



## Diversification of Animals and Management of Eco Exhibits



### 1. Themed Exhibitions

As tie-ins to the Chinese Zodiac Year, we launched eight exhibitions including “Happy Niu (Ox) Year –Exhibition of Bovidae Specimens”, All About Bovidae –Special Exhibit 2009, and “Special Exhibition of Medicinal Insects and Medical Applications” and “Special Exhibition of Exotic Species in Taiwan” in the Zoo; and held three exhibitions outside of the Zoo in cooperation with National Taiwan Museum.

#### ● All about Bovidae – Special Exhibit 2009

(from April 30, 2009 to December 31, 2009)

This exhibition showcased the classification, distribution, evolution, food habits, behaviors, morphology, structure, and habits, as well the relationship between bovid and man, and the members of this family inside the Taipei Zoo. Not only were the public able to observe bovid specimens directly and learned about their skulls and hooves, witty games also helped visitors to recognize the different hoof prints and the different pair of horns.

#### ● Special Exhibition of Medicinal Insects and Medical Applications

(from February 15, 2009 to June 30, 2009)

The stereotype impression we have about insects is that pests like mosquitoes, flies, cockroaches and fleas cause diseases to human, but we don't often see their medicinal properties and special contributions to help man overcome illnesses. For instance China has had more than 2,000 years of history effecting insects as medicinal treatments, and that there are more than 300 insects including ants, bees, cockroaches, cicadas, tiger beetles, praying mantis, silkworms, and flies currently in use in Chinese medicine practices. Insects are the green food of the 21<sup>st</sup> Century according to nutritionists. For insects contain rich nutrition easily digestible by the human body such as protein, fat, carbohydrates, and high quantities of free amino acids, vitamins, various salts



and calcium. Aside from their rich nutrients, quite a few insects offer unique health-giving properties too. There is a tremendous potential doing research to develop economic entomology. Following technological advancements the range of “edible” insects has ballooned; from human food to health supplements, and someday humans just might be taking insect medication too.

This exhibition began from the long medicinal practices used throughout Chinese history to discuss the developmental potential in modern medicine, so that the general public may deepen their impressions about the ancient wisdom, and see the developmental potential of insect resources.

### ● Exhibition of Exotic Species in Taiwan

(from December 12, 2009 to December 31, 2010)

In recent years, due to raising population, rapid trade growths, and convenient transportation modes, exchanges between countries worldwide have risen. Increasing human activities have facilitated the spread of plants, animals and microorganisms to all corners of the globe rapidly. Non-indigenous species, originally introduced to the locale for agricultural purposes or as biological control agents, have subsequently become pests. The invasion of exotic (alien) species is now a global issue with rising complications and seriousness, for these species cause huge losses in agriculture and may even harm human health. This matter has become a problem that all nations, plus each and every individual, must face and confront without exception.

Biodiversity is the most important bioresource valued by all nations globalwide. However in the modern day, efforts to sustain the diversity of life on Earth have been significantly hampered by the destructions of habitats, over hunting, chemical pollutions, climate changes and invading exotic species. Habitat destructions or alterations as results of overwhelming pressures from population growth and economic development are the worst of them all. Especially from an island perspective, invasive exotic species pose the greatest threats to the local biodiversity.

The severity of threats invasive alien species have on biodiversity is second only to habitat loss, for they damage the conservation and sustainability of indigenous biodiversity on global, regional and local levels, and adversely affect the goods and services afforded by the ecosystems. Exotic species can endanger native species through mechanisms such as predation, competition and by spreading invasive exotic diseases; and in worse cases alter or put indigenous ecosystems to risk. Since island ecosystems have the worst defenses against exotic species, the divergent threats these alien species pose on island ecosystems are the most serious.

The likes of “American Bullfrog”, “Red-eared Slider”, “Tilapia”, Mosquito Fish, “Apple Snail”, “East Africa Land Snail”, and “Red Swamp Crayfish”, each and everyone a species familiar to us and often dominate Taiwan’s natural environment uninvited as well as hugging the media attention, are in fact exotic species. The primary reason why exotic species invaded Taiwan is man. Humans



「殺很大—臺灣外來種生物特展」開幕活動





introduce certain animals as food or pets, but when these animals either escape or abandon to the wild, they destroy natural environment and cause economic losses, compete with endemic species for food and habitats and render survival for the endemic impossible, reduce biodiversity, and even put human health and safety at risk. These are issues every one of us must face. This Exhibition of Exotic Species in Taiwan contained many “lethal and deadly” exotic species, we hoped that through display and explanation the public could be more mindful of these alien species, and therefore increase willingness to cooperate with governmental policies to assist preventing or eradicating these species, as well as notifying conservation or disease prevention agencies for proper handling.

## 2.Exhibition of Diverse Plants

The opening of the Giant Panda Exhibit coincided with the lunar Chinese New Year in 2009. We therefore trimmed plants and greeneries into animal-shape designs based on the auspicious theme of “Tuan Yuan Meal” (reunion meal), symbolizing the warm invitation animals sent to the public to spend New Year’s Festival with “Tuan Tuan” and “Yuan

Yuan”, as a token response to the anticipation and joy our nationals felt for their arrival.

## 3.Management of Ecological Environment of the Plants inside the Zoo

The Zoo conducted a distribution study on naturalized plants inside the Zoo during the year, and compared the findings to the research data back in 1998. The purpose was to exam the spatial distributions of invasive alien species such as the “mile-a-minute weed” (*Mikania micrantha*) and other potentially invasive plants on the Zoo compound, and use the data for monitoring basis as well as biodiversity references for the management of exotic species in the future.

The Zoo systematically eradicates invasive alien species. Currently only one species exists – the mile-a-minute weed. Our plant removal project, implemented since 2007, calls for using clippers or cutters to trim the vines by hand every September to December. This year we added volunteer forces to engage in a large-scale preventive management in accordance to our systematic research basis.





## Establishment of Environmental Education Area

### 1. Water Conservation and Energy Saving Environmental Education Area

Pertinent to the promotion of water conservation and energy saving education, guided tours to visit the Zoo's "water and energy saving facilities and rain/used water utilization areas" are on going.

The continual water conservation and energy saving projects include: the recollected pool water from the Amphibian and Reptile House was filtered and purified by the aquatic pond, lotus pond, and the yellow water lily pond, facilitated a saving of roughly 5 tons of public water supply a day. The water reused from the Asian Tropical Rainforest Area after filtration and purification by fountain water allowed a saving of about 4 tons of public water supply a day. We expanded the rainwater (reclaimed water) catchment systems and the reclaimed water grading system too. The Zoo recycled more than 12,000 tons of reusable water each month for the use of landscape irrigation, aquatic plants and public restrooms, instead of public water supply.

In terms with energy saving, Penguin House switched from using 10W light bulbs in emergency exits to 1W LEDs, for a saving of at least 1,000 kilowatt-hours of electricity each month. Both Insectarium and the Education Center made same switch-over, and respectively saved no less than 500 kilowatt-hours of electricity each month too. The project to change all the display lights inside the Zoo from 50W to 8W LEDs has finished the switch-over at the Education Center, the remaining are on-going to improve energy efficiency.

### 2. Self-Produce Animal-Excrement Compost, Recycling for Reuse

The Zoo recycled excrements of large herbivores and produced 116.8 tons of compost for the whole year, for use on shrubs and trees and to improve the soil quality, so as to reduce the volume of chemical fertilizer used necessary.

### 3. Continuing with Trash Separation and Resource Recycling

There were a total of 100 recycling bins and composite plastic recycling bag units throughout the Zoo, and as we strongly encouraged trash separation, a total of 81,244 kg of waste was recycled.

### 4. Promoting No-Smoking Environmental Concept to Create a "Smoke-Free Taipei Zoo"

Long before the Tobacco Hazards Prevention Act came into effect and banned smoking in all public facilities, Taipei Zoo had spared no efforts promoting No Smoking in public areas by asking people to refrain from smoking and gradually reduced our smoking areas year-on-year. The Zoo proactively prohibited smoking entirely beginning January 1, 2009, even before the official promulgation by the Department of Health on July 11<sup>th</sup>. We continue to broadcast announcements at random about our smoking ban measures, produce No Smoking signs and Smoking-Fine notices for posting at suitable locations, and our staff and volunteers also encourage visitors to extinguish their cigarettes on site, so as to create a premium visiting environment and recreational quality.

## Educational Promotion Activities

### 1. Enhancing and Promoting Zoo's Regular Educational Visits

A total of 29,804 fourth grade students from 163 primary schools in Taipei City participated in the educational zoo visits. 240 persons attended the teacher's learning camps organized for five sessions. The Zoo also continued to carry out holiday stationary guides, scheduled keeper's explanation services, and put out bilingual introduction boards.

To deepen the public's understandings for indigenous



動物爸爸 Jason YA! 暢遊園區談保育





animals and to strengthen their awareness for eco-conservation, we launched a new educational activity titled “Jason Ya! Tour the Zoo and Talk about Conservation” effective April 19. On the morning of the third Sunday every month, the zoo director personally leads a guided tour around the Formosan Animal Area armed with professional animal keepers and docent volunteers.

For the first time students from the Taipei School for the Visually Impaired were invited to the Zoo to experience the “My Animal Buddy” activity, an event designed to inspire awareness for nature by inviting them to touch animals and related specimens, have fun doing olfactory exercises and take a hearing tour; so as to maximize the Zoo’s capacity as an educational medium.

## 2.Promoting Themed Educational Activities both Inside and Outside of the Zoo

Educational activities, themed exhibits and seminars were designed to collaborate with major holidays and specific themes. In addition to the “ICE ZOO-Love for Taipei Zoo” summer series held in 2006 and 2007, the Zoo launched a series starting 2008 titled “Animal Summer” as a tie-in to the annual international conservation theme.

The Convention on the Conservation of Migratory Species of Wild Animals convened at the end of 2008 in Rome, Italy, declared 2009 as the Year of the Gorilla and unveiled an official global action to protect this species and its habitats. The World Association of Zoos and Aquariums and the Annual Meeting of the Conservation Breeding Specialist Group also began a series of activities in the Year of the Gorilla (2009) as well. The Taipei Zoo too, was an active participant on the international front, and vigorously discussed about finding a mate for our resident

gorilla Bao Bao, so as to strengthen this individual’s importance amongst the captive population worldwide. We strengthened our cooperation with other zoos home to captive gorillas, and enriched the exhibit environments for our two males “Bao Bao” and “Happy”, organized gorilla related conservation and educational activities as well as the “Animals’ Summer 2009 – My Gorilla Buddies” series, all in the hope for visitors to learn more animal facts, and build up their knowledge about cherish nature and animal conservation, through dynamic interactions.

### ● Animal Summer 2009 – My Gorilla Buddies

Gorillas inhabit the tropical and subtropical rainforests in Africa. However due to the many articles human use for daily life such as pepper, coffee, and medicine, originate from their habitats, the production of these agricultural and medicinal items have turned gorilla’s natural habitats into farm lands, causing their natural range to diminish and broken up. The survival of the gorilla population is at stake as the result.

This series of activities spotlights on gorillas and primates. We aspire that education could enlighten people that many things we use in life come from the rainforest. Excess human activities have caused deforestation, oil crises and insufficient water resource, etc... so when we take from nature, we must do so in a way that’s not harmful to the natural environment, so as to prevent undue havocs from happening and thus sustain an endless supply of natural resources.

Taipei Mayor Hau Lung-bin decreed special admission fees for months July and August as a measure to encourage the public to come to the Zoo and join the educational actions about gorilla conservation.





### ● Children's Nature Exploration Science Camp

Field observation and scientific note keeping are the basic skills for doing ecological and biodiversity researches, which is why students learning how to do explorations and keep science records are an important part in environmental education.

This camp was an activity designed to core on knowledge exploration and problem-solving solutions, based on insects and plants commonly found in the environment, so as to lead children enter the realm of natural science.

Activity contents included: explore the correlation existing in nature by using insects as a base; introduction to interdependence relationship between the organisms in natural environments and their surroundings; use insects excel in camouflage to train students on how to find insects hiding in the surroundings; know the difference between each type of insects; and how to collect plants and to make specimens.

Camp activities were organized at the Taipei Zoo, Hsinchu City's Jia-Dong Primary School, Hualien's GuFeng Primary School, ZhuoLe Primary School, YuLi Library, and GaoLiao Primary School, as well as Tatung County's ChengGong HoPing Primary School. A total of 384 students either from remote areas, aboriginal and new immigrant backgrounds, low income families, and suffering from cancer, attended the activities.

### ● "Journey to Explore Butterfly and Insect Industries" Children's Camp

This camp was designed for students to explore, prove theories using scientific methods, and to learn about the scientific technologies and principles required in the development of insect industry, through personal experience and observation. The aim of doing so was to bolster their interest, stimulate their thinking, and to inspire their ability to solve problems using scientific methods

Class contents included meet the butterflies, the life of a butterfly, introduction to butterfly habitats and plants, how to operate a butterfly farm, the function and conservational value of butterfly farms, insect experience, and eco-challenge.

This camp was organized specifically for minority children including those from low income families, remote regions, and suffering from

physical or mental disabilities. The purpose was for those students to have the opportunity to cultivate scientific skills and attitudes through experience.

The camp was held on a butterfly compound in Puli, Nantou. A total of 146 children, both from Childhood Cancer Foundation of Taichung Veterans General Hospital and aboriginal background, attended the camp. Another session was held at the Insect Ecological and Recreational Farm in Bagua Mountain, where 62 new immigrant and low-income students were in attendance.

### ● Green Thinking -- Carbon Emission Reduction Training Program

Course contents including Earth fighting back – Environment in Crisis, ecology, Earth system science, Taipei Zoo's Energy-Saving House, a Trip to Water (education and observation of rain/used water utilization), talk about energy-saving and carbon reduction from value clarification angle, Taiwan's water resources, etc., were used to train guides about carbon emission reduction. A total 120 attendees took part in three separate training sessions.

### ● Green Thinking -- Carbon Emission Reduction Lesson Plan (Activity) Design Entries

Educational models amassed through this Design Entries activity were used to advance the progress of Energy Saving Carbon Emission Reduction Project and to encourage teachers to use the Zoo's educational resources on the Zoo's compound wisely. A total of 26 entries were submitted, and 8 were winning works.







## Publications and News

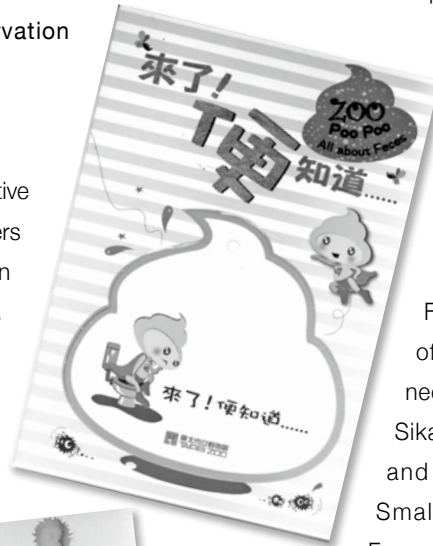
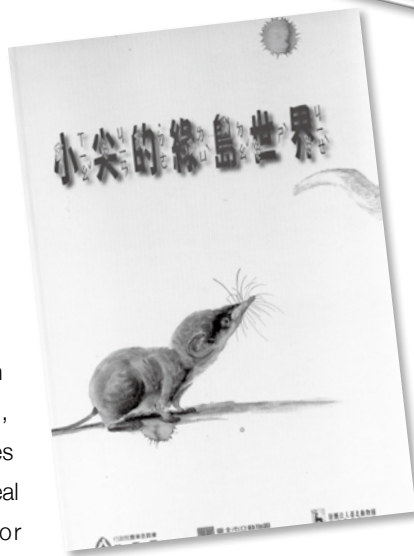
1. Taipei Zoo continued to publish zoo magazines, annual reports and academic journals. We published the following: "Pointy's Green Island", "Zoo Poo Poo-All about Feces", "Wake-Up Call from Taipei Animals – Hear Every Sound", and "Back to the Wild – Taiwan's Protected Animals and Ex-Situ Conservation Actions".

### ● "Pointy's Green Island"

Pointy is a Tada's Shrew, a subspecies native only to Green Island. This book takes readers to see the rich and unique animal ecology on the Green Island through Pointy's adventures. Animal illustrations inside are realistic and witty, making it easy for readers to identify these extraordinary wild animals.

### ● "Zoo Poo Poo-All about Feces"

This children's picture book is all about animal poops. The cute title, interesting illustrations, easy to understand text (Chinese with pinyin and English), stickers together with an entertaining game, transform boring feces knowledge into an ideal reading material for children.



### ● "Back to the Wild – Taiwan's Protected Animals and Ex-Situ Conservation Actions"

This compilation of research works from local conservation specialists dedicated to ex-situ conservation, contains a complete and systematic introduction to conservational successes and related strategies, and a full documentation of ex-situ conservation history. Conservation case studies include: Corals and Cetaceans of the Marine Ecosystem, Formosan Land-locked Salmon of the Stream Ecosystem, Ring-necked Pheasants and Formosan Sika of the Grassland Ecosystem, and Formosan Black Bears and Small Birdwing Butterflies of the Forest Ecosystem. The book also includes the importance and efficacy of in-situ and ex-situ conservation cooperation using the rehabilitation of the Taipei Frog as an example.

2. The Zoo uses the media as a channel for promotion putting forward conservation and education messages. For the year 2009 Taipei Zoo issued 162 press releases, strengthened web services and updated all the web contents in real time. The home page numbered 1,898,158 visitors for the year. Moreover, in conjunction to the network integration of Taipei City Government Organizations, the Zoo's English website came online on September 23, 2009.



臺灣黑熊保育宣導暨小小黑熊命名記者會





## ■ Numbers of Press Releases for Years 2007~2009

Unit: piece of news

Year	Number of Press Releases	Number of Media Reports
2007	130	1,345
2008	124	2,323
2009	162	2,333

## ■ 2009 Library Statistics

Item	Chinese Books	Western Books	Japanese Books	Total
Numbers	7,647	4,729	526	12,902

## ■ 2009 Numbers of Borrowing Statistics of Library Collection

Number of Borrowers	Number of Borrowed Books
1,117	3,443

# Innovative Educational Marketing

The implementation of conservation actions required diverse marketing and accessible education, ones that not only effectively expand the reach of conservation, also provide the public with knowledge and services pertinent to this subject. The radio program "Wake-Up Call from Taipei Animals", a show produced singlehandedly by the Zoo staff from strategy to post-production, takes advantage of the features and attributes of audio media to reach the listeners.



The program, coring on "animal anecdotes" and "conservation actions", airs every Saturday morning at 8 AM on Taipei radio station FM93.1 beginning February 7, 2009. The broadcasting range covers Taipei City, Taipei County and Taoyuan City. One may also tune-in the program online as well.

This program uses animated conversations between zoo workers and conservation specialists, to introduce different animal characteristics and ways of life, in depths print media could never achieve. The contents also help the listeners to find out about the diverse conservation and educational tasks the Zoo is currently involved in. Through topics such as wildlife in captivity and animal care the public can learn about animal behaviors and their living needs, so as to further their impressions about the role Taipei Zoo plays on wildlife conservation and education.

The Zoo turned the above program contents into audiobook in December 2009. "Wake-Up Call from Taipei Animals – Hear Every Sound" offers flexible services to anyone who wants to listen, so as to strengthen the efficacy of educational marketing.