of mainly tropical lowland rainforest trees with two-winged fruits. 12 species in China in 5 genera are distributed in Yunnan, Guangxi, Hainan and Tibet. The family is consisted of 3 subfamilies.

Tropical Botanical Garden in bloom

As a popular tourist attraction all year round, XTBG is a conservation base for 12,000 tropical plants from home and abroad and showcase of horticulture. It's a warm and friendly place for people of all ages. Flowers of varying colors and textures are seasonally on display.

From March to the end of September, when the gardens in full bloom and at their most spectacular, wild blooms of flowering plants and shrubs can be enjoyed at every corner of the garden. During this time, you can see many rare and exotic plants from all over the world.

The photographs displayed here are just a few plants among a large number of flowers blooming marvelously in this season.

A wonderful variety of insects and wildlife also enjoy this blossoming season.


PUBLIC
EDUCATION

Facts:

Total annual visits to the Garden	500,013
Total annual visits to the museums	341,352
Special educational programs	20
Hits to the Garden website:	2,100,000

"Charming Xishuangbanna" showing in Wuhan

An exhibition themed with "Wonderful Tropical Rainforest, Charming Xishuangbanna" was grandly opened in Wuhan Botanical Garden on the eve of the National Day of China. The exhibition aimed to popularize knowledge of tropical rainforest and promote tourism in Xishuangbanna.

The exhibition covered five sub-themes:

1. Introduction to the tropical rainforest -- oasis on the Tropic of Cancer, which displays wonders of tropical rainforest, rare plants and animals, plant seeds, and ecological conservation;
2. Folk Charms – approaching Dai homes, which displays natural scenery, folk customs, and ethnic cultural products of Xishuangbanna;
3. Ethnic music and dance performance;
4. Understanding tropical rainforest, where botanists deliver lectures on the ecological conservation of tropical rainforest;
5. Guided tours of tropical rainforest. Beautiful tour guides of Dai ethnic group lead visitors to experience the wonders of tropical rainforest and grace of Xishuangbanna.

Prof. CHEN Jin delivered a lecture on tropical rainforest protection on the opening day of the exhibition.

The exhibition is jointly sponsored by Xishuangbanna Government and Wuhan Tourism Administration Bureau, and organized by XTBG, Wuhan Botanical Garden and ChuTian Metropolis Daily. It lasts from September 30 to October 31.

Xishuangbanna is the only oasis on the Tropic of Cancer and the sole preserve of tropical rainforest in China. It is beautiful, rich and fantastic, like a pearl inlaid in the southwest frontier.

Through this exhibition, the organizers hope that the general public may have a better understanding on the importance of tropical rainforest and the charms of Xishuangbanna, meanwhile increase awareness of ecological protection.

"Charming Xishuangbanna" showing in Wuhan.

Inaugural issue of *Rainforest Story* released

The inaugural issue of the e-magazine *Rainforest Story* was released on September 25. The inauguration ceremony was attended by XTBG scientists, leaders, graduate students and tour guides. Prof. CHEN Jin and Dr. CAO Kunfang unveiled the nameplate of the e-magazine.

With the objective to attract public attention to ecology and indigenous culture in the tropics, raise their awareness of protection of environment and biodiversity and show people the beauty of science combining with literature and art, the E-magazine will focus on tropical rainforest around the world by using luminous text, images and videos. The initial planning is designed as follows:

1. To share frontier trends and results of research in tropical conservation biology, including botany, zoology, microbiology, and ecology, etc.
2. To show human stories from global tropical region, as well as some tropical sensitive viewpoint
3. To recall the history of worldwide rainforest, and record events of rainforest at different stages
4. To build a communication platform between life science and other disciplines such as art and literature

Starting from September 2009, the e-magazine will be published with the frequency of 60 pages x 4 issues x 1 volume per year.

Stay with us at http://emagazine.groups.xtbg.cn/, and you will be paid off with wonderful stories from the tropical rainforest.

The unveiling of the e-magazine *Rainforest Story* plaque on the inauguration ceremony.

Raising biodiversity awareness in National Science & Technology Week

During the National Science and Technology Week 2009, XTBG organized a series of activities and events to increase the understanding and awareness of biodiversity conservation and environmental protection. Many people including professors, experts, general visitors, teachers and students, both adult and children were involved.

The National Science and Technology Week (May16-22) and International Biodiversity Day (May 22) provided an opportunity to organize activities that help educate, publicize and emphasize the importance of biodiversity to human beings and spread XTBG's efforts in safeguarding biodiversity. Besides opening ceremony and special guided tours on International Biodiversity Day, other events were also arranged.

By using the collection of cultural relics in the Tropical Rainforest Ethnic Culture Museum and garden ornaments around it, "Pattra-leaf culture and biodiversity conservation" was introduced to the visitors.

Students from Menglun Middle School had a guided tour on International Biodiversity Day. Familiar with the Garden as they are, they still show much interest in the beautiful plants, especially palms of tropical flavor. They learned the relationships between plants and literature, plants and culture, etc. To them, it's both educational and entertaining. They said they would care for the environment and save resources in their daily life and popularize the importance of environmental protection among their peer students too.

Pattra-leaf culture (Palm Leaves Buddhism Sutra Culture) is an encyclopedia of the traditional culture of Dai ethnic minority group. It includes Pattra scripture, the scriptures written on cotton paper and traditional cultural images in folklore, which have recorded not only the scriptures of Southern Buddhism but also the contents of philosophy, history, law, language, calendar, literature, art, ethics, science and technology, medicine, etc. It is regarded as a "living" cultural form in the Dai area of China.

Visitors experiencing writing on palm leaves.

Visitors exploring in the *ex situ* conservation area, a 90-ha tropical rainforest in the Garden.

Special Guided Tours on International Biodiversity Day

Xishuangbanna Tropical Botanical Garden (XTBG) cultivates and conserves more than 13,000 rare and endangered plant species from around the world. To celebrate the “International Biodiversity Day” on May 22, a special guided tour of some of these threatened tropical plants is presented.

Prof. CHEN Jin, director of XTBG, said in his opening remarks that “On this special day, XTBG is glad to showcase the beautiful landscape of the garden and our efforts to combat the loss of biodiversity.” He appealed to the public to be aware of biodiversity conservation.

Many experts including the director, professors and associate professors actively involved in the event.

Prof. CHEN Jin personally is a tour guide for the first tourist group to the garden on this day. While showing the tourists around the garden, he focused on the interactions between plants and animals, especially seed dispersals and frugivorous animals. Serving as tour guides, the experts show the visitors some rare and wonderful tropical plants, for example, the “color-changing flower” whose colors change three times daily, the “dancing herb” whose leaves rotate gently, and the “mysterious fruit” which reverses tastes, turning sour to sweet. They also tell stories of the work being undertaken by XTBG to safeguard biodiversity around the globe.

The theme for the International Day on Biological Diversity (IDB) in 2009 is invasive alien species (IAS) - one of the greatest threats to biodiversity, and to the ecological and economic well-being of society and the planet.

Serving as a tour guide, Prof. CHEN Jin showing the visitors cauliflory plants, which means "flowers and fruits borne on the stems"

"People and Plants": an exhibition

To help the general public better understand the interactions between humans and plants, XTBG organized an exhibition themed "People and Plants" in the Museum, with items of wood carvings, medicinal plants, folk musical instruments and paper making technique of Dai people in Xishuangbanna were displayed.

During the two week exhibition, paper-making techniques were specially introduced, highlighting the uses of the tree bark of *Broussonetia papyrifera* by indigenous people of Xishuangbanna for making paper.

"People and Plants" exhibition in the Museum.

Joyful Drawing Training Course for Children

A 5-day drawing training course for children was held during February 7-11, 2009 at XTBG. The training course was organized for XTBG staff's children having winter vacation in the garden. It provided children with opportunities to engage themselves with plants and learn how to draw pictures.

Themed with "Plants and Art", the course created a playground for children. The activity was both educational and fun. It aimed at providing a colorful winter vacation for children and cultivating their esthetic senses.

The organizers encouraged the children to think about the environment and taught them to draw pictures of what they have perceived in the garden. More than 20 children enjoyed the course.

On the closing day, the organizers held a small exhibition of the works by the participating children. Through such activities, the children are expected to develop a keen interest and concern toward the protection of environment.

Mr. CHEN Wenyou teaching kids how to draw plant picture.

Science Communication of XTBG and Orienteering were well married up

On July 13, 2009, 59 summer campers from Macao middle schools came to XTBG to experience one day's summer camp for popular science. This summer camp was organized by Science and Technology Development Foundation of Macao Special Administrative Region (MSAR). Exchange Service Center of Yunnan Provincial Science and Technology Bureau was responsible for the reception and coordination work.

The first and most important item of the one-day summer camp in XTBG was orienteering. This orienteering was organized by Center for Public Education & Information, inviting LUO Hong as the designer and director, who is a Five-star Player of Orienteering and once took part in national and international orienteering contests. The 59 campers were divided into four groups to complete the competition in one hour. There were 29 controls in total, which meant every group needed good team work and task division. All boys and girls pushed for the aim of finding all the controls. They really did their utmost and learnt a lot from this contest.

It's the first time that public education was involved in orienteering in XTBG. It was a successful trial, and will be expanded and deepened. We believes this will be attractive to many more people .

After orienteering finished, campers attended to a scientific presentation named " Fig and Its Pollination Wasp" given by YAN Pei, a PhD engaged in fig & fig wasp research. They also toured about the garden, ravine rainforest and Tropical Rainforest Ethnic Culture Museum, and played team games. For them, it's really a tiring but wonderful and meaningful day.

Players of orienteering finding the controls.

Photo Exhibition on insects

As one of the activities in celebration of the Water Splashing Festival 1371, according to the Dai calendar, XTBG and the Entomological Society of Yunnan co-organized an exhibition on insect photos at the Tropical Rainforest Ethnic Culture Museum.

Insects and spiders are the most diverse groups of organisms and some of the most beautiful creatures in the world. About 60 insect species including bees, butterflies, dragonflies, ants, and caterpillars etc are displayed. Magnificently-colored images of insects attract visitors to look more closely at wildlife living on the same Planet.

The insect photography exhibit is a great way for visitor to learn more about insect behaviors. The exhibition is aimed at raising awareness of biodiversity conservation.

With all photos provided by the Entomological Society of Yunnan, the exhibition lasted from April to May.

Visiting XTBG, learning about the lightest wood in the world

A packed program of summer holiday activities takes place from July till late August. From July 22-31, visitors to XTBG had a chance to experience 'being a person of extraordinary strength' by lifting up a voluminous wood log.

How easy it is for a child to lift up such a big wood log! Is there real extraordinary strength? Why are people so strong? The secret came out that the visitors were lifting up balsa wood, the lightest wood in the world.

To differentiate the weight of light and heavy woods, visitors also experienced lifting up such heavy woods as *Dalbergia fusca* Pierre var. enneandra Zou et Liu.

Balsa is considered a lightweight among woods. It is the softest of all wood, and super lightweight, around a 1/3 weight to strength of other hardwoods. Balsa has a long, proud history -- it was used in construction of the Allied planes in World War II -- and is one of the most frequently imported woods to the United States. In World War I, balsa was used extensively in making life rafts and for packing armor plates for battleships. Because of its light weight and good insulating properties, it is still used as a packing material for highly finished materials.

Young visitor experiencing lifting up the lightest wood in the world, balsa tree, *Ochroma lagopus.*

"Beautiful Killer Plants" awarded 3rd prize for Best Science Stories by CAS

According to a recent announcement by the CAS, the TV works titled "*Beautiful Killer Plants*" has been honored with the Third Prize for National Best Stories by the Chinese Academy of Sciences.

Cooperating with Xishuangbanna TV in the making of popular science program "*Stories from the Rainforest*", XTBG has got some rewarding results.

The "*Beautiful Killer Plants*", an episode of the "*Stories from the Rainforest*", is co-authored by Prof. CHEN Jin, ZHU Hongxiang, and XIE Wei.

XTBG enlisted Yunnan Patriotic Education Base

XTBG has been awarded as a Patriotic Education Base of Yunnan Province since 1997. In celebration of the 60th anniversary of China, Yunnan Province has recently named a batch of Patriotic Education Base of Yunnan. XTBG is continuously honored.

XTBG is dedicated to promoting the spirit of Prof. CAI Xitao, spreading scientific knowledge and arousing awareness of biodiversity conservation as well.

Summer Camp helps youth of ethnic minorities

About 20 students from primary and middle schools of poor and mountain areas of Yuanjiang County, Yunnan province enjoyed a summer camp in Kunming, the Spring City of China during July 20-26.

This is the fourth time the Ecological Society of Yunnan has organized summer camps for young students of ethnic minorities from remote mountain areas to visit Kunming city, the capital of Yunnan, to have an understanding on scientific research and to increase awareness of environmental protection.

The seven-day trip focused on popular science about plants, animals, cultural relics, ecological protection, and safety.

Apart from popular science, the Ecological Society of Yunnan organized visits to parks, museums, libraries, and Kunming Zoo, etc.

The teenagers felt grateful for having such a good chance to participate in this camp. They said it opened a door for scientific enlightenment. They also want to connect the sense of personal responsibility learned in the camp, to spread the knowledge of ecological protection.

CCTV-10 "Approaching Science" investigates *Vibrissaphora ailaonica*

In early March, reporters with CCTV - 10 "Approaching Science" made an investigation tour to Ailao Mountain to shoot the characteristics behaviors and habitats of *Vibrissaphora ailaonica.* Prof. RAO Dingqi of Kunming Institute of Zoology accompanied the tour. Staff of XTBG Ailaoshan Station offered active assistance.

The reporters witnessed the living specimens of male and female Yunnan mustache toad (*Vibrissaphora ailaonica*) and had a successful filming.

Yunnan mustache toad (*Vibrissaphora ailaonica*) lives in Ailao Mountain and Wuliang Mountain ranges in Yunnan, China, and possibly in northern Vietnam. The species is at a risk of becoming threatened with extinction in the future and has been listed as a key protection animal in Yunnan.

Few people have ever seen this kind of frog. The public audience will feel very lucky to see this special species and have a general understanding about it in Approaching Science on CCTV-10, the science and education focused channel of China Central Television (CCTV).

male toad.

female toad.

young toad.

Daily visitors breaking record

To reward the public, XTBG offered free entry on its 50th birthday, Jan 1, 2009. Many people enjoyed free visits. Attracting 15,908 visitors, it set a new record.

On the day of free admission, thousands of visitors flooded into the Garden, filling it with joyous laughter, warm cheers, and songs.

Thousands of visitors flooding into the Garden.

PARTNERSHIP

DOMESTIC

XTBG offers advice and suggestions for local development

To implement a scientific outlook on development, the People's Government of Xishuangbanna held a special meeting to take advice and suggestions from XTBG on April 24. The meeting brought together about 100 officials and cadres from the local government to listen to reports made by Prof. CHEN Jin, Prof. Chuck CANNON, and Prof. MA Youxin.

Prof. Chuck CANNON presented a general introduction to environmental protection on the global scale. He analyzed environmental problems in Xishuangbanna and introduced some experience of USA in ecological protection.

Summing up the GIS data on land use change and long-term monitoring data on climate change over the past 40 years, Prof. MA Youxin made a report with the title of "The relationship between climate change and land use/cover change in Xishuangbanna".

In his report entitled "Countermeasures to harmonious development between economy and environment in Xishuangbanna", Prof. CHEN Jin proposed ecotourism, environment-friendly rubber plantation and tropical forestry as major industries for the development of Xishaungbanna.

After listening to the three reports, Mr. JIANG Pusheng, the CPC Secretary of Xishuangbanna, said that the local officials would study the reports carefully and make concise and effective policies to solve practical problems, so as to realize sound and rapid development.

Prof. Chuck CANNON (left) presenting a general introduction to environmental protection on the global scale.

Mr. JIANG Pusheng (right 2), the CPC Secretary of Xishuangbanna, and the local officials listening to the scientific presentations.

XTBG actively promotes development of environment-friendly rubber plantation

XTBG has been making joint efforts with Xishuangbanna local governments to promote the establishment of environment-friendly rubber plantation as demonstration areas. Up to now, some progress has been made. A leading group for the pilot work of environment-friendly rubber plantation has been set up, with LUO Hongjiang, Vice Governor of the People's Government of Xishuangbanna and XTBG Director CHEN Jin as group leaders. Prof. CAO Min, Dr. HU Huabin and other related officials of Xishuangbanna also play important roles in leading the group.

The project proposal for the establishment of environment-friendly rubber plantation is under preparation. Concerted efforts should be made by related government departments, institutions, and companies to get full and accurate data.

Scientists warned that the expansion of rubber plantations in Southeast Asia could have a "devastating" environmental impact. However, rubber is the third consumer product in the world after iron and petroleum. It is also an indispensable cash crop and strategically raw material for China.

To balance the need of economic development and environmental protection, it is significant to find valid measures. Environment-friendly rubber plantation seems to be effective. Researchers and planters have emphasized on community based farming and integrated farming system in relation to rubber plantation and production.

XTBG scientists have organized symposium, meetings with local officials, and field investigations, so as to actively promote the development of environment-friendly rubber plantation and protect biodiversity.

Environment-friendly rubber plantation.

Comprehensive cooperation between XTBG and Yunnan Investment Group Co. Ltd.

Headed up by Vice President LIU Haijian, a 6-person delegation of Yunnan Investment Group came to XTBG on September 9 to seek potential cooperations. Prof. CHEN Jin and Mr. PENG Daiping held talks with the visitors.

The delegation made field visit to the cultivation base of oil plants, such as *Plukenetia volubilis* Linneo, *Morinda citrifolia*, *Jatropha curcas* L. and *Aleurites montana*. They considered the great potential for the industry development of resource plants.

Prof. CHEN Jin accompanied the delegation to a rubber seed processing enterprise in Mengla and discussed some technical issues with the owner and technicians.

XTBG and Yunnan Investment Group have started comprehensive cooperation, which is marked by the signing of a strategic cooperation agreement and "cooperation agreement on pilot and large-scale development of *Plukenetia volubilis* " in Kunming on November 11. As representatives of the two sides, Director CHEN Jin of XTBG and President LIU Yinong of Yunnan Investment Group signed the two agreements.

Yunnan Investment Group is advantageous of capital operation, project development, forest base construction. while XTBG holds research platforms, scientific personnel, and many research achievements. According to the agreements, the two sides will have long-term mutual cooperation by taking advantages of each side and aim at developing and industrializing tropical and subtropical plant resources.

Based on the principle of mutual respect and candid cooperation, the two sides will focus on technology transfer of research achievements, introduction of plant provenances, adaptability study and cultivation techniques, tourism resources exploitation, and so on.

At present, the development of *Plukenetia volubilis* Linneo takes the priority. The two sides will make joint efforts on the introduction, adaptability study, cultivation and propagation techniques, product development and identification, and marketing extension.

CHEN Jin (front left) and LIU Yinong (front right) signing the strategic cooperation agreements between XTBG and Yunnan Investment Group.

XTBG offers advice for the construction of Chaozhou Botanical Garden

A 4-person group from Chaozhou came to XTBG on September 18 to show their gratitude to XTBG. Chaozhou is building up a botanical garden based on Huiru Park, during which process XTBG offered advice. Emeritus Professor XU Zaifu from XTBG assumes as chief consultant of Chaozhou Botanical Garden. Prof. CHEN Jin is also a consultant.

Mr. XU Jibin said that the establishment of Chaozhou Botanical Garden is of great significance. He expressed his gratitude to XTBG for the assistance, especially for Prof. XU Zaifu's contribution. Meeting with the guests, XTBG deputy director LI Hongwei talked about the achievements and development prospects of XTBG.

Chaozhou Botanical Garden donated two crocodile specimens which have already been permanently preserved in the Museum, and a pair of China art porcelain vases of 1.6 –meter height. XTBG provided some seedlings free of charge.

Qinling Botanical Garden seeks further cooperation with XTBG

Delegation of Qinling Botanical Garden meeting with assistant director YIN Shouhua.

Prof. SHEN Maocai, director of Qinling National Botanical Garden, led a 9-person group to XTBG on March 16, 2009. The visit was aimed at seeking cooperation in capacity building. Entrusted by Prof. CHEN Jin, assistant director YIN Shouhua gave warm reception to the guests.

The two sides exchanged ideas on campus construction. Prof. SHEN Maocai acknowledged XTBG for valuable support to Qinling Botanical Garden at the earlier stage of its construction. He hoped that XTBG will give more support in capacity building, species introduction and domestication, garden management and science popularization.

Under the joint sponsorship of the Shaanxi Government, the State Forestry Administration, CAS and Xi'an Government, the Qinling National Botanical Garden is under construction. It is designed to cover an area of 458 square kilometers, four times the size of Australia's Queensland Botanical Gardens. When completed, Qinling Botanical Garden will be the largest botanical garden in the world.

Local officials exchange ideas with XTBG on forest protection

On May 10, the CPC Secretary JIANG Pusheng of Xishuangbanna headed up local officials responsible for forestry, tourism and rubber industry to XTBG. The visit was aimed at exchanging ideas on the protection of tropical forest resources and giving feedback on Prof. CHEN Jin's earlier report presented to local officials.

Attaching importance to build harmonious and peaceful Xishuangbanna and improve ecological civilization, the local government seeks opinions and suggestions from XTBG experts.

Talking about current problems in management of nature reserves and protection of forest resources, JIANG Pusheng said that the local government has adopted a series of countermeasures. Prof. CHEN Jin expressed his thanks for importance by and prompt feedback from the local government and introduced some near-future development goals of XTBG.

XTBG has been keeping good cooperation ties with the local government for many years. XTBG has conducted a range of programs specifically intended for the benefit of the local people, based on a clearunderstanding of the situation and needs of local people. For example, an employment program has been initiated to create jobs for many ethnic youth to serve as tour guides in the Garden.

XTBG is to further assist in the building of Menglun Tourism Township and other initiatives.

XTBG honored "Outstanding institution for poverty alleviation" again

XTBG has been awarded the title of "Outstanding institution for poverty alleviation" by Yunnan Provincial Government in the year of 2008. It is the second consecutive year for XTBG to get the honorary title.

The honor is awarded in recognition of XTBG's enormous efforts to reduce poverty for Xishuangbanna, especially for Mengla County.

Certificate of Award.

ABROAD

Prof. QIU Huasheng and Prof. CHEN Jin head delegation to Cambodia

Mr. QIU Huasheng, deputy director general of CAS Bureau of International Cooperation, and XTBG director Prof. CHEN Jin headed a CAS delegation to Cambodia by invitation during December 21-26, 2009.

Meeting with Dr. Yin Kim SEAN, Cambodian vice minister of environment on December 22, the two sides exchanged ideas on the procedures of promoting the survey project of establishing a national botanical garden in Cambodia.

Dr. Mok MARETH, Cambodian Minister of Environment, met CAS delegation on December 23. He invited some officials of finance and foreign affairs to have discussion with the delegation. "The Cambodian Ministry of Environment will play an active role in coordinating the preparatory work of the establishment of national botanical garden", said the Minister.

Some Cambodian officials will be invited to visit XTBG next year, so as to have a better understanding on scientific botanical gardens and their management.

The CAS delegation had field survey at Phnom Kulen National Park (candidate site for the botanical garden) in Siem Reap Province on December 24.

Being sister province of Yunnan Province, Siem Reap has close contact with Yunnan. Officials of Siem Reap welcomed CAS delegation. They said that they would like to give full support for the establishment of national botanical garden in the province.

The CAS delegation included Prof. Dr. CAO Min, deputy director of XTBG, and some related officials.

Mr. QIU Huasheng (left 1) and Prof. CHEN Jin (left 2) discussing the master plan of establishing Cambodian national botanical garden.

Cooperation Agreement signed between XTBG and TMRC

Prof. CAO Min (left 2) and Dr. Bounhong SOUTHAVONG (right 2) exchanging a 5-year Cooperation Agreement between XTBG and TMRC.

Dr. Bounhong SOUTHAVONG, director of the Traditional Medicine Research Center (TMRC), Ministry of Health, LAOS, started a 5-day visit to XTBG on January 12, at the invitation of Prof. CAO Min, deputy director of XTBG. The two sides signed a scientific cooperation agreement.

According to the agreement, the two sides are to enhance academic exchanges, to conduct joint research programs, to make field investigation on medicinal plant resources in Laos, to have geobotanical studies and academic journal exchanges, etc. The possibility of jointly setting up a botanical garden marking the friendship between XTBG and TMRC is also included in the Agreement.

Prof. CAO Min said that cooperation between the two sides may be expanded in many aspects, and wished it a great success.

Established in 1976, the Traditional Medicine Research Center (TMRC), Ministry of Health, is the only institution, in Laos, dedicated to ongoing research on traditional Lao medicine and the use of medicinal plants.

Delegation of Cambodian Environment Ministry visits XTBG

During December 8-10, 2009, an 11-person delegation from the Cambodian Environment Ministry paid a visit to Xishuangbanna to observe and study the implementation of GMS Biodiversity Conservation Corridors Initiative (BCI) in Xishuangbanna, according to arrangement by GMS Environment Operations Center of Asian Development Bank. The delegation was headed up by Dr. Lonh HEAL, director of the Cambodian Environment Ministry's Environment Department. On December 9, the delegation visited XTBG. Dr. HU Huabin, managing director of BCI-Xishuangbanna, introduced the progress of the program and answered technical questions.

Prof. CHEN Jin, director of XTBG, held discussion with the officials during lunch on some preparatory work of the Cambodian National Botanical Garden under construction.

Personnel of the Program Management Office of BCI-Xishuangbanna accompanied a field visit to the corridor section between Mengla and Shangyong.

Delegation of Cambodian Environment Ministry.

Prof. Dr. CHEN Jin visits Cienfuegos Botanical Garden, Cuba

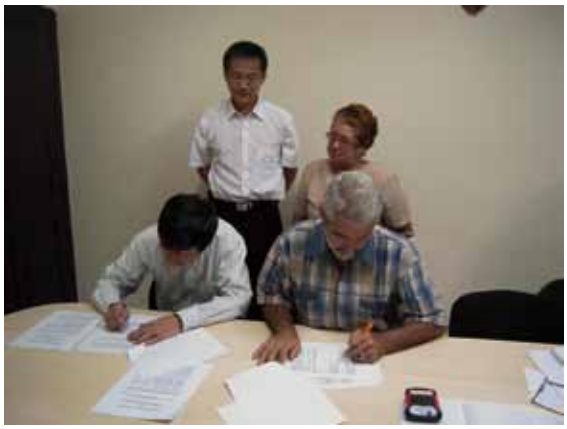
During November 12-20, Prof. CHEN Jin, Dr. HU Huabin and Ms. HU Jianxiang paid a visit to Jardín Botánico de Cienfuegos (Cienfuegos Botanical Garden), Cuba at the invitation of its director Dr. Lazaro J. O. QUINTANA.

Prof. CHEN Jin was invited as a keynote speaker at the celebratory scientific conference marking the 110 years' anniversary of the Garden. The conference, themed with "Role of botanic gardens in the conservation of the plant biological diversity", was held from November 18-20, covering such topics as economic botany, environmental education, biodiversity conservation, horticulture, ecology, landscape building, phytogenetical resources, role of botanical gardens in conservation and sustainable development, etc. Prof. CHEN Jin and Dr. HU Huabin were invited to chair sessions of the conference respectively.

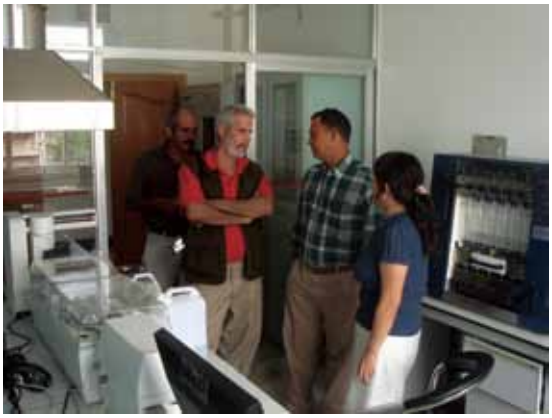
During the visit at Cienfuegos Botanical Garden, Prof. CHEN Jin met with executives of the Garden and discussed such work as gardening, public education, and scientific research. A cooperation agreement was signed between the two sides.

In addition, XTBG delegation introduced some plant species from Cienfuegos Botanical Garden. They also visited Topes de Collantes Great Natural Park, an area of Cuba boasting lush vegetation.

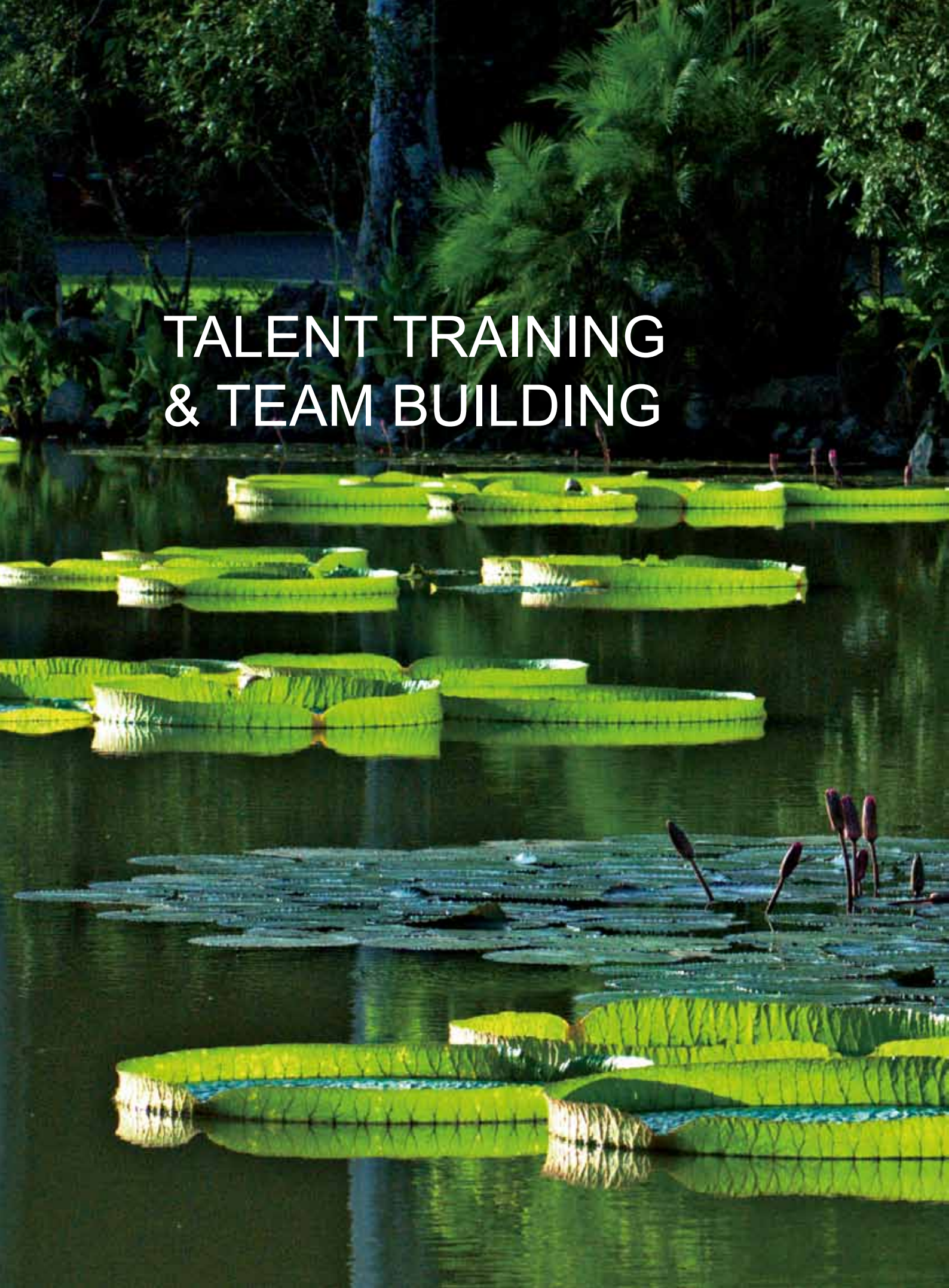
In September 2009, Dr. Lazaro J. O. QUINTANA, director of Jardín Botánico de Cienfuegos, headed up a 3-person delegation to visit XTBG for the first time.



Prof. Dr. CHEN Jin (front left 1) and Dr. Lazaro J. O. QUINTANA (front right 1) signing the cooperation agreement between XTBG and Cienfuegos Botanical Garden, Cuba.



Dr. Lazaro J. O. QUINTANA (right 3) heading up a 3-person delegation to visit XTBG Biogeochemistry Laboratory.



TALENT TRAINING & TEAM BUILDING

Facts:

New master degree students: 41
(including 1 from USA)

New doctoral degree students: 18
(including 1 from USA & 1 from Malaysia)

Total annual graduates with master degree: 26

Total annual graduates with doctoral degree: 15

Graduate Education

Graduation Ceremony 2009

June 19 came the "big day'" for all XTBG graduates, celebrating their successful accomplishments at XTBG. Graduation Ceremony 2009 was held to recognize their hard work and efforts. Graduates, academic supervisors, leaders, representatives of faculty members and students witnessed the glorious and excitement moment together.

In memory of the few years studying in XTBG, the graduates and their supervisors planted a tree of *Choerospondias axillaris* (Roxb.) Burtt et Hill, which symbolizes the blessings-prosperity, happiness, passion, health and good luck.

In the National Anthem of China, the graduation ceremony formally started at 4:00 p.m.

With a speech titled "Contributions of tropical biologists to science", Prof. CHEN Jin, director of XTBG, expressed congratulations to and best wishes for the students in the future. Fifteen graduates were conferred to the degree of Ph.D. and 26 were conferred with Master degrees. Prof. CHEN Jin posed group photos with the graduates. Other leaders and representative supervisors also conveyed congratulations and best wishes for the graduates and their family. A graduate representative spoke out their heartfelt gratitude to their advisors.

The graduation ceremony, in ardent atmosphere and good order, pushed the series activities for graduates' farewell to climax.

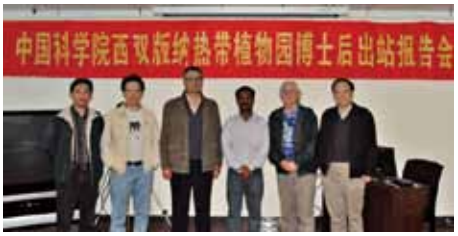
A farewell banquet and an evening party were held. The graduates also had games with their professors.

Graduation Ceremony 2009.

An Indian postdoctoral researcher completes studies at XTBG

Dr. Shanmugam MANI, a postdoctoral researcher at XTBG, has completed his studies and passed oral defense on November 16, 2009.

With the title "Monthly nutrient dynamics in the litterfall and soil in tropical rainforest of Xishuangbanna, Yunnan Province, Southwest China", Dr. Shanmugam MANI presented his studies over the past two years to the 5-person expert panel composed of his supervisor Prof. CAO Min and other 4 experts. After questioning and answering, the panel put forward some suggestions conducive to his future studies.



Dr. Shanmugam MANI (right 3) passing his postdoctoral defense.

ZHANG Yongjiang wins LI Bo Award

The 5th International Symposium on Modern Ecology (ISOME) was held in Lanzhou University from June 25 to July 2, 2009. According to careful evaluation by the expert panel of ISOMES, Mr. ZHANG Yongjiang, a PhD candidate from XTBG is among the 10 winners of ISOMES LI Bo Graduate Student Award 2009.

ZHANG Yongjiang's paper is entitled "Size-dependent mortality in a Neotropical savanna tree: linking adjustments in hydraulic architecture and carbon balance with population dynamics".

In 2007, Mr. SONG Fuqiang, a PhD candidate from XTBG won the same Award.

Team Building

Two XTBG scholars elected backup academic leaders of Yunnan

According to an announcement by Yunnan Provincial Science and Technology Department, Prof. FENG Yulong and Dr. ZHANG Ling of XTBG have been elected as backup young and middle-aged academic leaders in Yunnan Province.

To form a rationally structured personnel contingent and cultivate reserved human resources, Yunnan Province has proposed a "Talent Project". The Project supports and grants fund to innovative research topics undertaken by young and middle-aged science and technology personnel. Each year, about 100 academic backbones are screened out through application, recommendation nomination, soliciting experts' comments and opinions and confirmation.

Prof. FENG Yulong and Dr. ZHANG Ling are among the 12th batch of cultivation plan of the "Talent Project".

Prof. FENG Yulong receives "Special Government Allowance" by State Council

Prof. FENG Yulong has been recently awarded the 2008 Special Government Allowance by the State Council. It is said that the allowance is designed to encourage excellent scholars and experts who have made outstanding contribution to developments of society and science.

Prof. FENG has engaged in the studies of invasion ecology and has published widely. He has published his research observations in *PNAS, Oecologia, Planta, Ecological Monographs, Biological Invasions, Physiologia Plantarum*, and more.

Two XTBG scholars win "WANG Kuancheng Talents Award"

CAS has recently announced the results of "WANG Kuancheng Talents Award" for the year of 2009. Approved by "WANG Kuancheng Education Fund", Prof. FENG Yulong from XTBG won the title of "CAS WANG Kuancheng Award for Outstanding Achievements to Western Scholars", and Prof. CAO Kunfang was funded by the Foundation to attend the 10th International Congress of Ecology held in Brisbane, Australia, August 16-21 2009.

The Award is established to honor those outstanding scholars in western China for scientific innovations. It was founded by Mr. WANG Kuancheng, with a donation of USD 100 million in 1987.

Prof. ZHANG Yiping wins Second Class Natural Science Award of Yunnan

Awarding Ceremony of "Yunnan Science & Technology Prize 2008" held on June 16 in Kunming. Among the winners of the Prize, Prof. Dr. ZHANG Yiping and his partners of XTBG were conferred on the Second Class Natural Science Award of Yunnan Province for their contribution to the project "Study on the urban climate in Kunming".

Under the auspices of the National Natural Science Foundation of China (NSFC) and the Natural Science Foundation of Yunnan", Prof. ZHANG Yiping and his team studied the characters of urban climate in Kunming (in low latitude and plateau area) and their interrelationships with buildings.

With implementation of the Project, 38 academic papers got published.

Prof. ZHANG Yiping wins Second Class Natural Science Award of Yunnan.

Prof. YANG Darong honored "National Outstanding Field Researcher"

According to an announcement from Chinese Ministry of Science and Technology (MOST), some advanced groups and individuals who have made outstanding achievements on the work of filed science and technology is commended. Prof. YANG Darong of XTBG is among the 192 people who are awarded the honorary title of "National Outstanding Field Researchder".

Prof. YANG Darong has undergone many field studies over the past years. He had expeditions to Tibet, Qinghai-Tibet Plateau and many other remote regions for the studies of *Ficus* and *Cordyceps,* natural situation of Chinese caterpillar fungus (*Cordyceps sinensis*), etc, and much progress has been made.

It is understood that the announcement is aimed at promoting scientific spirit of seeking truth, being pragmatic, diligent and innovative in the related disciplines, and encouraging researchers out of the labs to the cutting edge line of the field scientific research.

VISITS

CAS Vice President ZHAN Wenlong inspects XTBG

CAS Vice President ZHAN Wenlong (right 1) inspecting XTBG.

Prof. ZHAN Wenlong, academician and vice president of CAS, paid an inspection tour to XTBG on November 25. He watched "*XTBG-A Blossoming Tropical Botanical Garden*", listened to a brief work report by Prof. CHEN Jin, and held talks with some executives.

Prof. ZHAN Wenlong gave positive comments on XTBG. He encouraged us to follow a way of development in the XTBG's spirit recognized as "responsibility, reality, sincerity and harmony".

Afterwards, ZHAN Wenlong visited some living collections within the Garden, in the company of Prof. CHEN Jin and Mr. LI Hongwei.

Vice Governor LI Jiang inspects XTBG

Ms. LI Jiang, Vice Governor of People's Government of Yunnan Province, paid an inspection tour to XTBG on January 2. In company with deputy director LI Hongwei and local officials, she was shown around the Garden.

Extending her warm congratulations to the 50th founding anniversary of XTBG, she was very satisfied with the achievements scored in scientific research, species preservation, public education and infrastructure construction. She also expressed her gratitude for XTBG's great contribution to the "Second Creation of Tourism" in Yunnan Province. She encouraged XTBG to continually expand its publicity work and contribute to the social and economic development.

Ms. LI Jiang (right 2), Vice Governor of People's Government of Yunnan Province, paying an on-site inspection to XTBG.

Vice Governor HE Duanqi inspects XTBG

Mr. HE Duanqi, Vice Governor of People's Government of Yunnan Province, paid an inspection tour to XTBG on February 17.

Prof. CHEN Jin, director of XTBG, made a work report entitled "Carrying on the past and opening the way for creating a world-class botanical garden", covering the history, status quo and development plan. Vice Governor HE Duanqi affirmed our achievements. "The 50 year's development history of XTBG is full of hardships, frustrations, revivals and successes, which is a real matter for congratulation", said HE.

The vice governor proposed three requirements for the development of XTBG. Firstly, aimed at becoming a world-class botanical garden, XTBG should protect plant diversity; meanwhile keeping the balance of animals especially native Chinese animals. Secondly, try to be a regional conservation leader by setting up comprehensive platforms of talents, scientific research, public education and species conservation. Thirdly, be a research & development base. Taking local industry into account, XTBG should have concerted development in both scientific research and application development.

The vice governor expressed his support for XTBG's application for setting up a key laboratory for the development of energy plants. He proposed XTBG to consider developing edible plants as another research importance.

The officials also made field visits to the living collections, new scientific research center under construction, and cultivation base of energy plants.

Mr. HE Duanqi (left 2), Vice Governor of People's Government of Yunnan Province, paying an on-site inspection to XTBG.

Mr. LIU Yunshan plants a memorial tree *Pterocarpus macarocarpus* in the garden

Mr. LIU Yunshan (right 2) planting a memorial tree *Pterocarpus macarocarpus* in the garden.

Mr. LIU Yunshan, Member of the Political Bureau and the Secretariat of the CPC Central Committee and head of Publicity Department of the CPC Central Committee, paid an inspection tour to XTBG on April 2.

He listened to a report on advances in scientific research, germplasm preservation and public education in XTBG by Mr. LI Hongwei, XTBG vice director. He urged XTBG to promote spiritual civilization and play a demonstration role for the local minority ethnic groups, while taking scientific research as its major mission.

After visiting the living collections, Mr. LIU Yunshan went to the rainforest protected within XTBG.

He also planted a memorial tree named *Pterocarpus macarocarpus* Kurz at the garden.

Officials from Yunnan Provincial Government and Xishuangbanna Prefecture accompanied the visit.

Mr. LUO Gan plants a memorial tree, *Dipterocarpus zeylanicus*. in the garden

Mr. LUO Gan, a former member of the Standing Committee of the Political Bureau of the CPC Central Committee, paid an inspection visit to XTBG on November 8. The inspection tour was accompanied by Yunnan CPC Secretary BAI Enpei and other local officials.

Prof. CHEN Jin, director of XTBG, made a work report to the inspecting leaders, focusing on research advances in oil plants and its economic potentials.

Mr. LUO Gan was accompanied to visit living collections within the Garden. Afterwards, he planted a memorial tree, *Dipterocarpus zeylanicus*.

During his stay at XTBG, Mr. LUO Gan also listened to work in progress on the construction of Menglun tourism township.

Mr. LUO Gan (right 2), a former member of the Standing Committee of the Political Bureau of the CPC Central Committee, planting a memorial tree, *Dipterocarpus zeylanicus* in the garden.

Leaders of CAS Kunming Branch visit Ailaoshan Forest Station

During March 24-26, President ZHANG Zhuangxin of CAS Kunming Branch led a 9-person group to visit Ailaoshan Subtropical Forest Ecosystem Station. Prof. CAO Min, deputy director of XTBG, accompanied the visit.

Prof. ZHANG Zhuangxin checked the 6-ha plot, flux observation system, phytotron and experiment base for vegetation restoration at the Station. After listening to work report on achievements over the past years and plans for the near future, he encouraged the scientific personnel to better support research work and contribute more to the local development.

While staying in Jingdong, Prof. ZHANG also held talks with local officials of Jingdong County, Pu'er City.

President ZHANG Zhuangxin (left 1) of CAS Kunming Branch visiting Ailaoshan Forest Station.

Other Visitors

January1-4, Dr. CHIU Sein Tuck, and a 3-person delegation from Kadoorie Farm & Botanic Garden, Hong Kong

February 8, Ms. XUE Hanqin, China's first ambassador to the Association of South East Asian Nations (ASEAN)

February 12-15, Dr. QIU Yin-long from University of Michigan, USA, Prof. James Alan DOYLE from University of California, Davis, USA, Dr. Andrea Dayle WOLFE from Ohio State University, USA, and Dr. Sean Warren GRAHAM from University British Columbia, Canada

February 15, Mr. SU Bo, director, State Bureau of Material Reserve, National Development and Reform Commission, and a 6-person delegation

February 15, Mr. LUO Zhengfu, Vice Governor, People's Government of Yunnan Province

February 17, General CHEN Binde, chief of the General Staff of the Chinese People's Liberation Army (PLA)

February 17, Academician ZHANG Yapin, director, Kunming Institute of Zoology, Chinese Academy of Sciences

February 27, Mr. WANG Shuping, deputy director-general, Department of Project Quality and Security Supervision and Administration, Ministry of Housing and Urban-Rural Development

March 1-2, Mr. Hasan MOINUDDIN, coordinator for the Biodivesity Conservation Corridor Initiative, Environment Operations Center, and a 32-person delegation from Laos, Thailand and Vietnam

March 1, Prof. ZHUANG Xuliang, head of Ecology and Environment Department, Bureau of Science and Technology for Resources and Environment, Chinese Academy of Sciences

March 14-15, Ms. ZHANG Jinfang, deputy director, Institute of Policy and Management, Chinese Academy of Sciences, and a 5-person delegation

March 14, Dr. MA Jinshuang, Brooklyn Botanic Garden, USA

April 3-6, Prof. LI, Bai-lian Larry, University of California-Riverside, USA

May 5, Mr. LIU Shiping, deputy director, Dongguan Botanical Garden

May 8-10, Mr. WANG Dasheng, director, Agricultural Office, Chinese Academy of Tropical Agricultural Sciences

May 10, Mr. JIANG Pusheng, the CPC Secretary of Xishuangbanna Dai Autonomous Prefecture, Yunnan, China, and a 20-person delegation from Xishuangbanna local government

May 10-12, Mr. YANG Xueyin, deputy director, and a 8-person delegation from Institute of Tropical Crops Genetic Resources, Chinese Academy of Tropical Agricultural Sciences

May 18, A 8-person delegation from CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora)

May 23-26, Prof. Jesse ZHU (ZHU Jingxu), Canada Research Chair and Fellow of the Canadian Academy of Engineering, University of Western Ontario, Canada

June 5, Mr. HUANG Bingsheng, former Vice Chairman of Yunnan People's Congress Standing Committee

June 6, Mr. KONG Fanwen, director, Bureau of Capital Construction, Chinese Academy of Sciences, and a 3-person delegation

June 8, Mr. LIU Yungeng, Chairman of Shanghai People's Congress Standing Committee

June 9, Dr. Doug NEEDHAM, head of Education Department, Longwood Garden, USA, and a 7-person delegation

July 1-2, Prof. ZHUANG Zhibin, director, Bureau of Life Sciences and Biotechnology, Chinese Academy of Sciences

July 2, Ms. XIN Shuying, deputy director, Bureau of Capital Construction, Chinese Academy of Sciences, and a 4-person delegation

July 11, Mr. XU Qinghua, director-general, Department of International Cooperation, Ministry

of Environmental Protection and a 8-person delegation

July 13-19, 35 teachers and students from University of Science and Technology of China

July 15, Mr. LI Wei, deputy director, and a 4-person delegation from Shanghai Chenshan Botanical Garden

July 16, Ms. LI Ting, deputy director, and a 2-person delegation from Bureau of Personnel and Education, Chinese Academy of Sciences

July 19, Dr. ZHANG Laiwu, Vice Minister of the Ministry of Science and Technology (MOST)

July 24, Ms. Yuko HITACHI, president, and a 3-person delegation from Yunnan Spice & Herb Agri. Co. Ltd.

August 1, Mr. CHENG Jianjun, deputy director, and a 13-person delegation from Shanghai Institute of Materia Medica, Chinese Academy of Sciences

August 4, Mr. DU Wenqi, deputy director of the office of the foreign affairs leading group of the CPC Central Committee

August 21, Prof. YANG Zongyu, and a 4-person delegation from Museum of Natural Science, Taiwan

August 29, Mr. WANG Zongnan, Chairman and a 13-person delegation from Bright Food (Group) Co., Ltd.

August 30, Mr. WANG Zhuangjun, deputy director, and a 7-person delegation from Wuhan Botanical Garden, Chinese Academy of Sciences

September 5, a 67-person delegation from the Meeting to Coordinate the Work within Lancang-Mekong Subregion

September 9, Mr. LIU Haijian, vice President, and a 6-person delegation from Yunnan Investment Group.

September 13-21, Dr. Lazaro J. O. QUINTANA, September 25-27, Prof. NIHLGARD, Asso. Prof. BENGTSON, and a 9-person delegation from Lund University, Sweden

September 27, Prof. Dr. Achim BRAUNING, and a 20-person delegation from University of Erlangen Nurnberg, Germany

October 12, Teachers and students from Centre for Evolutionary Biology, Uppsala University, Sweden

November 11, Ms. SONG Xiuyan, Governor of the People's government of Qinghai Province

December 8-10, A 11-person delegation from Cambodian central government

December 16-18, A 18-person delegation from International training workshop of research and management for tropical / subtropical forest biodiversity conservation. The members were from 10 countries: Malaysia, Thailand, Myanmar, Vietnam, Indonesia, Nigeria, Madagascar, Mexico, Colombia and Peru.

December 21, Ten countries' Media delegation from Commonwealth of Independent States

December 23-26,Dr. Sisavang VONGHACHACK, deputy director, National Agriculture and Forestry Research Institute, Laos, and a 2-person delegation

FINANCIAL REVIEW

Income and Expenditure (Million Yuan)

Categories	FY2006	FY2007	FY2008	FY2009
INCOME				
Government Grants	10.494	36.553	40.504	37.706
Infrastructure	4.000	0	0	27.800
Admissions & Services	27.993	26.801	25.776	30.179
Grants for research	20.201	18.250	26.637	31.772
Miscellaneous	0.696	0.582	0.417	0.195
Sum	**63.384**	**82.186**	**93.334**	**127.652**
EXPENDITURE				
Staff costs	24.726	36.448	41.196	43.139
Maintenance	4.645	0.830	0.673	0.807
General & Admin. Expense	3.752	4.029	1.687	2.403
Infrastructure	11.000	16.753	38.548	33.540
Equipment	4.692	10.014	16.041	20.559
Research & Horticulture	13.279	22.834	21.182	29.488
Miscellaneous	1.206	1.121	0.050	0.027
Sum	**63.000**	**92.029**	**119.377**	**129.963**

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Captions for cover photos
(*anti-clockwise*)

1. Physiognomy of Bulong Nature Reserve;
2. Celebration of the 50th Anniversary;
3. Exhibition in Wuhan Botanical Garden;
4. Wild edible plants collection;
5. The 5th International Symposium on Zingiberaceae
6. 2009 Graduation ceremony;
7. Experts' visit to the construction site of the new research center