

# Kadoorie Farm & Botanic Garden

ANNUAL REPORT 2012



To harmonise our relationship with the environment

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## **Kadoorie Farm and Botanic Garden Annual Report 2012**

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**Cover photo:** A view of the new Sky Trail in the Upper Nature Reserve area, which takes walkers from the Kadoorie Brothers' Memorial Pavilion through grassland and a forest restoration area to the T.S. Woo Pavilion close to Kwun Yum Shan.



# ABOUT KFBG

Kadoorie Farm and Botanic Garden (KFBG) is situated in the rural New Territories, on the northern slopes of Tai Mo Shan, Hong Kong's highest mountain. Two steep spurs enclose its deep-set valley. Within KFBG are streams, woodlands, orchards, vegetable gardens, walking trails, live animal exhibits, floral exhibits, sustainable agriculture demonstration plots, art exhibits, a wild animal rescue centre, a native tree nursery, and, other conservation and education facilities.

In the post-war years, Hong Kong was flooded with destitute immigrants. Many had traditional knowledge of crop production and livestock farming but no stock, others had land but no experience. They required support to rebuild their lives. In 1951, in response to these pressing human needs Lawrence and Horace Kadoorie established the Kadoorie Agricultural Aid Association (KAAA), which became a key partner of the Hong Kong Government in devising and implementing a plan to help Hong Kong feed itself. The Kadoorie brothers, part of a well-established business family, saw wealth as a sacred trust to benefit mankind. With such aid, thousands of people received agricultural training; thousands of pigs, chickens and ducks were bred and given to farmers or sold to them on credit; thousands received micro-loans; and numerous wells, irrigation channels, roads, footpaths, bridges, pigsties and farm houses were built. The farm site at Pak Ngau Shek was established in 1956 as a base for livestock breeding and distribution, agricultural research, farmers training, public education and recreation. The barren slopes were terraced and planted with orchards and vegetable gardens. The development of the botanic garden began in 1963 and the plant conservation programme from 1972.

On 20<sup>th</sup> January, 1995, the Legislative Council of Hong Kong passed an Ordinance (KFBG Chapter 1156) incorporating KFBG as a non-profit corporation designated as a conservation and education centre. It is a unique public-private partnership, for while the KFBG Corporation is a public organisation, it is privately funded by the Kadoorie Foundation (over HKD 80 million per year); these funds are supplemented by small donations from the public and occasional project-related Government grants that enable us to extend our work.

Since 1995, KFBG has been conducting a wide range of nature education, nature conservation and sustainable living programmes both on-site, and, throughout Hong Kong and South China.

In a time of severe global crisis – including the inter-related issues of widespread disconnection from nature, each other and self; the ever-increasing exploitation of, and unwise over-reliance on the world's dwindling resources to support unsustainable lifestyles; climate change; shrinking of natural habitats and species loss – KFBG, as an organisation, raises awareness, undertakes rigorous science-based species conservation and ecosystem restoration, and offers new ways of thinking and living to respond to the world's problems. Hence, our work brings hope and improvement by focusing on nature conservation, sustainable living and holistic education that re-connects people with nature. By working together with the public, Governments, academia, NGOs and businesses, we can protect our common future.

# MISSION & VISION

## MISSION

To harmonise our relationship with the environment.

## VISION

A world in which people live sustainably with respect for each other and nature.

## VALUES

### Sustainable Living

Appreciating the impact of our actions with regard to current and future generations. Having awareness of our connection with the environment. Valuing simple and responsible lifestyles.

### Justice

Being fair and accountable. Valuing socially equitable systems that protect the health of the planet, the people and their way of life. Protecting future generations.

### Love

Having self-awareness and understanding of the inter-relationship of all things. Having compassion and respect for all life. Recognising that outer discord is a reflection of inner discord. Striving for inner silence.

### Participation

Engaging mentally, physically, emotionally and spiritually; fostering respect for different viewpoints, openness, dialogue and teamwork.

### Professionalism

Being a role model of caring, integrity, commitment, professional standards and best practices for partners, organisations, individuals and communities.

### Learning

Being adaptive and flexible to changing circumstances. Having a holistic outlook. Being practical, objective, creative and insightful.

### Happiness

Appreciating that our happiness lies in creating and sharing happiness with others.

# PREFACE

I praise and thank our wonderful staff team, valuable volunteers, partners, workshop participants and visitors for what we have achieved together in pursuit of harmonizing our collective relationship with the environment.

A world in which people live sustainably, with respect for each other and nature is, perhaps, a distant vision, yet I believe we are making solid progress along a road of discovery towards this highly desirable destination; gaining momentum, friends and collaborators along the way.

I am frequently encouraged and impressed by the robust thinking, planning, commitment, creativity and, above all, passion that the KFBG teams put into the numerous and various programmes. It is the passion that helps us to keep pushing forwards, always positive and joyful.

For me, the highlights of 2012 were the first South East Asian Bioregional Permaculture Convergence, which brought together permaculture practitioners from fifteen countries; the Community Supported Agriculture Symposium, put on with our sister organization PCD; the Community Film Shows which attracted great interest from

members of the public interested in sustainability issues; the visit of Dr Satish Kumar who again gave inspiration and clear insight through his speeches to students, Government officials, business people, parents, children, and others; and of course there were so many heartwarming stories of wild animal rescue and rehabilitation, including sending confiscated Radiated and Ploughshare tortoises overseas to conservation breeding programmes; and so much progress in other areas of nature conservation including the start of the DNA barcoding programme in our Genetics Laboratory; the many thorough and caring letters and reports sent to Government and the Town Planning Board and others, putting the case for protecting ecologically valuable sites against development; and the memorable Fish Sanctuary promotion workshop held in remote Daoyin, Hainan, which I had the pleasure of attending, and which led to the Provincial Government promoting the establishment of “No-Catch Zones” across the island. The Daoyin workshop was a great event because it brought together villagers and officials who cared, it also brought out emotional, traditional singing and dancing to the sound of drums that had been hidden away in the mud houses for decades, and because it brought out tears of joy at the sight in the river of healthy fish, that had long been locally extinct through overfishing.

**Andy Brown**

*Executive Director*

# SUSTAINABLE LIVING

**KFBG** continues to play an active role in the community, raising awareness of a wide range of pressing sustainable living issues through a lively programme of film shows, lectures and workshops. On-site, permaculture was a prominent theme of our activities in 2012, including expanding the permaculture practices used in our regular agricultural production, running our newly-developed Permaculture Design Certificate course and enhancing our demonstration farm. The year culminated in our hosting of an international Permaculture Convergence and Festival. We also initiated a trial aquaponics scheme.

## Raising public awareness for sustainable living

During 2012, a diverse range of events and activities aimed at raising community awareness of issues such as Peak Oil and transition to low-carbon living was organised by KFBG's **Sustainable Living and Agriculture Department (SLA)**. Our **Community Film Festival** spread these messages through film shows at district-level venues across the territory, while MBA students at The Chinese University of Hong Kong were lectured on the subject by KFBG's Andy Brown.

The highly successful **Lifestyle of Health and Sustainability** programme, **LOHAS@2030**, was wound up in mid-February, after receiving more than 20,000 visitors to its exhibition at the Peak Galleria, and, 260 people participated in the various workshops. Our dedicated staff and volunteers helped to introduce permaculture concepts and practices to more than 3,000 visitors during the two-day **Permaculture Festival** at KFBG in November 2012.



LOHAS@2030 exhibition at the Peak Galleria.



An artist using traditional puppetry to interact with participants of the Permaculture Festival.

**AWARENESS-RAISING EXHIBITIONS ORGANISED IN 2012:**

TITLE	PERIOD	VENUE	VISITOR FLOW (estimated)
LOHAS@2030 Exhibition	1 Dec 2011 – 14 Feb 2012	Hong Kong Gallery, Peak Galleria	>20,000

**CARNIVALS AND/OR PUBLIC EVENTS ORGANISED IN 2012:**

EVENT	NUMBER OF DAYS	VENUE	NUMBER OF PARTICIPANTS
Community Film Festival (including pilot programme in March)	16	Multiple venues in various districts	>620
Permaculture Festival	2	KFBG	3,069



Participants of the Permaculture Design Certificate Course 2012 setting-up a swale (irrigation channel) at the 'One Dou' Farm as part of their learning experience.



A swale created at the 'One Dou' Farm to enhance water retention for irrigation of the farmland.

In the Lower Farm, the educational vegetable terraces were re-designed to create a demonstration plot in which food production is conducted according to permaculture principles and named the **'One Dou' Farm**, after a traditional way of measuring the size of a farm (one 'dou' being equivalent to an area of 675 square metres). This working display was formally opened to visitors in December 2012.

The **One Tonne Challenge** website ([www.climatechange.hk](http://www.climatechange.hk)) continued to garner pledges of carbon dioxide reduction from members of the public. By the end of the year, it had received more than 840,000 hits with more than 27,000 registered users (up 35% on the previous year), and a cumulative total of pledged carbon dioxide reduction of 91,000 tonnes, up from 71,000 tonnes at the start of the year. Meanwhile, the [www.lowcarbonliving.hk](http://www.lowcarbonliving.hk) website, of which KFBG is a project partner, received more than 11,000 hits in 2012.

## Re-skilling for sustainable living

Our on-going programme of re-skilling courses for existing and new farmers was conducted throughout the year, aimed at encouraging the transition to low-carbon living. A new one-day course on 'Planting Vegetables In Season' was introduced to the programme in 2012, attracting 32 participants in its inaugural run. The **Permaculture Design Certificate** (PDC) Course was closely integrated with the development of the 'One Dou' Farm.

### SUSTAINABLE FARMING COURSES ORGANISED IN 2012:

COURSE TITLE	DATE	NUMBER OF COURSES	VENUE	NUMBER OF PARTICIPANTS
Planting Vegetables in Season (one-day course)	14 Jan	1	KFBG	32
3-day Sustainable Agriculture Course for City Farmers	Mar – May	1	KFBG	21
13-day Permaculture Design Certificate Course	Apr – Jun	1	KFBG	28
Community Farming (one-day course)	Feb – Oct	3	KFBG	61

### PUBLIC WORKSHOPS AND TALKS ORGANISED IN 2012:

EVENT	DATE (AND NUMBER OF WORKSHOPS)	VENUE OR ORGANISATION	NUMBER OF PARTICIPANTS (estimated)
LOHAS@2030	1 Dec 2011 – 15 Feb 2012 (33)	Hong Kong Gallery, Peak Galleria	260
LOHAS Square	15 Jan – 16 Dec (10)	Central Star Ferry Pier	305
growFOOD@HOME workshop	4 Feb (1) 24 Feb (1)	Yan Oi Tong (Tuen Mun) Swire Properties Ltd	100 50
Low-carbon diet talk	21 Feb (1) 6 May (1)	Tuen Mun Hospital Ngau Tau Kok Public Library	30 15
LOWcarbonDIET@HOME workshop	Mar – Sep (4)	At KFBG or various venues provided by participating organisations for staff training or public participation	137
Low-carbon living talk	22 Apr (1)	Catholic Messengers of Green Consciousness	40



Low Carbon Cookery Workshop for Hong Kong Polytechnic University Alumni.

The pilot **Drama in Education for Sustainable Living** programme, inaugurated for primary school children in May 2011, was extended into March 2012. A series of 38 student workshops and one teacher workshop promoted sustainable living through process theatre, a lively drama technique. This successful programme was organised as a collaborative project with a local artistic organisation, Mandu's Shed of Creation.

## Facilities supporting sustainable living

The new vegetable plots in the 'One Dou' Farm provide a living, working demonstration of sound husbandry using permaculture principles. The farm provides a valuable facility for the general public to learn more about the practical aspects of sustainable farming.

Throughout 2012, we worked closely with the Tai Po Old Market Public School (Plover Cove) and the Salvation Army Tai Po Multi-service Centre for Senior Citizens to establish a **community farm** at a short-term tenancy piece of land in Tai Po. SLA staff provided design and training inputs to the scheme, which is aimed at students and elderly residents, and, was opened in October 2012. We have also been providing advice and training to Macau's Civic and Municipal Affairs Bureau in developing Macau's first community farm at a 5,400 square metre site on Coloane Island.

The regular Sunday **Farmers' Market@Central** continued to thrive and spread its message of mutual support between local farmers and consumers. Average sales for the 12 actively participating farmers was around HK\$2,100 for each farmer per market day. There were 51 market-days in 2012.

From January to March 2012, we resumed our **Winter Farmers' Market @ KFBG** programme to enable local organic farmers to sell their produce directly to people visiting KFBG on each Saturday, during the peak vegetable harvest period.

A diverse variety of informative and fun-filled events was organised at **LOHAS Square** at the Central Star Ferry Pier throughout the year. These events were enjoyed by thousands of citizens.



Students, the elderly and volunteers working together to create an organic community farm at Tai Po.



The KFBG Farmer's Market @ Central.

Participants of the Community-Supported Agriculture Symposium.



A group photograph of the graduates of the 2<sup>nd</sup> KFBG Permaculture Teacher Training Course.



Over 90 permaculturists from south-east Asia attended the first 'Bioregional Permaculture Convergence' in Hong Kong.

## Mobilising the community

Our far-reaching commitment to advancing the capacity of community organisations and building partnerships for sustainable living was maintained and further diversified. See **Appendix 1** for a full list of activities in 2012.

The new Permaculture Design Certificate (PDC) course was run over 13 successive Sundays from April to June 2012, and attended by 28 participants from diverse backgrounds including publishers, social workers, architects and farmers. Graduates of the course were put to immediate good use, helping to run the 'One Dou' Farm and passing on their valuable experience to visiting members of the public. In October, our three-day **Community-Supported Agriculture Symposium** brought together 144 participants from Hong Kong, mainland China and Taiwan for knowledge-sharing sessions, presentations and site visits. In order to plant a seed for even further local and regional capacity-building, we organised Hong Kong and mainland China's first ever **permaculture teacher training courses**, with consultant Rosemary Morrow, in November 2012. The two courses were attended by 33 students from across Asia. Our efforts culminated in the organisation of the first **South-East Asian Bioregional Permaculture Convergence**, also in November, at the Kadoorie Centre in Shek Kong. This remarkable event was supported by a wide range of like-minded organisations from around the region and featured some 24 sessions of presentations, open-space discussions and workshops attended by 90 local and overseas enthusiasts.

### Opening Ceremony of the Hong Lok Yuen Food Waste Recycling Project.



A community newsletter published for awareness-raising under the WasteReduction@TaiPo project.

We made great strides in galvanising the local Tai Po community in 2012, with a series of projects and initiatives launched in September 2012. At Hong Lok Yuen, the first of ten Environmental Protection Department (EPD)-funded pilot projects on **Food Waste Recycling at Housing Estates** commenced with the active support of our SLA Department. We aim to encourage residents to grow food organically at home, utilising their recovered 'waste' resources and minimising the transport component of the carbon footprint of their food consumption. We also received generous funding of HK\$208,818 from the Tai Po District Council (TPDC) for two further initiatives: The **WasteReduction@TaiPo** project is being jointly developed with TPDC and will raise community awareness of green consumption and food waste recovery in the district, through community tours and workshops backed up by production of newsletters and green maps. Another project, **Tai Po Treasures**, jointly organised with the TPDC, Tai Po Public Library and the Tai Po Environmental Association (TPEA), set out to inform Tai Po residents about the ecological, historical, cultural, architectural and environmental features of their local town and its surrounding environment. The project ran until December 2012 and included talks, themed tours and a photography competition, calendar and exhibition.

## The Green Hub

Complex negotiations and consultations on the detailed design and tendering arrangements for the conversion of the Old Tai Po Police Station into a **Green Hub for Sustainable Living** continued throughout the year. We gained approval in January 2012 for the general buildings plan and the fire services plan from the Buildings Department and Fire Services Department, respectively. A consultation meeting was then held with the Legislative Council's Public Services and Works Committee in February and its support for the project was obtained in April. The detailed design was eventually completed by September and tendering undertaken in October. However, the initial bids were considerably over-budget and we actively explored cost-saving measures. The Green Hub will eventually provide a focus for our community-based projects in Tai Po and will also be an ideal venue for running workshops and permaculture courses.



A workshop organized for Tai Po residents to 'rescue' food at wet markets from being thrown away.

## Working demonstrations of sustainability

IN 2012, THE FOLLOWING AGRICULTURAL PRODUCTS WERE PRODUCED AT KFBG:

TYPE OF PRODUCE	EGGS	FRUIT (kg)	VEGETABLES (kg)	HONEY (litres)	GREEN TEA (kg)	CHRYSANTHEMUM (kg)	ROSELLE (kg)	FRUIT TREE SEEDLINGS	POTTED PLANTS	COMPOST (kg)
Yield	176,120	8,653	25,213	98	31	25	70	126	1,989	58,920

The passage of Typhoon Vicente in late July caused significant losses in farm production.

We continued to make excellent use of our **bio-charcoal-making kiln**, installed in late 2010, to effectively re-cycle our wood waste. Some 4.1 tonnes of woody waste material was fed into the kiln over the course of the year, yielding  $\frac{3}{4}$  tonne of useful bio-charcoal – a 25% increase over 2011 – and more than 500 litres of wood vinegar by-product, which can be used as an organic fungicide. The process generated much interest and was featured in a cover story by *Ming Pao Weekly*. Our bio-charcoal and wood vinegar were promoted and sold during the Permaculture Festival in November 2012.



Our bio-charcoal-making kiln.

KFBG's agricultural practices provide a working model of sustainable agriculture, particularly with the establishment of the 'One Dou' Farm. Another ground-breaking innovation at KFBG, this year, was the establishment of a trial **aquaponics system**. The objective is to combine fish production with vegetable cultivation for food production with minimal water consumption and a high organic resource recovery. The system was stocked with fingerlings and seedlings in August. Future trials will establish the optimal combinations of types of crops to be grown and fish stocking density. In parallel with the new aquaponics system, and as a means of increasing self-sufficiency, we also began trials on the use of black soldier-flies in converting food waste into fish feed in the form of fly larvae. Another new initiative was the set-up of a vertical planting unit at the piggery in October, as part of a collaborative study – the **Vertical Greening Challenge** – with Green Warrior Permaculture. The objective is to assess the feasibility of a low cost "Do-It-Yourself" model using a vertical frame for growing food in Hong Kong.



An aquaponics trial system was set up in August 2012 at KFBG.

Genetically-modified (GM) crops are an anathema to the organic farmer and we played an active role in our collaborative **Non-GM Papaya Zone** pilot project, in tandem with our project partners Produce Green Foundation, O-farm and the TPEA, with support from the Heung Yee Kuk (a statutory advisory body representing the established indigenous villages' interests in the New Territories). The scheme started in 2012, and involves farmers, and, small stake-holders in the villages of Hok Tau and Sze Tau Leng in Fanling, and, San Uk Tsai and Fung Yuen in Tai Po, who were encouraged to plant non-GM papaya seedlings supplied by KFBG in place of trees of unknown GM provenance. A baseline survey that was conducted in 2011 indicated an alarmingly high prevalence of GM-contaminated papaya trees in the four villages – as much as 90% – in samples of the original papaya plants (collected in two of the participating villages) that were sent for laboratory analysis. The project is scheduled to continue for another two years and will, hopefully, result in the systematic eradication of GM papaya from the gardens and fields of the four participating villages.



A “No-Dig mulched” vegetable plot (left of photograph) shows much better crop growth compared to a vegetable plot that has been tilled in the traditional way (right of photograph). The field demonstration experiment is in a village in Sichuan.



Our HeChuRen partner showing soil aggregate test. On her right hand is a rich soil mixture from a one-year “No-Dig” vegetable plot. On her left hand is a soil mix showing a lack of organic material to bind the soil particles together. This is from a plot tilled the conventional way. This type of soil is prone to erosion.



In the rice-duck technology promoted to farmers in Guangxi, the ducks do the weeding, pest control of insects, aeration and fertilization of the soil in the rice fields.

Under the mainland China **Sustainable Agriculture Pioneers (SAP)** programme, three new projects were approved for funding in 2012, on the themes of rice-duck technology and organic rice tillage.

#### SCIENTIFIC PROJECTS RECEIVING FUNDING SUPPORT (IN 2012) UNDER THE SAP SCHEME:

NAME OF SCIENTIST/FARMER	AFFILIATION	RESEARCH TOPIC	PROJECT TIMEFRAME
Fang Yuan	Agriculture College of Guangxi University	Extension of the Rice-Duck Technology and Trial of Silicon Application on Methane Reduction in Paddy Field	2 years
Chen Yun	Chongqing Health Culture Revival (HCR)	Promotion of no-tillage farming	2 years
Lu Shihua	Sichuan Academy of Agriculture	Applied research in conservation tillage in organic rice production	1 year

Building on a highly successful SAP project in 2010-2011, Professor Lu Shihua of the Sichuan Academy of Agriculture has found that the best results for organic rice production are achieved through a combination of no-tillage with mulch from rape oilseed residue and covering of the rice-fields with plastic film. For the succeeding crop, a combination of no-tillage with rice straw mulch had the highest yield for rape oilseed production. Farmers in the Sichuan village where Professor Lu has been conducting his research projects have been highly impressed with his results and have begun to adopt a no-tillage method in their own fields cultivating rape oilseed crop.

# HOLISTIC EDUCATION

*In 2012 we continued to offer a varied programme of innovative and thought-provoking learning opportunities for visitors, workshop and talk participants, and students and teachers; both on-site and in the community. Visitors were able to enjoy a revamped and revitalised Amphibian and Reptile House, and added colour in the gardens with the addition of orchids to many trees. Towards the end of the year, we were privileged to host talks by distinguished visitors such as Dr Satish Kumar (a renowned educator, writer and co-founder of Schumacher College in Devon, UK), Arjan Sulak Sivaraksa (a leading Thai thinker and educator) and Dame Jane Goodall.*



An "ice breaking" game in the KFBG Plaza for participants of the "Happy Hours with Plants" programme.



Participants taking a look at the wonders of the forest in the Woodland Trail at KFBG.



A participant learning how to propagate Patchouli by taking a stem cutting in the "Happy Hours with Plants" programme.

## Themed Programmes

Children are naturally the focus of many of our educational programmes. Children living in the city, in particular, are often deprived of opportunities to experience the natural world in an outdoor setting, and we provide rich learning experiences of plants and animals at KFBG. This is exemplified by two very popular school programmes: **Happy Hours with Plants**, and the **World of Bats**. In the former, we seek to introduce school children to the pleasures of the plant world through a range of interactive activities such as a nature walk along the Woodland Trail, practical gardening experience, paper-making and handicrafts. Staff of the Education Department organised six sessions of the programme in 2012, for a total of 202 school children. We also ran the programme for a group of 35 youths from the Hong Kong Federation of Youth Groups. The World of Bats programme gives school children a chance to get up close and personal with these fascinating creatures, in the process learning about their importance to humans and in nature. This programme was run on 11 occasions in 2012, attended by a total of 635 school children.



Participants learning about the ecology of bats during the "Bat Safari in Guia Hill (Macau)" in June 2012.

Our **In Touch with Nature** summer camp was held from 26<sup>th</sup> to 31<sup>st</sup> May, 2012. Participants explored various themes including scientific field studies, experiential art, group sharing, games, sustainable lifestyles and self-reflection. On the last night, they took part in an exciting night walk in the KFBG estate during which they came face-to-face with bats, frogs, wild pigs and porcupines.

We are often asked to provide bespoke educational tours and programmes for public and private organisations, and this year was no exception. A special **Nature Walk for Macau Citizens in KFBG** was held on 23<sup>rd</sup> June, 2012. Some 50 Government Officers from the Macau Civic and Municipal Affairs Bureau and members of the Macau public were given an opportunity to learn about the ecological value and roles of native plants and animals. The packed programme included a guided walk, art and craft exercises, an eye-opening night encounter with wildlife and, by special invitation, an informative account of the ecological role of beetles in Hong Kong from the Agriculture, Fisheries and Conservation Department's (AFCD) beetle survey team. Another tailor-made programme entitled **A Day of Exploring the Interconnection with Nature** arose when a teacher at the Hong Kong Institute of Education made a special request. She had been inspired by attending Satish Kumar's 2011 talks on 'Holistic Education' and 'The Future of Food' (see videos of these talks on You Tube and the transcripts on our website) and wanted her students to benefit from KFBG's educational resources during their intensive summer camp. We duly designed a programme that included sessions on holistic education, animal encounters and food ecology. This is now available to other groups.



Students touching a python in "A Day of Exploring the Interconnection with Nature" on 5<sup>th</sup> June, 2012.

In March 2012, we put our experience of turtle conservation to good use during the **Macau Green Week**, at the invitation of the Macau Civic and Municipal Affairs Bureau. More than 1,000 Macau citizens visited our booth to learn about turtle conservation issues through a variety of interactive activities, games and close-contact encounters with live turtles. At the end of the week, we conducted a seminar and workshop, **Wisdom in a Shell**, for 140 members of the public at the Macau Cultural Centre. The participants were guided through the powerful symbolism of turtles in Chinese culture, their use in Traditional Chinese Medicine (TCM) and the current conservation crisis that is faced by turtles in the wild. Hopefully, events such as this will help to revive the once deeply embedded respect for turtles amongst the Chinese people.



More than 1,000 members of the public visited the KFBG display on turtle conservation during the Macau Green Week (March 2012).



KFBG organised a seminar and workshop, "Wisdom in a Shell", for members of the public at the Macau Cultural Centre in March 2012.



A volunteer explaining the features of a tortoise to members of the public in Macau.



Newly upgraded display panels and live animal exhibits in the Amphibian and Reptile House.



Chinese Alligator at the Wildlife Walkthrough Upper Pond in KFBG.



A Big-headed Turtle in the Streamlife Display at KFBG.



A Leopard Cat in the newly renovated Native Mammal Display at KFBG.

## Changes in exhibits

The permanent educational displays at KFBG are constantly evolving to meet new circumstances and to place emphasis on different themes. **The Amphibian and Reptile House** re-opened on 7<sup>th</sup> March after a thorough overhaul of its displays. These now feature Tokay Geckos, Chinese Water Dragons and a wide range of interesting native herpetofauna including Hong Kong Newts and Golden Coin Turtles with newly up-graded interpretative signs and display panels.

The devastating and completely unsustainable trade in wild animals was the theme for a new exhibit which opened in May 2012 at the **Reptile Lookout** where visitors were also able to see our two Rhinoceros Iguanas, newly re-housed after they outgrew their previous home at the **Sun Garden Animal Exhibit**.

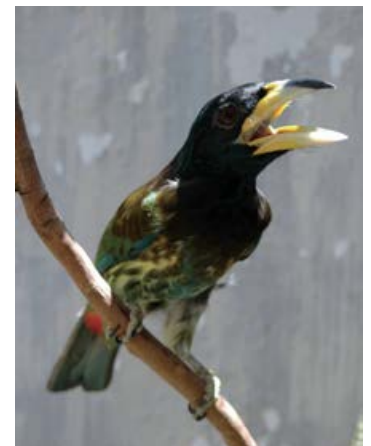
Their eventual replacements at the latter display area were a Green Tree Monitor and a juvenile Clouded Monitor both of which had been found as strays and brought to KFBG by the Hong Kong Police. The

Chinese Alligator previously housed at the Reptile Lookout was moved to a new display at the **Wildlife Walkthrough Upper Pond**, along with three Yellow-headed Temple-turtles. Meanwhile, a juvenile Big-headed Terrapin, confiscated from a local trader, was given a home at a new display in the **Streamlife Display** house in November 2012.



Two Rhinoceros Iguanas on display at the Reptile Lookout in KFBG.

Among other animal exhibits, the **Parrot Sanctuary** received an unusual new guest in June 2012, when a Great Barbet that had come through our Wild Animal Rescue Centre (WARC) was put in among the Eclectus Parrots and Blue-Fronted Amazons. This handsome bird requires a large enclosure and is perfectly compatible with the parrots. Nearby, the **Leopard Cat display** was re-opened for public viewing on 14<sup>th</sup> August, 2012 after extensive landscaping of the interior space.



A hand-raised Great Barbet in the Parrot Sanctuary at KFBG.



A tapestry of beautiful orchids inside the Orchid Greenhouse



Orchids planted on the branches of a Camphor Tree beside the Plaza in KFBG.



Orchids used for 'greening' vertical stone walls of the slope works near the Kwun Yum Garden.

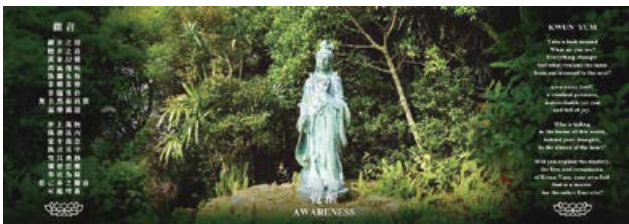
Our latest collection of orchids from Thailand flowered spectacularly during the spring and summer months of 2012. The beautiful blooms were on fulsome display in the **Orchid Greenhouse**. Elsewhere, more than 100 newly planted orchids provided adornment to trees in the **Plaza** and to the walls of the newly constructed slope below the **Kwun Yum Garden**. Further beautification using a variety of attractive plants was carried out at these areas as well as at the Plants & Us Greenhouse, the Walter Kerr Memorial Gardens, the Gurkha Garden, Butterfly Garden, Cascade Garden, Fauna displays and places in the Upper Farm. Our productive **Landscape Nursery** provided more than 4,324 potted plants to make these re-plantings possible.



Bird-nest Ferns raised in our Landscape Nursery were used to decorate the walls behind the statue of Sir Horace Kadoorie in the Plaza.

Re-vamped displays naturally require new or up-graded signs and information panels, so our creative design staff were kept occupied throughout the year. In addition to numerous new temporary signs scattered at exhibits across KFBG, various permanent panels were erected or made ready for installation. These included new location signs or informative signs at Monkey Haven, Reptile Lookout, the Plaza and Sun Garden Cafe. A

comprehensive up-grade and re-design of information panels in the **Insect House** is on-going. We take pains to ensure that our fixed signage is stylistically distinctive and in keeping with the heritage of KFBG.



New information panels about the work of KFBG in the Reception area.



A comprehensive up-grade of the features and re-design of information panels in the Insect House.



A talk about raptors presented to the general public during the Animal Encounters programme.



A talk about mules being given to secondary school students at the Mule Stables.



A young girl has a close encounter with a Ball Python during the Animal Encounters programme.

## Visitor activities

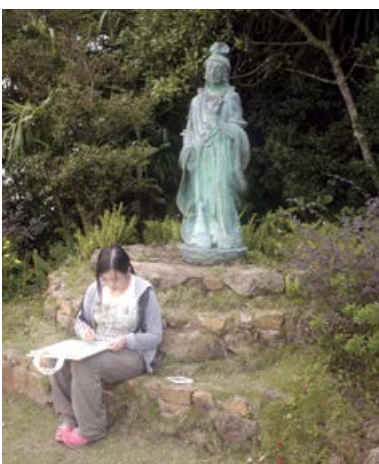
A significant number of visitors to KFBG choose to join our guided tours which are a great way to make the most of a visit and learn about the important and often unique work which is conducted on our hillside. Some 4,472 visitors joined 126 organised tours in 2012 (from a total of 155,623 visitors). Tour participants were able to meet and interact with our knowledgeable staff while exploring the many and varied exhibits and gardens. Our **Animal Keeper Talks** for school children and adults were also very well attended: a total of 104 such talks were given by our animal keepers to 2,975 individuals. More formal visits by groups or individuals representing tertiary institutions, government departments or community organisations were a regular occurrence. A total of 41 special visits involving 767 individuals, were made in 2012, with the purpose of professional knowledge exchange.

The **Animal Encounters** programme, initially held on the first Sunday of every month, was doubled in frequency from April onwards to the first and third Sundays of each month. These were led by Animal Keepers assisted by trained volunteers, and focused on pythons, mules, raptors and native mammals. They were popular Sunday events for our visitors occasionally attracting an audience in excess of 100 people. Our animal **Discovery Table** displaying confiscated bird, reptile and mammal specimens were set up near the Kwun Yum Garden on several Sundays during the year. Both events provide visitors with a valuable educational experience helping to raise their awareness of animal conservation issues.

Outdoor activities are an integral part of the experience of visiting KFBG and we aim to make such activities as diverse and enriching as possible. We provided a contemplative experience for visitors: **Solo in the Trees**. This programme encourages participants to explore the value of silent reflection in nature. Participants spend a period of tranquillity



KFBG volunteers introducing mammal and reptile specimens to visitors at the Discovery Tables.



A participant drawing her 'Insight of the Day' during the "Solo in the Trees" programme.



Students using simple musical instruments to express their feelings during the "Solo in the Trees" programme.



Participants of the "Solo in the Trees" programme enjoying the views of the sunset on Kwun Yum Shan.

at Orchid Haven and also enjoy a close-contact encounter with our mules and raptors. A new walking path, the **Sky Trail**, was developed in 2012. The sign-posts, fashioned from re-cycled pine tree trunks, were erected in planters near the Kadoorie Brothers' Memorial Pavilion and the T.S. Woo Memorial Pavilion towards the end of the year. The new trail will give visitors a spectacular lofty view of KFBG's environs and the surrounding hills. For those with an interest in seeing some of Hong Kong's elusive nocturnal fauna, the **Night Safari** programme was run on six occasions in 2012, between April and November. These nocturnal events were attended by 166 individuals.

Arts and crafts are a powerful medium through which individuals can connect with the natural world. We continue to encourage children to experience nature in this creative and rewarding way. More than 9,000 school children joined our activities at the **Kwun Yum Garden** Art and Environment Workshop in 2012, making a range of articles using natural resources such as pressed flower bookmarks, herbal bags, pine cone handicrafts and *Pandanus* windmills. The creative atmosphere at Kwun Yum Garden was boosted this year by the veteran orchidologist and talented botanical artist, **Mark Isaac-Williams**, who has established a 'studio' in the Kwun Yum Garden 'gallery'. Visitors are welcome and are able to chat with Mark about botanical art as he works on the beautiful orchid illustrations for the KFBG botanical art collection.



A new walking path, the Sky Trail, between the Kadoorie Brothers' Memorial Pavilion and the T.S. Woo Pavilion was developed in 2012.



Participants observing frogs at the Lily Pond during a Night Safari programme.



More than 9,000 school children joined our activities at the Kwun Yum Garden "Art and Environment" Workshop in 2012.



Mark Isaac-Williams drawing orchids at the public 'studio' in the Kwun Yum Garden.

## KFBG in the Media



KFBG staff were regularly interviewed by the media on sustainable living.

The news media took a lively interest in KFBG's range of activities throughout the year. Some 172 local newspaper and 12 magazine articles related to KFBG were published, and 11 television and radio interviews were conducted. To give a few examples, our staff were interviewed by *Sing Tao* on sustainable living issues; *Teen*

*Power* and *RTHK* on the state of agriculture in Hong Kong; *Ming Pao* on low-carbon living and bio-charcoal; *Scarecrow* magazine on the Non-GM Papaya Pilot Zone project and Hong Kong's exotic tree plantations; *U-Magazine* on soil conservation, and *Ta Kung Pao* on the Green Hub (KFBG's future additional programme site at the Old Tai Po Police Station).

Articles by John Fellowes, our consultant ('Not for trade' – on our attitude to the wildlife trade) and Andrew McAulay, Chairperson of KFBG ('A little-known jewel' – on KFBG itself) were published in the May/June 2012 issue of *Resurgence* magazine.

*The Wild Orchids of Hong Kong* by the late Gloria D'Almada Barretto, MBE, VMM, Dr Phillip Cribb and Dr Stephan Gale, published in November 2011 received excellent reviews in *Biodiversity Science* (20: 323. 2012) and *Gardens' Bulletin Singapore* (64: 273-275. 2012). KFBG's Stephan Gale is currently in discussions with Phillip Cribb, formerly of Royal Botanic Gardens, Kew, on the production of a field guide to the native Hong Kong orchids based on the information published in *The Wild Orchids of Hong Kong* book.

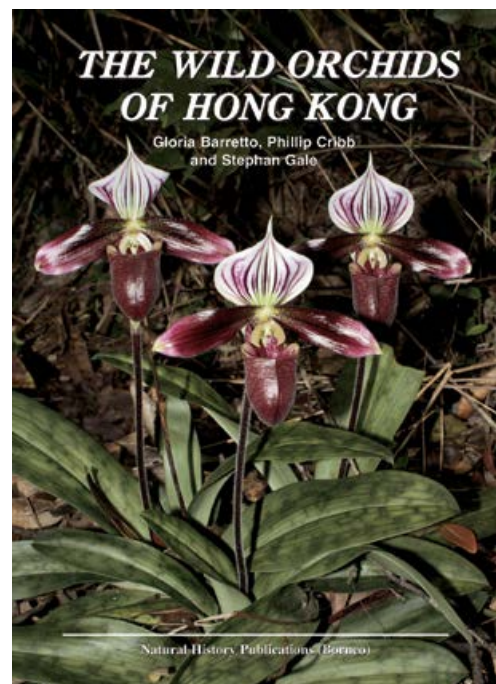
News, information and reports were frequently uploaded to the KFBG website during 2012 to keep the public up-to-date with our short- and long-term activities and projects. Our Facebook page, established in mid-2011 was a popular means of garnering current KFBG information. In 2012, 189 posts had reached a total of 179,667 people. Our new website was under development and should be launched in 2013.



In 2012, our Facebook page reached a total of 179,667 people.



Our staff were interviewed by *Ming Pao* on low-carbon living.



*The Wild Orchids of Hong Kong* book received excellent reviews in prestigious journals.

## Transformative Workshops

Following the success of our inaugural **Mindfulness in Nature** events in 2011, the one-day programme was conducted four times in 2012, for four groups of school teachers and Form Six students. Participants in this activity are facilitated towards being “at one with nature”, using the whole range of senses to appreciate the natural world and our profound relationship with it, in the peace and tranquillity of KFBG. Once we realize that we are nature, we work hard to protect nature; it is heartening that many schools in Hong Kong are offering the exploration of this insight to their students. In addition to ‘walking mindfully in nature’, some participants were engaged in a Food Ecology session, discussing the ways in which our daily food choices affect the well-being of ourselves, society, the wider economy and the Earth itself.

This educational programme is valuable not only to schools but to the wider community: we held a special workshop in October 2012 for ten members of the Diocesan Building & Development Commission.

Our **Little Fish Workshop – a half-day of silence in nature**, which was initiated in 2011, grew in popularity during 2012. It was run eight times during the cooler months of the year with a total attendance count of 91 (including some participants who joined the workshop more than once). This is our elementary-level transformative workshop aimed at helping people begin to learn how to connect with nature on a deeper, more profound level. We are now developing and expanding this programme into a progressive, three-stage series, **Little Fish, Dragon and an advanced programme**. The intermediate level in the series was piloted in February 2012, with 13 participants including one member of KFBG staff. This **Dragon Workshop** comprised a near full-day of silence in nature. We used the participant feedback from this exercise to fine-tune the Dragon Workshop programme, and its second running for a group of teachers and researchers from the Psychology Department of The University of Hong Kong was conducted later in the year. This is an evolving process and the structure of the final level in the series, the advanced workshop, has yet to be developed.



Visitors in the “Plant and Us” Greenhouse in “A Day of Mindfulness in Nature” programme on 12<sup>th</sup> November, 2012.



Sharing Session in the “Little Fish” Workshop on 13<sup>th</sup> October, 2012.



Walking to the summit of Kwun Yum Shan in the “Little Fish” Workshop, at sunset, on 8<sup>th</sup> December, 2012.



Stretching exercises in the “Little Fish” Workshop on 8<sup>th</sup> December, 2012.



Jane Goodall gave an inspiring talk to our staff and Friends of KFBG on 27<sup>th</sup> October, 2012.



Sulak Sivaraksa, who works to promote justice, peace, democracy and sustainable livelihoods gave a talk to KFBG staff and friends on 2<sup>nd</sup> November, 2012.

Dame Jane Goodall visited KFBG, and, shared her insights and experiences of being an ambassador for nature conservation in an inspiring and entertaining afternoon talk given to our staff and Friends of KFBG on 27<sup>th</sup> October, 2012.

**The Wisdom of Sustainability**, a special talk by Sulak Sivaraksa was organised on 2<sup>nd</sup> November, 2012. He is a teacher, scholar, publisher, founder of many organisations and the author of more than a hundred books and monographs in both Thai and English. He works to promote justice, peace, democracy and sustainable livelihoods. About 50 staff and friends attended the talk held at the Sky Room of the Conservation Building at KFBG.

Julie Richardson, the co-director of the Economics for Transition [to low carbon-living] programme at Schumacher College in England, visited KFBG from 24<sup>th</sup> to 27<sup>th</sup> November, 2012. Julie gave a talk to KFBG staff and some close friends on **Resilient Economics – Learning from Ecology** on 26<sup>th</sup> November, 2012 at KFBG.



"Resilient Economics – Learning from Ecology" a talk given by Julie Richardson at the Sky Room, KFBG on 26<sup>th</sup> November, 2012.



"Holistic Economics – How to Maximise your True Wealth" – a Public Talk given by Dr Satish Kumar at the Hong Kong Science Museum on 3<sup>rd</sup> December, 2012.

Dr Satish Kumar, the co-founder of Schumacher College, visited KFBG in December 2012. The KFBG Holistic Education team arranged a public talk with Satish at the Hong Kong Science Museum on 3<sup>rd</sup> December, 2012. The talk was about **Holistic Economics – How to Maximise Your True Wealth** and was attended by 210 people. After the public talk, a one-day workshop **Ecology and Economy – Prosperity Without Growth** led by Satish, with guest speakers Lam Chiu Ying and Chandran Nair was conducted at The University of Hong Kong Kadoorie Centre at Shek Kong on 4<sup>th</sup> December. It offered participants an opportunity to closely interact with the three speakers and explore possible ways to bring prosperity and well-being without harming the ecosystem on which all systems are dependent. About 50 participants from the Mainland, Hong Kong and Australia attended the workshop. A series of talks was also given by Satish to a wide range of audiences which were co-organised with the Green Connections group of The City University of Hong Kong, the Hong Kong General Chamber of Commerce, the Business Environment Council, the Royal Geographical Society and the Chinese International School from 2<sup>nd</sup> to 7<sup>th</sup> December, 2012. His talks were well received by all participants.



A group photograph taken at the Public Workshop on "Ecology and Economy – Prosperity Without Growth" on 4<sup>th</sup> December, 2012.

Dr Claire Elouard from Sukh Bhumi, India conducted two five-day workshops for KFBG staff, members of the Hong Kong public and external participants from mainland China and Taiwan on the relationship between people and nature in December 2012.



Participant of the "Energy of Nature" workshop presenting the characteristics of her "favourite" tree (December 2012).



An outdoor presentation of the relationship between plants and the environment by Dr Claire Elouard during the "Energy of Nature" Workshop in December 2012.

# NATURE CONSERVATION

**2012** was a busy year for the Fauna and Flora Conservation Departments, and, for the Kadoorie Conservation China Department. Radiated and Ploughshare Tortoises were sent to overseas conservation breeding programmes from our Wild Animal Rescue Centre, and many confiscated animals were repatriated to the Philippines. A DNA bar-coding system and wildlife forensics were developed in our Conservation Genetics Laboratory, and we initiated a major field study of the Hong Kong Long-eared Dog Orchid. Thousands of native trees were provided to ecological restoration programmes and two forest restoration monitoring programmes were launched in Hong Kong. In Hainan, a Fish Sanctuary promotion workshop led to the Provincial Government considering establishing No-Fishing Zones across the island, and a Hainan Gibbon awareness-raising event was run in two local townships. The work of the Ecological Advisory Programme became busier as closer links with other NGOs made environmental monitoring more effective across the Hong Kong countryside.



Seven Madagascar Radiated Tortoises in their temporary enclosure at KFBG.

## Managing species and populations

Critically endangered (CE) tortoises and turtles were prominent in the **Fauna Conservation Department** activities in 2012, and we have been actively supporting global conservation breeding efforts for several species. On 15<sup>th</sup> February, seven Madagascan **Radiated Tortoises** (*Astrochelys radiata*) were sent to Mogo Zoo, New South Wales, Australia. Eight Madagascan **Ploughshare Tortoises** (*Astrochelys yniphora*) – possibly the world's rarest tortoise – were sent to Atlanta Zoo, Georgia on 13<sup>th</sup> March. A few months later, we sent another five of these tortoises to the Durrell Wildlife Conservation Trust in Jersey (UK), four more to Rotterdam Zoo (Netherlands) and four were sent to be housed in Chester Zoo (UK). On 19<sup>th</sup> April, 21 **Vietnamese Golden Coin Turtles** (*Cuora cyclornata*) were re-located to Munster Zoo in Germany under a



A Ploughshare Tortoise after its arrival at Atlanta Zoo, Georgia.



Packing Vietnamese Golden Coin Turtles into special live animal boxes for shipment to Munster's Allwetter Zoo in Germany.



The shipment of Vietnamese Golden Coin Turtles being held by zoo staff on arrival at Munster's Allwetter Zoo in Germany.

breeding-loan agreement to boost the conservation breeding stock and assurance colony for this species. All of the above had earlier been confiscated by the Hong Kong authorities and rescued from the illegal wildlife trade. Our **Yunnan Box Turtle** (*Cuora yunnanensis*) partnership conservation breeding programme in Kunming (Yunnan) is now well-established and our staff made several visits during the year to check on the turtles' health, provide advice on husbandry and to carry out surveys of the wild population.

Early in the year, the **Wild Animal Rescue Centre** (WARC) received a confiscation of 23 **Giant Asian Pond Turtles** (*Heosemys grandis*, CE) and one Endangered **Yellow-headed Temple Turtle** (*Heosemys annandalii*) from the Agriculture, Fisheries and Conservation Department (AFCD). Long term re-homing solutions are currently being investigated for the two species. In February, 18 critically endangered **Philippine Forest Turtles** (*Siebenrockiella leytensis*) and 14 Vulnerable **South Asian Box Turtles** (*Cuora amboinensis*) were received from a confiscation case by AFCD. The former species is especially notable as it is a Philippine endemic and was long thought to be extinct; wild populations were only re-discovered in 2001. We liaised with the Philippine CITES Authorities and AFCD to secure the return of the animals to their natural environment; and, on 26<sup>th</sup> April the first batch was repatriated to the care of the Philippine Protected Areas and Wildlife Bureau. The culprit in this confiscation case was subsequently caught smuggling a second batch of these two species, as well as **Yellow-headed Water Monitors** (also known as Mindanao Monitors) and a Reticulated Python. These animals were held at KFBG and were also eventually repatriated to the Philippines on 1<sup>st</sup> August. This event received wide coverage from the media following a press briefing held on the 31<sup>st</sup> July. The smuggler was eventually sentenced to a six-week prison term. On 16<sup>th</sup> December, a total of 316 turtles of two protected Asian species were received by the Rescue Centre after an anti-smuggling operation conducted by the Customs and Excise Department foiled an illegal export attempt involving both protected turtles and snakes estimated to be valued at around US\$100,000.



An improved husbandry environment for the conservation breeding programme of the Yunnan Box Turtle.



A Reticulated Python – part of a consignment which was returned to the Philippines.



Two Philippine Yellow-headed Water Monitors (or Mindanao Monitors) before repatriation to the Philippines during a press conference at KFBG on 31<sup>st</sup> July, 2012.



Dr Gary Ades (right), Head of the Fauna Conservation Department and Paul Crow (left), Senior Conservation Officer showing the endemic Mindanao Monitors to members of the media during a press conference at KFBG on 31<sup>st</sup> July, 2012.



The first clutch of Golden Coin Turtle eggs laid during summer hatched on 3<sup>rd</sup> September, 2012, after about 90 days of incubation.



A turtle egg undergoing a routine heart rate check during the late stages of incubation. A record of 24 Golden Coin turtle eggs hatched at KFBG in 2012.



A search team removed over 20 turtle traps found in the stream at Wu Kau Tang during an illegal trap survey.



Several 3m x 3m "funnel traps" were discovered along the main stream at Wu Kau Tang.

During 2012, we modified the pairing patterns and incubation techniques for our assurance colony of the critically endangered **Chinese Golden Coin Turtles** (*Cuora trifasciata*) yielding a record 24 hatchlings. A total of 82 individuals underwent routine health assessments and were found to be in good condition. All female Golden Coin Turtles were given an ultrasound scan to check for egg follicles prior to the next breeding season. Meanwhile, out in the countryside, we conducted our regular habitat monitoring in August 2012 in 10 New Territories streams to check for signs of illegal turtle-traps. The results indicated that trapping pressure has increased in the Wu Kau Tang (Plover Cove) area but declined elsewhere.

In our local wildlife rehabilitation programme, record numbers of birds were brought to the Rescue Centre by the AFCD, Society for the Prevention of Cruelty to Animals (SPCA) or members of the public. These included resident species such as Bulbuls, Spotted Doves, Crested Mynas, Collared Scops Owls and Black Kites, as well as passage and winter migrants such as the Eastern Buzzard, Oriental Scops Owl, Eurasian Woodcock, Watercock and Blackbird. Unusually, three species of quail – Yellow-legged Buttonquail, Barred Buttonquail and Japanese Quail – were received between 22<sup>nd</sup> September and 26<sup>th</sup> October. Many of the young birds received, especially those which were less than a week old, unfortunately died within the first few days of arrival, mainly because of their poor condition. There were, however, some notable successes, including the return of six fully-fledged Black Kites close to the large roosting colony in Aberdeen Country Park in July 2012.



One of many baby Collared Scops Owls received by the Wild Animal Rescue Centre during the breeding season in 2012.



A Barred Buttonquail, a passage migrant, received and released in September 2012.



A Yellow-legged Buttonquail received and released in October 2012.



A Black Kite flying around the hillside soon after its release at KFBG on 3<sup>rd</sup> August, 2012.



Rehabilitated Masked Palm Civets in a soft release enclosure in the forest at KFBG.



A Civet takes its first step to freedom from the soft release enclosure (photograph taken by infra-red camera).



An injured Barking Deer under rehabilitation at the KFBG Wild Animal Rescue Centre.

Other than the rehabilitation of wild birds and reptiles (especially snakes), our native mammal cases were both interesting and wide-ranging. In January 2012, five Masked Palm Civets were released on Kwun Yum Shan after six months' care at the WARC. They had all arrived as rescued pups. Another individual, received in August 2012 as an un-weaned juvenile, was also successfully released on the KFBG hillside after attaining the requisite age and fitness for survival. A Red Muntjac (Barking Deer) found trapped in a catchwater on Lantau Island was treated and successfully released back to the wild on Lantau on 22<sup>nd</sup> February. Our first ever Rickett's Big-footed Bat was received from a member of the public at the end of that month, and later released. The interesting fish-eating behaviour of this species was discovered by Dr Gary Ades (Head of the KFBG Fauna Conservation Department) during studies in the early 1990s. Other WARC "guests" of interest included a tiny Lesser Bamboo-bat, Wild Boar and an un-weaned Rhesus Macaque that required hand rearing.

#### TOTAL NUMBER OF ANIMALS RECEIVED BY THE WILD ANIMAL RESCUE CENTRE FROM 1994 TO 15<sup>th</sup> DECEMBER, 2012:

Mammals	578
Birds	2,418
Reptiles*	20,386
Stray Snakes (via HK Police up to December 2012)	5,306
<b>Grand Total</b>	<b>28,688</b>

On 23<sup>rd</sup> January, Katie, KFBG's oldest Black Kite, was euthanised. She was 25 years of age and suffered from a deteriorating clinical condition caused by age-related kidney failure. Old enough to have had a starring role in a television documentary about Hong Kong wildlife filmed in the early 1990s, she had been with us since the earliest days of our raptor rehabilitation programme, and will be sadly missed by us in KFBG.

Since the establishment of the Wild Animal Rescue Centre in 1994, over 28,000 animals have been received including more than 5,000 snakes from the Hong Kong Police through the Stray Snake Project. The number of snakes received from the Police during 2012 was 687.

#### THE STATUS OF ANIMALS RECEIVED BY THE WILD ANIMAL RESCUE CENTRE, 21<sup>st</sup> DECEMBER, 2011 TO 15<sup>th</sup> DECEMBER, 2012

	TOTAL IN COLLECTION AT 21 <sup>st</sup> DECEMBER, 2011	RECEIVED/ CAPTIVE BRED	RELEASED/ RELOCATED	DIED/ EUTHANISED	TOTAL IN COLLECTION AT 15 <sup>th</sup> DECEMBER, 2012
Birds	94	441	205	236	93
Mammals	88	59	30	39	111
Reptiles*	364	682	242	120	671
Amphibians	7	0	0	0	6
Fish	234	0	0	0	204
<b>Total</b>	<b>820</b>	<b>1,005</b>	<b>395</b>	<b>340</b>	<b>1,085</b>

\*Excluding stray snakes received from the HKSAR Police.



A Rickett's Big-footed Bat soon after release at KFBG on 3<sup>rd</sup> February, 2012.



Extensive forest clearance has led to the loss of biodiversity throughout the Indo-Burma Hotspot. Where native vegetation does remain, such as on these limestone outcrops in central Laos, orchids are vulnerable to collection for the Traditional Chinese Medicine and horticulture trades.



Scientists from Laos and KFBG staff collecting plant specimens in the dense vegetation of the limestone hills in Laos.



A group photograph of team members from KFBG and the National Herbarium of Laos during field work in the Vang Vieng region of Laos.



KFBG staff with Dr Barbara Gravendeel searching for *Coelogyne fimbriata* var. *leungiana* on the slopes of Mt. Victoria on Hong Kong Island.

In mainland China, two quarterly surveys were conducted at Bawangling National Nature Reserve, Hainan in late December 2011 and March 2012 as part of our on-going **Hainan Gibbon conservation project** to monitor all gibbon family groups in the forest. Following an invitation from the Hainan Wildlife Conservation Bureau, we conducted a large-scale exploration survey in Jiayi Nature Reserve, near Bawangling, in April 2012, to investigate the reported occurrence of gibbons there. Over 60 people from four nature reserves in Hainan were mobilised to conduct the survey. While no gibbons were detected, we still have hopes for its survival in this excellent forest landscape. In March 2012, the **Kadoorie Conservation China** (KCC) Department initiated a new collaborative effort with the Kunming Institute of Zoology to confirm the continued existence of two critically endangered gibbon species in Yunnan.

Orchids and trees continued to provide the main focus for regional and local conservation efforts in the **Flora Conservation Department** with four projects on *Doritis pulcherrima* and *Bulbophyllum bicolor*, on-going **field surveys** of wild orchid populations and a survey of the **wild orchid trade**. An exploratory trip was made by senior staff members to the Vang Vieng region of Vientiane Province, northwest Laos, from 24<sup>th</sup> April to 2<sup>nd</sup> May, 2012 together with local counterparts from the Laos PDR National Herbarium (LNH) to assess both orchid diversity in the remaining forest fragments in the **Indo-Burma Biodiversity Hotspot** and to assess the scale of the illegal trade in orchids between China and neighbouring countries. The team investigated the floral diversity of a limestone forest and almost 300 herbarium collections were made, and these are expected to reveal several new records for Laos and at least one species new to science. Later in the year, staff from the Flora Conservation Department visited Hainan from 29<sup>th</sup> October to 2<sup>nd</sup> November for field work and to meet with current and prospective project partners in order to oversee the completion of KFBG's commitment to the development of a conservation strategy for *Doritis pulcherrima* on Hainan Island. Meetings were held with senior officials at Bawangling National Nature Reserve and Hainan University.

**Dr Barbara Gravendeel** from Leiden University, The Netherlands, visited KFBG in October 2012 to discuss a collaborative project on the ecology and conservation of the rare orchid *Coelogyne fimbriata* var. *leungiana*, which is believed to be endemic to Hong Kong. Two field visits were conducted to observe pollinators and collect leaf samples for DNA analysis. By comparing the biology and evolutionary history of this unusual orchid variety to that of its more common relative, *Coelogyne fimbriata*, we hope to identify the ecological factors which govern whether new floral forms prosper or fail to survive in the wild.

On the KFBG Estate, over 400 leaf samples collected from orchid plants in our living collections, especially in the genus *Bulbophyllum*, were processed for DNA sequencing in our **Conservation Genetics Laboratory**. The resulting data provides a clear picture of the diversity of orchids grown at KFBG, and will form a framework for identifying plants encountered in the field and on sale at markets during the course of on-going projects. The DNA libraries and DNA sequence data will serve as the basis for orchid conservation in Hong Kong and the region.

Detailed ecological studies of Hong Kong's endangered **Long-eared Dog Orchid (*Bulbophyllum bicolor*)** commenced with the on-set of the species' flowering season in May 2012. The phenology of plants in cultivation at KFBG was monitored and hand pollination to assess species' mating systems was carried out by staff from the **Orchid Conservation Section**. Field work was conducted at all known populations in Hong Kong to collect samples for genetic analysis, to observe pollinators and to evaluate the orchid's ability to produce seeds. Preliminary findings indicate that the species is dependent on flies for pollination but that fruit set can only be brought about when plants of two distinct genotypes are crossed. Research is on-going to help inform management guidelines for the conservation of the species.

During 2012, seeds of 65 orchid species were inoculated onto culture medium in a total of 692 flasks and seedlings of 51 orchid species and hybrids were sub-cultured in the **micro-propagation laboratory** from a total of 1,014 flasks. Hundreds of plants representing 16 species were hardened in the **Moth Orchid Shed**. Thirty-one orchid species in cultivation at KFBG were hand-pollinated and the seeds of some 51 species were added to the KFBG **Orchid Seed Bank** during the year.

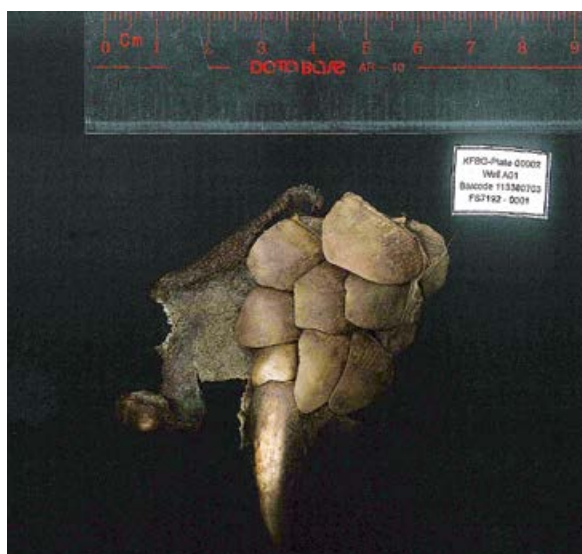
Numerous plant specimens especially parts of trees were collected from various locations in Hong Kong for the KFBG **Herbarium** and DNA samples were taken from many of these voucher specimens. The large number of DNA samples of various species being processed in the Conservation Genetics Laboratory requires systematic long term storage, and in 2012, we introduced an efficient barcoding system for labelling the samples. The reference barcoding database will be used in forthcoming projects on identification of species both in the wild plant and wild animal trades. With this technique, species can be identified even in processed Traditional Chinese Medicine (TCM) products. DNA barcoding is the only way to identify processed animal parts used in TCM. To this end, we have initiated a trial study to collect DNA samples from endangered species products, such as pangolin scales confiscated by the Hong Kong Customs and Excise Department. This initiative was given a boost by the October 2012 visit of Dr Barbara Gravendeel of Leiden University who in addition to being an authority on orchids is also an expert in wildlife forensics. She shared her experiences in identifying plant and animal samples confiscated at Schiphol airport in Netherlands using DNA barcodes.



Blue-bottle flies are a potential insect pollinator of the flowers of the threatened orchid *Bulbophyllum bicolor*.



DNA samples are processed in the Conservation Genetics Laboratory at KFBG.



DNA samples from Pangolin scales confiscated by the Agriculture, Fisheries and Conservation Department are extracted and processed in the Conservation Genetics Laboratory at KFBG.

## Managing ecosystems



Renovation work on the terraces in the Native Tree Nursery to create a Native Herbaceous Plants & Shrub Nursery.

Ecological restoration of disturbed habitats is another crucially important aspect of the work undertaken by the Flora Conservation Department. Every year, our **Native Tree Nursery (NTN)** provides several thousand seedlings for habitat enrichment schemes across Hong Kong. In 2012, we supplied 17,605 native tree seedlings to local NGOs and other sectors, 17,022 of which were for ecological restoration and 583 for urban greening, gardening and scientific research. To ensure the continued diversity and supply of our stock, more than 70,000 seeds of 84 native tree and shrub species were collected, under AFCD license. During the year, we transformed part of the existing Native Tree Nursery Extension into a **Native Herbaceous Plant & Shrub Nursery**. This is a timely development as many native plants cannot be sourced at local nurseries making it difficult for our willing partners to follow our native planting advice. Seeds of 12 species of suitable native herbs and shrubs for ornamental uses were collected from various sites within Hong Kong.

Progress continued on the **Global Forestry Observatory**, our new long-term collaborative project with the University of Hong Kong. On 20<sup>th</sup> June, staff from the Flora Conservation Department held meetings with two Directors of the Centre for Tropical Forest Science, Smithsonian Tropical Research Institute, Dr Stuart Davis and Dr Eldredge Bermingham, along with Dr Billy Hau of The University of Hong Kong. Three of our staff received

training in preparation for managing the two forest plots – a one-hectare plot on KFBG land behind the Kadoorie Centre and a 20-hectare plot at Tai Po Kau. During the year, we completed an inventory of the one-hectare forest plot recording 20,000 stems of 65, mainly early successional, tree species. The results are currently being analysed and will be useful in designing maintenance and planting schemes for forest enhancement and restoration in KFBG and elsewhere in the future.



Tree seedlings planted in the forest restoration site at Discovery Bay.

The growth of labelled tree seedlings was monitored to understand the performance of native tree species at our **tree planting sites** at Tai Mo Shan, Tai Lam, and Discovery Bay. Together with student interns, seedling monitoring surveys were conducted at these three sites in July and early August 2012. Soil samples of the new tree planting sites at Tai Lam and Discovery Bay were collected in late June and soil analyses was carried out by our student interns at the laboratory of Dr Billy Hau at The University of Hong Kong.

## Influencing policy and site development

Development pressure is an ever-present threat to Hong Kong's natural habitats and ecosystems, and we take an active interest in challenging or moderating the environmental impacts of proposed new construction projects wherever the need arises. The **Ecological Advisory Programme (EAP)** was extremely busy in 2012, commenting on 192 planning applications and nine draft Development Permission Area (DPA) plans. We submitted 154 letters regarding suspected unauthorised site excavation, land-filling and suspected illegal structures to the relevant authorities. We also made comments on feasibility studies for land use in Hong Kong and on Environmental Impact Assessments (EIA). Numerous surveys and site visits were conducted in the

North, West, East and Central New Territories as well as on Lantau Island, investigating ecological destruction cases, gathering ecological information for submissions and general routine site checks. Some of the more prominent issues are outlined below.

A planning study covering nearly the entire **Frontier Closed Area** (FCA) was completed recently by the Planning Department (PlanD). This area contains many ecologically sensitive areas, mainly due to its remoteness and the relatively low human disturbance. The Town Planning Board (TPB) approved draft DPA plans for some sites within the FCA including **Sha Tau Kok** but we considered that the plans gave insufficient weight to conservation. Several letters of concern were, thus, sent to the relevant authorities. The EAP, in collaboration with other green groups, is liaising with PlanD to raise the issue further and look more holistically at the rest of the FCA. The Civil Engineering and Development Department (CEDD) commenced an EIA study for development in Tung Chung in mid-2012. Government proposals involve reclamation of most of the intertidal mudflat in **Tung Chung Bay**, which contains a horseshoe crab nursery, and which causes adverse impacts to the **Tung Chung River** and its tributaries. The EAP conducted surveys in March 2012, in order to obtain up-to-date ecological information. Fish species of high conservation interest, rare sea grasses and mangroves were recorded. Consequently, a letter of concern was sent to the Environmental Protection Department (EPD) and the CEDD.

A controversial columbarium consisting of 60,000 niches is proposed to be built at **Sha Lo Tung**, one of Hong Kong's top 12 ecological hotspots. The EAP has been working closely with various environmental NGOs to object to this proposal. We consider that the EIA submitted by the project proponent provides insufficient information to assess the ecological impacts of this proposed development.

Concerns about Peak Oil, Climate Change and the impact on the Chinese White Dolphin led EAP and many other local NGOs to submit objections to the proposed **Third Runway for the Hong Kong Airport**.

The Government is proposing to build academic facilities in the **Lok Ma Chau Loop**. The site and surrounding areas are important to migratory birds and the Eurasian Otter, and thus, any development should be appropriately planned. We objected that the proposed plot ratio (i.e., building height) was too high and the buffer zones were too small for wildlife.

In Hong Kong's south-eastern approaches, **Po Toi Island** is a very important stepping stone for migratory birds. Early in 2012, an unauthorised columbarium development was detected. A draft DPA plan was then gazetted by the Government. The EAP provided arguments for protecting the island and gave a presentation in a TPB meeting. It is now mostly designated 'Unspecified' Zone and can be temporarily protected from unauthorised development.

In November 2012, a planning application was submitted for a Comprehensive Residential Development at **Nam Sang Wai (Yuen Long)**, a very important wetland on the Deep Bay margin providing habitats for numerous wetland species of high conservation importance including the Eurasian Otter and a large Great Cormorant roost. The EAP lodged an objection because the proponent's EIA gave insufficient details of the mitigation plans.



Mangroves and mudflat at Tung Chung Bay.



Seasonal stream at Sha Lo Tung, not properly covered in the developer's Environmental Impact Assessment report.



A Kadoorie Conservation China consultant, Lu Gang, encouraging farmers to plant Cardamom (*Alpinia oxyphylla*) called "yizhi" under Rubber Trees as an additional source of income. Once they have planted Cardamom, the farmers also stop spraying the understory of the rubber plantations with herbicides.



A local pig breed in Hainan called the "Five-foot Pig" because of their long snout reared using the deep bed-litter system. The litter absorbs both manure and urine, thus, reducing odours. The pig pen literally becomes a composting system for recycling organic wastes. The pigs are fed with the leaves of the Paper Mulberry Tree (*Broussonetia papyrifera*) locally called 'gou shu' which has a high protein content.



A Bee-keeping training programme for villagers in Yinggeling Nature Reserve, Hainan. They are now culturing the local strain of the Chinese Bee (*Apis cerana*).



A 'Fish Sanctuary Promotion Workshop' conducted in Daoyin Village at Yinggeling Nature Reserve, Hainan.

## Engaging communities in conservation

For any conservation effort to be successful, it must engage the interest, understanding and support of those whose livelihoods are most directly affected by it. That usually means the local villagers who depend to a greater or lesser degree on the natural resources that surround them. We are acutely aware of the importance of engaging local communities and demonstrating that conservation practices enhance the sustainability of villagers' resource-use. Our KCC team are constantly looking for ways to ensure that conservation-related activities in Hainan and elsewhere are actively supported by the local people.

On the Mainland, the **sustainable agriculture project** at Qingsong Township at the Bawangling National Nature Reserve, Hainan is showing some encouraging practical results. In an event co-organised by KCC and reserve staff, in January 2012, officials and village representatives from around Bawangling visited the project which includes improved pig husbandry techniques using locally-sourced natural feed and mixed under-storey planting of cash crops under monoculture plantations. The pig husbandry system has proved to be very popular and the local government has asked us to train more villagers to raise pigs using this method. In July 2012, KCC ran a workshop on sustainability project development for the sub-station managers in Yinggeling Nature Reserve, all of whom are local villagers.

In September 2012, KCC and the Yinggeling Nature Reserve staff visited Xinlong Botanic Garden (XBG) (in Hainan, in the south near Sanya) to explore the possibility of co-operative efforts in a **rubber agro-forestry project**. The XBG management are willing to provide cacao and coffee seedlings, and to subsequently buy back the produce. This proposal to diversify the under-storey cash crops in rubber plantations was discussed with farmers in Yinggeling's Gaofeng village. We also conducted training on bee-keeping for 15 villagers at Gaofeng village which focused on producing honey using only the local bees feeding on wild flowers, to showcase the importance of preserving local biodiversity. It was very popular and well-received by the villagers.

Freshwater fish are an important source of protein for villagers across Hainan but in most watercourses which flow beside villages the fish populations are under constant stress from over-fishing. In the villages around Yinggeling Nature Reserve, we have been promoting the set-up of **fish sanctuaries** (no-fishing zones). These have had mixed success in the past. So, in 2012, a 'Fish Sanctuary Promotion Workshop' was conducted in Daoyin village at Yinggeling and attended by 80 participants including people from Provincial and local government and villagers. The workshop involved experience-sharing and the re-introduction of a locally-extinct fish species. It was extensively covered by the local media, in part because of the great success of the Daoyin fish sanctuary in allowing the recovery of fish numbers and size. The Daoyin villagers showed great pride in the recognition of their achievement. A 12-page fish sanctuary manual produced by KCC is now being distributed to nature reserves and villages in Hainan that are interested in setting up their own fish sanctuaries.

Meanwhile in Hong Kong, staff from the Flora Conservation Department co-ordinated a team of 20 **conservation volunteers** to assist with monitoring and interpretation at the KFBG display at the Hong Kong Flower Show 2012. This year, the theme of the KFBG display was on orchids and the Indo-Burma Biodiversity Hotspot. Our display won the Grand Award for Design Excellence – Displays Section (Local). The volunteers played an important role in ensuring the display had maximum educational impact and emotional connectivity whilst guaranteeing visitor safety. Some 560,000 people attended the show.



Our staff in front of the award-winning KFBG booth at the Hong Kong Flower Show 2012 in Victoria Park.



A view into the "jungle vista" of the KFBG booth at the Hong Kong Flower Show 2012.

## Building Conservation Capacity

In 2012, several workshops and training sessions were organised in our on-going efforts to improve the capabilities of Hainan **nature reserve staff**. In February 2012, we organised practical training workshops in field survey techniques for wardens at Jiayi Nature Reserve and then assisted them in conducting their first biodiversity survey in April. Prior to the actual survey, another training workshop for 60 wardens from Jiayi, Yinggeling, Bawangling and Exianling was conducted by KCC staff members, who were joined by Zhang Rongjing from South China Agriculture University and Wu Liwei from Taiwan National Normal University. They shared techniques for surveying different groups of wildlife. Later in the year, wardens at Yinggeling were given further training on the study of reptiles. We also advised a group of 30 Jiayi wardens on **water monitor conservation and survey techniques**. In December 2012, our staff ran a three-day **advanced field training course for wardens** from Yinggeling Nature Reserve. At the invitation of Bawangling National Nature Reserve, a team from KCC gave lectures to around 60 Bawangling staff on topics ranging from community-based conservation to information about different faunal groups. Yinggeling was promoted by the national authorities as a demonstration model of nature reserve management.



Dr Bosco Chan (Head of Kadoorie Conservation China Department) teaching map reading skills in a biodiversity survey workshop at Jiayi Nature Reserve, Hainan in April 2012.



The KCC team giving a series of lectures on biodiversity survey skills to staff from Bawangling National Nature Reserve, Hainan.

On the Mainland, the KCC team also had many opportunities to share their knowledge and experience. On 27<sup>th</sup> March, 2012, Dr Bosco Chan, Head of KCC, gave a plenary talk on our Hainan nature reserve experience during the Association for Tropical Biology and Conservation (ATBC) meeting in Xishuangbanna, Yunnan which was attended by more than 200 international scientists. Dr Sung Yik Hei gave a talk on the **impacts of illegal trapping on Big-headed Turtle populations** at the same meeting. Bosco also presented a lecture on **nature reserve management** at a workshop on **human-wildlife conflict** in Nanning on 10<sup>th</sup> August, 2012 to more than 50 participants, including the directors of 13 Guangxi National Nature Reserves and delegates from various provinces. In November 2012, at Xishuangbanna Tropical Botanical Garden (XTBG) Bosco gave the same lecture as part of an **advanced field course in ecology and conservation** for staff of NGOs and nature reserves of various Asian countries. At the invitation of the Guangxi Provincial Forestry Department, Bosco also gave presentations on **community-based conservation and the biodiversity value of Guangxi** at a workshop on nature reserve management in Nanning on 19<sup>th</sup> November, 2012, at which the directors of 40 Guangxi nature reserves were present. To further bolster capacity in



A Big-headed Turtle (*Platysternon megacephalum*).

Guangxi, KFBG and the Hong Kong Bird Watching Society organised a one-day study tour of Hong Kong bird watching sites for Guangxi Forestry Department officials and reserve managers. We gave practical instruction in **radio-telemetry of turtles** to Zhang Fang of Anhui Normal University in August, in support of turtle monitoring work in Anhui and taught **camera trapping techniques** to 18 Tibetan herders in Diqing County, Yunnan in October 2012, at the invitation of our sister organisation, Partnerships for Community Development (PCD).

Dr Gunter Fischer and Dr Ng Sai Chit of the Flora Conservation Department travelled to Nanning in July 2012 to hold discussions with senior Guangxi officials and academics on a proposed **Guangxi Biodiversity Centre**, which would be a collaborative project between Government, NGOs and academia for the purpose of rigorous and holistic conservation action in Guangxi.

Over the years, we have built up considerable knowledge and experience of the local and regional wildlife trade. In May 2012, our staff participated in an **identification workshop for illegally traded wildlife** for Shenzhen customs officials, and provided training on how to identify endangered animal and orchid species. This workshop was jointly undertaken with our partners, Wildlife Conservation Society (WCS) China. In a second workshop co-organised with WCS, we provided animal identification training for Guangzhou Forestry Police in August 2012. In Hong Kong, the Fauna Conservation team was joined by SPCA inspectors during a field survey in which we looked for illegal animal trapping activity. This was a first step in capacity building for the SPCA team as part of a plan which they are developing to address illegal trapping of both wildlife and domestic animals.

In 2012, we gave separate training courses in **reptile husbandry** to staff of the Leisure & Cultural Services Department (LCSD) and AFCD. The LCSD programme began with lectures and demonstrations on handling reptiles at the Tuen Mun Reptile House followed by a short internship at KFBG for LCSD staff. The AFCD course, led by Paul Crow, was held over five days in October 2012. In February, we received a visit from a Guangdong green group (34580 Nature Community) keen to learn about animal rescue and rehabilitation, to contribute toward animal trade issues in Guangdong. Dr Sung Yik Hei and Dr Alex Grioni (our KFBG Senior Veterinarian) visited Kunming, as part of our collaborative project on the Yunnan Box Turtle, to make veterinary inspections and give advice on husbandry.

The DNA libraries and DNA sequence data that the Flora Conservation Department are building up at KFBG will serve as the basis for **orchid and tree conservation** in Hong Kong and the region. To further that process, on 11<sup>th</sup> June, 2012, Flora Conservation staff visited The National Orchid Conservation Center (NOCC) in Shenzhen to meet its director, Prof Zhong Jian Liu, and discuss collaboration on orchid conservation starting with the study of *Bulbophyllum* and the exchange of DNA samples. The work will later be extended to other orchid species in mainland China. We also arranged for four partners from our collaborative projects in Laos and Vietnam to attend the **8<sup>th</sup> International Symposium on Diversity and Conservation of Asian Orchids** in Shenzhen. In August 2012, we gave Dr Strong Song from Hainan University advice on DNA extraction from orchid silica gel samples.



A member of the KCC team teaching camera-trapping techniques to Tibetan herders in Deqin County, Yunnan.



Paul Crow, Senior Conservation Officer provided wildlife identification training for Shenzhen Customs Officials.



A Shenzhen Customs Official actively participating in the wild animal identification workshop.



Dr Stephan Gale presenting his talk on Hong Kong Orchids at the 8<sup>th</sup> International Symposium on Diversity and Conservation of Asian Orchids held in Shenzhen.

Numerous activities were organised under the **Rainforest Ambassador** volunteer programme in Hainan including the monthly Haikou bird surveys, the Hainan annual water-bird survey and assistance with the preparation of the fish sanctuary workshop in Daoyin. In November 2012, 30 residents from Haikou were recruited as “ecological surveyors” to conduct a biodiversity assessment of the Yangshan Wetland near Haikou City. This activity started with a four-day training workshop.



A group photograph of the participants of the Yangshan Wetland Ecological Surveyor Training, which is part of the KCC Rainforest Ambassadors Programme.

## Channelling knowledge into conservation planning

KCC and Flora Conservation staff attended the **Annual Meeting of the Association for Tropical Biology and Conservation, Asia Pacific Chapter** at the Xishuangbanna Tropical Botanical Garden in Yunnan in March 2012. Bosco Chan participated in a pre-conference workshop on prioritising conservation research in tropical Asia with 15 other invited scientists. The KFBG delegation met a number of experts in various scientific fields including ecological restoration, community-based conservation, orchid conservation and DNA bar-coding. On a related theme, Dr John Fellowes (our consultant) contributed to an important paper on **Key biodiversity areas in the Indo-Burma Hotspot**.

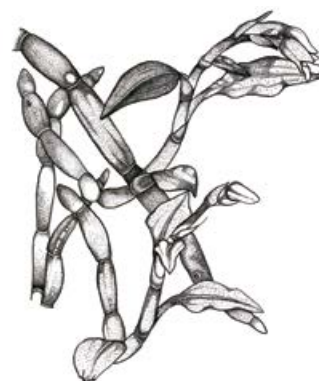
Our experience and knowledge of the distribution and status of regional fauna and flora means that we are involved in the drafting or review of species assessments for the International Union for Conservation of Nature (**IUCN Red List**). Following the discovery of the Jewel Orchid (*Cheirostylis pusilla*) in Hong Kong in 2010, Flora Conservation staff completed a full Red List assessment of the species throughout its range in tropical Asia, based on an analysis of sightings and herbarium specimens spanning the last 50 years, and, observations of various ecological attributes. The species was assigned a VU (Vulnerable) status. John Fellowes edited papers for the IUCN Primate Specialist Group's *Asian Primates Journal* and contributed to the IUCN members' consultation on the **Intergovernmental Panel on Biodiversity & Ecosystem Services**. He also led informal discussions to initiate an IUCN Ant Red List Authority. The proposal is to begin on a trial basis by reviewing out-dated status assessments made in the 1990s, to redirect conservation attention where it is most needed. John and KCC staff assisted in updating Red List assessments of six threatened southern China bird species. John also reviewed status assessments for the Hainan Leaf Warbler, Hainan Partridge, Hainan Peacock Pheasant, Gold-fronted Fulvetta and Brown-chested Jungle-flycatcher for Bird Life International (a global alliance of conservation organisations working together).



A Hainan Leaf Warbler (*Phylloscopus hainanus*).



*Cheirostylis pusilla* in its natural habitat in Hong Kong.



A sketch of the Jewel Orchid (*Cheirostylis pusilla*) discovered in Hong Kong.

A new website for the recently revitalised **Orchid Specialist Group (OSG) – Asia** was prepared by Dr Gunter Fischer and Dr Stephan Gale, and formally launched at the **3<sup>rd</sup> International Guangxi Yachang Orchid Symposium** in Nanning, China on 25<sup>th</sup> May, 2012. OSG-Asia is a network of individuals and organisations based in (or with an interest in) one of the countries or territories of the region (Cambodia, Hong Kong, Indonesia, Japan, Laos, Malaysia, Mongolia, Myanmar, North Korea, Philippines, People's Republic of China, Singapore, South Korea, Taiwan and Vietnam) who actively dedicate their time, technical expertise and resources towards the improved understanding of Asia's native orchids and their conservation status. It is one of the regional branches of the OSG, part of the Species Survival Commission umbrella that reports to the International Union for Conservation of Nature (IUCN). The newly-created website was also introduced to participants at

the **8<sup>th</sup> International Symposium on Diversity and Conservation of Asian Orchids** in Shenzhen by Gunter and Stephan in November 2012, where discussions were held on improving the website content and on an initiative to generate red data conservation assessments for all orchid species that occur naturally within the member countries of OSG-Asia.



KFBG staff at the 8<sup>th</sup> International Symposium on Diversity and Conservation of Asian Orchids (Shenzhen).

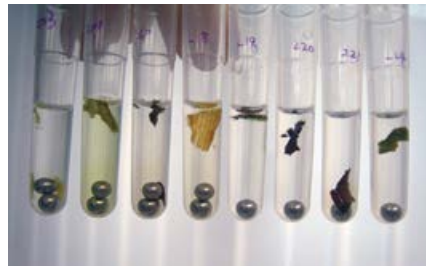
Two hundred copies of the English version of our nature reserve management guidebook, authored by KFBG staff and consultants, **Sustaining the Pulse – Managing for Biodiversity Conservation in South China's Forest Nature Reserves** were printed in early March. Copies were distributed to conservationists, reserve officials and researchers in mainland China and from Asian countries including Malaysia, Singapore, Indonesia, Laos, Sri Lanka and India during the ATBC meeting in Xishuangbanna, Yunnan. The Chinese version was printed in late August 2012 and will be a useful tool for workers on the front line of conservation in mainland China.



The book: 'Sustaining the Pulse – Managing for Biodiversity Conservation in South China's Forest Nature Reserves' produced by Kadoorie Conservation China.

## Research for conservation

We were actively engaged in conducting field and laboratory research throughout the year. The Flora Conservation Department work on **DNA sequencing of orchids** and other plants has been very productive. Protocols for the Conservation Genetics Laboratory have been developed and in KFBG, our staff have collected and processed hundreds of leaf samples from positively identified and uniquely labelled orchids in our Living Collections for screening, mostly species of the genus *Bulbophyllum*. We aim to eventually generate **DNA barcodes** for all species represented in the collection. Samples have also been obtained from Herbaria, markets and from wild plants of *Bulbophyllum bicolor* as part of the on-going conservation efforts focusing on this species (see below).

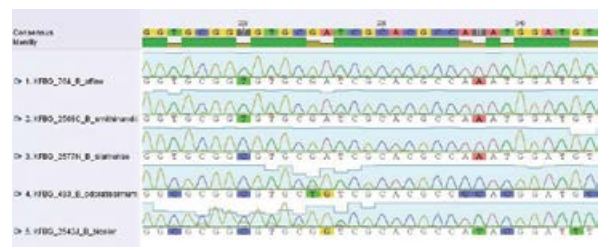


Leaf samples are added to 8 stripe tubes with buffer and grinding beads for DNA extraction.



Dr Jihong Li working in the Conservation Genetics Laboratory at KFBG.

A sequence database has also been built-up through our work with 57 *Bulbophyllum* orchid species. The sequences were edited and organised using a software called "Geneious". With these organised sequences, phylogenetic trees can be generated to show the relationships and taxonomic status of each species. In tandem with this effort, we commenced work on producing a checklist of all *Bulbophyllum* species recorded from countries within the Indo-Burma Biodiversity Hotspot.



An example of the DNA sequences of five *Bulbophyllum* orchid species in the Geneious software database.

Besides *Bulbophyllum*, we are also producing sequence databases for the phylogeny of priority orchid genera such as *Nervilia* and *Dendrobium*. These data will be used to establish a database for identifying known orchid species and distinguishing new discoveries in future. The orchid sequence data were analysed by comparing them to our own database and to the available sequences in the GenBank® \* world-wide database to look for a match or close match, to assess species genetic diversity and species identification.

(\*GenBank® is the US National Institutes of Health genetic sequence database, an annotated collection of all publicly available DNA sequences. <http://www.ncbi.nlm.nih.gov/genbank/>)

The data generated by all these efforts will help identify and focus attention on species of conservation importance, and will be instrumental in monitoring the illegal orchid trade. DNA bar-coding has great potential to detect illegal trade in orchids and other plants.

The Flora Conservation Department has continued to conduct ecological studies of the rare and endangered Long-eared Dog-orchid, *Bulbophyllum bicolor*, in which 'fruit set' has never been observed in wild Hong Kong populations. We investigated the ability of seeds produced by hand pollination of plants cultivated at KFBG to germinate under laboratory conditions. We found that cross-pollinated plants are able to produce healthy and viable seeds that germinate rapidly under *in vitro* culture conditions. This information is invaluable in pinpointing the causes of the species' rarity in the wild (some pairings work, while others do not) and may lead to us to do a trial re-introduction of plants which are the 'missing partners' so that the orchid populations can once again grow in the wild. Preliminary genetic sampling was also conducted on three populations of *B. bicolor* in the Hong Kong countryside as part of this on-going conservation project.

Outside of Hong Kong, two biodiversity survey projects targeting the **ferns and mosses** of the unusual Danxia Landscape of Hunan Province, *Biodiversity and Conservation Strategy of Pteridophytes in Danxia Landform of Hunan Province* and *Bryophytes Diversity in Danxia Landform of Hunan Province*, were completed. These two projects had been funded by KFBG since 2009. Final reports of the projects were submitted to us and accepted in March 2012. The two projects have found 183 fern species and 174 moss species, respectively, in the Danxia Landscape of Hunan; among them are a number considered 'rare and endangered' in the Province. Hotspots of diversity for these two plant groups in the Hunan Danxia Landscape were also identified. These findings, together with recommendations for conservation will be reported in scientific articles in peer-reviewed journals.

Our important fauna conservation research efforts mainly focused on fieldwork. At the Exianling Limestone Forest in Hainan, we launched a more systematic infra-red camera trap survey in July 2012 to target the endemic pheasants while the Hainan Gibbon surveys were conducted quarterly at Bawangling National Nature Reserve.

On the KFBG Estate, design and planning for the **Climate Watch programme** which aims to detect climate-induced changes in plant phenology was a work-in-progress. According to the current proposal, 28 trees in the Lower Farm area will be monitored by our visitors who can fill in paper forms or, if equipped with smart phones, they can record data such as flowering and fruiting periods of the plants. Similar trails exist at The Chinese University of Hong Kong and in Kowloon Park (managed by LCSD). This is part of a worldwide citizens' science programme involving the general public.



Philip Lo (a member of the KCC team) teaching wardens how to set-up an infra-red camera trap in Exianling Limestone Forest, Hainan.

**Scientific publications** of KFBG staff and partners during 2012 are listed in Appendix 2. Our services were also sought for peer reviews of papers submitted to many scientific journals, including *Biodiversity and Conservation*, *Biodiversity of the Eastern Himalaya*, *Biological Conservation*, *Botanical Journal of the Linnean Society*, *Bulletin of the National Museum of Nature and Science (series B, Tokyo)*, *Herpetological Conservation and Biology*, *Journal of Bombay Natural History Society*, *Journal of Medicinal Plant Research*, *Journal of Plant Research*, *Journal of Threatened Taxa*, *Malesian Orchid Journal*, *Nordic Journal of Botany*, *Asian Myrmecology*, *PLoS ONE* and *Zootaxa*.

We are occasionally requested to examine academic theses; an example in 2012 was for a PhD thesis on the "Critically Endangered Tonkin Snub-nosed Monkey in Vietnam" for the Australian National University. In addition, KFBG staff reviewed funding applications for the IUCN Turtle Conservation Fund, the Ocean Park Conservation Foundation and the Primate Society of Great Britain for conservation projects in Asia. Our staff also completed a review of the updated Critical Ecosystem Partnership Fund Ecosystem Profile for the Indo-Burma Biodiversity Hotspot.

# HOLISTIC ESTATE MANAGEMENT & MINIMAL ECO-FOOTPRINT

**T**he draft Land Management Plan is being upgraded, and management objectives for the KFBG Estate are under review. Hundreds of native and ornamental trees, herbs and shrubs were planted around the Estate. The Sky Trail connecting the Kadoorie Brothers' and T.S. Woo Memorial Pavilions was opened, and we started a Native Herbaceous Plant & Shrub Nursery. Waste water management was improved by the construction of a new, small waste water wetland just below the Upper Staff Canteen for treating sewage; and the installation of a 'grey-water harvest and re-use system' in the Lower Farm next to the vegetable sorting and cleaning facility. Various facilities were upgraded during the year. Detailed mapping of eight invasive plant species was conducted, in order to plan for their eventual removal, and Red Imported Fire Ants were found at several locations on the KFBG site; their eradication poses a major challenge for the future.

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## Land Management Plan

Several parts of the KFBG Land Management Plan were drafted in 2012, and the plan is now being re-organised for greater integration between the man-made and natural landscapes. A system was introduced whereby the Holistic Estate Management Forum review, enhance and endorse all proposed on-site projects that affect the ecological integrity, landscape character, aesthetics, safety or function of KFBG, before commencement. The six main management objectives for the Plan were agreed by a core group meeting together with the Chairman on 27<sup>th</sup> August, 2012 and relate to the strategic goals of Sustainable Living (Sustainable Yields and 'Healthy Planet'), Holistic Education ('Experience' and 'Learning') and Nature Conservation (Ecological Integrity and Species Recovery). The next step is to set primary and secondary management objectives for each zone. Further identification and refinement of each zoning area is on-going and will be consistent with the land use functionality.

Our **Geographic Information System (GIS)** technology is integral to co-ordinating and mapping various functions and attributes of the KFBG Estate. Many new map layers were generated and refined in 2012. New map layers for the different parts of the estate (Sky Trail, Never Never Trail, Enkianthus Walk, Wildlife Pond, Flamingo Pond, Monkey Haven, Golden Pavilion, Rainbow Pavilion and the Gloria Barretto Orchid Sanctuary) were created and integrated into our GIS system. Further work was undertaken to digitise and create three sets of agricultural land use layers for the Sustainable Living and Agriculture Department, and, two sets of maps for the Fauna Conservation Department. Map templates of the KFBG estate plotting the 3-dimensional terrain, a "climate diagram" and a location map for future publication were completed.

## Ecological Integrity of the KFBG Estate

**Red Imported Fire Ants** were detected at several locations on the hillside this year and further attempts at eradication of these insect pests were undertaken by our staff. The species has also defied repeated control measures at the Kadoorie Centre (Shek Kong) on land adjoining the KFBG estate although numbers have been greatly reduced. Eco-friendly management products have been sourced and are being applied on a trial basis but so far the ants have resisted elimination. This species that has proven to be an effective global invasive insect may prove extremely difficult to keep under control.

As a follow-up to the *Target Invasive Plant Species for Eradication from KFBG Site Survey* in 2011, detailed mapping of eight **invasive plant species** was conducted by staff of the Flora Conservation Department. Plans for evaluation and suggestions for eradication of these plants were drafted and are under review.

Although much of KFBG is situated on a sheltered and wet north-facing hillside, annual hill fires are still a major, recurrent threat to the estate. The trimming of the **fire-break** was carried out in the week of 20<sup>th</sup> October, 2012 prior to the onset of the dry season.

A suitable site for the quarantine of plants and planting materials obtained from external sources is being sought to avoid bringing unwanted and potentially invasive pests onto the KFBG estate. A project is underway to refine precautionary protocols and to investigate the feasibility of setting-up a **quarantine facility** outside the main area of the estate.

Wild monkeys causing a nuisance was a **pest management** issue in 2012, affecting both visitors and farm production. Many staff were involved in trying to return to a state of harmony with the monkeys, with them eating the abundant fruits in the forest and learning not to steal food from visitors or from cultivated areas. A two-week rat trapping exercise was also undertaken within the Fauna Conservation Department facilities after repeated damage and fouling was reported in relation to the Wild Animal Rescue Centre (WARC) extension building. A new pest-control fence was installed on the vegetable farming terraces to keep out wild boar from damaging and eating crops.



A maize crop at KFBG damaged by wild monkeys.



Signs of the Red Imported Fire Ants were found on the lawn of the Helipad at KFBG.



The fire-break at KFBG after trimming back the grass on 29<sup>th</sup> October, 2012.



Half-eaten and damaged guavas discarded on the ground by wild monkeys raiding a fruit tree orchard at KFBG.



A hazardous Flame of the Forest tree at the Veterinary Hospital was cut down by the KFBG Tree Team with the help of a 'Cherry Picker' on 21<sup>st</sup> September, 2012.



A tree in the Native Tree Nursery fell onto Lam Kam Road after Typhoon Vicente on 24<sup>th</sup> July, 2012. The photographs show the KFBG Tree Team cutting the fallen tree to open up the lane in Lam Kam Road.



## A visitor-friendly Estate

Our beautiful and unique estate requires dedicated care and attention in order to keep it a safe and attractive place for our visitors and staff. The **KFBG Tree Team** is at the forefront of these efforts, charged with the duty of removing old or damaged trees that have become a safety hazard. In 2012, we carried out 132 tree operations, removing 56 hazardous trees and pruning another 198 trees. The team was especially busy in the aftermath of powerful storms especially Typhoon Vicente which toppled 11 trees on 24<sup>th</sup> July, 2012. On this day, several large branches and trees from the Native Tree Nursery (NTN), which had fallen onto the main Lam Kam Road, were cleared promptly. Two Acacia trees posing a hazard in the Walter Kerr Memorial Gardens after the typhoon had to be removed with the use of cranes. Sadly, an old and large Flame of the Forest (*Delonix regia*) tree beside the KFBG Veterinary Hospital became hazardous and had to be cut down on 21<sup>st</sup> September, 2012.



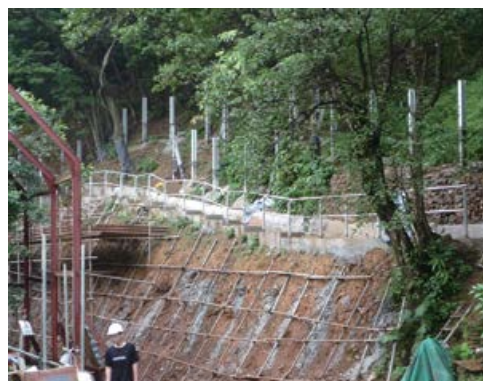
After Typhoon Vicente, two hazardous Acacia trees at the Walter Kerr Memorial Gardens were cut down using cranes (7<sup>th</sup> August, 2012).

KFBG is situated on a steep hillside and we have to ensure that **slope safety** is maintained in line with Government regulations. The stabilisation of the slope to the west of Misha's Bungalow was the major slope project of 2012. This slope now has a rough stone finish which will allow plants to establish faster and it will be covered by greenery in about three years time. Meanwhile, stabilisation works commenced on a slope to the west of Orchid Haven, necessitating temporary closure of the access road between Orchid Haven and the Upper Staff Canteen. Ground investigation work to

support the stability assessments of 16 other slope features around the estate were in progress as at the end of 2012 with on-going preventive and corrective maintenance works carried out on various other slopes.



Vegetation growing through the mat laid on the roadside slope to the west of Misha's Bungalow.



Stabilization works being conducted on the slope to the west of Orchid Haven – a work-in-progress.



The Facilities Department made renovations to numerous visitor facilities including farming terraces.



A view of the newly renovated Moth Orchid Shed at KFBG.

Our Facilities Department upgraded the seedling production facilities of the NTN and also erected a security fence at the perimeter of the lower nursery area to the north of Lam Kam Road to protect and, thus, open the site for intensive seedling production. We also upgraded the CCTV system at Orchid Haven and the Reception area. In our on-going programme of **building safety and maintenance**, the Facilities Department made repairs or renovations to numerous visitor or staff facilities in 2012 including the main gate, the Maintenance Workshop, the small bird quarantine enclosure, the Leopard Cats enclosure, the Wildlife Walkthrough, the Veterinary Hospital, Monkey Haven, terraces next to the *Plants and Us* Greenhouse, ponds, vegetable farming terraces, chicken houses, the Seed Bank, Moth Orchid Shed, workers' restrooms, the Amenities Building, the Sky Room, Sun Room and visitor baby feeding room. The Peculiar Greenhouse was considered unsafe and demolished, and trial pits were excavated to assess the stability and structural integrity of the retaining wall beside this location.

The Facilities Department completed a total of 1,604 requisitions for maintenance and repairs and 113 requisitions for small-scale capital works during the year.

**Aesthetic enhancement** is an important element in maintaining a visitor-friendly estate, especially when it can be combined with the need for practical utility. About 100 ferns of five native species and various orchid species were mounted on the retaining wall below Kwun Yum Garden to establish a green engineered slope. In order to determine the tolerance to dry conditions, four native plant species were selected to test for their growth performance under a restricted watering regime in a study carried out by an intern supervised by staff of the Flora Conservation Department. The research findings will be useful in advising the wider community on the adoption of drought-resistant native plants for use on green roofs. A plan is being devised to give the existing green roofs at KFBG a more natural look. Elsewhere, the *Plants & Us* Greenhouse, the Reception Plaza, Kwun Yum Garden, Walter Kerr Memorial Gardens, Cascade Garden, Gurkha Garden, fauna display areas and the Upper Farm area were beautified with many hundreds of plants in 2012.



A herbaceous native plant, *Elsholtzia argyi*, was used to decorate the planters along the road leading up to the Kadoorie Brothers' Memorial Pavilion in December 2012.

## Energy descent at KFBG

KFBG is committed to implementing **renewable energy** capacity insofar as is practicable on our estate. As part of our feasibility study for installation of a **wind turbine charger** at KFBG, logging of wind data at the Mountain Lodge in the Upper Farm was completed, and the anemoscope was re-located to the WARC for further data collection. However, following the change-over of the Hong Kong SAR Government

Administration, our collaborative funding application with the Government-funded Hong Kong Applied Science and Technology Research Institute is under review and the project was frozen. Findings of a feasibility study, on **solar energy generation** at the Reception Plaza, revealed that 6.5 kW of power at peak production would be generated by the proposed installation of mat type photovoltaic panels on the perimeter of the glass roof. Implementation was delayed by the need to re-tender the project, after rises in wage rates and materials costs prompted the original bid-winner to claim for an increase in the tender amount, thus invalidating the tender process. In the second round of the tendering process, China Light and Power, who had provided the original consulting services, came out as the winning bidder, and the project will proceed in 2013. Meanwhile, electrical work for the installation of a **Building Integrated Photovoltaic (BIPV)** system was carried out at 'One Dou' Farm, an educational vegetable terrace in the Lower Farm.



A 'Building Integrated Photovoltaic (BIPV)' system in operation on a shed in the 'One Dou' Farm.

Measures to **reduce energy and resource consumption** are also being actively implemented on the estate. In 2012, the Facilities Department replaced existing lights at the Farm Shop, Kwun Yum Garden and other areas in the Farm with more energy-efficient fluorescent tubes and LED lights. Public lighting controlled by photo-sensors was installed in the common areas of the Conservation Building, while a power consumption monitoring system was installed in the eastern main switch room in October 2012 to electronically gather energy consumption data from the sub-meters in that locality.



Mules transporting water to the upper farm.

Over the course of the year, the **mule team** delivered an impressive total of 19,654 kg of cargo and covered a total distance of 688 km, as calculated using a Garmin GPS satellite navigator unit. The majority of the cargo transported was compost delivered to the agricultural terraces of the Upper Farm and waste items removed from various parts of the estate. However, it was calculated that the **carbon footprint** for the mule feed actually exceeds that of the quantity of fuel that would be used if a diesel truck were employed for doing the same work, owing to the need to import high quality feed. Efforts are, therefore, being made to source alternative local feed sources which would increase carbon-savings related to having the mules working as pack animals on the estate.

## Water and resource use

We aim to make the most efficient use and re-use of our water resources while ensuring that our pristine stream is not fouled by wastewater. An underground septic tank and sump pit at the NTN was constructed to replace the old septic tank, and water samples are regularly collected and tested to verify that the quality of stream water beside the nursery, as it leaves the Farm, meets Government standards.

Continuing the theme of productive waste recycling, we developed a small **wetland wastewater treatment facility** in the Upper Farm, stocking it with various suitable plant species for nutrient uptake and water filtering to treat sewage from the Upper Staff Canteen, and, a grey-water harvesting and re-use system was put into operation at the vegetable-sorting area in the Lower Farm. A similar facility was built to collect and utilise the backwash water from the filtration plants for irrigation. Improvement works to the sewage pumping system at the wetland equalisation tank are in progress.

All plant waste materials on the KFBG Estate are gathered and re-used either in animal husbandry or for use as mulch. In 2012, several tonnes of organic plant material were recycled in this way.



A mini-wetland system constructed on the hillside below the Upper Staff Canteen for sewage treatment.



Grey-water from washing activities at the vegetable-sorting area is collected and re-used for irrigation.

# AN EVOLVING ORGANISATION

**T**he forums for overseeing the implementation of our strategic goals have worked smoothly in carrying us forward while progress in the 'vibrant culture' programme has been very encouraging. Our dynamic staff members continue to develop, sharing knowledge and attending many diverse training events to broaden and deepen the skills and thinking that they can bring to their work.

## Dynamic structure

We are adhering to the KFBG Strategy and regular forums for Sustainable Living, Holistic Estate Management, Holistic Education, Nature Conservation, Vibrant Culture, and Minimal Eco-Footprint were held in 2012. The regular gathering of forum members, who are knowledgeable and passionate staff from various disciplines and levels, in order to oversee key strategic goals and make recommendations to the Management Team is working well, though some issues are complex and progress more slowly. The future structure of a Holistic Education Department, for the fuller realisation of one of our key strategic goals, is under review.

We now have a standardised Proposal and Report Form for Nature Conservation projects in which proponents detail all aspects of all projects for review by members of the forum. Overall, the process operates well and has led to many value-added comments and an increased sense of shared responsibility.

## Vibrant culture

We are keen to instil a lively sense of community amongst our staff and to provide a working environment that is stimulating and rewarding. This is facilitated by regular staff events in which concepts can be introduced, ideas exchanged and knowledge shared. The second meeting of the Vibrant Culture Forum took place on 13<sup>th</sup> February, 2012, and explored the relationship between personal and organisational values. Further forums were held in May and September 2012. We subsequently decided to arrange Vibrant Culture Experience programmes three or four times a year; the first such programmes were run by Roy Horan, an external consultant, in May and September 2012. A staff gathering was led by Andy Brown in July 2012; this included sharing and question & answer sessions with Heads of Department and a fun team activity. A film show and discussion series was introduced in order to help consolidate an understanding and appreciation of KFBG's core values. Transition and strategy workshops were run for new staff, by Andy Brown and Andrew McAulay on 7<sup>th</sup> and 14<sup>th</sup> June, 2012.



**Vibrant Culture Experience: 'Interlocking Petals' – an activity for building teamwork amongst KFBG staff.**



**The value of trust in the pursuit of goals through team activity.**



**Group discussions during a Vibrant Culture Experience (September 2012).**

## Great people

In 2012, 33 new staff joined KFBG, injecting new blood into the organisation and we said goodbye to 32 staff. One particularly notable departure was that of Senior Conservation Officer Dr Ng Sai Chit, after two years of his second spell with KFBG (he previously worked with the China Programme [now Kadoorie Conservation China] for five years). His exceptional botanical expertise will be sadly missed as will all our former colleagues.

A large amount of training was undertaken, both in-house and with external providers to build the capacity of our new and existing staff so as to deliver even stronger programmes. As is evident from the following summary, the training received was diverse and wide-ranging. **Field-Map Forest Plot Training** was provided by the Institute of Forest Ecosystem Research to several staff of the Flora Conservation Department in January 2012. Nine Flora Conservation officers participated in a wilderness skills course in January, to increase their safety awareness when on field trips, and followed this with training in rock climbing and abseiling in February and October 2012. In March 2012, Daisy Hu participated in a training course, **Orchid Conservation Using in-vitro Techniques** at the Centro Flora Autoctona della Regione Lombardia, Parco in Galbiate, Italy. Daisy will now apply the skills she learnt for the collection, storage and micro-propagation of seeds obtained from rare and threatened orchids here in Hong Kong. In March, members of the Tree Team attended a demonstration in **Good Rigging Control Systems in Tree Rigging**. In June 2012, Tam Yip Shing and Yip Tsz Lam of the Sustainable Living and Agriculture Department attended a four-day trip organised by the Hong Kong Institute of Education to study the floating raft and A-frame mist spraying models of aquaponics systems in Shandong. Denise Laughlin, our veterinary nurse, sat the **City and Guilds Certificate examination for veterinary nursing of exotic species** in the United Kingdom. Our consultant, John Fellowes gave training in the identification of Red Imported Fire Ants to five staff members in August 2012, and in the same



Dr Ng Sai Chit (on a field trip to collect seeds in Pok Fu Lam) moved on to a university post.



Raymond Tsui, a rock/mountain climbing trainer instructing KFBG staff on the usage of karabiner and knots in rock climbing.



A 'Raft Model' system for vegetable cultivation using aquaponics in Shandong.



An A-frame mist spraying system for vegetable cultivation using aquaponics in Shandong.



KFBG staff taking care of seedlings of the rare herbaceous plant, Snake Aroid (*Amorphophallus kiusianus* (Makino) Makino) in the Native Tree Nursery.

month, Andy Brown provided a **facilitation skills workshop** for seven staff and six Education Department volunteers. Four Tree Team members attended talks on tree identification on 13<sup>th</sup> September and 29<sup>th</sup> October, 2012 organised by the **Hong Kong Tree Society**. These four members of staff, together with Kam Mui Wong, also attended a course on Hong Kong termites on 14<sup>th</sup> December, 2012. In the Flora Conservation Department, Eric So and Charlotte Shiu attended the **5<sup>th</sup> International Arboriculture Summit**, organised by the Institute of Arboriculture Studies (Hong Kong) in November 2012. The theme of the conference was 'Trees: the mystery within'. Eric So also delivered a two-day in-house Tree Assessment Training course to six members of staff. Thirteen Flora Conservation staff received **BG-BASE** (a plant database) instruction over five days in December 2012. To enable our frontline staff to set up the Native Herbaceous & Shrub Nursery, in-house training in seed collection, caring, sowing and seedling care was provided to several members of staff. May Cheng, Alice Hui and Idy Wong attended an **Energy of Nature** training course run at KFBG by Dr Claire Elouard from Sukh Bhumi, India.

Capacity-building among our staff was also facilitated by a number of sharing sessions over the course of the year, commencing with one on Pig-nosed Turtle repatriation hosted by Gary Ades and Tan Kit Sun on 6<sup>th</sup> January, 2012. Chris Shepherd, Assistant Director of TRAFFIC Malaysia, gave a presentation to staff on the Asian Wildlife Trade on 17<sup>th</sup> January, 2012. Other themes for these sharing sessions included training for display animals (Debbie Ng), planning for forest camping (Tan Kit Sun), permaculture (external consultant Rosemary Morrow) and ecological landscaping (Caroline Law). In addition, several **Journal Club** sessions were held in 2012, covering a broad range of topics of direct relevance to our diverse fields of nature conservation work, such as restoration genetics (Zhang Huarong), orchid pollination case studies from Réunion and Taiwan (Daisy Hu), forest restoration in Hong Kong (Dr Billy Hau from The University of Hong Kong), use of GIS data in forest management (Alfred Lam), studies of the rare Hong Kong orchid *Bulbophyllum bicolor* (Stephan Gale), seed collection in the wilds of Hong Kong (Kenniss Yau) and the benefits of gardening (Alice Hui).



Frank Rinn (from Heidelberg, Germany) demonstrating use of the latest 'Electronic Needle Drill Resistance Machine' that he developed for inspecting the health of trees.



Guy Meilleur (from USA) holding a discussion on how to restore damaged trees.



Chris Shepherd, Assistant Director of TRAFFIC Malaysia, presenting a talk on the Asian Wildlife Trade to KFBG staff.



Dr Gary Ades (Head of KFBG Fauna Conservation Department), and Tan Kit Sun (Senior Conservation Officer) sharing their experiences of repatriating Pig-nosed Turtles to Indonesian Papua with KFBG staff.



Debbie Ng, Conservation Officer of the Fauna Conservation Department, giving a talk on the use of positive reinforcement techniques for husbandry and veterinary training of the resident animals at KFBG.



"Clicker game" – Debbie Ng and a volunteer demonstrating the use of a 'clicker' for positive reinforcement training of the resident animals at KFBG.



Alice Hui (Horticulture Officer) sharing her experiences on the human connection with plants in the "Plants and Us Greenhouse" with Flora Conservation staff during the Flora Journal Club activity (November 2012).



An experiential activity in using our senses to connect with plants – "Close your eyes, open your mind" was carried out during the Flora Journal Club activity on 30<sup>th</sup> November, 2012.

## Good governance

We continue to strive to comply with the relevant regulations of Hong Kong and the People's Republic of China, not least the Kadoorie Farm and Botanic Garden Ordinance (CAP. 1156), and periodically update our internal policies and actions to ensure compliance and best practice.

Responding to a request from KFBG, the Agriculture, Fisheries & Conservation Department (AFCD) has amended the license terms and conditions of the KFBG Animal Exhibition License to better reflect the unique situation at KFBG. The amended document was issued in November 2012.

The audit for the year ending 31<sup>st</sup> March, 2012 was carried out in early August by Pricewaterhouse Coopers. The annual budgeting exercise for the Financial Year 2013-2014 and the revised Five-Year Plan was carried out in November and December.

We thank the KFBG Board for their continued selfless support and wise advice.

We thank the Trustees of the Kadoorie Foundation for their trust and support of the work of KFBG. We also thank our public donors and the Government for their grants and other contributions to our programmes.



Visitors walking in the peaceful surroundings of KFBG.

### NUMBER OF VISITORS TO KFBG OVER THE PAST 5 YEARS:

	2008	2009	2010	2011	2012
<b>School Groups</b>	44,322	38,475	42,543	48,430	47,385
<b>Commercial Groups</b>	23,976	19,809	19,321	22,283	13,032
<b>NGO Groups</b>	15,804	14,032	12,875	19,373	19,154
<b>Individuals</b>	46,541	57,531	55,078	66,281	76,070
<b>Total</b>	<b>130,643</b>	<b>129,847</b>	<b>129,817</b>	<b>156,367</b>	<b>155,641</b>

### FINANCIAL FIGURES (excluding depreciation):

EXPENDITURE (HK\$)	*YEAR ENDED 31.3.12 (audited)	**YEAR ENDED 31.3.13 (unaudited)
<b>Capital</b>	13,498,185	25,312,000
<b>Operating</b>	65,642,554	69,227,000
<b>Total</b>	<b>79,140,739</b>	<b>94,539,000</b>

INCOME (HK\$)	YEAR ENDED 31.3.12	YEAR ENDED 31.3.13
<b>Kadoorie Foundation</b>	81,400,000	84,000,000
<b>Shop Sales</b>	1,868,879	2,065,944
<b>Government Funding</b>	1,554,309	1,038,367
<b>Entrance Fees</b>	651,220	1,085,020
<b>Workshop Fees</b>	295,298	665,104
<b>Public Donations</b>	69,449	32,844

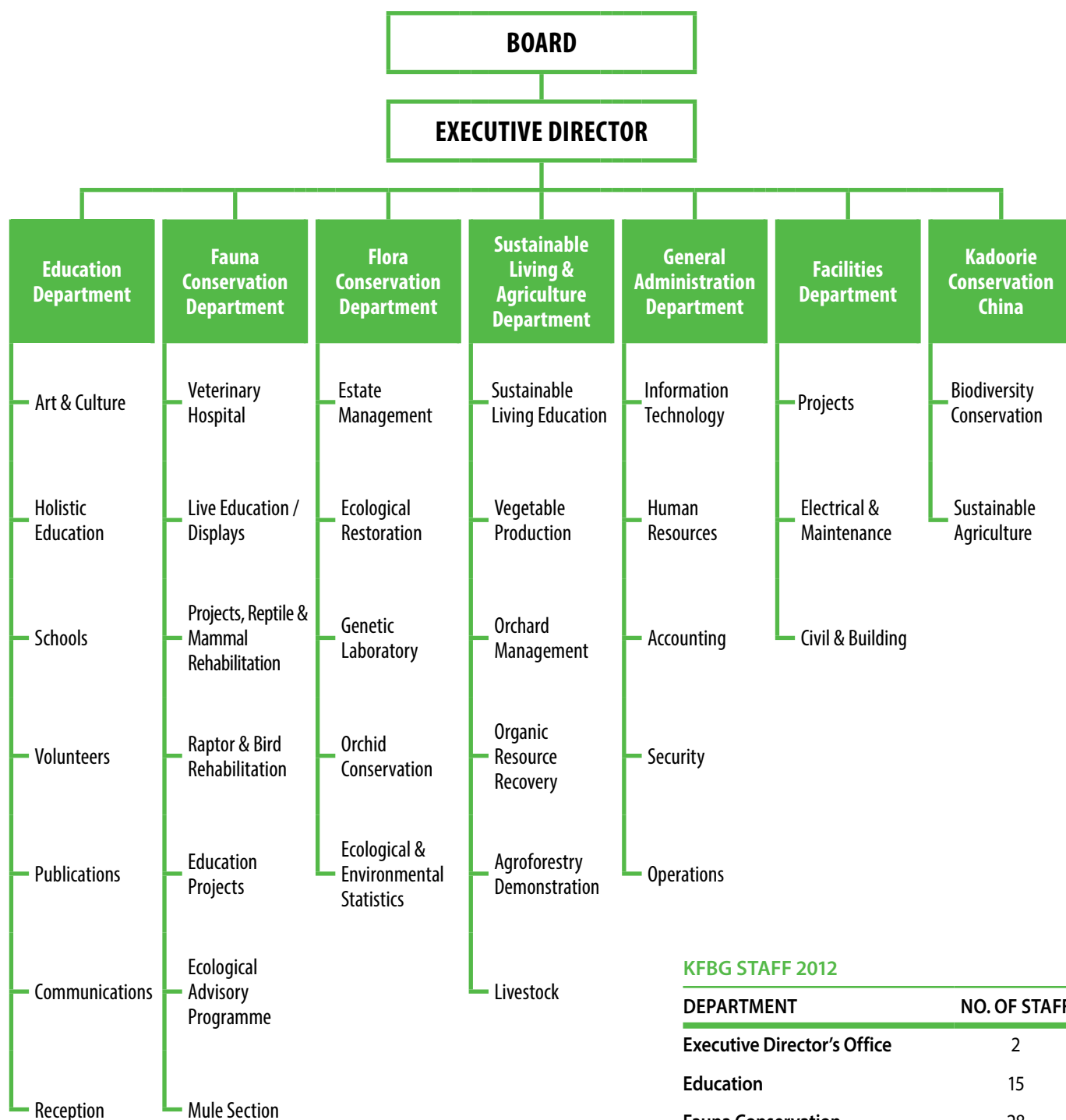
\* From Audited Accounts.

\*\* From Management Accounts (expenditure includes commitments accrued and not yet settled).



The pristine stream with clear water rushing over boulders in KFBG.

## KFBG Organisation



### KFBG STAFF 2012

DEPARTMENT	NO. OF STAFF
Executive Director's Office	2
Education	15
Fauna Conservation	28
Flora Conservation	61
Sustainable Living & Agriculture	50
General Administration	30
Facilities	20
Kadoorie Conservation China	10
<b>Total Number of Staff</b>	<b>216*</b>

Note: \*As at 31<sup>st</sup> December, 2012.

## **Members of the Board** of the Kadoorie Farm and Botanic Garden Corporation

***Andrew McAulay*** (Chairperson)

***Ian D. Boyce***

***Dr Lawrence Lee***

***Ruy Barretto, S.C.***

***Deborah McAulay Whittle***

***Daniel R. Bradshaw***

## **Senior Management** of the Kadoorie Farm and Botanic Garden Corporation

### **Executive Director**

***Andy Brown***

### **Heads of Department**

Education Department

***Dr Chiu Sein Tuck***

Facilities Department

***Denis Ng***

Fauna Conservation Department

***Dr Gary Ades***

Flora Conservation Department

***Dr Gunter Fischer***

General Administration Department

***Florence Au***

Kadoorie Conservation China

***Dr Bosco Chan***

Sustainable Living & Agriculture Department

***Idy Wong***

# APPENDIX 1

The following table lists KFBG activities through 2012 aimed at building capacity in community organisations and partnerships for sustainable living.

PARTNER ORGANISATION	DATE	PROGRAMME TITLE	LOCATION
Linden Centre	3 <sup>rd</sup> February, 2012	Half-day interflow on agroforestry and community garden design	KFBG
'34580 Nature Community', Guangdong	13 <sup>th</sup> February, 2012	One-day training on agroforestry, sustainable farm design, community farming, wetland system wastewater recovery, livestock husbandry and organic resource recovery	KFBG
School of Design, Hong Kong Polytechnic University	7 <sup>th</sup> March, 2012	Documenting KFBG Constructed Wetland Wastewater Treatment System for Asian Lifestyle Design Research Laboratory	KFBG
Yew Chung Community College and Hong Kong Permaculture Institute	16 <sup>th</sup> March – 26 <sup>th</sup> April & 21 <sup>st</sup> September – 26 <sup>th</sup> October, 2012	Food Waste Composting – Theory & Application Certificate Course	KFBG
Volunteers of the KFBG Sustainable Living and Agriculture Department	18 <sup>th</sup> March, 2012	Local Exchange Trading System training workshop	Tsim Sha Tsui
Guest speakers from Permaculture Institute Hong Kong and The Chinese University of Hong Kong	1 <sup>st</sup> April – 24 <sup>th</sup> June, 2012	Permaculture Design Certificate course	KFBG
Transition Network	25 <sup>th</sup> April, 2012	Peak Money & Economic Resilience Forum	London
Tai Po District Council, Tai Po Environmental Association and Tai Po Public Library	22 <sup>nd</sup> May, 2012	Tai Po Treasures	Tai Po
Tai Po Old Market Public School (Plover Cove) and The Salvation Army Tai Po Multi-service Centre for Senior Citizens	25 <sup>th</sup> June, 2012	Provided advice on design and training of community garden	Tai Po
Hong Lok Yuen Property Management Ltd and Environmental Protection Department	7 <sup>th</sup> July, 15 <sup>th</sup> September & 6 <sup>th</sup> October, 2012	Food Waste Recycling at Housing Estates – talk and workshop	Hong Lok Yuen/ KFBG
Tai Po Environmental Association	4 <sup>th</sup> July, 2012	Food Waste Recycling	Tai Po/Fung Yuen Butterfly Reserve
Tai Po District Council	2 <sup>nd</sup> August, 2012	WasteReduction@TaiPo project	Tai Po
Hong Kong Institute of Architects (HKIA)	9 <sup>th</sup> August, 2012	Provided advice on preparation of paper proposing city farming for submission to HKSAR Government	HKIA
Partnerships for Community Development	17 <sup>th</sup> – 19 <sup>th</sup> October, 2012	Community-Supported Agriculture Symposium	Kadoorie Centre (Shek Kong)
Rosemary Morrow	11 <sup>th</sup> – 17 <sup>th</sup> & 23 <sup>rd</sup> – 28 <sup>th</sup> November, 2012	Permaculture Teacher Training Certificate Course	Tai Po
Numerous local and regional permaculturists	19 <sup>th</sup> – 22 <sup>nd</sup> November, 2012	South East Asian Bioregional Permaculture Convergence	Kadoorie Centre (Shek Kong)

# APPENDIX 2

Specialist scientific publications from **KFBG staff and consultants** (#) or collaborators/  
project executants/Studentship holders (\*) for 2012 are listed as follows:

TITLE	AUTHORS	JOURNAL / PUBLICATION
Comparative study of leaf morphology in <i>Aster hispidus</i> Thunb. var. <i>leptocladus</i> (Makino) Okuyama (Asteraceae).	H Hayakawa, Tunala, Y Minamiya, K Ito, <b>Stephan Gale</b> , J Yokoyama, R Arakawa, T Fukuda	<i>American Journal of Plant Sciences</i> 3: 110-113.
Community characteristics of tropical montane evergreen forest and tropical montane dwarf forest in Bawangling National Nature Reserve on Hainan Island, South China (in Chinese with English abstract).	*Long Wenxing, Zang Runguo, Ding Yi	<i>Biodiversity Science</i> (Chinese) 19 (5): 558-566.
Air temperature and soil phosphorus availability correlate with trait differences between two types of tropical cloud forests.	*Long Wenxing, Zang Runguo, Ding Yi	<i>Flora</i> 206(10): 896-903.
Within- and among-species variation in specific leaf area drive community assembly in a tropical cloud forest.	*Long Wenxing, Zang Runguo, Brandon S Schamp, Ding Yi	<i>Oecologia</i> 167(4): 1103-13.
Impacts of illegal trapping on endangered Big-headed Turtles in Hong Kong.	<b>Sung Yik-Hei</b>	<i>Abstract of ATBC Asia-Pacific Chapter Annual Meeting.</i>
From doing research to helping nature reserves – a case study from Hainan Island.	<b>Bosco Chan Pui-Lok</b>	<i>Abstract of ATBC Asia-Pacific Chapter Annual Meeting.</i>
Key biodiversity areas in the Indo-Burma Hotspot: process, progress and future directions.	AW Tordoff, MC Baltzer, <b>John R Fellowes</b> #, JD Pilgrim, PF Langhammer	<i>Journal of Threatened Taxa</i> 4(8): 2779-2787.
<i>Nervilia pangteyana</i> sp. nov., a terrestrial orchid for western Himalaya, India.	JS Jalal, <b>Pankaj Kumar</b> , GS Rawat	<i>Nordic Journal of Botany</i> 30: 100-105.
<i>Dendrobium multilineatum</i> Kerr (Orchidaceae): a new distributional record for Vietnam.	RK Kumar Choudhary, TT Bach, DD Huyen, LV Nong, DV Hai, BH Quang, <b>Pankaj Kumar</b> , S-H Park, C Lee, Y-M Lee, J Lee	<i>Taiwania</i> 57: 225-228.
On the occurrence of <i>Pelatantheria insectifera</i> (Orchidaceae) in Jim Corbett National Park, India.	JS Jalal, <b>Pankaj Kumar</b> , A Kotia, GS Rawat	<i>Richardiana</i> 12: 108-115.
Diversity and conservation of Hong Kong ferns.	<b>Ng Sai Chit</b> , YH Yan	<i>Newsletter of Biodiversity and Nature Conservation</i> 62(1).
Impact of atmospheric nitrogen deposition on soil properties and herb-layer diversity in remnant forests along an urban-rural gradient in Guangzhou, southern China.	*Huang Liuqing, Zhu Weixing, Ren Hai, Chen Hongfeng, Wang Jun	<i>Plant Ecology</i> 213(7): 1187-1202.

TITLE	AUTHORS	JOURNAL / PUBLICATION
Amphibian fauna of Hainan Yinggeling Nature Reserve, with new genus and species records for Hainan Island.	<b>Michael Lau Wai-Neng,</b> <b>Bosco Chan Pui-Lok</b>	<i>Chinese Journal of Zoology</i> 47(1): 51-61.
Ecology of Big-headed Turtle in Hong Kong.	<b>Sung Yik-Hei</b>	<i>Abstract of 5<sup>th</sup> Asian Herpetological Conference.</i>
Endemic and rare amphibians of Hainan Island, China.	<b>Bosco Chan Pui-Lok, Sung Yik-Hei</b>	<i>Froglog</i> 20 (5): 19-20.
Description of a new species of the genus <i>Xenophrys</i> Günther, 1864 (Amphibia: Anura: Megophryidae) from Mount Jinggang, China, based on molecular and morphological data.	Ying-yong Wang, TD Zhang, J Zhao, <b>Sung Yik-Hei</b> , JH Yang, H Pang, Z Zhang	<i>Zootaxa</i> 3546: 53-67.
New species of <i>Falcaustra</i> (Nematoda: Kathliniidae) in <i>Platysternon megacephalum</i> (Testudines: Platysternidae) from China.	Charles R Bursey, <b>Sung Yik-Hei</b> , Stephen R Goldberg	<i>Journal of Parasitology</i> 98 (3): 569-571.
Discovery of <i>Protophthirus maolanensis</i> in Guangxi, with taxonomic discussion.	*Tian-bo Chen, Jian Luo, *Yuanjun Meng, Pak-Ho Wan, Ke Jiang	<i>Sichuan Journal of Zoology</i> 32 (1) (Online pre-view).
<i>Tracacichthys tuberculum</i> , a new species of nemacheiline loach from Guangdong Province, South China (Pisces: Balitoridae).	Chun-Xian Du, E Zhang, <b>Bosco Chan Pui-Lok</b>	<i>Zootaxa</i> 3586: 304-312.
<i>Acrossocheilus longipinnis</i> (Wu 1939), a senior synonym of <i>Acrossocheilus stenotaeniatus</i> Chu & Cui 1989 from the Pearl River basin (Teleostei: Cyprinidae).	Le-Yang Yuan, <b>Bosco Chan Pui-Lok</b> , E. Zhang	<i>Zootaxa</i> 3586: 160-172.
Mixed flocks in Hainan's tropical forests.	<b>John R Fellowes</b> #	<i>China Birdwatch</i> 85: 27.
Contribution to the knowledge of Chinese Phasmatodea I: A review of Neohiraseini (Phasmatodea: Phasmatidae: Lonchodinae) from Hainan Province, China, with descriptions of one new genus, five new species and three new subspecies, and re-descriptions of <i>Pseudocentema</i> Chen, He & Li and <i>Qiongphasma</i> Chen, He & Li.	George Ho Wai-Chun	<i>Zootaxa</i> 3620: 404-428.