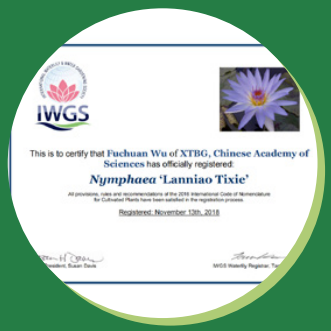
XTBG



# Annual Report 2018

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

Cover photos, anti-clockwise:

1. Toxeus magnus (Araneae Salticidae) a jumping spider that mimics ants
2. Opening of Office of SEABRI in Lao PDR
3. Nymphaea 'Lanniao Tixie' registered by International Waterlily and Water Gardening Society
4. XTBG won the title of "Top Ten Favorite Tourism Destinations for Netizens"
5. ZOU Shouqing and TAO Guoda of XTBG won the 2018 "China Botanical Garden Lifetime Achievement Award"
6. 2018 Annual Conference of XTBG
7. 2018 Orchid flower show

# Annual Report 2018

Xishuangbanna Tropical Botanical Garden
Chinese Academy of Sciences

April 30, 2019

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

**XTBG's vision:**

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

**XTBG's mission:**

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

*Photo by ZHU Wen-Bin*

# CONTENTS


**SCIENCE** ..... 2

Project Development ..... 4

Research Progress and Outreach Highlights ..... 10

Improvement of Research Facility ..... 24

Conferences and Symposia ..... 26

**HORTICULTURE** ..... 32

**PUBLIC EDUCATION** ..... 38

**PARTNERSHIP** ..... 44

Domestic ..... 45

International ..... 47

**TALENT TRAINING AND TEAM BUILDING** ..... 50

Postgraduate Education ..... 51

Talent Training ..... 53

Team Building ..... 56

**VISITS** ..... 58

Other Visitors ..... 62

**FINANCIAL REVIEW** ..... 64

**PUBLICATIONS** ..... 66

Science

**In 2018, XTBG received 152 million Yuan in research funds from 98 new projects:**

28 projects funded by the National Natural Science Foundation of China;

11 projects funded by Yunnan Provincial Fund for Natural Sciences;

7 projects funded by CAS "President's International Fellowship Initiative" projects;

16 projects supported by other CAS program

**In 2018, XTBG researchers have achieved the following:**

249 research articles published in internationally peer-reviewed scientific journals (Source Journals of ISI Web of Science);

3 published monographs;

12 authorized patents;

1 new waterlily cultivar, *Nymphaea* 'Lanniao Tixie' officially registered by IWGS

*SEABRI hold the second annual conference*

*The 1st conference of the 2nd directorate of SEABRI*

# Project Development

## Project Development "Chinese Academy of Sciences-Southeast Asia Biodiversity Research Institute" Project

"Chinese Academy of Sciences-Southeast Asia Biodiversity Research Institute" project (SEABRI, CAS) was launched as a preliminary research program in 2014, numbers of activities have been conducted in 2018.

- From January 31 to February 2, 2018, about 80 scientists from China and Myanmar met in Nay Pyi Taw to discuss biodiversity conservation and research. The two sides will expand long-term cooperation to different ecosystems. Further new discoveries are expected, by carrying out joint field surveys, specimen analysis, data share, etc.
- Members of the 2nd Directorate of SEABRI gathered together in Kunming on May 3, 2018, to sum up achievements and discuss work plans. They discussed the key areas of the future work. Several issues, such as, how to deal with relevant difficulties and challenges, recruitment of international talents, and promote significant achievements, etc. have been

*The Joint Center for Research and Education unveiled*

*Opening of Office of SEABRI in Lao PDR*

discussed. At the meeting, five new institutions were added to the directorate of SEABRI.

◆ Prof. ZHANG Yaping and Dr. Sourioudong Sundara congratulated SEABRI on the opening of the Office of SEABRI in Lao PDR on October 17, 2018. With the platform, SEABRI will contribute more to regional biodiversity conservation and ecological protection in Lao PDR. The opening of SEABRI Office in Lao PDR resulted from the Memorandum of Agreement (MOA) signed between XTBG and BEI in 2017.

◆ CAS unveiled a new plate for the CAS-Myanmar Joint Center for Research and Education at SEABRI in Myanmar on October 22, 2018. The aim of the joint center is to strengthen biodiversity-related research and develop early-career researchers between the CAS and Myanmar, according to a statement at the unveiling ceremony. The University of CAS (UCAS) is one of the main sponsors for this program.

◆ Twenty-seven young plant researchers from institutes and universities of Myanmar gathered together in Nay Pyi Taw for the training from September 17 to 24, 2018. The training is the second of its kind jointly organized by XTBG and its Myanmar collaborator. It is designed to improve capacity building and equip young researchers of Myanmar with a deeper understanding of the science of plant identification and forest management.

*Second tropical plant identification and forest management training*

*XTBG researchers completed field expedition in northern Lao PDR*

◆ At the invitation of Biotechnology and Ecology Institute (BEI) of Lao PDR, a team with 13-staffs from XTBG conducted a large-scale biodiversity investigation in northern Lao from March 20 to April 12, 2018. The researchers collected about over 800 sheets of plant specimens in 300 species, 80 specimens of fish, and 150 DNA materials of animals.

◆ The 7th China–Myanmar joint field expedition by researchers of SEABRI to survey biodiversity in north Myanmar came to a successful end on June 26, 2018. During the field expeditions, some new plant species were discovered and will be confirmed by further investigation.

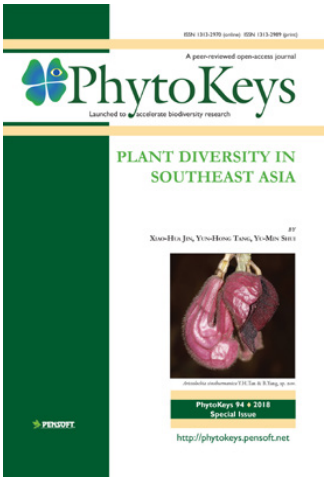
◆ MraukOo is an ancient city with a population of about 230,000. The drinking water of most of the villages here comes from ponds with visible green algae. They invited SEABRI and domestic experts in ecological and water conservancy engineering to conduct on site investigation from March 24 to 28, 2018. SEABRI will work together with Chinese Embassy in Myanmar and Eco-Environmental Sciences, CAS, to launch the Clean Drinking Water Support Program in Mrauk Oo in the next year.

◆ Rice is the largest food crop in Myanmar. SEABRI conducted a scientific comparative experiment between the selected hybrid rice and the local varieties of Myanmar. From May 26 to June 1, 2018, experts from Chengdu Institute of Biology, CAS held an evaluation meeting on China hybrid rice in Myanmar. The results showed that the hybrid rice from China generally shortened the growing time by 30-40 days in the growing period in Myanmar, and the two test sites' production increased by 23.87% and 47.65% respectively comparing to local varieties. Outstanding performance in production, disease and drought resistance for the introduced varies by Chinese scientists were praised by the local people.

In a special issue of Phytokeys, it highlights a new effort by SEABRI to promote awareness of the biodiversity and its conservation in the region. The special issue is entitled "Plant diversity in Southeast Asia". It firstly focuses on taxonomic discoveries to bridge the gap between our knowledge and diversity. For more information about the newly discovered plant species, please refer to Phytokeys at https://phytokeys.pensoft.net/issue/1229/. Journal of Man and the Biosphere is the bi-monthly published and non-profit official magazine of China Man and the Biosphere Programme. The magazine is dedicated to finding a solution between ecological conservation and sustainable development, and tries to provide insights to the policy makers, scholars and managers of protected areas.

*Clean drinking water program*

*Rice breeding cooperation with Agriculture University of Myanmar*




*SEABRI reports on plant diversity in Southeast Asia*

*Journal of Man and the Biosphere published "Myanmar field survey" album*

## Project Development “Chinese Union of Botanical Gardens” Project

The Chinese Union of Botanical Gardens (CUBG) continues to promote the full coverage protection (pilot) program of native plants, the national botanical garden standard system construction and capacity building. In 2018, the CUBG's “Full Coverage Protection Program of Native Plants” was adopted by the Ministry of Ecology and Environment as a case in the “China's Implementation of the Sixth National Report of the Convention on Biological Diversity”. The protection database of full coverage protection program on native plants was on line and all the information in the pilot areas can be accessed through internet.

**Changes in the number of species of threatened native plants in each pilot area**

| Region | Regional extinct | | Critically endangered | | Endangered | | Vulnerable | | Near threatened | | Lower risk | | Data deficiency | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Expert assessment | Final grade | Expert assessment | Final grade | Expert assessment | Final grade | Expert assessment | Final grade | Expert assessment | Final grade | Expert assessment | Final grade | Expert assessment | Final grade | Expert assessment | Final grade |
| Beijing Tianjin Hebei | 7 | 12 | 5 | 16 | 10 | 28 | 64 | 101 | 0 | 60 | 1888 | 1764 | 389 | 16 | 2363 | 1997 |
| Sichuan Yunnan Xizang | 11 | 10 | 57 | 184 | 154 | 160 | 874 | 312 | 0 | 427 | 4816 | 4800 | 2275 | 2239 | 8187 | 8132 |
| Guangdong | 3 | 3 | 61 | 66 | 199 | 205 | 259 | 268 | 383 | 387 | 4629 | 4596 | 510 | 501 | 6044 | 6026 |
| Guangxi | 19 | 2 | 236 | 590 | 611 | 734 | 1055 | 875 | 0 | 475 | 4182 | 4677 | 2424 | 1585 | 8527 | 8938 |
| Xinjiang | 7 | 6 | 10 | 11 | 28 | 29 | 468 | 219 | 0 | 295 | 2652 | 2750 | 398 | 197 | 3563 | 3507 |
| Jiangsu | 6 | 10 | 15 | 78 | 84 | 162 | 350 | 337 | 0 | 188 | 1716 | 1299 | 421 | 78 | 2592 | 2152 |
| Jiangxi | 2 | 2 | 26 | 26 | 81 | 82 | 132 | 133 | 327 | 333 | 2954 | 2938 | 758 | 743 | 4280 | 4257 |
| Hubei | 5 | 4 | 28 | 34 | 92 | 101 | 238 | 238 | 0 | 439 | 3509 | 3765 | 968 | 92 | 4840 | 4673 |
| Hunan | 3 | 2 | 58 | 61 | 243 | 248 | 369 | 377 | 547 | 571 | 3428 | 3429 | 413 | 407 | 5061 | 5095 |
| Fujian | 2 | 2 | 12 | 12 | 87 | 87 | 153 | 153 | 222 | 222 | 3253 | 3214 | 194 | 190 | 3923 | 3880 |
| Xishuangbanna | 1 | 2 | 43 | 151 | 140 | 191 | 874 | 521 | 0 | 163 | 4816 | 2904 | 532 | 78 | 4200 | 4010 |
| Liaoning | 1 | 7 | 8 | 18 | 36 | 36 | 146 | 125 | 0 | 88 | 1740 | 1815 | 589 | 458 | 2520 | 2547 |
| Chongqing | 2 | 2 | 22 | 22 | 100 | 100 | 192 | 192 | 287 | 287 | 3849 | 3821 | 63 | 63 | 4515 | 4487 |
| Shaanxi | 0 | 0 | 36 | 29 | 107 | 104 | 150 | 143 | 451 | 469 | 3325 | 3311 | 260 | 245 | 4329 | 4301 |
| Total | 73 | 64 | 764 | 1298 | 2039 | 2267 | 4550 | 3994 | 3362 | 4404 | 44023 | 45083 | 9115 | 6892 | 63926 | 64002 |

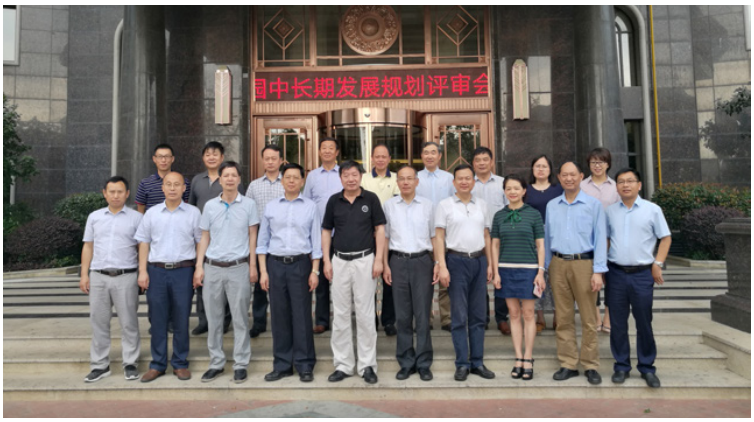
In the year 2018, a total of 190 professionals have been trained on the CUBG run training program, i.e., “Environmental Education Research and Practice”, “Garden Horticulture and Landscape Construction”, “Plant Classification and Appraisal”, and X Series “Botanical Garden Volunteer System Construction” and “Living Collection and Ex situ Conservation Management” training courses.

The “Big Data Platform of China Off Site Conservation Plant” project has completed the “Information Database of Botanical Garden Institutions” and initially established the “Plant Information Management Platform (PIMS) of CUBG” and has been examined and tested in 40 botanical gardens. The project is also funded by the CAS's Class A pilot project “CAS-Earth”, and future management will also be part of the national scientific data to be included in the unified management and stable maintenance support.

Based on the Expert Advisory Committee of CUBG and the Working Committee of the CAS Botanical Garden, CUBG has provided consultations for both Guilin Botanical Garden and Kunming National Plant Museum project.

*Training course for living collection and ex situ conservation management*

*Annual Work Meeting 2018 of CAS Botanical Gardens Committee*




*Medium and long-term development planning review meeting for Guilin Botanical Garden*

## UK-XTBG program on show at UK Research and Innovation Impact Festival

UK Research and Innovation (UKRI) celebrated its China launch in November in Beijing covering the breadth of UKRI's activities and objectives. The event demonstrated the impact and breadth of research and innovation collaboration between the UK and China. It was attended by over 250 senior government officials, academics, policy makers, and businesses from both nations.

The UK Research and Innovation Impact Festival showcased innovative technology developed through the £275 million UKRI collaborative portfolio with China, including fossil plants, satellite and wireless sensors, virtual and augmented reality, medical and rehabilitation robots and 3D models of drug-resistant bacteria.

As the only invited program in the field of Geosciences, Prof. ZHOU Zhekun and Dr. SU Tao of XTBG were invited to present their progress on UK-XTBG project "The evolution of vegetation and biodiversity change during the Paleogene and early Neogene".

The project is part of Biosphere Evolution, Transitions & Resilience (BETR), a joint program between the Natural Environmental Research Council (NERC) and the National Natural Science Foundation of China (NSFC).

*Prof. ZHOU Zhekun introduces plant fossils to the participants*

"The aim of the BETR program is to advance understanding of the evolution of the biosphere by integrating excellent palaeoscience (e.g. palaeontology, geochemistry, geochronology and phylogenomics) and cutting edge modelling", said Dr. SU Tao.

A major component of the BETR program will be undertaken under the 'Understanding Monsoon and Biodiversity Relevant to Landscapes and Livelihoods in Asia' (UMBRELLA) project.

"Broadly speaking, our project aims to better understand the evolution of the climate and ecosystem throughout S.E. Asia during the last 65 million years", said Prof. ZHOU Zhekun.

# Research Progress and Outreach Highlights

## Center for Integrative Conservation

### Jumping Spider Provides Milk and Prolonged Parental Care for Young

Lactation is the production and secretion of milk for the young and is a mammalian attribute. However, there have been few examples of milk provisioning in non-mammals.

In a study published in the journal ***Science*** on November 30, researchers at the XTBG report milk provisioning in *Toxeus magnus* (Araneae: Salticidae), a jumping spider that mimics ants. In a field study, researchers observed a jumping spider species whose breeding nest is composed of either several large individuals, with two or more adults, or one adult female and several juveniles.

"It's a puzzling observation for a species assumed to be noncolonial. It's possible that the jumping spider might provide either prolonged maternal care or delayed dispersal. We decided to test it," said Dr. CHEN Zhanqi, the first author of the study.

The researchers assessed how offspring developed and behaved under maternal care both in laboratory conditions and in the field. No spiderlings were observed leaving the nest for foraging until they were 20 days old. Closer observation revealed that the mother provided a seemingly nutritive fluid, hereafter called milk, to the offspring.

Milk provisioning in *T. magnus* involves a specialized organ over an extended period, similar to mammalian lactation. Observations under the microscope showed droplets leaking from the mother's epigastric furrow where the spiderlings sucked milk.

The spiderlings ingest nutritious milk droplets secreted from the mother's epigastric furrow until the subadult stage (around 40 days). If blocked from obtaining milk, the newly emerged spiders will stop development and die within 10 days, showing that milk is indispensable for offspring survival in the early stage.

Moreover, the researchers tested why parental care and milk provisioning were continued after 20 days when the spiderlings were able to forage for themselves. The mother continued nest maintenance throughout, carrying out spiderlings' exuviae and repairing nest damage. When receiving both maternal care and milk, 76% of the hatched offspring survived to adulthood (around 52 days). Milk provisioning after 20 days did not affect adult survivorship, body size, sex ratio or development time, but the mother's presence played a key role in assuring a high adult survival rate and normal body size. Thus, milk provisioning complemented their foraging in later stages.

Although the mother apparently treated all juveniles the same, only daughters were allowed to return to the breeding

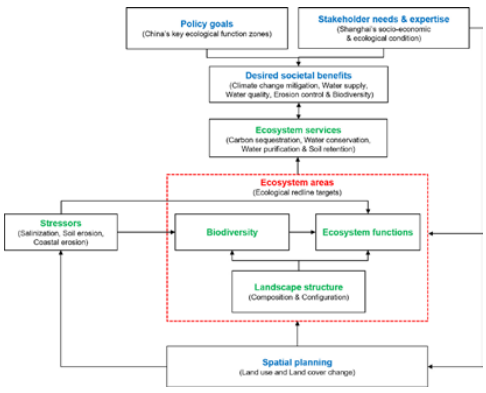
*Toxeus magnus (Araneae Salticidae) a jumping spider that mimics ants*

*Main authors of the research*

nest after sexual maturity. Adult sons were attacked if they tried to return. This may reduce inbreeding depression.
The findings show that in the jumping spider species, the mother invests much more than the male invests, predicting a female-biased sex ratio to be optimal for reproductive success with a polygamous mating system.
"Our findings demonstrate that mammal-like milk provisioning and parental care for sexually mature offspring have also evolved in invertebrates," said Dr. CHEN. "We anticipate that our findings will encourage a reevaluation of the evolution of lactation and extended parental care and their occurrences across the animal kingdom."

## Researchers propose a transdisciplinary framework to determine ecological redline areas in Shanghai

Ecosystem services (ES) assessments offer a means of practicing integrated approaches to address the serious policy challenge of incorporating environmental issues into development decisions. However, there is a fundamental lack of science–policy frameworks, explaining methodological standards for application in policy.
Researchers from XTBG and their collaborators create a science–policy framework that builds upon core elements of other ES frameworks but details both the specific institutional and ecological components (e.g. types of information, indicators, and methodological steps) for public policy.
They got their science–policy framework published in ***Nature Communications.*** The researchers presented the transdisciplinary framework and methodology for China's Ecological Redline Policy (ERP), one of the first national policies utilizing multiple ES. The framework details how to incorporate the needs of stakeholders in particular policymakers into the development of the ES science, and illustrate how policymakers can use the science in the policy process.
They proposed five indicators to standardize ecological redline areas (ERA) designation processes: ES hotspots; biodiversity hotspots; ecologically fragile hotspots (vulnerable to stressors); landscape structure (composition and configuration); stakeholder opinions.
They determined a current ecological redline target of 1098 $km^2$ at the municipal scale. ERAs cover 16% of Shanghai's total land area, representing a 174% increase in terrestrial protected area. ES criteria expand ecosystem protection by 142% (681 $km^2$).
They also found that ERP significantly increases ES flows compared to other land use scenarios.
"If properly implemented, ERP could potentially reduce the tradeoff between urbanization and ecosystem protection in Shanghai", said Dr. BAI Yang, the first author of the study.
"Our study supports the use of ES information in urban planning for developing more comprehensive plans on ecosystem protection", added BAI Yang.



*Ecosystem services assessment and policy development framework*

## Cultivating orchids may help conserve wild species in China

Over-exploitation of economically valuable species is a major threat to biodiversity. Few studies have investigated the role of consumer behavior in driving over-exploitation of rare, wild species in the lucrative horticultural trade.

Dr. Sophie Williams, a postdoc of XTBG, and her collaborators conducted a study to investigate consumer preferences for particular attributes of ornamental plants. They took a targeted approach, focusing on the Chinese market for orchids. To quantify the role of consumer preferences for wild orchids in China's horticultural market, they used conjoint analysis to determine which attributes are preferred by orchid owners and non-owners in two socio-economically contrasting areas of South China.

Working in two very different locations in China, Xishuangbanna, a sparsely populated rural area in southwest China, and Hong Kong, a densely populated metropolis, researchers found that consumer preference was not driving demand for wild or rare orchids in Chinese flower markets. Across both study sites, price and color were found to be the most important attributes. Whilst a slight preference for wild plants was detected at Xishuangbanna, plant origin was the last. Other factors, primarily cost and flower color, took precedence in driving choice.

The researchers also measured awareness of orchid import regulations. The majority of consumers in their sample did not know what the Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES) is, or how it applies to different orchid groups.

This suggested that most people who purchase orchids may not be aware of the issues related to the illegal trade in wild plants. Consumers just want cheap colorful flowers, and would be just as happy buying cultivated plants.

The findings showed that trade in wild ornamental orchids in South China is supply-driven.

The researchers thus suggested that the best way to conserve wild orchids might be to strengthen enforcement of existing regulations to prevent wild plants being sold, and support legal businesses selling sustainable commercially grown orchids.

The study entitled “Using consumer preferences to characterize the trade of wild-collected ornamental orchids in China” has been published in ***Conservation Letters.***

## Researchers explore ecological variation along light gradient in savanna–forest boundaries

A huge body of research has been performed on shade tolerance in forest trees, yet there is little information comparing light responses of open vs closed habitat trees. The relative contribution of shade-casting tree canopies vs tree densities has seldom been studied at the forest–savanna boundaries.

In a recent study published in ***New Phytologist,*** researchers from XTBG and their African collaborators explored the drivers of the systemic transition from open savanna to shaded closed forests. They integrated shade effects on grasses and woody plants, and related these effects to the feedbacks that sustain alternative biome states. They wished to determine how trees can modify the light environment under their canopy and whether this creates environmental barriers across biome boundaries.

The researchers investigated how shade depth, represented by canopy leaf area index (LAI), is generated by adult trees across savanna–forest boundaries and how a shade gradient filters tree functioning, and grass composition and biomass. They selected 23 sites at the boundary between savanna and forest (10 sites) and between savanna and thicket (13 sites) in Hluhluwe-iMfolozi Park in South Africa.

*Hluhluwe-iMfolozi Park*

They found that the shading by trees is likely involved in two important ecological thresholds at which the ecological functioning shifts in relation to canopy closure: fire suppression threshold and deep shade threshold.

Grass photosynthetic types and tree traits (fire and competition) were remarkably well sorted on the light gradient. When grasses fueling fire are suppressed, a functional transformation would happen and lead to a shift of fire related traits in trees. Then, tree competition for light becomes the major filter.

The fire-suppression threshold(LAI c. 0.5) occurred in a more open environment. It separated savanna from thicket and forest, and is created by an increase in density of trees with similar light interception ability.

The deep-shade threshold occurred at an LAI > 1.5. The deeper shade responsible for the second threshold, separating forest from the two other biomes (thicket and savanna), is explained by a combination of both tree density and more efficient allocation of biomass to light interception. The study suggests that shade suppression of grass biomass is an essential first step for the maintenance of alternative stable states.

## CAS Key Lab of Tropical Forest Ecology

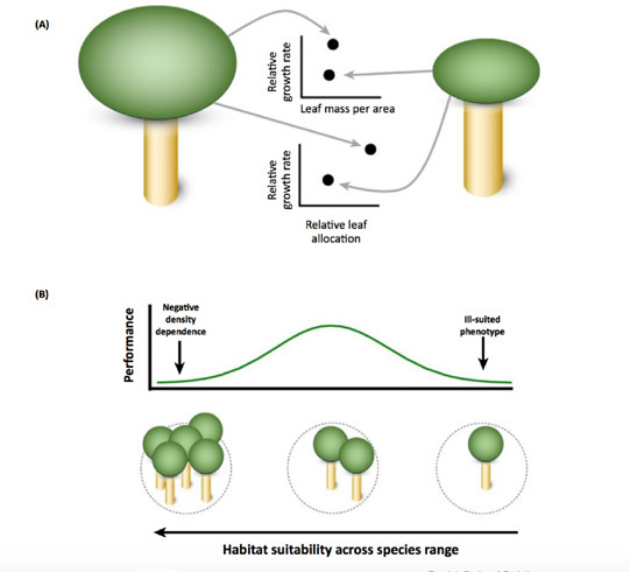
### Functional trait–demographic relationships are weak

Functional trait is defined as a physiological or morphological trait that influences the growth, survival, or reproductive rate of an individual plant. While the popularity of functional traits in community ecology is clear, the relative success of ecologists attempting to link functional traits to demographic performance is questionable, particularly in tree communities.

By consulting a large amount of literature, researchers from XTBG and University of Maryland found evidence that functional traits often fail to predict demographic rates. The trait–demographic rate relationships are not as strong as often assumed or portrayed.

They argue in ***Trends in Ecology & Evolution*** that the weak relationships arise from three fundamental problems with trait-based community ecology as it is currently implemented.

They first stated that a trait with little context has little predictive power. The way in which a trait of an individual influences demographic performance is dependent on the environment as well as the other trait values of the individual.




*Two contexts that are often ignored in trait–demographic rate studies in tree community ecology*

They then put forward that measuring individuals is challenging, but advised. “A tradition in functional trait ecology has been to average trait and demographic rate values at the species level for downstream analyses. Individuals, however, vary in their trait values as well as the environmental contexts that they occur in on the landscape. Averaging this information will obscure trait–rate relationships that could be elucidated by analyzing individual-level data. Utilizing species mean values measured from populations not in the study system that they are being applied to will further exacerbate the problem.” said Dr. YANG Jie, the first author of the study.

“Specifically, important contextual information is frequently ignored, there is too much focus on species relative to individuals, and there are dimensions of tree function that are critical for determining tree demographic rates that are not captured by easily measured functional traits” said Dr. CAO Min, a researcher of the study.

## Plant fossil archives implicate climate change in Tibet's southeastern margin

The uplift history of southeastern Tibet is crucial to understanding processes driving the tectonic evolution of the Tibetan Plateau and surrounding areas. However, our current understanding of the processes of landscape evolution in the southeastern part of the Himalaya-Tibet Edifice (HTE) has been undermined. Then, the elevation history of the Tibetan Plateau is one of collisional modification of a large pre-existing area of high and complex topography.

Researchers from XTBG and their collaborators used radiometrically dated plant fossil assemblages to seek uplift, climate and biotic changes at the Eocene-Oligocene transition in southeast Tibet. They got their research result published in ***National Science Review.***

The researchers attempted to quantify when southeastern Tibet achieved its present elevation, and what kind of floras existed there at that time. They employed well-dated fossil floras and used a technique independent of isotope fractionation models and lapse rates.

With new radiometric dating and newly-collected plant fossil archives, they quantified the surface height of part of Tibet's southeastern margin of Tibet in the latest Eocene (i.e. about 34 million years ago) to be about 3 km and rising, possibly attaining its present elevation (3.9 km) in the early Oligocene.

The result demonstrated clearly that the early onset of uplift in southeastern Tibet, rather than a later during the later Oligocene and Neogene. They also found that the Eocene-Oligocene transition in southeastern Tibet witnessed leaf size diminution and a floral composition change from sub-tropical/warm temperate to cool temperate.

Their findings show that the elevation of southeastern Tibet took place largely prior to the Oligocene, which has major implications for uplift mechanisms, landscape development and biotic evolution, countering arguments for a Neogene onset of lower crustal flow, uplift and river incision.

## Study uncovers three factors promoting species coexistence in tropical tree community

A present challenge in tree community ecology is to elucidate how intra-specific functional trait or genetic variation is naturally distributed in populations and how it is related to intra-specific negative density dependence. Integrating the spatially continuous individual genetic diversity area relationship (IGDAR) with demographic rates across size classes may be a powerful way to elucidate these processes that are likely occurring simultaneously in natural populations that cannot be experimentally manipulated.

Researchers from XTBG and their international collaborators conducted a study to focus on the spatial distribution of intra-specific genetic diversity in a natural population of a tropical tree and the demographic implications of related neighbors.

The researchers employed an individual genetic diversity area relationship (IGDAR) and individual species area relationship (ISAR) frameworks. Using nine pairs of microsatellite DNA primers,

*20-ha Xishuangbanna tropical seasonal rainforest dynamics plot*

they developed microsatellites to genotype individuals of *Beilschmiedia roxburghiana* (Lauraceae), an evergreen, small- to medium sized tree, in the 20-ha Xishuangbanna tropical seasonal rainforest dynamics plot where growth and survival has been monitored for 10 years.

They found that spatial clustering of genotypes was evident across spatial scales, particularly in smaller individuals. Individuals that are surrounded by closely related conspecifics had lower relative growth rates than individuals surrounded by random or more diverse than expected conspecific neighbors. Furthermore, the species richness of neighboring heterospecifics had no impact on the demographic rates of focal individuals.

The researchers thus have uncovered three pieces of evidence that should promote species coexistence in a hyper-diverse tropical tree community—dispersal limitation, low intra-specific diversity in local neighborhoods and negative demographic consequences of closely related neighbors. The study entitled "Intra-specific relatedness, spatial clustering and reduced demographic performance in tropical rainforest trees" has been published online in ***Ecology Letters.***

## Study reveals key factors explaining successful invasion of Chromolaena odorata

The biotic resistance hypothesis predicts that, during alien plant invasion, many biological factors (e.g. species richness, functional traits and plant-soil interactions) can affect the resistance of a community to the invader. Numerous studies have revealed biotic resistance in plant communities. However, it is largely unknown whether disturbance effects on invasion success differ between the native and non-native communities. *Chromolaena odorata*, a semi-lignified perennial subshrub, is an invasive species in tropical and subtropical areas.

Dr. ZHENG Yulong of XTBG and his colleagues used biomass fraction of *C. odorata* as a measure of 'invasion success' in a series of artificial communities varying in species richness. The researchers established a series of artificial communities in a common garden using resident plants from Mexico (native range) and China (non-native range). They used the proportion of *C. odorata* biomass, which was calculated from the biomass of *C. odorata*/biomass of all plants in the community to evaluate invasion success. They explored the effects of plant-soil microbe interactions and allelochemicals on invasion success by adding the fungicide carbendazim or pure activated carbon respectively.

A high proportion of *C. odorata* biomass indicated that the community was easily invaded by *C. odorata* and invasion success was great.

They found that range, harvesting time (i.e. disturbance) and species richness, but not treatment (i.e. control, fungicide, activated carbon), had significant effects on invasion success. The interactions of range × richness, range × time, richness × time and time × range × richness had significant effects on invasion success, whereas interactions among other factors had no significant effects on invasion success. There were significant differences of invasion success between communities with species from Mexico and China.

Harvesting time differentially influenced invasion success, increasing invasion success more greatly in non-native communities than in native communities. Both functional and phylogenetic distances were correlated with invasion success, with communities of functionally distant close relatives leading to the greatest invader success.

"The main novelty of this study is that it addresses many factors in a single experiment, and by doing so facilitates the identification of key factors explaining successful invasion of *C. odorata*" said Dr. ZHENG Yulong, the main researcher of the study.

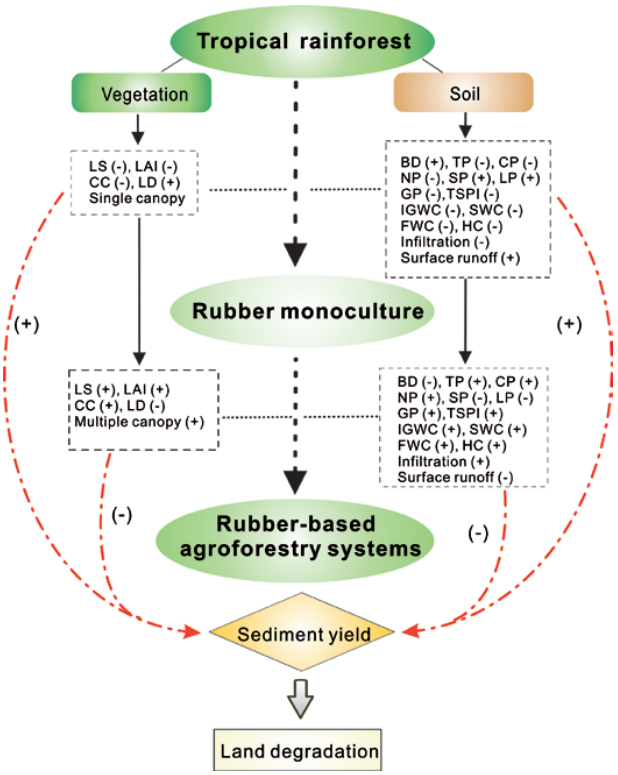
The study entitled "Species composition, functional and phylogenetic distances correlate with success of invasive Chromolaena odorata in an experimental test" has been published in the prestigious journal ***Ecology Letters.***

*C. odorata at different stages*

## Rubber monoculture leads to unfavorable vegetation and soil conditions in Xishuangbanna

In Xishuangbanna, dramatic land-use changes have occurred due to the rapid increase in monoculture rubber plantations at the expense of tropical rainforests. Previous studies have shown that the conversion of tropical rainforests to rubber plantations has resulted in high bulk densities and compact and crusted soil. However, little is known about other soil physical properties (i.e., soil porosity and water storage capacity) and their relationships with sediment yield in this region.

Prof. LIU Wenjie and his team of XTBG measured the effects of changes in soil physical properties and vegetation traits on runoff and sediment yield under different types of land use in Xishuangbanna. The researchers chose the tropical rainforest, rubber monoculture and four rubber-based agroforestry systems representing different land-use types in Xishuangbanna. They compared the effects of land-use changes by employing space-for-time substitution (SFT), a tool used for estimating vegetation status and environment at separate locations.




*Effects of land-use changes on soil properties and vegetation traits in Xishuangbanna, SW China. "+" denotes positive effect, "–" denotes negative effect. LS: leaf size, LAI: leaf area index, CC: canopy cover, LD: litter decomposition, BD: bulk density, TP: total porosity, CP: capillary porosity, NP: noncapillary porosity, SP: solid phase, LP: liquid phase, GP: gas phase, TPSI: three soil phase indices, IGWC: initial gravimetric water content, SWC: saturated water capacity, FWC: field water capacity, HC: hydraulic conductivity.*

The results showed that conversion of tropical rainforest to rubber monoculture resulted in unfavorable vegetation (i.e., low leaf area index, low canopy cover) and soil conditions (i.e. low porosity and low hydraulic conductivity) as well as less litter. Those drawbacks reduced rain water infiltration and thereby increased surface runoff and sediment yield, which could ultimately cause land degradation.

Compared with rubber monoculture, the runoff and sediment yield in rubber-based agroforestry systems decreased, because of the partial improvement in soil physical properties (i.e., lower bulk density, higher field capacity) and increased protection provided by the multi-layered canopy or litter layer. The researchers thus recommended that local governments and farmers should consider intercropping *F. macrophylla* and T. cacaotree species within rubber monoculture plantations in Xishuangbanna.

The study entitled "Effects of land-use changes on runoff and sediment yield: Implications for soil conservation and forest management in Xishuangbanna, SW China" has been published online in *Land Degradation & Development*.

## Scientists combine large fossil data and climate modeling to reveal climate in in Eurasia during the Oligocene

A joint research team from China and UK compiled 149 macrofossil data in the mid-high latitudes of Eurasia, combining with climate modeling, revealed the Oligocene climate in Eurasia. This study was published on ***Gondwana Research*** recently. The corresponding author, Prof. XING Yaowu, from XTBG explained that the Oligocene represents a transitional time period from a warm climate to a cooler climate with the formation of large ice sheets in the Antarctic.

In this study, scientists compiled 149 macrofossil floras in the mid-high latitudes of Eurasia, then quantitatively reconstructed the Oligocene climate and compared the fossil data to a range of different HadCM3L model simulations from the University of Bristol.

During the Oligocene, Eurasian mid-high latitudes were mainly dominated by a humid subtropical climate. Mean annual temperature (MAT) ranged between 5.4 °C and 25.5 °C with mean annual precipitation (MAP) ranging from 338 to 2453 mm. Three regions (Europe, central Eurasia and eastern Asia) indicate different climatic regimes, with a generally warmer and wetter climate in Europe and a colder and drier climate in central Eurasia when compared to eastern Asia. Their results indicate that geographic changes (e.g. retreat of the Paratethys Sea) played an important role in shaping the climate pattern of Eurasia. The results demonstrate that models simulated much higher temperature seasonality (lower simulated winter temperatures and higher simulated summer temperatures) in Eurasia. These results provide some constraints that should be considered for future paleoclimate modelling.

“This study shows that combining fossil data with climate models can provide valuable information for future climate predictions.”, Prof Yaowu Xing said.

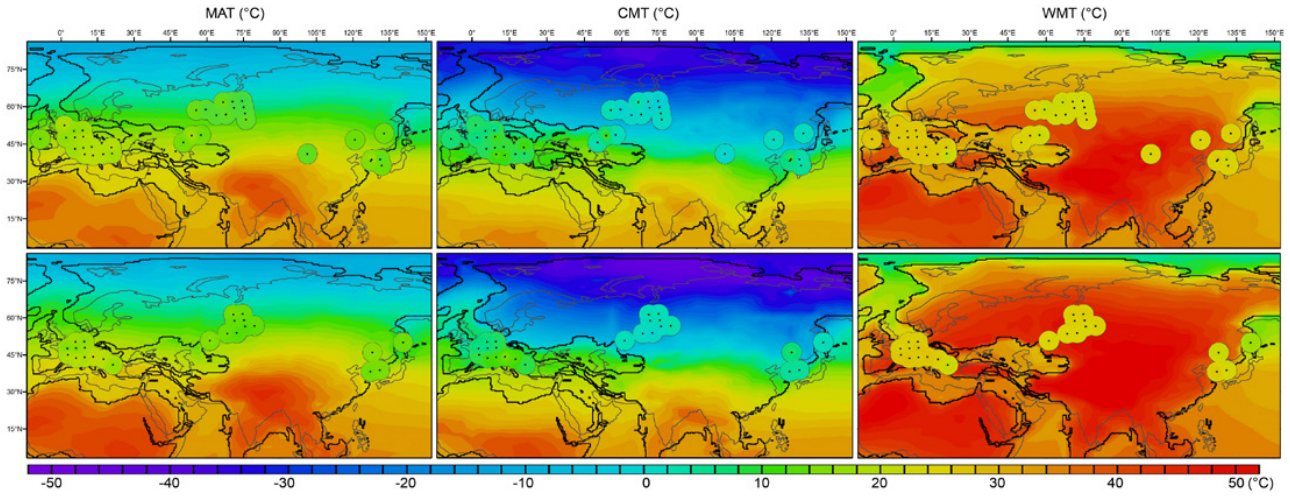



*Fig. 6 The fossil data versus the HadCM3L simulation for MAT, CMT, WMT . Grey color lines and dark thick lines on the map represent the present day and Oligocene land–sea boundaries respectively. Filled circles*

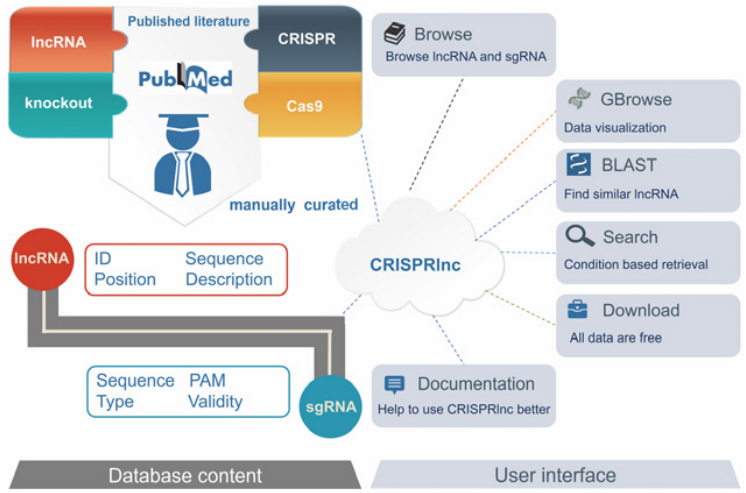
## CAS Key Lab of Tropical Plant resource and Sustainable Use

# Researchers construct a manually curated database of validated sgRNAs for lncRNAs

Long non-coding RNAs (lncRNAs) were once regarded as junk sequences. Due to the extremely complicated and inconstant mechanisms when compared with protein-coding genes, most of lncRNAs have not been well studied. CRISPR/Cas9 provides new opportunities for deeply researching lncRNA's functions, and is receiving increasing attention in the field of lncRNA studies.

Researchers from XTBG and Hunan Normal University constructed CRISPRlnc —a manually curated database of validated single guide RNAs (sgRNAs) for lncRNAs from all species. They got their new database published in ***Nucleic Acids Research.***

The researchers collected data upon different CRISPR/Cas9-based systems, including CRISPR knockout (CRISPRko), CRISPR activation (CRISPRa), CRISPR interference (CRISPRi) and CRISPR edit (CRISPRedit). After manually reviewing more than 200 published papers, the new version of CRISPRlnc contains 305 lncRNAs and 2102 validated sgRNAs across eight species, including mammalian, insect and plant.




*CRISPRlnc database overview*

"We handled the ID, position in the genome, sequence and functional description of these lncRNAs, as well as the sequence, protoacceptor-motif (PAM) motif, CRISPR type and validity of these sgRNAs", said Prof. LIU Changning, principal investigator of the study. As the first database against the validated sgRNAs of lncRNAs, CRISPRlnc will provide a new and powerful approach for genome editing of lncRNAs.

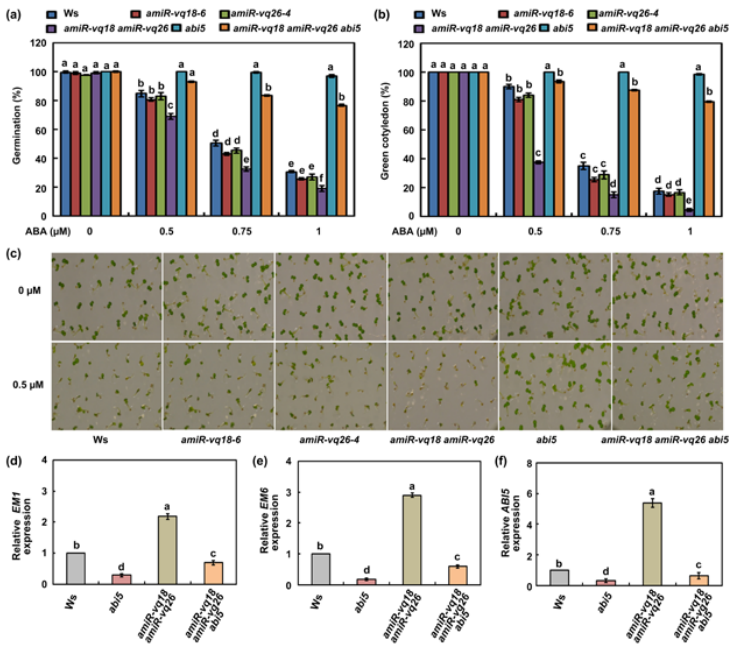
"We believe that our CRISPRlnc database will thrive in the fields related to lncRNA and CRISPR/Cas9 studies, and will be popular among people in these fields", said Prof. LIU. For biologists to better access the information of CRISPRlnc, the researchers established a user-friendly website. Please refer to the CRISPRlnc database at http://crisprlnc.xtbg.ac.cn/ or http://www.crisprlnc.org.

## Study reveals roles of VQ motif-containing proteins in abscisic acid signaling

Seed germination and subsequent seedling establishment are crucial developmental stages during the life cycle of higher plants. They are modulated by diverse endogenous hormones and the surrounding environment.

Arabidopsis ABSCISIC ACID-INSENSITIVE5 (ABI5) is a central transcription factor of abscisic acid (ABA) signaling that represses those processes. ABI5 is precisely modulated at post-translational level. However, whether it interacts with other crucial transcriptional regulators remains to be investigated.

Prof. YU Diqiu and his team of XTBG reported in the Plant Journal that VQ18 and VQ26 function antagonistically with ABI5 to maintain the appropriate ABA signaling level necessary to fine-tune seed germination and subsequent seedling establishment.




*VQ18 and VQ26 negatively regulate ABA signal transduction and promote seed germination*

The researchers used the yeast two-hybrid (Y2H) assay to identify VQ18 and VQ26 as interacting partners of the ABI5 transcription factor. They found that VQ18 and VQ26 genes are predominantly expressed in germinating seeds and induced by ABA.

Further analysis showed that VQ18 and VQ26 formed a complex with ABI5 in the nucleus. Decreasing the expression of VQ18 and VQ26 simultaneously enhanced ABA responses during seed germination. The overexpression of VQ18 or VQ26 conferred germinating seeds being less ABA-sensitive. Consistently, the expression levels of several regulons of ABI5 were modulated by VQ18 and VQ26 in response to ABA. The increased ABA signaling of plants in which VQ18 and VQ26 were simultaneously suppressed required ABI5.

Additionally, VQ18 and VQ26 acted as negative interactors of the ABI5 transcription factor. The overexpression of VQ18 or VQ26 rendered germinating seeds less sensitive to ABA compared with wild-type.

## Researchers reveal negative role of Jasmonate in regulating stomatal development in Arabidopsis cotyledons

Jasmonate is a critical signal that regulates a wide range of physiological processes. Despite recent advances in our understanding of the jasmonate signaling pathway, the relationship between jasmonate signaling and other developmental processes or signaling pathways are still not fully understood.

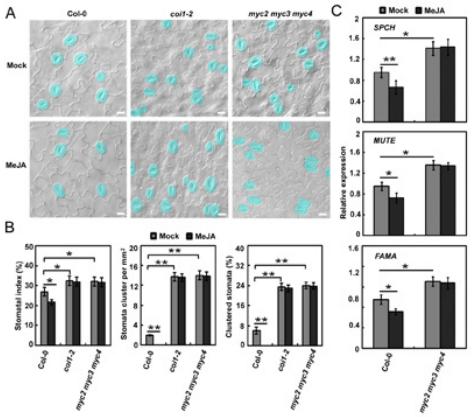
Prof. YU Dqiu and his team used molecular and genetic approaches to study the role of jasmonate in regulating stomatal development. They revealed that jasmonate negatively regulated stomatal development in *Arabidopsis cotyledons*. They got their research result published online in ***Plant Physiology.***

Microscopic observations revealed that exogenous jasmonate repressed stomata development, as the number of stomata in cotyledons of Arabidopsis seedlings germinated on medium with methyl jasmonate (MeJA) was reduced.

Conversely, blocking jasmonate biosynthesis and signaling led to enhanced stomatal development, as the number of stomata increased in cotyledons of jasmonate-related mutants, such as JASMONATE RESISTANT1 (jar1), CORONATINE INSENSITIVE1-2 (coi1-2) and the myc2 myc3 myc4 triple mutant.

Moreover, they found that jasmonate repressed stomatal development dependently of the MYC transcription factors. The MYC2, MYC3, and MYC4 transcription factors play central and redundant roles in jasmonate-mediated processes including stomatal development.

Their work showed that the jasmonate inhibits stomatal development in *Arabidopsis cotyledons*. It also showed that MYC transcription factors modulate the expression of SPEECHLESS (SPCH), MUTE, and FAMA to integrate jasmonate signaling and stomatal development.




*To investigate the molecular characteristics of coi1-2 and myc2 myc4, we introduced the E1728 and pSPCH:SPCHGFP markers into the coi1-2 and myc2 myc4 mutants through crossing. As shown in Figure, the coi1-2 and myc2 myc4 mutants cotyledon epidermis produced many more E1728- and pSPCH: SPCH-GFP-positive cells than the wild type, suggesting that the number of epidermal cells entering the stomatal lineage increased in the coi1-2 and myc2 myc4 mutants background compared with the wild type. Taken together, these results showed that endogenous jasmonate may negatively modulate stomatal development in Arabidopsis cotyledons.*

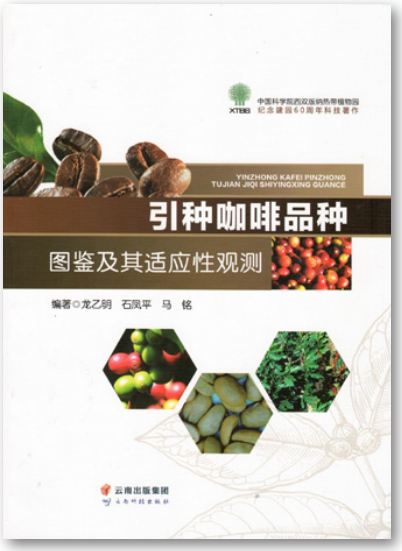
## New book

In 2018, the Tropical Plant Introduction and Domestication: Principles and Practices, jointly written by CHEN Biqiang, XU Youkai, and MA Xinxiang, was formally published by the Hubei Science & Technology Press.

This book is a summary of the principles and practices of the

tropical plant introduction and domestication at XTBG in the recent 60 years. The content of this book is structured into five chapters.

This book is of great value not only to those who are agriculturists, foresters, gardeners, horticulturists, but also to those who are studying or working in medical and health care, pharmaceutical industry and interesting in the plant introduction and domestication.

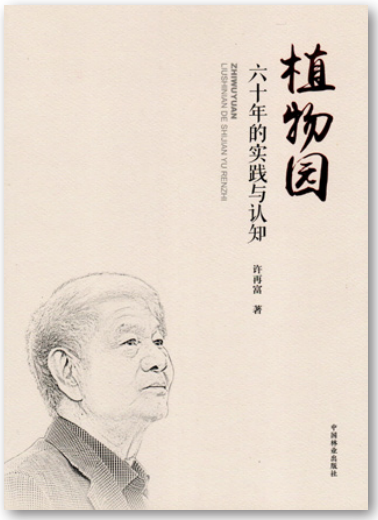



The Introduced Coffee Varieties and Their Adaptive Observation, jointly written by LONG Yiming, SHI Fengping, and MA Ming, was formally published by the Yunnan Publishing Group.

These years coffee of Yunnan is glorified as the best coffee in the world, and is called high quality and thick fragrant in international markets of London. Foreign merchants buy and mix it with other kinds of coffee to enhance their taste. Using the earth resources in tropical and subtropical areas to develop coffee production can not only meet the need of home market but also can make profit in foreign currency. And it is beneficial not only to our country commercial construction but also to help the peasants in mountain areas to become rich. The quick development in production and introduce of foreign coffee breeds have solved the problem of barren cultivars and optimize the structure of breeds. But it also produces the problem of breed confusion: some are named by place; some are called species in number. This makes one breed several names. Study groups of the Ten Thousand Species Project introduce about 100 breeds and observe them in fixed places. We classify these coffee breeds by their botanical characteristics, biological differences and relational information, and explain it with pictures and words. We compile the book for scientific research, teaching and department of production.

The Sixty Years of Practice and Cognition in the Botanical Garden, written by XU Zaifu, was formally published by the China Forestry Publishing House.

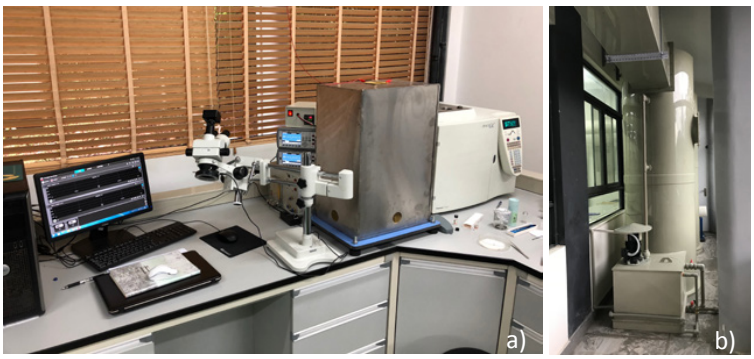
The author of the book, Prof. XU Zaifu, came to the XTBG in the early 1960s to experience, practice and explore the management and development of the Botanical Garden for nearly 60 years. Among them, he has been engaged in the leadership of the XTBG for more than 30 years. The book contains more than 60 papers related to botanical research and practice from more than 250 published papers. It not only covers the main academic ideas of XU Zaifu's botanical garden management and development, but also reflects the development of XTBG and even China over the past 60 years.



# Improvement of Research Facility

## Two projects passed the acceptance by CAS

"Gas Chromatography coupled with Electroantennography" and "Acid waste gas purification unit" were successfully passed the acceptance by CAS. The former project play a key role in the study of insect chemoreception mechanisms, the screening of bioactive components of insect pheromones or plant allelochemicals, and so on. The latter project is designed to treat acid containing waste gas, which can reduce air pollutant and protect the environment. Two projects were supported by "the equipment functional development of technological innovation projects of CAS", with a total of 600,000 Yuan was funded.




*a) Gas Chromatography coupled with Electroantennography*
*b) Acid waste gas purification unit*

## Stable Isotope Ratio Mass Spectrometer was introduced to central laboratory

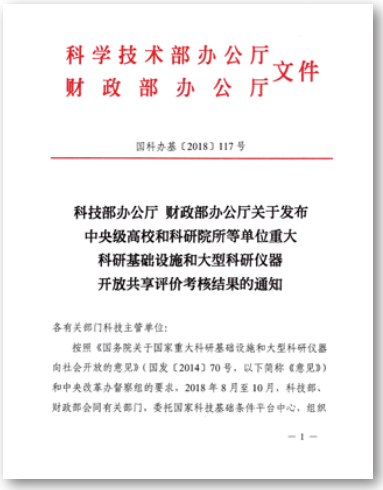
Isotopic (13C/12C; 2H/1H; 18O/16O and 15N/14N) analysis of light elements (e.g. C, N, H, O) in soil, plants and water using an elemental analyzer coupled to a stable isotope ratio mass spectrometer (Isoprime100). The analytical results can be used for researching the circulation and source of water and nutrition in different ecosystems, the water and nutrition absorption and utilization by root, and other research areas.

With the increase of the sample year by year, we should change different elemental analyzer frequent because of different samples (liquid and solid), the existing equipment cannot meet the needs of users, and the samples will be waiting for a long time. We see an effective way to address the problem —— an elemental analyzer coupled to a stable isotope ratio mass spectrometer (Thermo DELTA V Advantage) was introduced to central laboratory from Thermo (USA).

*Stable Isotope Ratio Mass Spectrometer was introduced to central laboratory*

## Public Technology Service Center (PTSC) Obtaining Open Sharing Examining Award of National Major Scientific Research Instruments and Facilities

In order to implement the “State Council's opinions on opening national major scientific research infrastructure and large scientific research instruments to the society” and requirements of Supervisory Group of the Central Reform Office, PTSC of XTBG actively explores the open sharing management methods of large research infrastructures and instruments, strengthens construction of experimental technology support team, continuously raising open sharing and using efficiency of instrument and equipment, and make them to fully function in scientific innovation service and support. Due to sound management system and high efficiency of open sharing and using, open and sharing examination result of instruments and equipment of XTBG PTSC was evaluated as good and ranked 49$^{th}$ among 373 appraisal units in China. PTSC will obtain an award of 850,000 yuan presented by national Ministry of Science and Technology and Ministry of Finance. The award will contribute to increasing service level and research supporting ability of PTSC.



科学技术部办公厅
财政部办公厅文件

国科办基〔2018〕117号

科技部办公厅 财政部办公厅关于发布
中央级高校和科研院所等单位重大
科研基础设施和大型科研仪器
开放共享评价考核结果的通知

各有关部门科技主管单位：

按照《国务院关于国家重大科研基础设施和大型科研仪器向社会开放的意见》（国发〔2014〕70号，以下简称《意见》）和中央改革办督察组的要求，2018年8月至10月，科技部、财政部会同有关部门，委托国家科技基础条件平台中心，组织

－1－

*XTBG was evaluated as good and ranked 49$^{th}$ among 373 appraisal units in China*

## XTBG Institutional Repository gets fully updated

The Institutional Repository (IR) of XTBG has got fully updated in 2018, from CSpace 3.0 to CSpace 6.0, an international knowledge management platform developed by Lanzhou Library, CAS.

XTBG-IR is built for archiving and collecting all the research output of XTBG. It provides access to the output of XTBG. It aims to improve the visibility, usage and impact of research conducted at XTBG. The content types include academic journal articles, conference papers, theses and dissertations, books and book chapters, patents, etc.

XTBG-IR is also part of the CAS IR Grid, an overarching repository infrastructure that connects the institutional repositories (IR) of member institutes throughout CAS.

XTBG-IR has collected and preserved over 8,700 scientific achievements, and most of them are with open accessed full content and available for users.

Up to now, XTBG-IR has more than 1.7 million total views and 320 thousand total downloads.

*XTBG-IR*

# Conferences and Symposia

## 2018 Annual Conference of XTBG

*2018 Annual Conference of XTBG*

*Prof. Chen Jin makes an opening speech*

XTBG held its Annual Academic Meeting 2018 to showcase the research progress in plant sciences, ecology, and conservation ecology on December 8-9. Prizes were awarded for the best oral and poster presentations.

The two-day meeting included keynote plenary lectures, oral presentations by principal investigators and early-career researchers. It also included discussion and communication.

On behalf of the two key laboratories and conservation center respectively, Dr. YANG Jie, Prof. LIU Changning, and Prof. KYLE Tomilinson made plenary presentations on the first day. Their presentations included “Why Functional Traits Do Not Predict Tree Demographic Rates”, “Study on lncRNAs”, and “The ecology and evolution of spiny plants-progress so far”.

35 principal investigators presented the research progress of their groups respectively. 37 young researchers and students presented their work. The oral and poster presentations by early-career researchers were evaluated. The best oral presentation winner prize went to Dr. LIU Yuntong and SUN Peng. The best poster presentation prize winner was ZHU Xiai.

“The annual academic conference provides a platform for XTBG researchers to present research progress, to have academic exchange and discussion. It also helps development of early-career researchers. Last year, one presentation entitled ‘MILK-PROVISIONING maternal care in a jumping spider’ was discussed at the annual conference. This year we witness its publication in journal Science, which is really encouraging”, said Prof. CHEN Jin.

Thus, the annual conference showcases the best of our research.

## International workshop on the response of forest ecosystems to climate change

Species 2000 Global Team meet at XTBG

Species 2000 (www.sp2000.org) is an autonomous federation of taxonomic database custodians, involving taxonomists throughout the world. The goal is to collate a uniform and validated index to the world's known species: the Catalogue of Life.

It coincided that the SP2000 Global Team meeting was held in XTBG in March. XTBG invited the experts of the SP2000 Global Team to have academic exchanges

*Public symposium*

*SP2000 Global Team meeting*

on March 22. At the public symposium, scientists of the TEAM and XTBG talked about global biodiversity information facility (GBIF), species of Asia, zero extinction plan, etc.

Species 2000 is an autonomous federation of taxonomic database custodians, involving taxonomists throughout the world. Its goal is to collate a uniform and validated index to the world's known species (plants, animals, fungi and microbes).

The Species 2000 and Integrated Taxonomic Information System (ITIS) product, the Catalogue of Life is the most comprehensive and authoritative global index of species currently available. It consists of a single integrated species checklist and taxonomic hierarchy. The Catalogue holds essential information on the names, relationships and distributions of over 1.6 million species. This figure continues to rise as information is compiled from diverse sources around the world. More information about the collaboration between Species 2000 and ITIS can be found under Organiation on the Catalogue of Life Website.

## 5th meeting of Chinese Plant Biology Female Scientists held at XTBG

The 5th academic meeting of the Plant Biology Female Scientists Branch of Chinese Society for Plant Biology was held at XTBG from March 29 to April 1. The meeting brought together 190 plant biologists from 58 institutes and universities.The participants had discussions on the two themes named “plant diversity: their research and utilization” and “promote career development of female scientists”.

On behalf of XTBG, deputy director HU Huabin sent warm welcome to the female scientists at the opening ceremony. He hoped that the meeting will provide an opportunity for XTBG researchers to communicate with peers deeply, strengthen cooperation, and join hands to promote the development of the field of plant biology in our garden, the cultivation of innovative talents in plant biology and the construction of beautiful China. CAS Academicians XU Zhihong, ZHAO Jindong and other well-known plant biologists were invited to make keynote speeches. 31 women scientists presented their recent research progress in plant biology.

While talking about career development of female scientists, women researchers had warm discussion. They shared their experience and thoughts in science careers. Speaking at the closing ceremony, CAS Academician CHEN Xiaoya acknowledged the key role of women scientists in promoting development of science.

The meeting was sponsored by the Plant Biology Female Scientists Branch of Chinese Society for Plant Biology and organized by CAS Key Laboratory of Tropical Plant Resource and Sustainable Use of XTBG. Prof. YU Diqiu of XTBG and Prof. XIA Guangmin of Shandong University played an important role for holding the meeting at XTBG. The meeting was also financially supported by the Chau Hoi Shuen Foundation Women in Science Program of Berkeley, University of California.

*Keynote speakers*

*5th meeting of Chinese Plant Biology Female Scientists*

## Biodiversity conservation to be enhanced in Belt and Road region

Integration of individual and collective capabilities is called for to facilitate long-term, multi-disciplinary inventories of biodiversity in Belt and Road Countries, and to enhance capacity for undertaking biodiversity research and conservation, according to a recent report. The news is released from the Session “Biodiversity and Conservation” of the Alliance of International Science Organizations (ANSO) in the Belt and Road Region on November 4-5. The 38 scientists at the Session have recognized both the growing threat from human activities and climate change to Belt and Road Countries’ biodiversity, and the importance of indigenous and local communities’ knowledge and wisdom for biodiversity and sustainable utilization.

*Prof.CHEN Jin speaks*

“It’s the moral obligation of scientists from Belt and Road region at the interface between scientific research and biodiversity conservation to seek effective ways”, said Prof. CHEN Jin of XTBG. As botanical gardens are important places to protect biodiversity, the researchers proposed to set up a coordination body for botanical gardens, the ANSO Botanical Gardens Union (ANSO-BGU), in order to strengthen capacity building for botanical gardens along the Belt and Road region. “With ANSO-BGU, we aim to encourage the establishment of new botanical gardens in key areas, reinvigorate existing botanical gardens, promote ex situ conservation and capacity building, as well as environmental education”, said CHEN Jin.

The session brought together researchers from China, Myanmar, Sri Lanka, Kennya, and Lao PDR. The researchers agreed to work more closely to enhance biodiversity conservation along Belt and Road region. They also released Recommendations on Biodiversity Conservation in the Belt and Road Countries from the meeting.

*“Biodiversity and Conservation” of the Alliance of International Science Organizations (ANSO)*

## XTBG scientists participate in ATBC 2018

The 55th Annual Meeting of the Association for Tropical Biology and Conservation (ATBC) was held in in Kuching, Sarawak, Malaysia from July 1-5. With the theme of “Linking Natural History and the Conservation of Tomorrow’s Tropical Ecosystems”, the ATBC 2018 brought together over 900 tropical biologists from 56 countries.

Headed up by Prof. CHEN Jin, more than 10 professors and students of XTBG participated in the ATBC 2018. They presented their research work progress via oral or poster presentations at different symposia. Following are some presentations by XTBG researchers.

CHEN Jin  Frequent hybridization and obligate pollination may facilitate species diversification of Ficus plants.

Richard Corlett  Anthropogenic climate change in SE Asia and its impacts on biodiversity.

FAN Zexin  Seasonal dynamics of stem radial growth of evergreen and deciduous tree species and their responses to microclimate in an Asian tropical dry karst forest.

ZHANG Ling  Mating system and fine-scale spatial genetic structure in the aggregated self-compatible hermaphrodite mistletoe Dendrophthoe pentandra (Loranthaleae) in Xishuangbanna, SW China.

SU Tao  Paleobotany in tropical SE Asia: progress and opportunities.

*The 55th Annual Meeting of the ATBC.jpg*

LIN Hua  Leaf temperature regulation strategies of plants from a hot dry and a hot wet habitat.

CHEN Yajun Convergence in plant hydraulic strategies across plant lifeforms in severe water-stressed habitats.

Moreover, Dr. Alice Hughes of XTBG was lead trainer of the workshop named “Fundamentals of GIS for ecology and species distribution modeling”.

In addition, Prof. Richard Corlett was awarded one of the two Honorary Fellows of ATBC. Honorary fellow is the highest award given by ATBC to "persons of long distinguished service to tropical biology."

## XTBG attends 12th China-Lao Transboundary Annual Meeting

The 12th China-Lao Transboundary Annual Meeting was held in Jinghong, capital city of Xishuangbanna, on May 23-24. Representatives of XTBG reported its contribution to transboundary biodiversity conservation and ongoing investigation of biodiversity in Lao.

Mr. LI Hongwei, CPC secretary and deputy director of XTBG, introduced the efforts XTBG have been made to conserve

*The 12th China-Lao Transboundary Annual Meeting*

China-Laotian biodiversity. In 2017, XTBG has signed MoU with Biotechnology and Ecology Institute (BEI) of Lao PDR, further promoting scientific collaborations in biodiversity conservation and ecology between China and Lao PDR.
Dr. SONG Liang of XTBG introduced the large-scale biodiversity investigation in northern Lao from March to April. He also reported future work plans in cooperation with Laotian counterparts in 2018.
At the annual meeting, participants from China and Lao discussed future work in the joint protected areas. China donated equipment like computers, printers, and cameras to their Laotian counterparts.
After 12 years collaboration and practice, the cross border biodiversity conservation has been strengthened, and the capacity of nature reserve staff on management of conservation has been improved, and the conservation awareness of villagers have been improved.

## XTBG Seminar Program

Since its establishment in 2010, the XTBG Seminar Program has conducted more than 388 seminars, with new speakers virtually every week in 2018. A total of 59 talks were given by speakers from the USA, the UK, Australia, India and 15 other countries. Prof. Anthony Ives , the distinguished research professor, University of Wisconsin-Madison , Prof. David Ellsworth of Western Sydney University , Prof. Ferry Slik, Universiti Brunei-Darusalam and other prominent scientists on ecology, biodiversity conservation, resource plant studies and other research fields were invited to talk in XTBG. XTBG Seminars are held on every Tuesday, with video link to the XTBG Kunming division. Talk language is in English. The program provides XTBG scientists and students a platform to communicate with international researchers while helping outsiders know more about the institute.

*Prof. Doyle Benton McKEY, University of Montpellier, France*

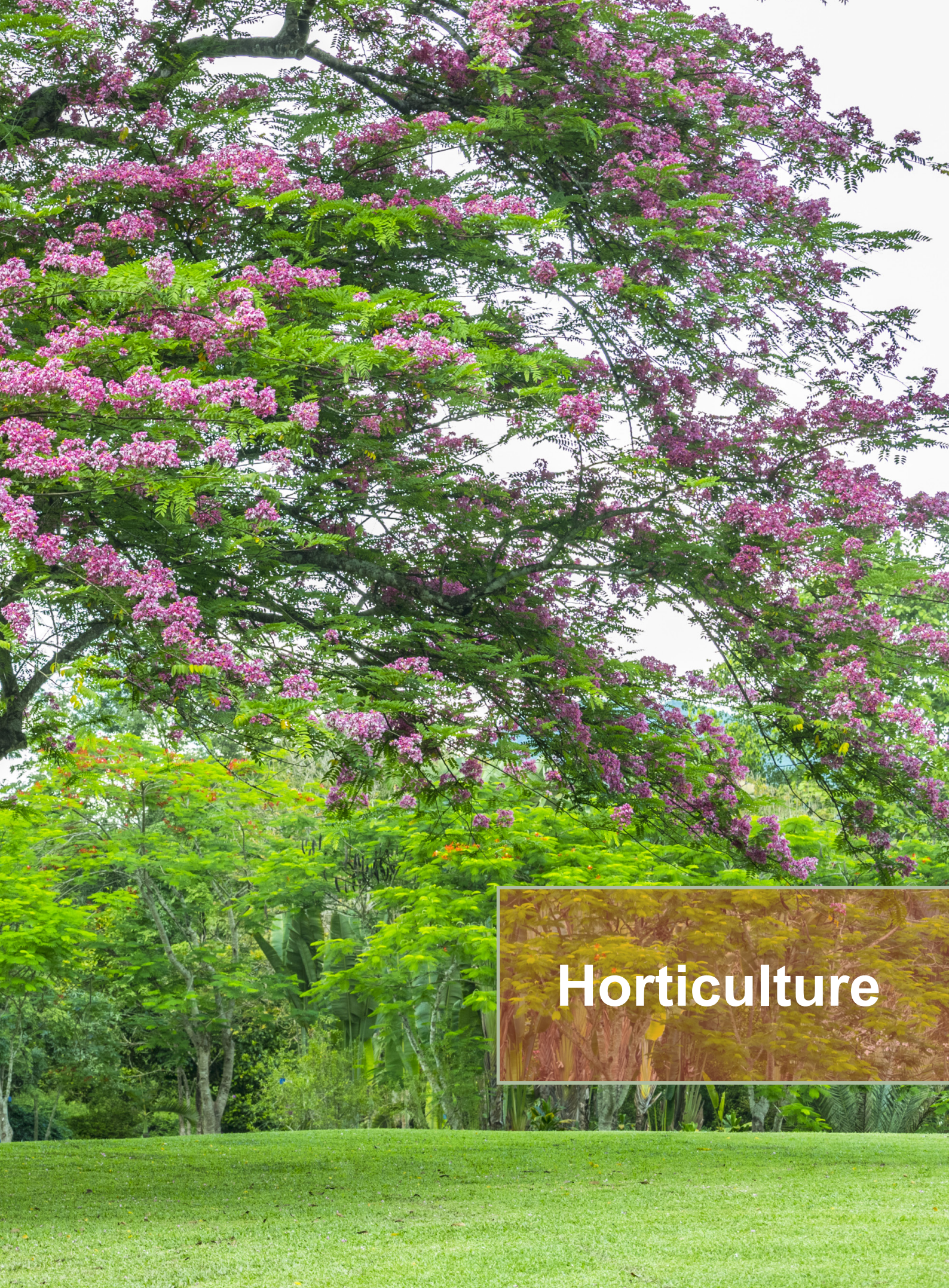
*Prof. David Ellsworth, University of Western Sydney*

*Dr. Marc-André SELOSSE, University of Gdansk*

*Dr. Masatoshi Katabuchi, Michigan State University*

*Dr. Stefano Draisma, Prince of Songkla University*

*Dr. Pieter Alle Zuidema, Wageningen University*


Horticulture

**Facts:**

1. Total number of accession: 23923
2. Total number of species: 13522
3. Total number of unidentified species: 5512
4. Total number of species from wild: 7800
5. Number of accession collected in 2018: 2240
6. Number of species collected in 2018: 2181

## The orchid show 2018 in XTBG

The themed Orchid Show “Natural orchids – the gift of nature” grandly opened at XTBG on April 10.The annual Orchid Show offers visitors a once-a-year opportunity to see a display of hundreds of orchids from Xishuangbanna and other tropical areas. Making use of natural elements at Shade Plant Garden of XTBG, the Orchid Show features the awe-inspiring diversity and beauty of the largest family of flowering plants on earth. Visitors may explore hundreds of amazing orchid blooms arranges in captivating displays, and appreciate many unique, rarely seen orchids. “Many wild orchids are at risk of extinction due to over-collection and their nature habitats. By this annual show, we hope to raise the public awareness of protecting orchids and create opportunities to enjoy the beauty of these stunning flowers” said organizers of the Orchid Show.“Furthermore, our botanical garden is a sanctuary for rare and endangered plants. We’ll try to protect orchids and other plant diversity” added a researcher of XTBG.

*2018 Orchid flower show*

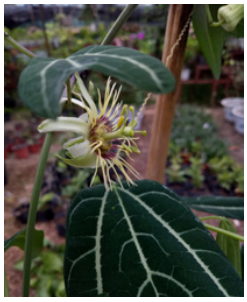
## Ex-situ conservation: Progress on introducing species from the two lists “Full-Coverage Conservation Plan for Native Plants” and “plant species with extremely small populations project”.

There are 347 “zero extinction species” in Xishuangbanna, and now about 62% of the “zero extinction species” are being preserved in XTBG. There are 396 “zero extinction species” in Puer, and about 50% of the them are being conserved in XTBG. In 2018, ten species with extremely small populations have been investigated and known clearly to us, and we have also done quadrat survey on each species, collected soil samples and made specimens of their associated plants. eight new species, A new Chinese genus record and six new species record were also found. The Fern research group (FRG) published four new species/combinations as first author or co-authors.

*Fieldwork*

## Improvement in propagating plants

We have successfully propagated native endangered species from seeds, some plants were propagated using innovative techniques such as grafting and tissue culture (example: *Passiflora xishuangbannaensis, Thunia alba*).
In 2018, great efforts have been made in propagating fifty rare and endangered ferns and great success has been made, especially in reproducing *Adiantum capillus-veneris*, *Christensenia assamica, Brainea insignis* and we have used Angiopteridaceae bract to do division propagation for the first time.
Propagation experiments have been made in reproducing some species with very high ornamental value, including *Aristolochia gigantea* and *Strongylodon macrobotrys*. Thirty *Aristolochia gigantea* seedlings and *Strongylodon macrobotrys* cutting seedlings have been gained successfully.
More grafting has been done for *Sapria himlayana* and one graft from last year has survived but no flowers have yet been produced. Population of *Paphiopedilum parishii* were surveyed and seeds were collected and sown in vitro.
The experiment of symbiotic seed germination of *Dendrobium*



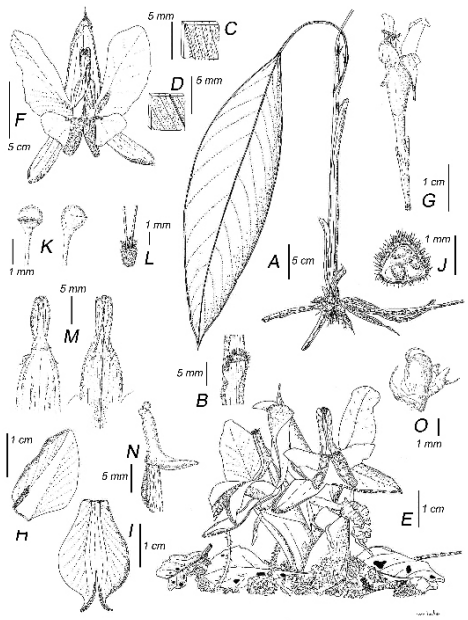
*Passiflora xishuangbannaensis*

*Propagation of ferns*

*chrysotoxum* was finished, and two effective fungal strains promoting seed germination were found. The fungi will have potential to propagate seedlings.

## Phylogenetics and population genetics

The Fern Research Group carried out research on the genus Scleroglossum (Polypodiaceae) and the Asplenium trichomanes complex (Aspleniaceae) using integrative approaches including DNA barcodes. The group also generated whole chloroplast genome data for 25 fern species including some rare and endemic taxa in China. The Orchid research group collected leaf samples of Paphiopedilum parishii for whole genome sequencing and population genetic marker development. We sequenced 4 chloroplast regions as well as ITS for a new species of Curcuma.




*Curcuma rubrostriata*

## Policies and management

A policy for the living collection in XTBG was written and published. It will act as a guide for field work and maintenance of plants in the future, and it will be revised and renewed on a regular basis. XTBG was registered as a CITES organization. In May, XTBG has been the 10th research institute registered by CITES in China, which will be of great importance in enhancing communication and cooperation between XTBG and some other relevant organizations in the world. And most importantly in starting and enhancing our exchange programs of living plants, seeds and research samples outside of China

*XTBG was registered by CITES*

## *Nymphaea* 'Lanniao Tixie' registered by International Waterlily and Water Gardening Society

A new waterlily cultivar, *Nymphaea* 'Lanniao Tixie', has been officially registered by the International Waterlily and Water Gardening Society (IWGS). It's the second time that cultivars of *Nymphaea* cultivated by researchers of XTBG. *Nymphaea* 'Lanniao Tixie' was cultivated by Mr. WU Fuchuan. *Nymphaea* 'Lanniao Tixie' has some special characteristics of Nymphaea 'Lanniao Tixie'. The petals of flowers are blue. Some pink freckles appear on the blue petals when it blooms on the second or the third days. The top of the calyx turns red.

In the registration process, all provisions, rules and recommendations of the International Code of Nomenclature for Cultivated Plants have been satisfied. IWGS president Susan Davis and registrar Tamara Kilbane signed the certificate of recognition to certify that WU Fuchuan has officially registered Nymphaea 'Lanniao Tixie'.

IWGS

This is to certify that Fuchuan Wu of XTBG, Chinese Academy of Sciences has officially registered:

*Nymphaea* 'Lanniao Tixie'

All provisions, rules and recommendations of the 2016 International Code of Nomenclature for Cultivated Plants have been satisfied in the registration process.

Registered: November 13th, 2018

IWGS President, Susan Davis

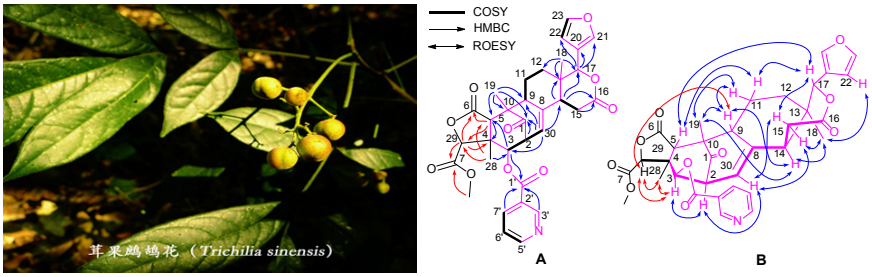
IWGS Waterlily Registrar, Tamara Kilbane

*Certification*

*Nymphaea'Lanniao Tixie'*

## Natural Products

A systematic medicinal chemical composition study was carried out on the genus *Scutellaria*. 17 compounds were isolated and identified, including 6 diterpenes (4 new compounds), 4 coumarins, 4 fluorenones, and 2 lignans. The research literature found that coumarin compounds have a smooth muscle stretching function, and anthrone has functions such




*Eight new compounds from Trichilia sinensis (Meliaceae)*

to prevent stone formation. Comprehensive analysis of the treatment of kidney stones cover black substance may be consistent efficacy of coumarin (smooth muscle stretch) acridine and one species.

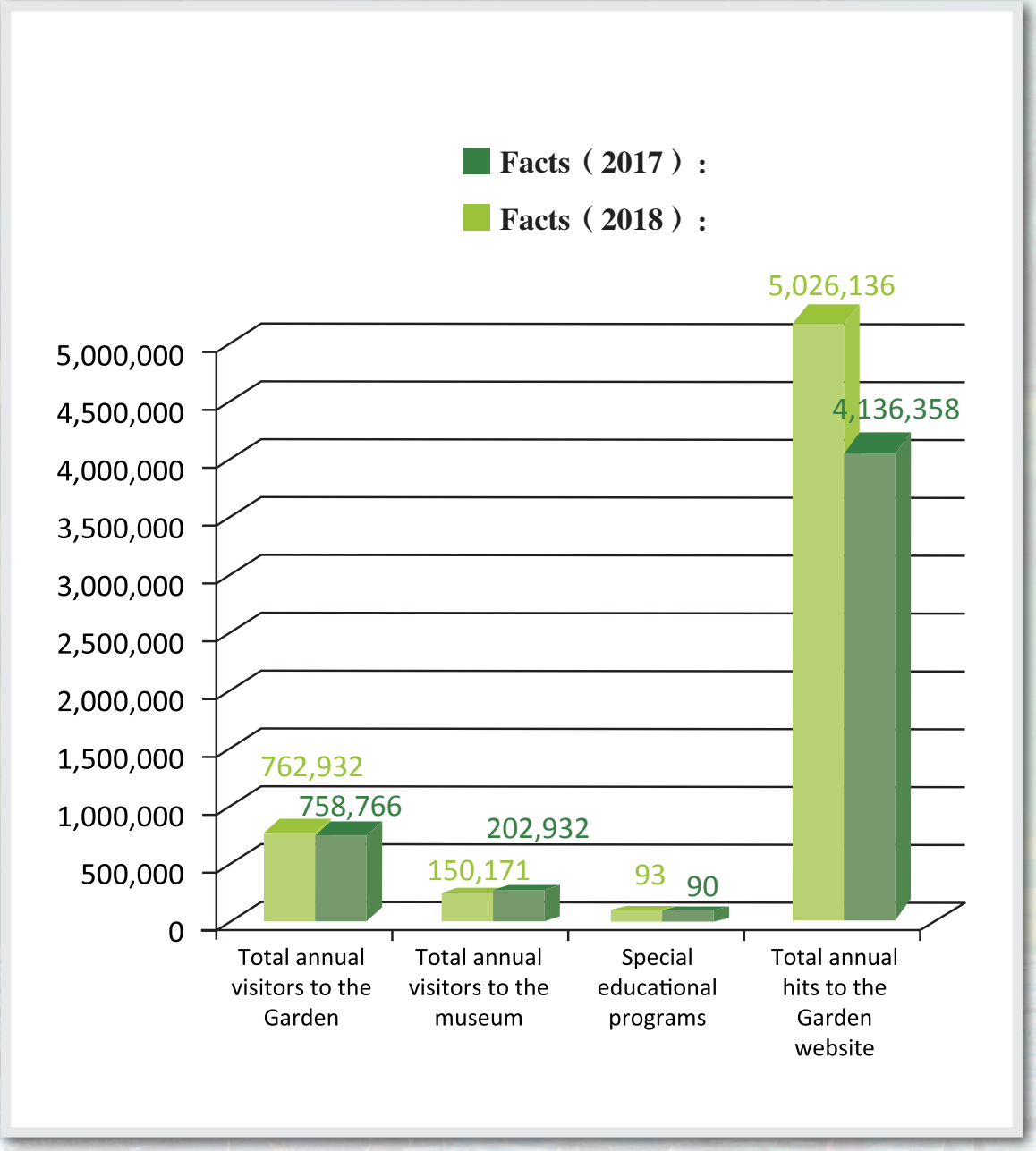
The chemical constituents of five species of the Meliaceae family were studied, more than 100 compounds were isolated and identified, and 40 new compounds were found . Nine new compounds were found in *Trichilia connaroides* fruits, three of the novel compounds have significant cellular cytotoxic activity; five new jasmonic acid glycosides plant hormones were found in *Aglaia* plants.

Research and functional evaluation of aromatic plants. A total of 55 aromatic oils have been extracted, and 24 of them have been evaluated for anti-inflammatory activity. 12 essential oils have certain anti-inflammatory activity; they have been exchanged with Yunnan Institute of Infectious Diseases for testing their repellent activity on mosquitoes.

New progress has been made in the study of traditional mosquito repellent plants, *Adenosma indianum* was tested against mosquito-borne diseases. Substantial progress has been made in the construction of production bases, large-scale planting, extraction of essential oils. We planted 3 acres of *Adenosma indianum* this year and could collect 1400 kg of raw material acquisition, extracting 5 l of essential oils. 150 kg of seeds were collected to meet the planting next year.

Advance the development of the high-content anticancer drug in *Nothapodytes*. A systematic investigation was conducted on the newly discovered high-content camptothecin plant resources in Xishuangbanna, and samples from different producing areas in Taiwan and Xishuangbanna were collected to analyze the content of camptothecin in different producing areas. CHEN Jin, XU Zengfu and five other studies submitted proposals for the development of the *Nothapodytes* industry in Xishuangbanna, it could become a substitute for Xishuangbanna to replace rubber.

# Public Education


Facts（2017）:
Facts（2018）:
5,026,136
4,136,358
5,000,000
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
762,932
758,766
202,932
150,171
93
90
Total annual visitors to the Garden
Total annual visitors to the museum
Special educational programs
Total annual hits to the Garden website

## Training courses becoming more influential

In 2018, XTBG organized more than 20 training programs, including such quality ones as Advanced Field course in Ecology and Conservation, Environmental Interpretation Training for Tour Guides from Eco-Tourism Attractions, and Nature Education Training for Elementary and Secondary School Teachers. These programs had a total of over 860 participants from about 14 countries, making XTBG training courses become more influential home and abroad. Specifically, the 10th Advanced Field course in Ecology and Conservation was held from October 16 to November 28 and the students were trained to develop skills in independent research including project design and execution, data analysis and interpretation and oral and written presentation of results. During the past decade, about 200 students have attended the field course and 10 papers have been published based on the projects of the course.

*Graduation of the training course*

## Luosuo River Science Education Forum developing proposals for educational excursions

*Luosuo River Science Education Forum*

July 10 and 11, XTBG held the 3rd Luosuo River Science Education Forum, themed "Science education in the context of educational excursions", attracting over 120 participants from organizations affiliated with CAS, botanical gardens, publishers, colleges, elementary and secondary schools, and civil nature education organizations. After over 20 symposia, oral and poster presentations, case sharing, talks and discussion, the forum participants reached common concern and declared five proposals to promote the integration and development of science and education in China. The proposals were expected to standardize the educational excursions and unite various resource organizations and institutions all over China.

## Science Festival making science alive for the public

May 19-20, XTBG held the 3rd Science Festival for the Youth, showcasing its latest scientific achievements via posters, science equipment, and face-to-face communication to the public. The festival was themed with “Science in your words”, involving more than 2000 participants, including XTBG graduate students & researchers, middle school students from local communities, and the garden tourists. 54 conference style poster presentations showcasing progress in plant science, ecological studies, and conservation study were made. Some equipment and research samples were also on show. The

*Science Festival for the Youth*

*Scientist communicating with students*

*The poster of the Science Festival*

presentations covered such topics as perspectives of tropical rain forests, microscope exploration, wisdom of plants, artificial caterpillars, plant physiology, herbal medicine, forest conservation, etc. The festival was aimed to convey cutting-edge technologies, provoke the public’s spirit of active scientific exploration and thinking, and increase science literacy of local school students.

## Science paper on spider's prolonged milk provision attracting international Media Cover

*The news press of the Science research*

On the 30th of November, a Science paper on a jumping spider's behavior of long-term milk provision was published online. On the same day, XTBG held a press conference in Beijing and the authors CHEN Zhanqi and QUAN Ruichang introduced their research to the world. The news reached more than 100 million people in only one week, including media such as CCTV, Xinhua News Agency, The New York Times, the Washington Post, USA Today, National Geographic, BBC, British Guardian and microblog, WeChat platform as well as other media. Over 50 media from about 10 countries have reported the news, maximizing the impact the XTBG's overwhelming research.

## The new media boosting XTBG's popularity online

In order to follow the fast-developing trend of online communication, XTBG set up its Douyin station in September 1st and in just two days a short video on brood parasitism of bird has won 5.96 million clicks, which helped much to attract 12,000 fans. During the summer vacation, relying on the activity of waterlily, a live event of "Waterlily, King of Lotus" was released on Xinhua News Agency's Facebook, Twitter, and YouTube platforms at the same time. The total number of browse on the 3 platforms exceeded 2 million in a short period of time. Specifically the view of Facebook was 1.73 million receiving the highest browse among the overseas media live broadcasts of Xinhua News Agency, ranking first in all of its live broadcasts.

*The live show of royal waterlily*

## Birding Fair enriching relative souvenirs

*Birding lecture*

The 7th Birding Fair was held in November, attracting 19 institutions focusing on bird research or conservation, such as the Shanshui Nature Conservation Center, Wilderness Xinjiang, Meijing Nature, Kunming Animal Museum of the CAS, Wild Birds Society from Friends of Nature, the China Youth Federation of Bird Watching and so on. A large number of school students from local communities and tourists have participated the fair by attending lectures from experienced birders or playing games themed on birds. In addition, the fair worked as a great resource of birding products. We have designed and produced 30 bird-themed products, including keychains, brooches, stickers, mugs, headscarves, bags, folders and T-shirts. These products can be used as gifts for guests, or as souvenirs for tourists, especially nature lovers.

*Birding souvenirs*

## Tropical Rainforest Eco Culture Exhibition Toured to Xiamen

In order to let more people know about Xishuangbanna's unique tropical rain forest and its unique culture, from September 22nd to October 31st, XTBG and Xiamen Botanical Garden held an Exhibition named as"Entering the Magical Tropical Rainforest and Experiencing Xishuangbanna". The exhibition was aimed to introduce the magical tropical rain forest in Xishuangbanna and the profound knowledge of local culture to the public. In order to highlight the exhibition concept of "protecting the tropical rain forest is to protect human beings', the exhibition engaged various demonstration ways to make it live and attracting. A total of 193 exhibits were shown in the exhibition, including 70 kinds of seeds and fruits, 120 pieces of folk art exhibits, and nearly 1,000 pictures. The exhibition also attracted Xiamen media cover, leading to a wider influence in Fujian Province.

*The lecture for the Exhibition*

*The Exhibition show*

# Partnership

# Domestic

## XTBG and Lanzhou University forge partnership

XTBG and Lanzhou University, one of top universities in west China, forge partnership on July 22, marked by a signing ceremony of a MoU at Lanzhou University.

As representatives of the two sides, Prof. CHEN Jin and Prof. AN Lizhe (recently appointed as president of Beijing Forestry University), then vice president of Lanzhou University, signed the MoU.

Prof. CHEN Jin said that "We are pleased to become a latest partner with Lanzhou University. We hope to carry out comprehensive cooperation between the two sides, especially on scientific research and talent training."

According to the MoU, the two sides will have comprehensive cooperation on talent exchange, talent training, scientific research, field stations, and platforms of science resources, etc.

*Signing ceremony of the strategic cooperation agreement between XTBG and Lanzhou University*

*CHEN Jin and Vice President of Lanzhou University, AN Lizhe signed a strategic cooperation agreement on behalf of both parties.*

## XTBG and Kunming University of Science and Technology discuss cooperation

On the morning of July 2, LI Hongwei led a team to visit the Lianhua Campus of Kunming University of Science and Technology. WANG Xueqin, the president of Kunming University of Science and Technology, warmly received LI Hongwei and his colleagues. The two sides held a discussion and exchanged ideas in a friendly atmosphere. LI Hongwei hopes that the two sides will cooperate in all aspects of postgraduate joint training, cooperation in applying major projects, academic exchanges, popular science education, and joint education with Kunming University of Science and Technology attached primary school. WANG Xueqin fully affirmed the necessity of comprehensive cooperation between the two sides. He hoped that XTBG would strengthen the discipline construction and academic exchanges with the College of Life Science and Technology and the School of Environmental Science and Engineering of Kunming University of Science and Technology. The joint school of the two sides covers Kunming University of Science and Technology attached primary school and attached middle school.

*The two sides held talks and exchanges*

On the basis of the discussion and exchange, the two sides will organize a formal framework cooperation agreement and sign to promote the all-round cooperation between the XTBG and the Kunming University of Science and Technology.

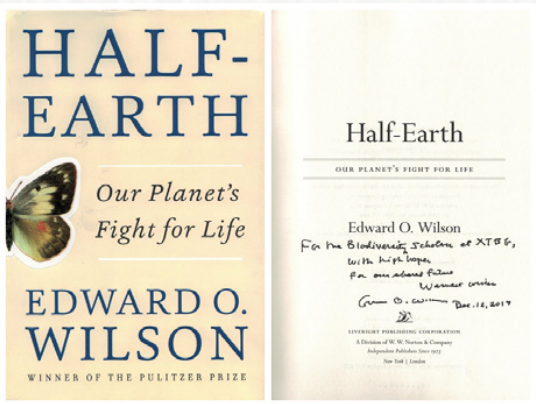
# International

## America

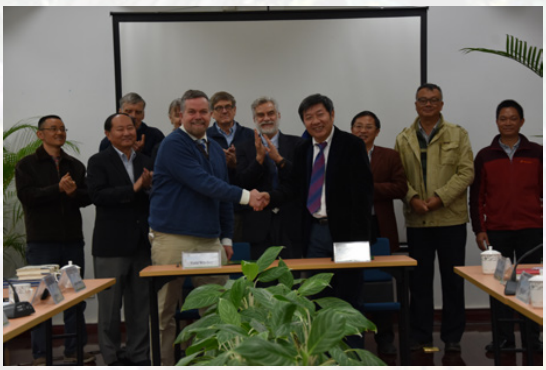
A MoU was signed between XTBG and Discover Life in America (DLIA) on January 11. As representatives of the two sides, Prof. CHEN Jin and Dr. Todd P. Witcher, executive director of DLIA signed the MoU at XTBG.

According to the MoU, the two institutions (XTBG and DLIA) will establish specific collaborative actions, in order to significantly contribute to the development of education, training and research programs. A model All Taxa Biodiversity Inventory (ATBI) site will be established at XTBG, in support of the E.O.Wilson Biodiversity Foundation's (EOWBF) Half-Earth project of which Global Biodiversity Census is a part. Cooperation between the two sides will be implemented by information exchange, reciprocal visits by DLIA and XTBG staff, and a scientific exchange program oriented to participatory citizen science, comprehensive biodiversity inventory, taxonomic expertise exchange, and conservation and sustainable use of resources.

The visit of the DLIA delegation was at the invitation of Prof. CAO Min. during their stay at XTBG, a workshop on citizen science was held, which attracted scientists and students. XTBG and DLIA had discussion on biodiversity inventory, environmental education, and how to put joint efforts to establish All Taxa Biodiversity Inventory (ATBI) at XTBG, etc. After the signing ceremony, Dr. Todd P. Witcher presented a book named Half-Earth: Our Planet's Fight for Life to XTBG, entrusted by Prof. Edward O. Wilson, author of the book and a renowned biologist.




*The book presented by Prof. Edward O. Wilson*



*Prof. CHEN Jin and Dr. Todd P. Witcher sign MoU*

## Germany

On behalf of XTBG, Prof. Harald Schneider hosted the traveling conference BIOMON funded by the German Ministry of Education and Research (BMBF) to explore join research collaborations involving researchers based at XTBG and different institutes located in Germany.

During the visit, Prof. CHEN Jin signed two MoU. One MoU was agreed between XTBG and the Museum für Naturkunde (Berlin) represented by Vice-Director Prof. Christoph Häuser and one was agreed between XTBG and the University of Leipzig (Germany) represented by Prof. Alexandra Müllner-Riehl. The visiting group involved six colleagues representing four different institutions. The Museum für Naturkunde (Berlin) was represented by Prof. Christoph Häuser and Dr. Thomas von Rintelen, the Botanical Garden and Botanical Museum of the Freie Universität Berlin by Dr. Eckhard von Raub-Straube, the University of Leipzig by Prof. Alexandra Müllner -Riehl, the Zoological State Collection at Munich by Dr. Michael Balke, and the Zoological Research Museum Alexander Koenig at Bonn by Fabian Herder.

*MOU signing with Alexandra Müllner-Riehl*

*MOU signing with Christoph Häuser*

The main aim of the visit was to discuss research collaborations with focus on rapid biodiversity assessments and the contribution of biodiversity research to bioeconomic initiatives. During the visit, a wide range of research collaborations including exchange programs for students and early stage researchers have been agreed on. Researchers and Students interested in these programs are welcome to contact Prof. Harald Schneider.

## Thailand

A MoU was signed between University of Phayao and XTBG On June 19. The two sides will have deep cooperating from 2018 to 2023, with the agreement. The MoU encourages the exchange of school, students, academic information and materials in the belief that the research and educational processes at both institutions will be enhanced and that mutual understanding between their respective school and students will be increased by the establishment of such exchanges.

*Prof. HU Huabin and Prof. Mondhon Sanguansermsri sign MoU*

The two sides will promote education of graduate students, exchange of academic information and materials, organizing joint research programs and investigations, holding joint conferences and workshops, etc. As representatives of the two sides, president Mondhon Sanguansermsri of University of Phayao and XTBG deputy director HU Huabin signed the MoU. They also exchanged gifts.

During their stay in XTBG, Dr. Mondhon Sanguansermsri and his companions visited the research facilities and living collections of XTBG. They spoke highly of XTBG's achievements in scientific research, biodiversity conservation, public education, and supporting platforms.

## Japan

A MoU was signed between XTBG and Faculty of Agriculture and Life Science of Hirosaki University at Menglun on October 29. As representatives of the two sides, Prof. CHEN Jin of XTBG and Prof. Sasaki Choichi of Hirosaki University signed the MoU.

*Prof. CHEN Jin and Prof. Sasaki Choichi sign MoU*

According to the MoU, XTBG and Hirosaki University are to cooperate in education and scientific research. Specifically, the two sides will exchange scientific information, organize symposia and other related activities, exchange faculty and administrative staff and students. Moreover, the two sides will mutually contribute to development of educational and research programs. The agreement is effective for 5 years.

During their stay in XTBG, Prof. Sasaki Choichi and his colleagues of Hirosaki University visited the research facilities and living collections.

# Talent Training and Team Building

# Postgraduate Education

## 2018 University of Chinese Academy of Sciences on Graduate International Cooperation Program.

On July 18, learning from the International Cooperation Office of the University of Chinese Academy of Sciences that the doctoral student CAO Donghua of the Nutritional Immunity and Functional Food Research Group of the XTBG, under the guidance of the researcher XU Youkai, was awarded the 2018 International Cooperation and Training Program for the Graduate Students of the University of Chinese Academy of Sciences. The project will be funded by a one-year exchange study at the University of Vienna in Austria, which is the first time that the XTBG has received a grant from the project. As an important part of the introduction and training of talents in the XTBG, postgraduate education has always been highly valued. In implementing the talent introduction program of "bringing in and going out", XTBGX focuses on cultivating the international vision of graduate students. It not only recruits excellent international students to study in the XTBG, but also actively creates and seeks opportunities for domestic graduate students to go abroad to carry out further studies in famous universities and scientific research institutions. Totally eight students (CAO Donghua, ZHAO Fan, ZHOU Liping, DENGWEI Yidong, GAO Jinbo, TANG He, ZHANG Junjun and ANJANA JAYASANKA ATAPATTU ATAPATTU ARACHILAGE) get XTBG graduate students conference grants attended international conferences during year 2018.

## 2018 National Construction High-Level University Public Education Fund

On June 19th, the "Notice on the Catalogue of Postgraduate Students for the Construction of High-Level Universities in 2018" issued by the China Scholarship Fund Management Committee and the International Cooperation Office of the University of Chinese Academy of Sciences were informed that the XTBG Biogeography and Ecology Research Group Graduate student DING Wenna (instructor: XING Yaowu researcher), Chemical Ecology Research Group's graduate student CHENG Yanan (instructor: TAN Ken researcher), Co-evolution Research Group graduate student ZHANG Ting (instructor: PENG Yanqiong researcher) were awarded the 2018 National Construction High-Level University Public Education Fund, and they will go to the Field Museum of Natural History, the University of Tours, and the National Center for Scientific Research to conduct 12 to 15 months exchange study.

*CHENG Yanan*

*DING Wenna*

*ZHANG Ting*

*Outgoing graduates and their teachers pose a photo*

## Graduation Ceremony 2018

"Graduation marks not only the end of a momentous life chapter, but more importantly it symbolizes the beginning of a new journey for us". It's the words by graduates of XTBG on their graduation ceremony 2018. This year, the "big day" fell on June 14. The outgoing graduates assembled in their gowns of master degree or doctoral degree, tossed their hats into the air, marking the successful completion of their studies at XTBG. Following the tradition of their alumni, the outgoing graduates in their academic gowns planted a tree (*Horsfieldia tetratepala*) for memory in front of the students' apartment.

The graduation ceremony and degree awarding was held in the afternoon, presided over by XTBG CPC Secretary LI Hongwei. All students and supervisors gathered together to celebrate the "big day" of the graduating students, to celebrate their academic achievement, to honor their hard work and dedication. Prof. CHEN Jin addressed the graduation ceremony. He talked about the characteristics of XTBG graduates, showing confidence in their accomplishment and future work. As teacher representative, Prof. CHEN Jianghua sent warm congratulations to graduates on their successful completion of studies. Graduate representatives reviewed the joys and sorrows of studying in XTBG, and spoke out their feelings and expressed their heartfelt gratitude to their teachers. Other leaders and teacher representatives also conveyed congratulations and best wishes for the graduates and their family.

At last, Prof. CHEN Jin moved the tassel of the caps of every graduate to the right place. He also posed photo with every outgoing graduate. The audience expressed congratulations to all graduates of doctoral or master's degree amid enthusiastic applause. Profs. YU Diqiu and LIU Wenyao conferred certificates of honor to outstanding graduates. A farewell evening party was held, which was filled with cheers and applause.

*Students and their teachers plant a tree for memory*

# Talent Training

## Advanced Field Course in Ecology and Conservation - XTBG 2018

From 15 October to 26 November 2018, XTBG held the Advanced Field Course in Ecology and Conservation - XTBG 2018 (AFEC-X 2018). In total, 167 students and young researchers from 102 organizations in 18 countries applied for the course, and finally 30 applicants from 19 institutions in 12 countries were accepted.

AFEC-X 2018 had five components, i.e. Lectures and practicals, Student's own work presentation, Field trips, Independent projects, and Course symposium. During the whole course, 30 staffs and students (mainly from XTBG) were teaching and assisting the course. Professor Richard Corlett, Alice Hughes, Kyle Tomlinson and Akihiro Nakamura were the core instructors. LIU Jingxin was the coordinator. Ecology and Biogeography of Tropical East Asia, Biodiversity Crisis in tropical East Asia, Research & Conservation at Botanical Gardens, History and Development of Modern Conservation Biology, Tropical environments and ecosystems of east Asia (Forest, Plantations and Major crops of Tropical East Asia, The savannas of Asia), Academic skills (Modern scientific publishing, Literature Searches and Reading, Scientific writing and Scientific English), Climate change ecology, Biodiversity science (arthropods, birds, bats), Techniques in ecology and conservation (species distribution modelling, drones, thermal cameras, pollination ecology methods), Soil ecology, Statistics with R and experimental design. Participants also made a two-day trip to visit XTBG's 20 ha permanent plot and Canopy corridor to get to know how the plot was setup and maintained, and how to carry out canopy ecology work, during the field trip students also did the bird watching.

Eight groups, organized according to the students' interests, carried out eight independent projects in and around XTBG:

1). Reproductive related color changes in a spider *Philoponella alata*; 2). Vertical stratification of predation risk and predator evasion tradeoff: an artificial caterpillar experiment; 3). Effect of light on the foraging activity of nectar-feeding bats; 4). What kind of plants have higher thermal tolerance? 5). Nest heat insulation on different substrate associate with shelter: an egg cooling experiment from phytotron; 6). Do color and posture influence the protective value of snail poop masquerading by sawfly caterpillars? 7). Are Spine, thorn and prickles able defenders of the plants against invertebrates? 8). Identifying high conservation priority areas in Peninsular Malaysia.

*AFEC-X 2018 group photo*

On Nov. 26, a symposium was held to present the findings of the independent research projects. Each student group's performance was evaluated by a panel of judges composed of Richard Corlett, Ferry Slik, Kyle Tomlinson, Aki Nakamura, CHEN Jin, CHEN Hui, YU Wenbin, CHEN Zhanqi, ZHANG Ling and WANG Bo. The best research project award went to "Do color and posture influence the protective value of snail poop masquerading by sawfly caterpillars?" and carried out by Dinelka Thilakarathne from University of Peradeniya Sri Lanka, NIU Ying from XTBG, Ruhama Maya Sari from Andalas University Indonesia, Sabita Gurung from Small Mammals Conservation and Research Foundation Nepal, and Venus Saksongmuang from Prince of Songkla University Thailand. Afterwards, the participants received certificates from the judges.

AFEC-X is mainly supported by XTBG. This year it was also funded by Bureau of International Co-operation Chinese Academy of Sciences, Bureau of Personnel Chinese Academy of Sciences.

## Outstanding university students gather at XTBG for Summer Camp 2018

The 2018 XTBG Excellent University Students Summer Camp was held successfully from July 28 to August 4. It brought together 70 outstanding undergraduate students from 30 universities to approach and understand XTBG through one-week-long activities, including visit, study, communication, lectures, and other social and educational activities.

At the opening ceremony of the summer camp on July 30, the campers sang the XTBG song "Our Garden, Our Home" in chorus. Afterwards, XTBG CPC Secretary LI Hongwei expressed a warm welcome to all campers and gave a brief introduction to the development of the Garden. Many professors played a key role in motivating and inspiring the students. A series of lectures made the students have a general understanding on the scientific research. The lectures aroused the students' interest for study, such as "molecular mechanism of interaction between plants and environmental factors, signaling pathway, and their application" by Prof. YU Diqiu; "understanding biodiversity through an evolution perspective" by Prof. LI Jie; "Plants on plants" by Prof. LIU Wenyao; "plant-animal interactions: diverse and complex" by Prof. ZHANG Ling; "Conserving the Tee-of-Life in the Anthropocene" by Prof. Harald Schneider; etc.

*XTBG Summer Camp*

Academic salon, laboratory tours, field trip, touring XTBG in the night, volleyball contest all provided the campers pleasant, practical, and meaningful experiences. Face-to-face communication with graduate supervisors made the students have a better understanding on XTBG. Some of them become potential students of XTBG and may keep contact with their future supervisors.

At the closing ceremony on August 3, Prof. YU Diqiu, ZHANG Jiaolin, and HU Yanru issued certificates of completion for the students.

## Environmental educators gather for advanced training course at XTBG

29 environmental educators from botanical gardens, non-governmental organizations (NGOs), and universities gathered together at XTBG from August 1-14. Their purpose was for the two-week-long Advanced Training Course for Environmental Education Research and Practice. The training course is initiated by the CUBG and held annually at XTBG. It is the sixth session since 2013.

Following tradition of the past courses, the training consisted of lectures on theories of environmental education, research methods, statistical analysis, literature comprehension, small research projects, etc. In addition, Prof. Justin Dillion, a professor of science and environmental education at the University of Exeter, talked about history of environmental education, status quo of environmental education in UK, and environmental education for sustainability, etc. Prof. CHEN Jin, current chairman of CUBG, delivered lectures and guided the participants to studies through the whole two-week course.

During the training course, the

*Prof. CHEN Jin poses with trainees holding certificates of completion*

*Advanced Training Course for Environmental Education Research and Practice 2018*

*Prof. CHEN Jin gives lectures to the trainees*

teachers used non-formal education methods to develop the participants' skills and understanding of the topic. Prof. Kyle W. Tomlinson of XTBG and Mr. WU meng, a Ph.D candidate at Taiwan University, are also teachers at the training course. The trainees were divided into 12 small groups to work for small independent project. They presented their results to expert panel on August 14. The presentations by the trainees were exciting and won praise from the training specialists, which marked the training course a success. On August 14, the 29 trainees received certificates of completion from their teachers.

## 2018 CUBG Horticulture Training course

From October 15th to November 2nd, 25 staff from 15 China's botanical gardens have been attending a horticulture training course at Kunming Botanical Garden and XTBG. The course is the sixth of its kind which has been arranged by the CUBG, with the aim of raising horticulture capacity of botanical gardens nationwide.

Following tradition of the past years, the course was composed of theory course in the morning, practice in the afternoon, and discussion in the evening. Mr. Martyn Dickson, senior horticulturist at Royal Botanic Gardens Edinburgh (RBGE), and David Tricker, indoor horticulturist at RBGE, were invited to be key teachers at the training. Using facilities of Kunming Botanical Garden and XTBG, the students were introduced to principles and techniques of landscape construction, plant health, aspects of ornamental crop management, as well as practical, hands-on landscape and garden management.

*2018 CUBG Horticulture Training course*

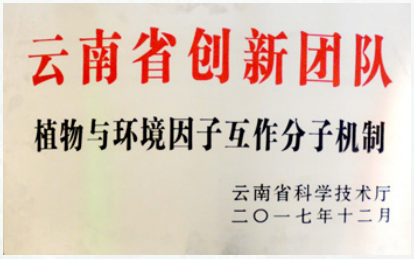
The first part of the course took place in Kunming Botanical Garden, which was a 9-day instruction, including propagation technology – seed propagation and cutting propagation of plant, brush cutting and care of woody plants; landscape arrangement of gardening plant; common plant pests; discovery of new plant species; standard of investigating and collecting germplasm of wild plant species with extremely small populations; etc. A half-day off-site filed trip was also arranged to Dounan Flower market. The second part of the course took place in XTBG. The hands-on instructions covered such topics as use of horticultural machinery, gardening management, identifiable of tropical plants, tropical landscaping, etc.

According to the organizer, some outstanding students will have opportunity to study at in Royal Botanical Gardens Edinburgh or some other famous botanical gardens in UK. It's the sixth course from 2013 on and will be continuously held every year.

# Team Building

## YU Diqiu's team awarded title of "Yunnan Innovation Team"

After evaluation by Yunnan Department of Science & Technology, the team headed up by Prof. YU Diqiu has been awarded the title of Yunnan Innovation Team". The title is awarded in recognition of the accomplishments of their work over the past three years. The team of molecular mechanism of interactions between plants and environmental factors, with Prof. YU Diqiu as principal investigator, has been conferred certificate and plate of Yunnan Innovation Team. The research team is composed of YU Diqiu, XU Peng, HU Yanru, CHEN Ligang, LIANG Gang, JIANG Yanjuan, and CHEN Jianghua.




Over the past three years, the research team focused on the interactions between plants and environmental stress factors. They tried to reveal the molecular mechanisms of 1) how plants adopt to multiple stress conditions (e.g. drought, heat and cold) at the same time; 2) how multiple signals or proteins coordinate to modulate various stress responses; 3) how plants balance growth or development and stress tolerance. The research team got 32 papers published in such top journals as *Plant Cell, Molecular Plant, Plant Physiology, Plant Journal*, and *Journal of Experimental Botany*. They also jointly applied for one patent, and bred new agricultural cultivars. A batch of young researchers has been promoted.

The innovation team awards are the province's way of fostering top talent and encouraging ongoing scientific innovation. The awards provide incentive for young scientists to work hard, and promote innovation in science that benefits industry and improves Yunnan's economic competitiveness.

## 8 Scientists of XTBG were approved by CAS "Light in Western China" Project

After the approval of CAS Personnel Bureau, 8 scientists in XTBG (BAI Yang, LI Su won A category for "Western Young Scholar", while GONGPAN Pianchou, YAO Xin, LEI Rihua, YANG Bin, TANG Mingyong, HUANG Jianfeng won B category for "Western Young Scholar"), were approved by CAS "Light in Western China" project, in total of 4.8 million Yuan.

By the end of 2018, 112 scientists in XTBG had received funding from the "Light in Western China" project, totaling 22.34 million Yuan.

*Photo by HUANG Tian-Ping*

## New members of Youth Innovation Promotion Association, CAS

Dr. SUN Yongshuai, Dr. LIU Shengjie and Dr. LIU Chenggang were enlisted of the membership of Youth Innovation Promotion Association, CAS (YIPA). 2,400,000 Yuan was funded. YIPA is a non- profit youth academic organization approved by CAS in 2011. YIPA is aiming to bring outstanding CAS young scientists together, to improve their innovative and creative ability, thereby making more scientific progress to CAS and China.

## YU Diqiu wins May 1st Labor Medal of Yunnan Province

Yunnan Province held the Commendation Conference of Provincial May 1 Labor Medal Award to celebrate the "May Day" International Labor Day on April 26. Prof. YU Diqiu of XTBG was one of the winners of honorary title of “the May 1st Labor Medal of Yunnan Province”.

May 1st Labor Medal is an honor given by Yunnan Provincial Federation of Trade Unions to advanced workers who have made great contributions to economic construction and social development of Yunnan.

Prof. YU Diqiu is currently a research scientist and doctoral supervisor of XTBG. In recent years, he has published more than 60academic papers in such prestigious journals as *Proceedings of the National Academy of Sciences of the United States of America (PNAS), Plant Cell, Plant Physiology, Plant Journal, Molecular Plant*, etc. He has also cultivated a batch of young researchers. Some of the young researchers have become principal investigators of XTBG. He is now engaged in transferring research results into production, especially on rice in Yunnan.

*Yu Diqiu speaks at the awarding ceremony*

## QUAN Ruichang honored CAS outstanding CPC member

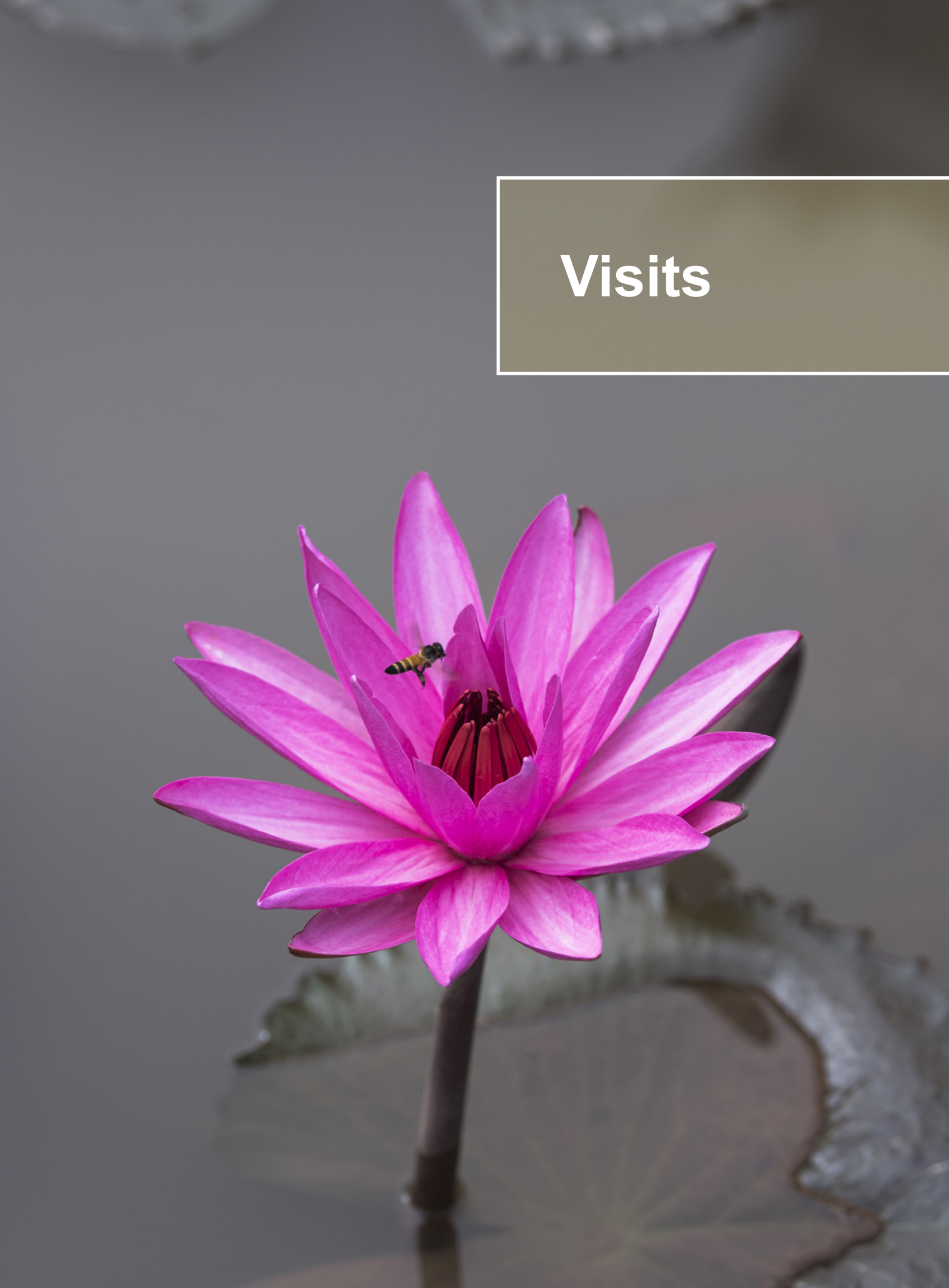
The CAS held a meeting to celebrate the 97th birthday of the Communist Party of China (CPC) on June 29. At the celebratory meeting, 30 science and technology staff members have been awarded the honor of CAS outstanding CPC member. Prof. QUAN Ruichang is one of the honor winners.

Prof. QUAN Ruichang is recognized for his contribution to promoting the “green belt and road” cooperation, especially for the work at the CAS Southeast Asia Biodiversity Research Institute.

*Prof. QUAN Ruichang wins honor of outstanding CPC member*

The honor is to promote CAS model members who are loyal to the party and bold in taking responsibilities in the new era. It will also inspire and guide science and technology staff to strive for more achievements.

# Visits



## Science and Technology Department of Yunnan province inspects SEABRI in Myanmar

On November 21, 2018, Mr. XU Bin, Vice Chairman of the CPPCC and Director General of the science and technology department of Yunnan province, led 7 delegates to visit the SEABRI Myanmar office.
During their visit, Prof QUAN Ruichang welcomed Mr. XU Bin's team and had a meeting with them. Mr. XU Bin emphasized that SEABRI and science and technology department of Yunnan province could cooperate tightly, and effectively improve the livelihood of local people in Myanmar by making full use of the technical advantages of the SEABRI platform and Yunnan province.

## French Consul General in Chengdu visited XTBG

On the afternoon of February 4th, Ms. Fabienne Mansencal, Consul General of the French Consulate General in Chengdu visited the XTBG and met with Prof. CHEN Jin.

CHEN Jin met with Ms. Fabienne Mansencal in the third conference room of the research center and had a discussion with her. CHEN Jin first extended a warm welcome to the visit of Fabienne Mansencal and introduced the overall situation of the XTBG. Subsequently, the two sides exchanged ideas on the cooperation between the XTBG and France and future cooperation plans, the current cooperation with other countries, especially European countries and Western countries, and the CHEN Jin hoped to strengthen communication with the consulate, consolidate and broaden cooperation with France. The topics were discussed in depth.

After the discussion, Fabienne Mansencalcommunicated with the French scholars of the XTBG, learned about the life and scientific research of French researchers in the XTBG, and expressed appreciation for the internationalization process of the XTBG. She believed the future cooperation between XTBG and France will be even broader.

## AP-BON discusses cooperation potential with XTBG

Prof. Tetsukazu Yahara from Kyushu University of Japan, who's also co-chair of the Asia-Pacific Biodiversity Observation Network (AP-BON), paid a visit to XTBG from January 22 -25. The tour was to discuss cooperation potential on biodiversity observation and studies.

During his stay in XTBG, Prof. Tetsukazu Yahara introduced the AP-BON with a title of "Introduction to AP-BON and SE Asian Plant Diversity Assessment". Prof. LIN Luxiang introduced XTBG plot-based platforms for forest ecology research. Afterwards, the two sides discussed how to carry out cooperation on biodiversity monitoring and research, in the thought of "small-big- super plots". They specifically talked about setting up plot network in Indo-China Peninsula at the gradient of longitude, and establishing database of functional traits and DNA barcoding of trees in Southeast Asian countries.

In addition, Prof. Tetsukazu Yahara invited Prof. LIN Luxiang to be a member of the working committee of AP-BON. Prof. Tetsukazu Yahara then made field tours to the 20-ha forest plot and other 1-ha plots, canopy cranes, etc. He also discussed discovery of new plant species with XTBG researchers.

## CAS Vice President DING Zhongli inspects SEABRI in Myanmar

Prof. DING Zhongli, Vice Chairman of the Standing Committee of the 13th National People's Congress (NPC) and Vice President of CAS, visited Myanmar from September 16-19, 2018, at the invitation of Myanmar's House of Representatives.
During his stay in Myanmar, CAS Vice President Zhongli DING paid an inspection tour to SEABRI. He listened to the report on cooperation between CAS and Forest Department of Myanmar, and work progress between the two sides. Chinese ambassador Liang HONG in Myanmar accompanied the tour. They also looked around the research facilities there and the four laboratories of animal diversity and conservation, aquatic biodiversity, traditional medicine and ethnobotanical research, and plant diversity and conservation

# Other Visitors

## January

2 Dr. TIAN Mingyi of South China Agricultural University visited XTBG and gave a talk at XTBG Seminar and agreed to conduct the cooperative study.

9 Dr. Dr. WU Jinsong of Kunming Institute of Botany visited XTBG and gave a talk at XTBG Seminar.

17 Dr. WU Chunsheng from Institute of Zoology, CAS visited XTBG and discussed the coorperation issues.

23 Dr. Akira Yamawo, Hirosaki University of Japan, was invited to XTBG for academic exchanges.

29 Dr. Anthony Ives of University of Wisconsin-Madison visited XTBG and gave a talk at XTBG Seminar.

30 Dr. XIN Zhou of China Agricultural University visited XTBG and gave a talk at XTBG Seminar.

## February

8 Prof. Mark van Kleunen of the Universität Konstanz visited and conducts cooperative research and gave a talk at XTBG Seminar.

## March

6 Dr. ZOU Yi of Xi'an Jiaotong-Liverpool University visited XTBG and gave a talk at XTBG Seminar.

13 Dr. WAN Tao of Fairy Lake Botanical Garden, Shenzhen visited XTBG and gave a talk at XTBG Seminar.

19 Dr. CHEN Xulin of the Wuhan Institute Of Virology, CAS visited and gave a talk at XTBG Seminar.

27 MA Hong of Pennsylvania State University visited XTBG and gave a talk at XTBG Seminar and conducted cooperative research.

## April

3 Dr. Bruno Leles of United Nations Environment Programme visited XTBG and gave a talk at XTBG Seminar.

10 Dr. Simon Scheiter of Senckenberg Institute, Frankfurt-am-Maine, Germany visited XTBG and gave a talk at XTBG Seminar.

17 Dr. Evangelos Tatsis of Shanghai Institute of Plant Physiology & Ecology visited XTBG and gave a talk at XTBG Seminar.

24 Dr. LI Binbin from the Duke Kunshan University visited XTBG and visited the tree rings and plant physiology and ecology research group.

## May

2 Prof. XU Jidong of the Chaoyang University of Technology visited XTBG.

21 Dr. David Ellsworthv of Western Sydney University visited XTBG and gave a talk at XTBG Seminar.

22 Dr. Muller-Scharer of University of Freiburg visited XTBG and gave a talk at XTBG Seminar.

29 Prof. Gaurav Srivastava of the Birbal Sahni Institute of Palaeosciencesn visited XTBG and Paleoecology Research Group to conduct research on the Cenozoic plants in Southwest China.

## June

4 Angelica Kristina V. Monzon from Center for Conservation Innovations, Tagaytay City, Philippines visited and conducted cooperative research on insect behavior

6 Roderick w. Bouman of Hortus Botanicus and the Naturalis Biodiversity Center, in Leiden, the Netherlands visited XTBG and gave a talk at XTBG Seminar.

11 Dr. Abraham Dabengwa of University of Cape Town visited XTBG and gave a talk at XTBG Seminar.

13 Dr.Raphael k. Didham of the University of Western Australia visited XTBG and gave a talk at XTBG Seminar.

15 Prof. Kris A. G. Wyckhuys from the China Academy of Agricultural Sciences CAAS, visited XTBG and conducted academic exchange on tropical forest ecology.

16 Prof. Adam of Sun Yat-Sen University visited XTBG and gave a talk at XTBG Seminar.

26 Dr. Peter Wilf of the Pennsylvania State University, USA visited XTBG and gave a talk at XTBG Seminar.

## July

3 Prof. LUO Shixiao from the South China Botanical Garden, CAS, visited XTBG and conducted research.

4 Dr. Matthias Herrmann of Max Planck Institute for Developmental Biology visited XTBG and gave a talk at XTBG Seminar.

7 Prof. Jan Peter Mayser, University of Bristol, UK, visited XTBG to conduct paleoenvironment research.

15 Prof. Ram Oren from U.S. Duke University visited XTBG to conduct data analysis, collaborate on new research experiments, and discuss future cooperation plans.

17 Prof. Doyle McKey from the University of Montpellier, France visited XTBG and conducted academic exchange on the diversity and function of termites in tropical forests

31 Prof. Michael L. Arnold from the University of Georgia visited to conduct academic exchange on tropical forest canopy ecology.

## August

1 Prof. Anthony Balfour Cunningham from University of Stellenbosch visited to carry out academic exchanges on taxonomy and phylogenetics of Polygonaceae.

4 Prof. Georg Miehe from University of Marburg, Germany visited for academic exchanges

14 Prof. Panuwan Chantawannakul, Chiang Mai University, visited and conducted academic research on tropical forests.

21 Dr. Michael Orr of the Institute of Zoology in Beijing visited and exchanged the role of vines in the food web of forest ecosystems.

26 Dr. Yves Francois Basset from the Center for Tropical Research in Panama, came to work with the Young Canopy Ecology team to conduct joint research to monitor changes in insect diversity.

## September

4 Prof. Sara Bumrungsri from the Prince of Songkla University visited XTBG and exchanged ideas with the Global Change Study Group and gave a report on “XTBG SEMINAR”.

16 Dr. Benjamin Paffhausen of Freie Universitty Berlin visited XTBG and gave a talk at XTBG Seminar.

18 Researcher Xiao Qing of the Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences visited and accepted the hyperspectral imager and exchanged near-surface remote sensing research techniques.

## October

1 Prof. Benjamin Paffhausen of the Free University of Berlin in Germany visited XTBG and carried out research on bee information exchange and cooperation.

9 Prof. MENG Fanrui from the University of New Brunswick, Canada visited XTBG and the Paleoecology Research Group to conduct research.

16 Dr. Mikhail V. Kozlov and Dr. Elena L. Zvereva visited XTBG and gave a talk at XTBG Seminar.

26 Dr. YI Zhuangfang of Development Seed visited XTBG and gave a talk at XTBG Seminar.

20 Dr. CHEN Naichong of Oklahoma State University, USA visited XTBG and gave a talk at XTBG Seminar.

## November

6 Dr. Patrick of the University of Western Australia visited XTBG to collaborate in a tropical forest plot and conducted a report at XTBG SEMINAR.

13 Dr. Stefano Draisma of Prince of Songkla University visited XTBG and gave a talk at XTBG Seminar.

14 Dr. Masatoshi Katabuchi of Michigan State University, was invited to XTBG for academic exchanges.

15 Prof. Uma Shankar of North-Eastern Hill University, India visited XTBG and gave a talk at XTBG Seminar.

## December

4 Dr. Yosuke Kojima of Toho University in Japan visited XTBG and gave a talk at XTBG Seminar.

20 Dr. Eric I. Ameca of Beijing Institute of Zoology visited XTBG and gave a talk at XTBG Seminar.

25 Dr. Lijuan Yan of Tsinghua University visited XTBG and gave a talk at XTBG Seminar.

# Financial Review

## Income and Expenditure (Million Yuan)

| | Categories | FY 2015 | FY 2016 | FY 2017 | FY 2018 |
|---|---|---|---|---|---|
| **INCOME** | | | | | |
| | Government Grants | 49.974 | 64.922 | 65.255 | 71.791 |
| | Infrastructure | 0 | 0 | 0 | 0 |
| | Admissions and Services | 82.277 | 85.688 | 84.620 | 83.737 |
| | Grants for Research | 66.777 | 79.298 | 92.614 | 102.819 |
| | Miscellaneous | 2.374 | 3.475 | 6.790 | 12.971 |
| | Sum | 201.402 | 233.383 | 249.280 | 271.319 |
| **EXPENDITURE** | | | | | |
| | Staff Costs | 104.629 | 132.588 | 145.995 | 162.659 |
| | Maintenance | 4.329 | 24.097 | 7.768 | 19.161 |
| | General and Admin. Expense | 1.627 | 6.131 | 3.136 | 3.676 |
| | Infrastructure | 0 | 0 | 0 | 0 |
| | Equipment | 26.256 | 18.479 | 21.129 | 28.615 |
| | Research and Horticulture | 76.675 | 48.234 | 59.318 | 55.913 |
| | Miscellaneous | 0 | 0 | 0 | 0 |
| | Sum | 213.516 | 229.530 | 237.346 | 270.025 |

# Publications

1. Armani, M; Van Langevelde, F; Tomlinson, KW; et al. 2018. Compositional patterns of overstorey and understorey woody communities in a forest-savanna boundary in Ghana. PLANT ECOLOGY & DIVERSITY, 11(4): 451-463.
2. Aryal, S; Bhuju, DR; Kharal, DK; et al. 2018. Climatic upshot using growth pattern of *pinus roxburghii* from western Nepal. PAKISTAN JOURNAL OF BOTANY, 50(2): 579-588.
3. Aung, K; Jiang, YJ; He, SY. 2018. The role of water in plant-microbe interactions. PLANT JOURNAL, 93(4): 771-780.
4. Bai, Y; Wong, CP; Jiang, B; et al. 2018. Developing China's Ecological Redline Policy using ecosystem services assessments for land use planning. NATURE COMMUNICATIONS, 9: 3034.
5. Barba-Montoya, J; dos Reis, M; Schneider, H; et al. 2018. Constraining uncertainty in the timescale of angiosperm evolution and the veracity of a Cretaceous Terrestrial Revolution. NEW PHYTOLOGIST, 218(2): 819-834.
6. Beng, KC; Corlett, RT; Tomlinson, KW. 2018. Seasonal changes in the diversity and composition of the litter fauna in native forests and rubber plantations. SCIENTIFIC REPORTS, 8: 10232.
7. Bernardo, P; Charles-Dominique, T ; Barakat, M ; et al. 2018. Geometagenomics illuminates the impact of agriculture on the distribution and prevalence of plant viruses at the ecosystem scale. ISME JOURNAL, 12(1): 173-184.
8. Bjorkman, AD; Myers-Smith, IH; Elmendorf, SC; et al. 2018. Tundra Trait Team: A database of plant traits spanning the tundra biome. GLOBAL ECOLOGY AND BIOGEOGRAPHY, 27(12): 1402-1411.
9. Cai, L; Zhang, L; Fu, QT; et al. 2018. Identification and expression analysis of cytokinin metabolic genes IPTs CYP735A and CKXs in the biofuel plant *Jiatropha curcas*. PEERJ, 6: e4812.
10. Cai, X (Cai, Xu)[ 1,2 ] ; Liu, JX (Liu, Jia-Xiang)[ 1 ] ; Song, QS (Song, Qi-Shi)[ 1 ] ; Chen, KL (Chen, Ke-Li)[ 2 ] ; Lu, ZY (Lu, Zhi-Yuan)[ 1 ] ; Zhang, YM. 2018. Chemical constituents of *Afzelia xylocarpa*. CHEMISTRY OF NATURAL COMPOUNDS, 54(4): 764-765.
11. Cai, ZQ; Zhang, YH; Yang, C; et al. 2018. Land-use type strongly shapes community composition, but not always diversity of soil microbes in tropical China. CATENA, 165: 369-380.
12. Cao, L; Wang, B; Yan, C; et al. 2018. Risk of cache pilferage determines hoarding behavior of rodents and seed fate. BEHAVIORAL ECOLOGY, 29(4): 984-991.
13. Cao, L; Yan, C; Wang, B. 2018. Differential seed mass selection on hoarding decisions among three sympatric rodents. BEHAVIORAL ECOLOGY AND SOCIOBIOLOGY, 72(10): UNSP 161.
14. Chai, X ; Yang, Z ; Fu, Q ; et al. 2018. First Report of Root and Basal Stem Rot in Sacha Inchi (*Plukenetia volztbilis*) Caused by *Fusarium oxysporum* in China. PLANT DISEASE, 102(1): 242-242.
15. Chang, YF; Ebihara, A; Lu, SG; et al. 2018. Integrated taxonomy of the *Asplenium normale* complex (Aspleniaceae) in China and adjacent areas. JOURNAL OF PLANT RESEARCH, 131(4): 573-587.
16. Charles-Dominique, T; Midgley, GF; Tomlinson, KW; et al. 2018. Steal the light: shade vs fire adapted vegetation in forest-savanna mosaics. NEW PHYTOLOGIST, 218(4): 1419-1429.
17. Chen, CF; Liu, WJ; Wu, JN; et al. 2018. Spatio-temporal variations of carbon and nitrogen in biogenic structures of two fungus-growing termites (*M. annandalei and O. yunnanensis*) in the Xishuangbanna region. SOIL BIOLOGY & BIOCHEMISTRY, 117: 125-134.
18. Chen, F; Yuan, YJ; Fan, ZX; et al. 2018. A Winter Precipitation Reconstruction (CE 1810-2012) in the Southeastern Tibetan Plateau and Its Relationship to Salween River Streamflow Variations. PURE AND APPLIED GEOPHYSICS, 175(6): 2279-2291.
19. Chen, G; Wang, ZW; Wen, P; et al. 2018. Hydrocarbons mediate seed dispersal: a new mechanism of vespicochory. NEW PHYTOLOGIST 220(3): 714-725.
20. Chen, HH; Zhang, Y; Peng, YQ; et al. Latitudinal effects on phenology near the northern limit of figs in China. SCIENTIFIC REPORTS, 8(1): 4320.
21. Chen, JQ; Wang, HP; Li, Y; et al. 2018. Arabidopsis VQ10 interacts with WRKY8 to modulate basal defense against *Botrytis cinerea*. JOURNAL OF INTEGRATIVE PLANT BIOLOGY, 60(10): 956-969.
22. Chen, JY; Cui, T; Wang, HM; et al. 2018. Spatio-temporal evolution of water-related ecosystem services: Taihu Basin, China. PEERJ, 6: e5041.

23. Chen, Q; Xu, GR; Zhang, S; et al. 2018. Consumption of an exotic plant (*Spartina alterniflora*) by the macrobenthic fauna in a mangrove wetland at Zhanjiang, China. WETLANDS, 38(2): 327-335.
24. Chen, W; Zhang, X; Li, J; et al. 2018. Comprehensive analysis of coding-lncRNA gene co-expression network uncovers conserved functional lncRNAs in zebrafish. BMC GENOMICS, 19(s2):113.
25. Chen, ZQ; Corlett, RT; Jiao, XG; et al. 2018. Prolonged milk provisioning in a jumping spider. SCIENCE, 362(6418): 1052-1055.
26. Cheng, WD; Xing, S; Chen, Y; et al. 2018. Dark butterflies camouflaged from predation in dark tropical forest understories. ECOLOGICAL ENTOMOLOGY, 43(3): 304-309.
27. Compton, SG; Chen, XY; Chen, Y; et al. 2018. Host-parasitoid relationships within figs of an invasive fig tree: a fig wasp community structured by gall size. INSECT CONSERVATION AND DIVERSITY, 11(4): 341-351.
28. Ding, HB; Bin, Y; Zhou, SS; et al. 2018. *Hedychium putaoense* (Zingiberaceae), a new species from Putao, Kachin State, Northern Myanmar. PHYTOKEYS, 94: 51-57.
29. Ding, WN ; Kunzmann, L ; Su, T ; et al. 2018. A new fossil species of *Cryptomeria* (Cupressaceae) from the Rupelian of the Luhe Basin, Yunnan, East Asia: Implications for palaeobiogeography and palaeoecology. REVIEW OF PALAEOBOTANY AND PALYNOLOGY, 248: 41-51.
30. Ding, WN; Huang, J; Su, T; et al. 2018. An early Oligocene occurrence of the palaeoendemic genus *Dipteronia* (Sapindaceae) from Southwest China. REVIEW OF PALAEOBOTANY AND PALYNOLOGY, 249: 16-23.
31. Do, TV; Li, JW. 2018. *Aristolochia bhamoensis* sp nov (Aristolochiaceae) and a diagnostic key to all known A. subgen. *Siphisia* species from Myanmar. NORDIC JOURNAL OF BOTANY, 36(8): UNSP e01909.
32. Dong, SH; Wen, P; Zhang, Q; et al. 2018. Olfactory eavesdropping of predator alarm pheromone by sympatric but not allopatric prey. ANIMAL BEHAVIOUR, 141: 115-125.
33. Dossa, GGO; Schaefer, D; Zhang, JL; et al.. 2018. The cover uncovered: Bark control over wood decomposition. JOURNAL OF ECOLOGY, 106(6): 2147-2160.
34. Elias, LG; Kjellberg, F; Farache, FHA; et al. 2018. Ovipositor morphology correlates with life history evolution in agaonid fig wasps. ACTA OECOLOGICA-INTERNATIONAL JOURNAL OF ECOLOGY, 90: 109-116.
35. Elias, LG; Silva, DB; Silva, R; et al. 2018. A comparative venomic fingerprinting approach reveals that galling and non-galling fig wasp species have different venom profiles. PLOS ONE, 13(11): e0207051.
36. Engel, MS; Wang, B; Alqarni, AS; et al. 2018. A primitive honey bee from the Middle Miocene deposits of southeastern Yunnan, China (Hymenoptera, Apidae). ZOOKEYS, 775: 117-129.
37. Fan, QF; Liu, Y; Kulakowski, D; et al. 2018. Countercurrent separation assisted identification of two mammalian steroid hormones in *Vitex negundo.* JOURNAL OF CHROMATOGRAPHY A, 1553: 108-115.
38. Fan, ZX; Thomas, A. 2018. Decadal changes of reference crop evapotranspiration attribution: Spatial and temporal variability over China 1960-2011. JOURNAL OF HYDROLOGY, 560: 461-470.
39. Fei, XH; Song, QH; Zhang, YP; et al. 2018. Carbon exchanges and their responses to temperature and precipitation in forest ecosystems in Yunnan, Southwest China. SCIENCE OF THE TOTAL ENVIRONMENT, 616: 824-840.
40. Feldberg, K; Krings, M; Schneider, H ; et al. 2018. Jochen Heinrichs March 14, 1969-April 22, 2018. CRYPTOGAMIE BRYOLOGIE, 39(3): 407-411. Biographical-Item
41. Ferlian, O; Eisenhauer, N; Aguirrebengoa, M; et al. 2018. Invasive earthworms erode soil biodiversity: A meta-analysis. JOURNAL OF ANIMAL ECOLOGY, 87(1): 162-172.
42. Fraceto, LF; Maruyama, CR; Guilger, M; et al. 2018. Trichoderma harzianum-based novel formulations: potential applications for management of Next-Gen agricultural challenges. JOURNAL OF CHEMICAL TECHNOLOGY AND BIOTECHNOLOGY, 93(8): 2056-2063.
43. Fu, QT; Niu, LJ; Chen, MS; et al.. 2018. De novo transcriptome assembly and comparative analysis between male and benzyladenine-induced female inflorescence buds of *Plukenetia volubilis*. JOURNAL OF PLANT PHYSIOLOGY, 221: 107-118.

44. Fu, W; Lin, H; Liu, XZ; et al. 2018. Constructal design of molten salt flow and heat transfer in horizontal hollow disc-shaped heaters. PROCEEDINGS OF THE ROMANIAN ACADEMY SERIES A-MATHEMATICS PHYSICS TECHNICAL SCIENCES INFORMATION SCIENCE, 19: 166-171(SI).
45. Gale, SW; Duangjai, S; Li, JH; et al. 2018. Integrative analyses of *Nervilia* (Orchidaceae) section Linervia reveal further undescribed cryptic diversity in Thailand. SYSTEMATICS AND BIODIVERSITY, 16(4): 377-396.
46. Galindon, JM; Pasion, B; Tongco, MD; et al. 2018. Plant diversity patterns in remnant forests and exotic tree species-based reforestation in active limestones quarries in the Luzon and Mindanao biogeographic sub-regions in the Philippines. ECOLOGICAL RESEARCH, 33(1): 63-72.
47. Gan, Y; Song, Y; Chen, YD; et al. 2018. Transcriptome analysis reveals a composite molecular map linked to unique seed oil profile of *Neocinnamomum caudatum* (Nees) Merr. BMC PLANT BIOLOGY, 18: 303.
48. Gao, JB; Zhou, WJ; Liu, YT; et al. 2018. Effects of Litter Inputs on N2O Emissions from a Tropical Rainforest in Southwest China. ECOSYSTEMS, 21(5): 1013-1026.
49. Gao, JM; Song, Y; Zheng, BJ. 2018. Complete chloroplast genome sequence of an endangered tree species, *Magnolia sieboldii* (Magnoliaceae). MITOCHONDRIAL DNA PART B-RESOURCES, 3(2): 1261-1262.
50. Gao, XY; Zhang, X; Meng, HH; et al. 2018. Comparative chloroplast genomes of Paris Sect. Marmorata: insights into repeat regions and evolutionary implications. BMC Genomics, 19(Suppl 10): 878.
51. Gong, HD ; Geng, YJ ; Yang, C ; et al. 2018. Yield and resource use efficiency of *Plukenetia volubilis* plants at two distinct growth stages as affected by irrigation and fertilization. SCIENTIFIC REPORTS, 8: 80.
52. Gong, QB; Landrein, S; Xi, HC; et al. 2018. *Aristolochia tongbiguanensis*, a new species of Aristolochiaceae from Yunnan, China. TAIWANIA, 63(3): 183-187.
53. Gong, ZW; Tan, K; Nieh, JC. 2018. First demonstration of olfactory learning and long-term memory in honey bee queens. JOURNAL OF EXPERIMENTAL BIOLOGY, 221(14): UNSP 177303.
54. Gray, TNE; Hughes, AC; Laurance, WF; et al. 2018. The wildlife snaring crisis: an insidious and pervasive threat to biodiversity in Southeast Asia. BIODIVERSITY AND CONSERVATION, 27(4): 1031-1037.
55. Guo, B; Yang, G; Zhang, FF; et al. 2018. Dynamic monitoring of soil erosion in the upper Minjiang catchment using an improved soil loss equation based on remote sensing and geographic information system. LAND DEGRADATION & DEVELOPMENT, 29(3): 521-533.
56. Hai, BT; Chen, J; McConkey, KR; et al. 2018. Gibbons (*Nomascus gabriellae*) provide key seed dispersal for the Pacific walnut (*Dracontomelon dao*), in Asia's lowland tropical forest. ACTA OECOLOGICA-INTERNATIONAL JOURNAL OF ECOLOGY, 88: 71-79.
57. Hai, D; Min, DZ; Khang, NS; et al. 2018. *Premna vietnamensis* (Lamiaceae, Premnoideae), a distinct new species from the Central Highlands of Vietnam. PLOS ONE, 13(5): e0195811.
58. Han, X; Hu, YR; Zhang, GS; et al. 2018. Jasmonate Negatively Regulates Stomatal Development in *Arabidopsis Cotyledons*. PLANT PHYSIOLOGY, 176(4): 2871-2885.
59. He, XL; Luo, K; Brown, C; et al. 2018. A taxonomic, functional, and phylogenetic perspective on the community assembly of passerine birds along an elevational gradient in southwest China. ECOLOGY AND EVOLUTION, 8(5): 2712-2720.
60. He, XX; Chen, YQ; Liu, SJ; et al. 2018. Cooperation of earthworm and arbuscular mycorrhizae enhanced plant N uptake by balancing absorption and supply of ammonia. SOIL BIOLOGY & BIOCHEMISTRY, 116: 351-359.
61. Hogan, JA; Zimmerman, JK ; Thompson, J; et al. 2018. The Frequency of Cyclonic Wind Storms Shapes Tropical Forest Dynamism and Functional Trait Dispersion. FORESTS, 9(7): 404.
62. Hu, X; Chen, W; Li, J; et al. 2018. ZFLNC: a comprehensive and well-annotated database for zebrafish lncRNA. DATABASE-THE JOURNAL OF BIOLOGICAL DATABASES AND CURATION, bay114.
63. Hu, XD ; Pan, BZ; Fu, QT; et al. 2018. The complete chloroplast genome sequence of the biofuel plant Sacha Inchi, *Plukenetia volubilis*. MITOCHONDRIAL DNA PART B-RESOURCES, 3(1): 328-329.

64. Hu, XD; Pan, BZ; Fu, QT; et al. 2018. De novo transcriptome assembly of the eight major organs of Sacha Inchi (*Plukenetia volubilis*) and the identification of genes involved in alpha-linolenic acid metabolism. BMC GENOMICS, 19: 380.
65. Hu, YH; Johnson, DJ; Mi, XC; et al. 2018. The relative importance of space compared to topography increases from rare to common tree species across latitude. JOURNAL OF BIOGEOGRAPHY, 45(11): 2520-2532.
66. Huang, H ; Zi, XM; Lin, H; et al. 2018. Host-specificity of symbiotic mycorrhizal fungi for enhancing seed germination, protocorm formation and seedling development of over-collected medicinal orchid, *Dendrobium devonianum*. JOURNAL OF MICROBIOLOGY, 56(1): 42-48.
67. Huang, HS; Su, T; Zhou, ZK. 2018. Fossil leaves of *Buxus* (Buxaceae) from the Upper Pliocene of Yunnan, SW China. PALAEOWORLD, 27(2): 271-281.
68. Huang, J; Su, T; Jia, LB; et al. 2018. A fossil fig from the Miocene of southwestern China: Indication of persistent deep time karst vegetation. REVIEW OF PALAEOBOTANY AND PALYNOLOGY, 258: 133-145.
69. Hughes, AC. 2018. Have Indo-Malaysian forests reached the end of the road? BIOLOGICAL CONSERVATION, 223: 129-137.
70. Ito, Y; Enju, C Li, J; et al. 2018. Evolutionary distinctiveness and conservation priority of the endangered *Najas ancistrocarpa* (Hydrocharitaceae). SYSTEMATICS AND BIODIVERSITY, 16(1): 45-54.
71. Ji, MY; Qin, HL; Chen, H; et al. 2018. Seed germination requirements of *Ficus virens* (Moraceae) as adaptation to its hemi-epiphyte life form. POLISH JOURNAL OF ECOLOGY, 66(1): 14-22.
72. Jian, HY; Li, SF; Guo, JL; et al. 2018. High genetic diversity and differentiation of an extremely narrowly distributed and critically endangered decaploid rose (*Rosa praelucens*): implications for its conservation. CONSERVATION GENETICS 19(4):761-776.
73. Jiang, N; Zhou, Z; Yang, JB; et al. 2018. Complete chloroplast genome of *Anemoclema glaucifolium* (Ranunculaceae), a vulnerable and threatened species endemic to the Hengduan Mountains. CONSERVATION GENETICS RESOURCES, 10(4): 601-604.
74. Jiang, XC; Wang, ZW; He, QB; et al. 2018. The Effect of Neonicotinoid Insecticide and Fungicide on Sugar Responsiveness and Orientation Behavior of Honey Bee (*Apis mellifera*) in Semi-Field Conditions. INSECTS, 9(4): 130.
75. Jiang, XF; Zhu, XF; Chen, LL; et al. 2018. What ecological factors favor the shift from distyly to homostyly? A study from the perspective of reproductive assurance. JOURNAL OF PLANT ECOLOGY, 11(4): 645-655.
76. Jiang, XF; Zhu, XF; Li, QJ. 2018. Variation in the degree of reciprocal herkogamy affects the degree of legitimate pollination in a distylous species. AOB PLANTS, 10(3): ply022.
77. Jiang, XJ; Liu, WJ; Chen, CF; et al. 2018. Effects of three morphometric features of roots on soil water flow behavior in three sites in China. GEODERMA, 320: 161-171.
78. Jiang, YL; Song, MY; Zhang, S; et al. 2018. Unravelling community assemblages through multi-element stoichiometry in plant leaves and roots across primary successional stages in a glacier retreat area. PLANT AND SOIL, 428(1-2): 291-305.
79. Jin, YQ; Li, J; Liu, CG ; et al. 2018. Carbohydrate dynamics of three dominant species in a Chinese savanna under precipitation exclusion. TREE PHYSIOLOGY, 38: 1371–1383.
80. Jin, YQ; Li, J; Liu, CG; et al. 2018. Response of net primary productivity to precipitation exclusion in a savanna ecosystem. Forest ECOLOGY AND MANAGEMENT, 429: 69-76.
81. Khamcha, D; Corlett, RT ; Powell, LA; et al. 2018. Road induced edge effects on a forest bird community in tropical Asia. AVIAN RESEARCH, 9:20.
82. Khan, MA; Bera, M; Spicer, RA; et al. 2018. Evidence of simultaneous occurrence of tylosis formation and fungal interaction in a late Cenozoic angiosperm from the eastern Himalaya. REVIEW OF PALAEOBOTANY AND PALYNOLOGY, 259: 171-184.
83. Krings, M; Schneider, H; Bechteler, J; et al. 2018. Jochen Heinrichs: March 14, 1969-April 22, 2018. PLANT SYSTEMATICS AND EVOLUTION, 304(8): 937-941.

84. Lai, FJ; Luo, J; Jiang, D; et al. 2018. Iron(III)-modified tungstophosphoric acid supported on silica-pillared montmorillonite as catalysts for fructose conversion to methyl levulinate. JOURNAL OF CHEMICAL TECHNOLOGY AND BIOTECHNOLOGY, 93(2): 557-568.
85. Lamarre, GPA; Juin, Y; Lapied, E; et al. 2018. Using field-based entomological research to promote awareness about forest ecosystem conservation. NATURE CONSERVATION-BULGARIA, 29: 39-56.
86. Lan, GY; Li, YW; Lesueurd, D; et al. 2018. Seasonal changes impact soil bacterial communities in a rubber plantation on Hainan Island, China. SCIENCE OF THE TOTAL ENVIRONMENT, 626: 826-834.
87. Lan, QY; Yin, SH; He, HY; et al. 2018. Seed dormancy-life form profile for 358 species from the Xishuangbanna seasonal tropical rainforest, Yunnan Province, China compared to world database. SCIENTIFIC REPORTS, 8: 4674.
88. Lei, RH; Ma, ZB; Yu, DQ. 2018. WRKY2/34-VQ20 Modules in *Arabidopsis thaliana* Negatively Regulate Expression of a Trio of Related MYB Transcription Factors During Pollen Development. FRONTIERS IN PLANT SCIENCE, 9: 331.
89. Li, HL; Guo, JY; Goldberg, SD; et al. 2018. Fruiting patterns of macrofungi in tropical and temperate land use types in Yunnan Province, China. ACTA OECOLOGICA-INTERNATIONAL JOURNAL OF ECOLOGY, 91: 7-15.
90. Li, J; Jin, YQ; Liu, YT; et al. 2018. Effects of precipitation exclusion on N2O emissions in a savanna ecosystem in SW China. ATMOSPHERIC ENVIRONMENT, 187: 1-8.
91. Li, JL; Pan, BZ; Niu, LJ; et al. 2018. Gibberellin Inhibits Floral Initiation in the Perennial Woody Plant *Jatropha curcas*. JOURNAL OF PLANT GROWTH REGULATION 37(3): 999-1006.
92. Li, JW; Huang, LQ; Li, GW; et al. 2018. Lectotype, epitype and amendment of *Gastrodia angusta* (Orchidaceae). PHYTOTAXA, 356(4):291-296.
93. Li, JW; Tan, YH; Wang, XL; et al. 2018. *Begonia medogensis*, a new species of Begoniaceae from Western China and Northern Myanmar. PHYTOKEYS, 103: 13-18.
94. Li, S; Li, D; Zhang, P; et al. 2018. ABCF3 regulates the expression of aquaporin genes and endoplasmic reticulum stress-related genes in *Arabidopsis*. THEORETICAL AND EXPERIMENTAL PLANT PHYSIOLOGY, 30(3): 215-222.
95. Li, SF; Xing, YW; Valdes, PJ; et al. 2018. Oligocene climate signals and forcings in Eurasia revealed by plant macrofossil and modelling results. GONDWANA RESEARCH, 61: 115-127.
96. Li, W; Tang, GH; Chen, L; et al. 2018. New pyridocarbazole alkaloids from *Strychnos nitida*. NATURAL PRODUCT RESEARCH, 32(13): 1532-1536.
97. Li, WF; Zhou, WQ; Bai, Y; et al.. 2018. The smart growth of Chinese cities: Opportunities offered by vacant land. LAND DEGRADATION & DEVELOPMENT, 29(10): 3512-3520.
98. Li, XF; Fu, BT; Guo, J; et al. 2018. Bamboo shoot fiber improves insulin sensitivity in high-fat diet-fed mice. JOURNAL OF FUNCTIONAL FOODS, 49: 510-517.
99. Li, XK; Luo, YF; Daroch, M; et al Y. 2018. Oxygen-assisted ethanol organosolv pretreatment of sugarcane bagasse for efficient removal of hemicellulose and lignin. CELLULOSE, 25(10): 5511-5522.
100. Li, XY; He, Y; Zeng, ZZ; et al. 2018. Spatiotemporal pattern of terrestrial evapotranspiration in China during the past thirty years. AGRICULTURAL AND FOREST METEOROLOGY, 259: 131-140.
101. Li, YY He, LL; Li, J; et al. 2018. Genome-Wide Identification, Characterization, and Expression Profiling of the Legume BZR Transcription Factor Gene Family. FRONTIERS IN PLANT SCIENCE, 9: 1332.
102. Liang, XQ ; Lu, P; Zhang, JW; et al. 2018. First fossils of *Zygogynum* from the Middle Miocene of Central Yunnan, Southwest China, and their palaeobiogeographic significance. PALAEOWORLD, 27(3): 399-409.
103. Liao, Q; Ye, TH; Song, Y. 2018. Complete chloroplast genome sequence of a subtropical tree, *Parasassafras confertiflorum* (Lauranceae). MITOCHONDRIAL DNA PART B-RESOURCES, 3(2): 1216-1217.
104. Lin, H; Zhang, HL; Song, QH. 2018. Transition from abstract thermodynamic concepts to perceivable ecological indicators. ECOLOGICAL INDICATORS, 88: 37-42.
105. Lin, SY; Shao, LJ; Hui, C; et al. 2018. Why Does Not the Leaf Weight-Area Allometry of Bamboos Follow the 3/2-Power Law? FRONTIERS IN PLANT SCIENCE, 9: 583.

106. Lin, YX; Grace, J; Zhao, W; et al. 2018. Water-use efficiency and its relationship with environmental and biological factors in a rubber plantation. JOURNAL OF HYDROLOGY, 563: 273-282.
107. Lin, YX; Zhang, YP; Zhao, W; et al. 2018. Pattern and driving factor of intense defoliation of rubber plantations in SW China. ECOLOGICAL INDICATORS, 94: 104-116(1).
108. Linnemann, U; Su, T; Kunzmann, L ; et al. 2018. New U-Pb dates show a Paleogene origin for the modern Asian biodiversity hot spots. GEOLOGY, 46(1): 3-6.
109. Liu, CA; Nie, Y; Zhang, YM; et al. 2018. Introduction of a leguminous shrub to a rubber plantation changed the soil carbon and nitrogen fractions and ameliorated soil environments. SCIENTIFIC REPORTS, 8: 17324.
110. Liu, CG; Jin, YQ; Liu, CG; et al. 2018. Phosphorous fractions in soils of rubber-based agroforestry systems: Influence of season, management and stand age. SCIENCE OF THE TOTAL ENVIRONMENT, 616: 1576-1588.
111. Liu, HM; Russell, SR; Vogel, J; et al. 2018. Inferring the potential of plastid DNA-based identification of derived ferns: a case study on the *Asplenium trichomanes* aggregate in Europe. PLANT SYSTEMATICS AND EVOLUTION, 304(8): 1009-1022.
112. Liu, JQ; Liu, WJ; Li, WX; et al. 2018. Effects of rainfall on the spatial distribution of the throughfall kinetic energy on a small scale in a rubber plantation. HYDROLOGICAL SCIENCES JOURNAL-JOURNAL DES SCIENCES HYDROLOGIQUES, 63(7): 1078-1090.
113. Liu, JQ; Liu, WJ; Zhu, K. 2018. Throughfall kinetic energy and its spatial characteristics under rubber-based agroforestry systems`. CATENA, 161: 113-121.
114. Liu, JY; Zheng, Z; Xu, X; et al. 2018. Abundance and distribution of cavity trees and the effect of topography on cavity presence in a tropical rainforest, southwestern China. CANADIAN JOURNAL OF FOREST RESEARCH, 48(9): 1058-1066.
115. Liu, M; Xu, FZ; Xu, XL; et al. 2018. Age alters uptake pattern of organic and inorganic nitrogen by rubber trees. TREE PHYSIOLOGY, 38(11): 1685-1693.
116. Liu, Q; Gao, JY. 2018. *Gastrochilus dulongjiangensis* (Aeridinae, Vandeae, Epidendroideae, Orchidaceae), a new species from Yunnan Province, China. PHYTOTAXA, 340(3): 293-296.
117. Liu, Q; Zhou, SS; Jin, XH; et al. 2018. *Dendrobium naungmungense* (Orchidaceae, Dendrobieae), a new species from Kachin State, Myanmar. PHYTOKEYS, 94: 31-38.
118. Liu, R; Feng, T; Wang, SS; Shi, et al. 2018. OMI satellite observed formaldehyde column from 2006 to 2015 over Xishuangbanna, southwest China, and validation using ground based zenith-sky DOAS. SCIENCE OF THE TOTAL ENVIRONMENT, 613: 168-175.
119. Liu, S; Liu, WY; Shi, XM; et al. 2018. Dry-hot stress significantly reduced the nitrogenase activity of epiphytic cyanolichen. SCIENCE OF THE TOTAL ENVIRONMENT, 619: 630-637.
120. Liu, SJ; Hu, J; Behm, JE ; et al. 2018. Nitrogen addition changes the trophic cascade effects of spiders on a detrital food web. ECOSPHERE, 9(10): e02466.
121. Liu, X; Tang, GH; Weng, HZ; et al. 2018. A new selaginellin derivative and a new triarylbenzophenone analog from the whole plant of *Selaginella pulvinata*. JOURNAL OF ASIAN NATURAL PRODUCTS RESEARCH, 20(12): 1123-1128.
122. Liu, YT; Li, J; Jin, YQ; et al. 2018. The influence of drought strength on soil respiration in a woody savanna ecosystem, southwest China. PLANT AND SOIL, 428(1-2): 321-333.
123. Lou, DJ; Wang, HP; Yu, DQ. 2018. The sucrose non-fermenting-1-related protein kinases SAPK1 and SAPK2 function collaboratively as positive regulators of salt stress tolerance in rice. BMC PLANT BIOLOG, 18: 203.
124. Lu, ZQ; Li, Y; Yang, XY; et al. 2018. *Carpinus tibetana* (Betulaceae), a new species from southeast Tibet, China. PHYTOKEYS, 98: 1-13.
125. Luo, K; Hu, YB; Lu, ZY; et al. 2018. Interspecific feeding at a bird nest: Snowy-browed Flycatcher (*Ficedula hyperythra*) as a helper at the Rufous-bellied Niltava (*Niltava sundara*) nest, Yunnan, Southwest China. WILSON JOURNAL OF ORNITHOLOGY, 130(4): 1003-1008.

126. Luo, Y; Erst, AS; Yang, CX; et al. 2018. *Aquilegia yangii* (Ranunculaceae), a new species from western China. PHYTOTAXA, 348(4): 289-296.
127. Lutz, JA; Furniss, TJ; Johnson, DJ; et al. 2018. Global importance of large-diameter trees. GLOBAL ECOLOGY AND BIOGEOGRAPHY, 27(7): 849-864.
128. Mammides, C; Chen, J; Goodale, UM; et al. 2018. Measurement of species associations in mixed-species bird flocks across environmental and human disturbance gradients. ECOSPHERE, 9(7): e02324.
129. Mao, Z; Wang, Y; McCormack, ML; et al. 2018. Mechanical traits of fine roots as a function of topology and anatomy. ANNALS OF BOTANY, 122(7): 1103-1116.
130. Marinho, CR; Pereira, RAS; Peng, YQ; et al. 2018. Laticifer distribution in fig inflorescence and its potential role in the fig-fig wasp mutualism. ACTA OECOLOGICA-INTERNATIONAL JOURNAL OF ECOLOGY, 90: 160-167. (Special issue)
131. Martins, K; Gugger, PF; Llanderal-Mendoza, J; et al. 2018. Landscape genomics provides evidence of climate-associated genetic variation in Mexican populations of *Quercus rugosa*. EVOLUTIONARY APPLICATIONS, 11(10): 1842-1858.
132. Meegahakumbura, MK; Wambulwa, MC; Li, MM; et al. 2018. Domestication Origin and Breeding History of the Tea Plant (*Camellia sinensis*) in China and India Based on Nuclear Microsatellites and cpDNA Sequence Data. FRONTIERS IN PLANT SCIENCE, 8: 2270.
133. Mizuno, T; Hagiwara, Y; Akino, T. 2018. Chemical tactic of facultative myrmecophilous lycaenid pupa to suppress ant aggression. CHEMOECOLOGY, 28(6): 173-182.
134. Mizuno, T; Hayashi, M; Akino, T. 2018. Combined use of two defensive traits in pupae of *Scymnus posticalis* ladybirds. ETHOLOGY, 124(7): 468-474.
135. Moazzam, NS; Zhang, YP; Sha, LQ. 2018. Dynamics of root and leaf decomposition in chronosequence of rubber plantation (*Hevea brasilensis*) in SW China. PAKISTAN JOURNAL OF BOTANY, 50(2): 791-799.
136. Mohandass, D; Campbell, MJ; Chen, XS; et al. 2018. Flowering and fruiting phenology of woody trees in the tropical-seasonal rainforest, Southwestern China. CURRENT SCIENCE, 114(11): 2313-2322.
137. Morris, JL; Puttick, MN; Clark, JW; et al. 2018. REPLY TO HEDGES ET AL.: Accurate timetrees do indeed require accurate calibrations. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, 115(41): E9512-E9513.
138. Morris, JL; Puttick, MN; Clark, JW; et al. 2018. The timescale of early land plant evolution. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, 115(10): E2274-E2283.
139. Nieberding, F; Breuer, B; Braeckevelt, E; et al. 2018. Fog Water Chemical Composition on Ailaoshan Mountain, Yunnan Province, SW China. AEROSOL AND AIR QUALITY RESEARCH, 18(1): 37-48.
140. Osborne, CP; Charles-Dominique, T; Stevens, N; et al. 2018. Human impacts in African savannas are mediated by plant functional traits. NEW PHYTOLOGIST, 220(1): 10-24. ( Editorial Material)
141. Pagani-Nunez, E; Xia, X; Beauchamp, G; et al. 2018. Are vocal characteristics related to leadership patterns in mixed-species bird flocks? JOURNAL OF AVIAN BIOLOGY, 49(5): UNSP e01674.
142. Pan, JJ; Wang, HP; Hu, YR; et al. 2018. Arabidopsis VQ18 and VQ26 proteins interact with ABI5 transcription factor to negatively modulate ABA response during seed germination. PLANT JOURNAL, 95(3): 529-544.
143. Panthi, S; Brauning, A; Zhou, ZK; et al. 2018. Growth response of *Abies georgei* to climate increases with elevation in the central Hengduan Mountains, southwestern China. DENDROCHRONOLOGIA, 47: 1-9.
144. Pasion, BO; Roeder, M; Liu, JJ; et al. 2018. Trees represent community composition of other plant life-forms, but not their diversity, abundance or responses to fragmentation. SCIENTIFIC REPORTS, 8: 11374.
145. Primack, RB; Miller-Rushing, AJ; Corlett, RT; et al. 2018. Biodiversity gains? The debate on changes in local- vs global-scale species richness. BIOLOGICAL CONSERVATION, 219: A1-A3. Editorial Material
146. Puttick, MN; Morris, JL; Williams, TA; et al. 2018. The Interrelationships of Land Plants and the Nature of the Ancestral Embryophyte. CURRENT BIOLOGY, 28(5): 733-745.

147. Qiao, D; He, ZR; Ma, XD; Wang, HC. 2018. *Pterygiella luzhijiangensis* sp nov (Orobanchaceae), a new procumbent species from Yunnan, southwest China. NORDIC JOURNAL OF BOTANY, 36(4): UNSP e01680.
148. Rajeh, T; Tu, P; Lin, H; et al. 2018. Thermo-Fluid Characteristics of High Temperature Molten Salt Flowing in Single-Leaf Type Hollow Paddles. ENTROPY, 20(8): 581.
149. Ray, S; Mishra, S; Bisen, K; et al. 2018. Modulation in phenolic root exudate profile of *Abelmoschus esculentus* expressing activation of defense pathway. MICROBIOLOGICAL RESEARCH, 207: 100-107.
150. Regalado, L; Schmidt, AR ; Krings, M ; et al. 2018. Fossil evidence of eupolypod ferns in the mid-Cretaceous of Myanmar. PLANT SYSTEMATICS AND EVOLUTION, 304(1):1-13.
151. Regalado, L; Loriga, J; Bechteler, J; et al. 2018. Phylogenetic biogeography reveals the timing and source areas of the *Adiantum* species (Pteridaceae) in the West Indies, with a special focus on Cuba. JOURNAL OF BIOGEOGRAPHY, 45(3): 541-551.
152. Rozainah, MZ; Nazri, MN; Sofawi, AB; et al. 2018. Estimation of carbon pool in soil, above and below ground vegetation at different types of mangrove forests in Peninsular Malaysia. MARINE POLLUTION BULLETIN, 137: 237-245.
153. Ru, DF; Sun, YS; Wang, DL; et al. 2018. Population genomic analysis reveals that homoploid hybrid speciation can be a lengthy process. MOLECULAR ECOLOGY, 27(23): 4875-4887.
154. Shao, XN; Brown, C; Worthy, SJ; et al. 2018. Intra-specific relatedness, spatial clustering and reduced demographic performance in tropical rainforest trees. ECOLOGY LETTERS, 21(8): 1184-1181.
155. Shao, XN; Li, QM; Lin, LX; et al. 2018. On the origin and genetic variability of the two invasive biotypes of *Chromolaena odorata*. BIOLOGICAL INVASIONS, 20(8): 2033-2046.
156. Shen, JY; Yan, LC; Landrein, S; et al. 2018. *Salacia menglaensis* (Celastraceae), a new species from China. ANNALES BOTANICI FENNICI, 55 (4-6): 279-283.
157. Shen, T Corlett, RT; Song, L; et al. 2018. Vertical gradient in bryophyte diversity and species composition in tropical and subtropical forests in Yunnan, SW China. JOURNAL OF VEGETATION SCIENCE, 29(6): 1075-1087.
158. Siddiq, Z; Cao, KF. 2018. Nocturnal transpiration in 18 broadleaf timber species under a tropical seasonal climate. FOREST ECOLOGY AND MANAGEMENT, 418: 47-54.
159. Slik, JWF; Franklin, J; Arroyo-Rodriguez, V; et al.2018. Phylogenetic classification of the world's tropical forests. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, 115(8):1837-1842.
160. Song, XY; Hogan, JA; Lin, LX; et al. 2018. Canopy openness and topographic habitat drive tree seedling recruitment after snow damage in an old-growth subtropical forest. FOREST ECOLOGY AND MANAGEMENT, 429: 493-502.
161. Song, XY; Johnson, DJ; Cao, M; et al. 2018. The strength of density-dependent mortality is contingent on climate and seedling size. JOURNAL OF VEGETATION SCIENCE, 29(4): 662-670.
162. Song, Y; Gan, Y; Liu, LY; et al. 2018. The floral transcriptome of *Machilus yunnanensis*, a tree in the magnoliid family Lauraceae. COMPUTATIONAL BIOLOGY AND CHEMISTRY, 77: 456-465.
163. Song, Y; Yao, X; Liu, B; et al. 2018. Complete plastid genome sequences of three tropical *Alseodaphne* trees in the family Lauraceae. HOLZFORSCHUNG, 72(4): 337-345.
164. Sreekar, R; Katabuchi, M; Nakamura, A; et al. 2018. Spatial scale changes the relationship between beta diversity, species richness and latitude. ROYAL SOCIETY OPEN SCIENCE, 5(9): 181168.
165. Stewart, AB; Sritongchuay, T; Teartisup, P; et al. 2018. Habitat and landscape factors influence pollinators in a tropical megacity, Bangkok, Thailand. PEERJ, 6: e5335.
166. Su, T; Li, SF; Tang, H; et al. 2018. *Hemitrapa Miki* (Lythraceae) from the earliest Oligocene of southeastern Qinghai-Tibetan Plateau and its phytogeographic implications. REVIEW OF PALAEOBOTANY AND PALYNOLOGY, 257: 57-63.
167. Sun, YS; Abbott, RJ; Lu, ZQ; et al. 2018. Reticulate evolution within a spruce (*Picea*) species complex revealed by population genomic analysis. EVOLUTION EVOLUTION, 72(12): 2669-2681.

168. Tan, YH; Li, DR; Zhou, SS; et al. 2018. *Premna grandipaniculata* (Lamiaceae, Premnoideae), a remarkable new species from north Myanmar. PHYTOKEYS, 94: 117-123.
169. Tanalgo, KC; Hughes, AC. 2018. Bats of the Philippine Islands A review of research directions and relevance to national-level priorities and targets. MAMMALIAN BIOLOGY, 91: 46-56.
170. Tanalgo, KC; Tabora, JAG; Hughes, AC. 2018. Bat cave vulnerability index (BCVI): A holistic rapid assessment tool to identify priorities for effective cave conservation in the tropics. ECOLOGICAL INDICATORS, 89: 852-860.
171. Tang, CQ; Matsui, T; Ohashi, H; et al. 2018. Identifying long-term stable refugia for relict plant species in East Asia. NATURE COMMUNICATIONS, 9: 4488.
172. Tang, FX; Li, JW; Pan, B; et al. 2018. New and Newly Record Orchids of *Nervilia* (Nervilieae, Epidendroideae, Orchidaceae) in China. PHYTOTAXA, 379(2): 162-168.
173. Tang, MY; Bai, X; Niu, LJ; et al. 2018. miR172 Regulates both Vegetative and Reproductive Development in the Perennial Woody Plant *Jatropha curcas* . PLANT AND CELL PHYSIOLOGY, 59(12): 2549-2563.
174. Tang, XL; Zhao, X; Bai, YF; et al. 2018. Carbon pools in China's terrestrial ecosystems: New estimates based on an intensive field survey. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, 115(16): 4021-4026.
175. Tian, XF; Tang, R ; Chen, G; et al. 2018. Separation of Monascus pigments from extractive fermentation broth with a high concentration of triton X-100. SEPARATION SCIENCE AND TECHNOLOGY, 53(16): 2601-2611.
176. Togashi, HF; Atkin, OK; Bloomfield, KJ; et al. 2018. Functional trait variation related to gap dynamics in tropical moist forests: A vegetation modelling perspective. PERSPECTIVES IN PLANT ECOLOGY EVOLUTION AND SYSTEMATICS, 35: 52-64.
177. Umana, MN; Zhang, CC; Cao, M; et al. 2018. Quantifying the role of intra-specific trait variation for allocation and organ-level traits in tropical seedling communities. JOURNAL OF VEGETATION SCIENCE, 29(2): 276-284.
178. Umana, MN; Zipkin, EF; Zhang, CC; et al. 2018. Individual-level trait variation and negative density dependence affect growth in tropical tree seedlings. JOURNAL OF ECOLOGY, 106(6): 2446-2455.
179. Wan, JP; Zhang, P; Sun, LL; et al. 2018. Involvement of reactive oxygen species and auxin in serotonin-induced inhibition of primary root elongation. JOURNAL OF PLANT PHYSIOLOGY, 229: 89-99.
180. Wan, JP; Zhang, P; Wang, RL; et al. 2018. Comparative physiological responses and transcriptome analysis reveal the roles of melatonin and serotonin in regulating growth and metabolism in *Arabidopsis*. BMC PLANT BIOLOGY, 18: 362.
181. Wan, JP; Zhang, P; Wang, RL; et al. 2018. UV-B Radiation Induces Root Bending Through the Flavonoid-Mediated Auxin Pathway in *Arabidopsis*. FRONTIERS IN PLANT SCIENCE, 9: 618.
182. Wang, B; Lu, M; Cook, JM; et al. 2018. Chemical camouflage: a key process in shaping an ant-treehopper and fig-fig wasp mutualistic network. SCIENTIFIC REPORTS, 8: 1833.
183. Wang, B; Phillips, JS; Tomlinson, KW. 2018. Tradeoff between physical and chemical defense in plant seeds is mediated by seed mass. OIKOS, 127(3): 440-447.
184. Wang, J; Zhang, X; Chen, W; et al. 2018. CRlncRNA: a manually curated database of cancer-related long non-coding RNAs with experimental proof of functions on clinicopathological and molecular features. BMC MEDICAL GENOMICS, 11(Suppl 6): 114.
185. Wang, PP; Li, J; Gao, XY; et al. 2018. Genome-Wide Screening and Characterization of the Dof Gene Family in Physic Nut (*Jatropha curcas* L.). INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES 19(6):1598.
186. Wang, QW; Liu, CG; Zhou, WM; et al. 2018. Mobile carbon supply in trees and shrubs at the alpine treeline ecotone. PLANT ECOLOGY, 219(4): 467-479.
187. Wang, QW; Qi, L; Zhou, WM; et al. 2018. Carbon dynamics in the deciduous broadleaf tree Erman's birch (*Betula ermanii*) at the subalpine treeline on Changbai Mountain, Northeast China. AMERICAN JOURNAL OF BOTANY, 105(1): 42-49.

188. Wang, S; Chen, XP; Gong, HD; et al. 2018. Response of soil microbial abundance and diversity in Sacha Inchi (*Plukenetia volubilis L.*) farms with different land-use histories in a tropical area of Southwestern China. ARCHIVES OF AGRONOMY AND SOIL SCIENCE, 64(4): 588-596.
189. Wang, Y; Mao, Z; Bakker, MR; et al. 2018. Linking conifer root growth and production to soil temperature and carbon supply in temperate forests. PLANT AND SOIL, 426(1-2): 33-50.
190. Wang, YT; Fang, Z; Yang, XX; et al. 2018. One-step production of biodiesel from *Jatropha* oils with high acid value at low temperature by magnetic acid-base amphoteric nanoparticles. CHEMICAL ENGINEERING JOURNAL, 348: 929-939.
191. Wang, ZY; Wang, B; Yi, XF; et al. 2018. Scatter-hoarding rodents are better pilferers than larder-hoarders. ANIMAL BEHAVIOUR, 141: 151-159.
192. Wen, Y; Qin, DW; Leng, B; et al. 2018. The physiological cold tolerance of warm-climate plants is correlated with their latitudinal range limit. BIOLOGY LETTERS, 14(8): 20180277.
193. Williams, SJ; Gale, SW; Hinsley, A; et al. 2018. Using consumer preferences to characterize the trade of wild-collected ornamental orchids in China. CONSERVATION LETTERS 11(5): UNSP e12569.
194. Wu, L; Tan, YH; Hareesh, VS; et al. 2018. *Ophiorrhiza macrocarpa* (Rubiaceae), a new viviparous species from Yunnan, southwestern China. NORDIC JOURNAL OF BOTANY, 36(4): UNSP e01637.
195. Wu, LW; Bourguignon, T; Sobotnik, J; et al.. 2018. Phylogenetic position of the enigmatic termite family Stylotermitidae (Insecta: Blattodea). INVERTEBRATE SYSTEMATICS, 32(5): 1111-1117.
196. Wu, Y; Song, L; Liu, WY; et al. 2018. Fog Water Is Important in Maintaining the Water Budgets of Vascular Epiphytes in an Asian Tropical Karst Forests during the Dry Season. FORESTS, 9(5): 260.
197. Wu, Y; Zhong, T; Liu, GL; et al. 2018. The relative strength of different floral visitors driving floral evolution within a *Primula secundiflora* population. EVOLUTIONARY ECOLOGY, 32(6): 587-599.
198. Wu, Y; Zhong, T; Zhang, ZQ; et al. 2018. Pollinator-mediated selection on floral traits varies in space and between morphs in *Primula secundiflora*. AOB PLANTS 10(5): ply059.
199. Xi, NX; Chu, CJ; Bloor, JMG. 2018. Plant drought resistance is mediated by soil microbial community structure and soil-plant feedbacks in a savanna tree species. ENVIRONMENTAL AND EXPERIMENTAL BOTANY, 155: 695-701.
200. Xing, S; Bonebrake, TC; Ashton, LA; et al. 2018. Colors of night: climate-morphology relationships of geometrid moths along spatial gradients in southwestern China. OECOLOGIA, 188(2): 537-546.
201. Xing, S; Cheng, WD; Nakamura, A; et al. 2018. Elevational clines in morphological traits of subtropical and tropical butterfly assemblages. BIOLOGICAL JOURNAL OF THE LINNEAN SOCIETY, 123(3): 506-517.
202. Xu, DD ; Xu, LT; Zhou, FY ; et al. 2018. Gut bacterial communities of Dendroctonus *valens* and Monoterpenes and Carbohydrates of *Pinus tabuliformis* at different attack densities to host pines. FRONTIERS IN MICROBIOLOGY, 9: 1251.
203. Xu, GR; Zhang, S; Zhang, YX; et al. 2018. Environmental correlates underlying elevational richness, abundance, and biomass patterns of multi-feeding guilds in litter invertebrates across the treeline. SCIENCE OF THE TOTAL ENVIRONMENT, 633: 529-538.
204. Xu, Q; Ding, L; Spicer, RA; et al. 2018. Stable isotopes reveal southward growth of the Himalayan-Tibetan Plateau since the Paleocene. GONDWANA RESEARCH, 54: 50-61.
205. Xu, Q; Spicer, RA; Ding, L. 2018. Evidence from Paleosols for low to moderate elevation of the India-Asia suture zone during mid-Cenozoic time. GEOLOGY, 46(2): E434-434. Editorial Material
206. Xue, BN; Tan, YH; Thomas, DC; et al. 2018. A new Annonaceae genus, *Wuodendron*, provides support for a post-boreotropical origin of the Asian-Neotropical disjunction in the tribe Miliuseae. TAXON, 67(2): 250-266.
207. Xue, P; Wen, B. 2018. Desiccation tolerance of intermediate pomelo (*Citrus maxima*'Mansailong') seeds following rapid and slow drying. SEED SCIENCE AND TECHNOLOGY, 46( 3): 511-519.

208. Ya, JD; Yu, ZX; Yang, YQ; et al. 2018. Complete chloroplast genome of *Firmiana major* (Malvaceae), a critically endangered species endemic to southwest China. CONSERVATION GENETICS RESOURCES, 10(4): 713-715.
209. Yang, B; Ding, HB; Li, JW; et al. 2018. Two new species of *Hiptage* (Malpighiaceae) from Yunnan, Southwest of China. PHYTOKEYS, 110: 81-89.
210. Yang, B; Ding, HB; Zhou, SS; et al. 2018. *Aristolochia sinoburmanica* (Aristolochiaceae), a new species from north Myanmar. PHYTOKEYS, 94: 13-22.
211. Yang, B; Wang, PY; You, DB; et al. 2018. Coupling evapotranspiration partitioning with root water uptake to identify the water consumption characteristics of winter wheat: A case study in the North China Plain. AGRICULTURAL AND FOREST METEOROLOGY, 259: 296-304.
212. Yang, B; Zhou, SS; Ding, HB; et al. 2018. Two new species of *Trivalvaria* (Annonaceae) from northern Myanmar. PHYTOKEYS, 94: 3-12.
213. Yang, J; Cao, M; Swenson, NG. 2018. Why Functional Traits Do Not Predict Tree Demographic Rates. TRENDS IN ECOLOGY & EVOLUTION, 33(5): 326-336.
214. Yang, JQ; Fan, YL; Jiang, XF; et al. 2018. Correlation between the timing of autonomous selfing and floral traits: a comparative study from three selfing *Gentianopsis* species (Gentianaceae). SCIENTIFIC REPORTS, 8: 3634.
215. Yang, P; Li, ZB; Yang, DR; et al. 2018. Comparison of the antennal sensilla of females of four fig-wasps associated with *Ficus auriculata*. ACTA OECOLOGICA-INTERNATIONAL JOURNAL OF ECOLOGY, 90: 99-108.
216. Yang, XX; Wang, YT; Yang, YT; et al. 2018. Catalytic transesterification to biodiesel at room temperature over several solid bases. ENERGY CONVERSION AND MANAGEMENT, 164: 112-121.
217. Yang, YT; Yang, XX; Wang, YT; et al. 2018. Alcohothermal carbonization of biomass to prepare novel solid catalysts for oleic acid esterification. FUEL, 219: 166-175.
218. Yao, XN; Cai, YR; Yu, DQ; et al. 2018. bHLH104 confers tolerance to cadmium stress in *Arabidopsis thaliana*. JOURNAL OF INTEGRATIVE PLANT BIOLOGY, 60(8): 691-702.
219. Yao, YT; Li, ZJ; Wang, T; et al. 2018. A new estimation of China's net ecosystem productivity based on eddy covariance measurements and a model tree ensemble approach. AGRICULTURAL AND FOREST METEOROLOGY, 253: 84-93.
220. Yao, YT; Wang, XH; Li, Y; et al. 2018. Spatiotemporal pattern of gross primary productivity and its covariation with climate in China over the last thirty years. GLOBAL CHANGE BIOLOGY, 24(1): 184-196.
221. Yin, CY; Palmroth, S; Pang, XY; et al. 2018. Differential responses of *Picea asperata* and *Betula albosinensis* to nitrogen supply imposed by water availability. TREE PHYSIOLOGY, 38(11): 1694-1705.
222. Yoshida, T; Ban, Y; Nakamura, A. 2018. Vertical stratification of invertebrate assemblages in water-filled treeholes of a temperate deciduous forest. BASIC AND APPLIED ECOLOGY, 27: 61-70.
223. Yu, DY; Yang, XD; Liu, MQ. 2018. Three new species of *Tomocerus* from tropical zone of China (Collembola, Tomoceridae). ZOOTAXA, 4508(2): 225-236.
224. Yu, WB; Randle, CP; Lu, L; et al 2018. The Hemiparasitic Plant *Phtheirospermum* (Orobanchaceae) Is Polyphyletic and Contains Cryptic Species in the Hengduan Mountains of Southwest China. FRONTIERS IN PLANT SCIENCE, 9: 142.
225. Yu, WB; Wang, H; Liu, ML; et al. 2018. Phylogenetic approaches resolve taxonomical confusion in *Pedicularis* (Orobanchaceae): Reinstatement of *Pedicularis delavayi* and discovering a new species *Pedicularis milliana*. PLOS ONE, 13(7): e0200372.
226. Yuan, X; Wen, B. 2018. Seed germination response to high temperature and water stress in three invasive Asteraceae weeds from Xishuangbanna, SW China. PLOS ONE, 13(1): e0191710.
227. Zhang, F; Feng, S; Zhou, JJ; et al. 2018. *Apios chendezhaouna* (Fabaceae), an overlooked species and a new combination from China: evidence from morphological and molecular analyses. PHYTOTAXA, 371(1): 1-16.
228. Zhang, JJ; Wang, ZW; Wen, P; et al. 2018. The reluctant visitor: an alkaloid in toxic nectar can reduce olfactory learning and memory in Asian honey bees. JOURNAL OF EXPERIMENTAL BIOLOGY, 221(5): jeb168344.

229. Zhang, LP; Chen, LG; Yu, DQ. 2018. Transcription Factor WRKY75 Interacts with DELLA Proteins to Affect Flowering. PLANT PHYSIOLOGY, 176(1):790-803.
230. Zhang, P; Sun, LL; Qin, J; et al. 2018. cGMP is involved in Zn tolerance through the modulation of auxin redistribution in root tips. ENVIRONMENTAL AND EXPERIMENTAL BOTANY, 147: 22-30.
231. Zhang, QY; Huang, J; Jia, LB; et al. 2018. Miocene *Ulmus* fossil fruits from Southwest China and their evolutionary and biogeographic implications. REVIEW OF PALAEOBOTANY AND PALYNOLOGY, 259: 198-206.
232. Zhang, R; Yi, TS; Pan, B. 2018. *Pseudarthria panii* (Fabaceae: Desmodieae), a new species from Asia, 120 years after its first collection. PHYTOTAXA, 367(3): 265-274.
233. Zhang, WL Gao, JY. 2018. High fruit sets in a rewardless orchid: a case study of obligate agamospermy in *Habenaria*. AUSTRALIAN JOURNAL OF BOTANY, 66(2): 144-151.
234. Zhang, X; Wang, J; Li, J; et al. 2018. CRlncRC: a machine learning-based method for cancer-related long noncoding RNA identification using integrated features. BMC MEDICAL GENOMICS, 11(Suppl 6): 120.
235. Zhao, DK; Shen, Y; Shi, YN; et al. 2018. Probing the transcriptome of *Aconitum carmichaelii* reveals the candidate genes associated with the biosynthesis of the toxic aconitine-type C-19-diterpenoid alkaloids. PHYTOCHEMISTRY, 152: 113-124.
236. Zhao, DK; Shi, YN; Zhu, XY; et al. 2018. Identification of Potential Biomarkers from *Aconitum carmichaelii*, a Traditional Chinese Medicine, Using a Metabolomic Approach. PLANTA MEDICA, 84(6-7):434-441.
237. Zhao, ML; Song, Y; Ni, J; et al. 2018. Comparative chloroplast genomics and phylogenetics of nine *Lindera species* (Lauraceae). SCIENTIFIC REPORTS, 8: 8844.
238. Zhao, ZM; Shen, YX; Shan, ZJ; et al J. 2018. Infiltration Patterns and Ecological Function of Outcrop Runoff in Epikarst Areas of Southern China. VADOSE ZONE JOURNAL, 17(1): UNSP 170197.
239. Zheng, YL; Burns, JH; Liao, ZY; et al. 2018. Species composition, functional and phylogenetic distances correlate with success of invasive *Chromolaena odorata* in an experimental test. ECOLOGY LETTERS, 21(8): 1211-1220.
240. Zhou, RW; Li, WJ; Zhang, YP; et al. 2018. Responses of the carbon storage and sequestration potential of forest vegetation to temperature increases in Yunnan Province, SW China. FORESTS, 9(5): 227.
241. Zhou, SS; Tan, YH; Jin, XH; et al. 2018. *Coelogyne victoria-reginae* (Orchidaceae, Epidendroideae, Arethuseae), a new species from Chin State, Myanmar. PHYTOKEYS, 98: 125-133.
242. Zhou, SS; Tan, YH; Li, R; et al. 2018. *Magnolia kachinensis* (Magnoliaceae), a new species from northern Myanmar. PHYTOTAXA, 375(1): 92-98.
243. Zhou, ZK. 2018. A tribute to my supervisor Professor Zhengyi Wu. PROTEIN & CELL, 9(10): 827-831.
244. Zhu, CH; Fang, Z; Su, TC; et al. 2018. Cellulase immobilized on mesoporous biochar synthesized by ionothermal carbonization of cellulose. CELLULOSE, 25(4): 2473-2485.
245. Zhu, SD; Chen, YJ; Ye, Q; et al. 2018. Leaf turgor loss point is correlated with drought tolerance and leaf carbon economics traits. TREE PHYSIOLOGY, 38(5): 658-663.
246. Zhu, XA; Liu, WJ; Jiang, XJ; et al. 2018. Effects of land-use changes on runoff and sediment yield: Implications for soil conservation and forest management in Xishuangbanna, Southwest China. LAND DEGRADATION & DEVELOPMENT, 29(9): 2962-2974.
247. Zhu, XJ; Guan, YY; Qu, YH; et al. 2018. Elevational divergence in the great tit complex revealed by major hemoglobin genes. CURRENT ZOOLOGY, 64(4): 455-464.
248. Zou, P; Li, RT; Ye, YS; et al. 2018. *Amomum hainanense* (Zingiberaceae), a new species from Hainan, China. NORDIC JOURNAL OF BOTANY, 36(12): UNSP e01735.
249. Zou, YH; Zhao, L; Xu, YK; et al. 2018. Anti-inflammatory sesquiterpenoids from the Traditional Chinese Medicine *Salvia plebeia*: Regulates pro-inflammatory mediators through inhibition of NF-kappa B and Erk1/2 signaling pathways in LPS-induced Raw264.7 cells. JOURNAL OF ETHNOPHARMACOLOGY, 210: 95-106.

**XISHUANGBANNA TROPICAL BOTANICAL GARDEN, CHINESE ACADEMY OF SCIENCES**

Headquarter
Menglun, Mengla
Yunnan 666303, P. R. China
Tel. + 86 691 8715460
Fax. + 86 691 8715070

Kunming Division
88 Xuefu Road, Kunming
Yunnan 650223, P. R. China
Tel. + 86 871 65171169
Fax. + 86 871 65160916

**www.xtbg.cas.cn**

Editor in chief: CHEN Jin
Compiled by: WANG Sidi, HE He, SHI Jipu
Translated by: AI Chongrui, WANG Sidi
Proofed by: Richard CORLETT
Designed by: WANG Sidi, LIANG Peng
Photo: ZHU Renbin, ZHANG Jiaojiao
This doument is available from XTBG's website at
http://english.xtbg.cas.cn/rs/ar_1/