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|----------------------|------|
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森林脉搏 Living Forests

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第七期 Issue No. 7

本期内容
Inside this issue

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二零零四年五月 May 2004



抓紧海南的森林
Holding on to Hainan's forests

嘉道理农场暨植物园简介

Introduction to Kadoorie Farm & Botanic Garden (KFBG)

嘉道理农场暨植物园是香港的一所慈善机构，早在 1951 年，嘉道理家族的两兄弟，罗兰士与贺理士，创办本园以推行农业辅助计划，帮助从大陆移民来香港的贫困农户自力更生。该计划帮助了超过三十万名农民改善生活。两兄弟于九十年代先后辞世，但其家族传统仍延续下来。嘉道理慈善基金会为中国和东南亚地区内服务贫困社群的计划提供资助，而嘉道理农场暨植物园则因应香港社会的转型，现已建成为一所自然教育与保育中心，并根据 1995 年通过的香港法例成为一家公益事业公司。我们的任务是 "提高大众对人与环境关系的认识，透过保育和教育，积极改善世界"。本园现推行的计划有野生动植物保育、可持续农业和环境教育等等。

Kadoorie Farm & Botanic Garden (KFBG) is a charity based in Hong Kong, with a tradition of agricultural aid dating back to 1951, when the two brothers Lawrence and Horace Kadoorie began a self-help scheme for poor immigrant farmers from China. This scheme was to help over 300,000 Hong Kong farmers to achieve a good standard of living. Both brothers died in 1990s, but the family's philanthropic activities continue. The Kadoorie Charities fund projects throughout China and the South East Asia region. KFBG, in response to changing priorities in Hong Kong, has become a centre for environmental education and conservation, enshrined by a Government Ordinance in 1995 as a public corporation. The Mission Statement of the KFBG is "TO INCREASE THE AWARENESS OF OUR RELATIONSHIP WITH THE ENVIRONMENT AND BRING ABOUT POSITIVE CHANGE IN THE WORLD THROUGH CONSERVATION AND EDUCATION". KFBG now has thriving programmes in wild plant and animal conservation, sustainable agriculture, environmental education and other areas.

于《森林脉搏》内刊登之文章，其内容纯属作者之个人意见，与本园立场无关。
The articles in *Living Forests* represent the personal views of the authors and are not necessarily shared by the editors or by KFBG.



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Front page photo - by Jiang Enyu.
背景照由李国诚拍摄。
Background photo - by Lee Kwok Shing.

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编辑的话

Editorial

海南岛为全球第四十三大岛，面积在热带亚洲地区中排行第十。海南岛地处浅海大陆架，最近一次与亚洲大陆相连距今仅数千载，岛内生物群因而并不如苏拉威西及婆罗洲那些岛屿，在全球享有举足轻重的独特地位。但海南本身历史久远，温暖潮湿的气候造就了丰富的生物多样性。由于东亚热带地区的低地早已受人为活动的洗礼而改变，海南的高山和溪谷便顺理成章地成了适应这独特环境的生物及生态系统(仍在不断演化)的庇护所。

本期《森林脉搏》以海南岛为主题，并邀请到不同的保育专家与读者分享他们对岛内森林的一些见解。首先从海南的生物地理特性娓娓说起，再从海南的历代变迁阐述人类开发如何改写了当地森林的命运。不过，最重要的还要看我们现在怎看待及管理它们，以及用什么法子亡羊补牢，为海南建构出一个绿色的明天。今期我们得到各界人士踊跃来稿，撰述海南的现行保育方案，为了保护海南，他们都不遗余力地推动自然保护区的调查工作、倡议制衡威胁的对策、提高自然保育意识及进行森林恢复。海南岛是全球极危的海南长臂猿仅余的一片乐土，究竟岛上的自然生态遗产能否逃过被侵蚀的厄运？相信大家都会怀著乐观的心拭目以待。

The island of Hainan is the 43rd-largest separate land mass on Earth – the tenth-largest island in tropical Asia. Sitting on a shallow continental shelf it has not long been separated from the Asian mainland – just a few thousand years since the latest connection – and so its biota lacks the global distinctiveness of Sulawesi or Borneo, for example. But the land itself is very old, and for much of its existence the warm wet conditions have favoured prolific life. As human influence has transformed the lowlands of tropical East Asia, the mountains and valleys of Hainan have grown in importance as refuges for species and ecosystems uniquely adapted (and still adapting) to this setting.

We devote the bulk of this issue of *Living Forests* to the island, inviting various experts to share their perspectives on Hainan's forests. We begin with biogeography, and a sense of the island's biological identity; we proceed with history, and how forests and their life have changed with the rise of humans. The thrust though, is how we perceive and manage the forests today, and how we might do better tomorrow; various contributors discuss current efforts on inventorying nature reserves, countering threats, promoting awareness and allowing forest recovery. Will we reverse the erosion of the island's natural heritage, symbolised by such critically threatened residents as the Hainan Gibbon? The world looks on in hope.

人工养殖中国野生大鲵

致编辑，

本人欲回应有关第六期《森林脉搏》第四十六页刊登娃娃鱼课题组于 1995 年成功人工养殖大鲵的报导。1978 年，湖南省水产科学研究所和湖南省桑植县娃娃鱼研究所宣布人工繁殖大鲵获得初步成功；此后，大鲵的人工繁殖和养殖技术不断取得进步，受精率从 1978 年的 68% 提高到 2003 年的 96%，孵化率从 1978 年 2.5% 提高到 2003 年的 18%，初步实现了人工条件下，大鲵人工繁育的成功。

人工繁殖大鲵仅仅是保护这一珍稀濒危物种的手段之一，在野外捕捉大鲵做亲本既可能造成种系混杂，也会造成野生种群数量的下降，异地人工繁育大鲵只可作为应急的保护措施；目前，中国大鲵仍然具有比较丰富的遗传多样性和具有自然恢复的能力，保护大鲵的关键是保留足够的野生种群实行原地保护、地方种群遗传多样性的保存和自然栖息环境的保护。

李成

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回应

以上是一位读者回应上一期《森林脉搏》的来函，欢迎各位读者就本刊各项内容发表意见或提供资料。

生物多样性公约缔约国大会第七次会议

生物多样性公约缔约国大会第七次会议已于 2004 年 2 月 9 至 20 日假马来西亚吉隆坡的太子世贸中心举行。出席人数逾 2,300 名，与会者分别来自 161 个国家的政府机关、联合国机构、非政府组织、跨政府组织、原住民及地方社区、学术及工业界别人士。大会以探讨保护区在生物多样性保育中担当的角色、科技转移与技术合作、山地生态系统的生物多样性为题，并贯彻落实第六次大会定下于 2010 年前明显减慢生物多样性损耗速度的目标。此外，大会亦跟进了「可持续发展世界高峰会议」提出的呼吁，号召各缔约国坐言起行，按照生物多样性公约的框架，制定共同分享从利用基因资源所得利益的国际体制。

CAPTIVE BREEDING OF GIANT SALAMANDER IN CHINA

Dear Editors,

Living Forests 6 (p. 46) referred to a breakthrough in captive breeding of Giant Salamander made in 1995 by a Salamander Reproduction Task Force. Hunan Provincial Institute of Aquatic Sciences and Sangzhi Institute of Giant Salamander, Hunan gained preliminary success in the artificial breeding of giant salamander in 1978. Good progress was made thereafter in artificial breeding and raising techniques; the insemination rate increased from 68% in 1978 to 96% in 2003 and the hatching rate rose from 2.5% in 1978 to 18% in 2003.

But artificial breeding is just one of the means to save this rare and endangered species; catching salamanders for breeding may lead to outbreeding and a decline of the wild population, and *ex-situ* conservation can only be regarded as a contingency measure. As Chinese Salamander is still of comparatively rich genetic diversity and capable of natural recovery, most critical to saving the species is to maintain sufficient wild populations for *in-situ* conservation, conserve the genetic purity of sub-populations and protect natural habitats.

Li Cheng

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Chengdu Institute of Biology (CAS)
PO 416, Chengdu, Sichuan, 610041)

Feedback

The above was received in response to a news item in the last issue of *Living Forests*. Readers are welcome to send information or views on any issues covered.

7th MEETING OF THE CONFERENCE OF THE PARTIES, CONVENTION ON BIOLOGICAL DIVERSITY

The 7th meeting of the Conference of the Parties (COP-7) to the Convention on Biological Diversity (CBD) took place from 9-20 February 2004, at the Putra World Trade Centre in Kuala Lumpur, Malaysia. Over 2,300 participants attended, representing 161 governments, as well as UN agencies, non-governmental organisations (NGOs), intergovernmental organisations (IGOs), indigenous and local communities, academia and industry.

Top issues at the conference included the role of protected areas in the preservation of biological diversity, the transfer of technology and technological cooperation, and the biological diversity of mountain ecosystems, as well as the implementation of the target set at COP-6 to achieve a significant reduction in the rate of loss of biodiversity by 2010. COP-7 also followed up on the call for action issued at the World Summit on Sustainable

与会单位于会议进行期间亦举办了百多项相关活动，藉此宣扬新的保育理念及游说与会者加入行动行列。当中一项由嘉道理农场暨植物园主办、于 2 月 13 日举行名为「华南自然保护区管理之挑战与转机」的活动，旨在促进与各国代表的讯息交流并与有意合作之团体建立伙伴关系。

「凝聚共识、达成决策」是生物多样性公约的基本原则，要取得积极正面的成果全赖缔约国的参与及信守承诺。然而，发展中及已发展缔约国的意见南辕北辙，以及政府代表、非政府组织及地方群体抱持的观点迥异，使这项工作变得极其艰巨。这种分歧正反映在公约第三个方针 - 公平均等地分享基因资源带来的利益 - 的讨论上。争论如斯激烈，使大会扩大讨论文件范围，让各与会者尽情抒发意见。于是，体制内容最终扩展至不仅覆盖基因资源，更涉及传统知识，并须确保当地居民都能参与议论。这绝对是切实推行公约的一步，但具体措施仍有待落实，以彰显生物多样性公约作为有效政策框架解决利益共享议题的适合性。

这是本园首次参与生物多样性公约缔约国会议。我们从中得以扩阔视野，体察可持续发展及生物多样性保育的社会经济及环境因子之间的密切联系。作为会后跟进工作，本园已于 2004 年 2 月 27 日假世界自然(香港)基金会总部进行简报，盼能充当国际与本地间沟通桥梁，共同探讨生物多样性公约的内容。我们亦殷切期待与本港及国内的保育人士分享此行收集的资讯及经验。欲交流之人士请电邮至 scbt@kfbg.org 与我们联系。

王丽贤

(嘉道理农场暨植物园)

相关讯息

生物多样性公约 (CBD)

<http://www.biodiv.org/convention/articles.asp>

缔约国大会 (COP)

<http://www.biodiv.org/convention/cops.asp>

Development to negotiate an international regime on access to, and sharing of, the benefits derived from utilising genetic resources, within the CBD framework. In parallel to the conference, there were over a hundred side-events, announcing new conservation initiatives and/or lobbying for actions. KFBG hosted one side-event entitled 'Challenges and Opportunities in Nature Reserve Management in South China' on 13 February, to share our information and elicit partnerships with interested parties.

Making decisions by consensus is a ground rule for CBD, and constructive output relied entirely on participation and commitment. However, the disparate views of Party countries from the North and South, as well as different perspectives held by government delegates, NGOs and indigenous communities, make this task extremely difficult. These contrasts were clearly reflected in the discussion regarding the Convention's third objective: the fair and equitable sharing of benefits arising out of the utilisation of genetic resources. The heated debates eventually produced a text broad enough for all Parties to develop the confidence to continue the negotiation process – the regime's scope was eventually extended to cover not only genetic resources but also traditional knowledge, as well as ensuring indigenous participation in the negotiation. It was a positive step but concrete measures are awaited to show the appropriateness of CBD as an efficient policy framework to address benefit-sharing.

This was the first time KFBG had participated in a COP meeting of CBD. The exposure has widened our perspective regarding the close linkages of socio-economic and environmental factors in sustainable development and biodiversity conservation. To follow up on our participation in CBD, the KFBG delegates organised a briefing programme at the Headquarters of WWF Hong Kong on 27 February 2004. We hope we can serve as a bridge between international discussion under CBD and the local context. We are keen to share the information collected and exchange views regarding CBD with conservationists in Hong Kong and China – please contact us by email at scbt@kfbg.org

Idy Wong

(KFBG)

Further reading

Convention on Biological Diversity (CBD)

<http://www.biodiv.org/convention/articles.asp>

Conference of the Parties (COP)

<http://www.biodiv.org/convention/cops.asp>

嘉道理生物多样性奖学金消息

二零零四年嘉道理生物多样性奖学金将于本年五月开始接受申请。欢迎各位在华南地区从事野生动植物研究的博士及硕士研究生申请。详情请浏览本园网页 www.kfbg.org 公布的最新消息。

2001 年度奖学金得主硕士研究生徐振华先生由于未能履行奖学金接纳书所订要求，本园现正式终止对其「车八岭自然保护区膜翅目多样性研究」的资助。

吴狄姬

(嘉道理农场暨植物园)

保育悲歌

2003 年 10 月，广东省韶关市林业局副局长朱祖就先生在柬埔寨期间不幸遇上车祸丧生。朱局长对促成本园与韶关市林业局合作事宜帮助甚殷，更主动协助统筹。纵使公务繁忙，在本园开展红外线自动照相机哺乳类动物调查初期，朱局长仍在百忙中抽空，陪同中国项目成员前往车八岭国家级自然保护区考察。本园全人谨向他的亲属及同僚致以最深切的慰问。

同年 10 月，我们痛失了另一位挚友——Heinz Hafner 教授，他与癌魔抗战两载，可惜终与世长辞。Heinz 是瑞士的生物学家，他一直醉心鹭鸟研究，在法国的 Tour du Valat 生物站工作多年，并任世界自然保护联盟物种生存委员会鹭鸟专家组的组长。Heinz 在 2000 年曾与本园研究队一同到国内进行全球最稀有的鹭鸟——海南鴈的调查。此行使他对中国一见倾心，每每忆述昔日在国内接触的人与地时，仍会兴奋雀跃。他生前为人胸襟广阔，相信曾与他共事的人都会永远怀念他。在此，我们谨再次向他的亲友致以挚诚的吊慰。

陈辈乐，费乐思

(嘉道理农场暨植物园)

KFBG BIODIVERSITY STUDENTSHIPS NEWS

An invitation for applications for the 2004 KFBG Biodiversity Studentships will be issued in May 2004. Application from M.Phil. or Ph.D. students conducting research on wild fauna and flora in South China are welcome. Please visit the KFBG website www.kfbg.org for the latest announcements and details.

One studentship project begun in 2001, on Hymenoptera biodiversity in Chebaling National Nature Reserve, was terminated after the beneficiary, Mr Xu Zhenhua, was unable to meet the Terms of Acceptance of the award.

Norris Ng

(KFBG)

SAD NEWS

In October 2003, Deputy Director Zhu Zujun of Shaoguan Forestry Bureau, Guangdong Province died in a car accident while travelling in Cambodia. Director Zhu was instrumental and very supportive in the current collaborative work

between Shaoguan Forestry Bureau and KFBG; despite his hectic schedule, he accompanied KFBG China Programme members to Chebaling National Nature Reserve at the beginning of our ongoing camera trapping mammal survey. We are sure all who knew Director Zhu cherished his enthusiasm and openness, and KFBG offers its deepest sympathy to his family and colleagues.

Also in October, we lost another friend—Professor Heinz Hafner, after his two-year battle with cancer. Heinz was a Swiss biologist with a passion for herons and egrets, who had worked for many years at the Tour du Valat Biological Station in France; he was also co-chair of the IUCN SSC Heron Specialists Group. In 2000, he came to China to join the KFBG team in a survey of the world's rarest ardeid, the White-eared Night Heron. He fell in love with the country, and spoke with great warmth and enthusiasm of the people and places he met. No-one who worked with Heinz will forget his *joie-de-vivre* or his generosity of spirit; we again send condolences to his family and friends.

Bosco Chan, John Fellowes

(KFBG)



(左二) 朱局长正与中国项目成员进行会议
(Second from left) Director Zhu in discussion with CP members



(中) Heinz Hafner 教授参与 2000 年海南鴈调查
(Middle) Prof. Heinz Hafner participating in the 2000 White-eared Night Heron survey



专题

Feature articles

Biogeographical Characteristics

海南岛的生物地理特征 Biogeographical characteristics of Hainan Island

张荣祖 (中国科学院地理研究所)

Zhang Rongzu (Institute of Geography, Chinese Academy of Sciences)

海南岛是中国的第二大岛，位于北纬18°9'-20°11'和东经108°36'-111°4'之间，面积33,600平方公里，仅次于台湾。海岛北面隔约30公里宽的琼州海峡与雷州半岛相对，东、西、南面被热带海洋包围，分别与菲律宾、越南、南洋群岛相望。在生物地理区划系统中，海南岛被划属于东洋界（Oriental Realm）中的华南区（South China region）。

东洋界在地理上包括东南亚一带和中国秦岭—淮河一线以南、横断山以东的广大地域，它的核心地带为印度尼西亚、菲律宾、马来半岛、中南半岛和中国的东南沿海地区。海南岛就在此核心地带。东洋界生物区系的最主要的特点是自从第三纪或更早时期以来，这一地区的气候未经巨大变化，而处于相对稳定的湿热状态，加以内部生境复杂繁多，有利于物种的分化。而且这一地区处于南北古陆接触地带，发生过南北古陆物种的相互交汇。因此东洋界地区是世界上物种最丰富的地区之一，并且保存了很多第三纪的子遗种。

海南岛本是大陆的一部分，在距今约200万年前早更新世时，海水侵入了今日的琼州海峡，才把海南岛分离出来。自成岛以后，由于地壳的变动和海水的升降，海南岛曾与大陆至少有过两次相联。因此，海南岛上的动植物主要源于大陆，与中国大陆和中南半岛相同的物种很多，尤其是与闽、广、桂沿海地带的，因此划属华南区。依照对繁殖鸟类的统计，海南与闽广一带相似的百分率达73%；与滇南山区为53%¹。然而，因为孤立和面积不大，岛上缺乏很多大陆上的生物，如犬科、大型猫类及牛科。海南岛的两栖类、爬行类、鸟类、兽类、昆虫和种子植物分别占全国各类总数的14%、26%、29%、15%、10%和19%，但面积仅占全国0.35%，

Thirty kilometres from Leizhou Peninsula across Qiongzhou Strait in the north, with the Philippines in the east, the Greater Sunda Islands in the south and Vietnam in the west, Hainan is the second largest island in China after Taiwan. With an area of 33,600 km², Hainan Island is at 18°9'-20°11'N, 108°36'-111°4'E. Biogeographically it belongs to the South China region of the Oriental Realm.

In China the Oriental Realm lies to the south of Qinling Mountains and the Huaihe River, and east of the Hengduan Mountains. Globally its centre is in the Greater Sundas, Indochina and southeast coast of China. Since the Tertiary Period or earlier, the Oriental Realm has been characterized by relatively stable, humid and warm climate and diverse natural habitats, all conducive to the radiation of species. The collision of the Australian plate with the Southeast Asian continental shelf in the Miocene, 25 million years ago, prompted an exchange of species between them. Located in an area of convergence, the Oriental Realm has among the richest biological resources in the world, including many relict taxa of the Tertiary.

Hainan Island was formerly part of mainland China, but was separated by the formation of the Qiongzhou Strait in the Early Pleistocene (2 million years ago). Hainan experienced at least two continental connections thereafter, owing to plate movements and sea level changes. Consequently, Hainan's flora and fauna have their origins in mainland China, bearing great similarity to those of Indochina, and especially to those along coastal regions in Fujian, Guangdong and Guangxi, such that Hainan is considered part of South China. Analysis of the resident bird fauna indicates that Hainan's similarity to Fujian-Guangdong and mountainous South Yunnan is 73% and 53% respectively¹. Though its isolation and small area are reflected in the absence of many mainland taxa (such as canids, large cats and bovids), its biota is rich considering it occupies only 0.35% of China's total land area. Hainan has a significant proportion of the total



海南省拥有如此丰富的生物，若以物种密度来计，可能为全国之冠。

自海南岛孤立以来，许多与大陆共有的物种进化为岛屿亚种，有些还演化为本岛特有种。海南坡鹿（*Cervus eldi hainanus*），还有巨松鼠（*Ratufa bicolor hainana*）和白鹇（*Lophura nycthemera whiteheadi*）等都是中南半岛和华南的种而在本岛分化为特有亚种。海南长臂猿（*Nomascus* sp.）及海南孔雀雉（*Polyplectron bicalcaratum* 或 *P. katsumatae*）是特有的岛屿亚种还是特有种，尚在争论中。海南特有种在各类生物中都有，如两栖类中的海南湍蛙（*Amolops hainanensis*），爬行类中的霸王岭睑虎（*Goniurosaurus bawanglingensis*），鸟类中的海南山鹧鸪（*Arborophila ardens*），兽类中的海南兔（*Lepus hainanus*），淡水鱼类中的保亭近腹吸鳅（*Plesiomyzon baotingensis*）等等。本岛各类群特有种所占的比例（表 1）与它们的扩散能力成反比。

门类 Group	兽类 Mammalia ²	鸟类 Aves ²	爬行类 Reptilia ²	两栖类 Amphibia ²	淡水鱼类 Pisces ³	昆虫 Insecta ⁴	种子植物 Spermatophyta ⁵
海南录得种数 No. of species recorded in Hainan	76	344	93	38	85	5,842	2,400
中国录得种数 No. of species recorded in China	500+	1,186	352	435	709	34,000 ⁶	24,500
(a)海南特有种占海南省种数的比例(%) % of Hainan species endemic to Hainan	5.2	0.6	4.3	21.1	34	14.6	40
(b)中国特有种占海省种数的比例(%) % of Hainan species endemic to China	17.4	6.7	35.8	37.4	-	-	-

表 1. 海南及中国录得的各类群种数及(a)海南特有种占海南省种数的比例及(b)中国特有种占海南省种数的比例

Table 1. Number of species recorded from Hainan and China in each animal and plant group, and proportion of Hainan species endemic to (a) the island and (b) China.

有关资料来源，请对照参考文献

For data sources (1-6) see references.

生物地理特征

岛上有些典型热带种类，不见于中国东南沿海，却分布于中南半岛和云南南部，有些甚至达印度和南洋群岛。

例如头盔蟾蜍(*Bufo galeatus*)、瘰鳞蛇(*Acrochordus granulatus*)、棕腹隼雕(*Hieraaetus kienerii*)、爪哇金丝燕(*Collocalia fuciphaga*)、坡鹿及大泡灰鼠(*Berylmys berdmorei*)。这表明海南岛生物地理的特征较华南大陆地区更具热带的色彩，并且说明在更新世时海南岛与南部岛屿及中南半岛也有过陆地相联，而岛上亦一直保持热带气候。

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Hainan supports a number of tropical species which do not occur in China's southeastern coastal areas, but are distributed in Indochina and South Yunnan. Some of these also occur in India and islands of the Greater Sunda Islands. Examples are the toad *Bufo galeatus*, the snake *Acrochordus granulatus*, Rufous-bellied Eagle *Hieraaetus kienerii*, Edible-nest Swiftlet *Collocalia fuciphaga*, Eld's Deer and Small White-toothed Rat *Berylmys berdmorei*. Thus Hainan has far more tropical elements than other places in the South China region, reflecting the continental connection between Hainan and the Sunda Shelf during the Pleistocene, and the persistence of the tropical climate on the island.

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海南热带雨林的过去、现在和未来

Past, present and future of Hainan tropical rainforests

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海南岛, 祖国最年轻的省份、最大的经济特区, 一颗璀璨的绿色明珠。她的绿, 源自于岛上神秘的热带雨林。地处热带亚洲北缘的她, 总面积3.39万平方公里。以五指山、鹦歌岭为隆起核心的中高周低地貌, 使热带雨林在全岛生态环境保护和经济社会可持续发展中占非常重要的地位。热带雨林是海南岛这颗绿色明珠的精华所在。

然而, 海南岛的热带雨林却经历了人类对她的无数次浩劫, 森林面积的变化与人口、社会和经济的发展密切相关。据《汉书》记载, 海南岛在远古为蛮荒之地, 全岛几乎被热带原始森林所覆盖, 抱粉学的研究证明, 在西元前 111 年海南岛划入西汉王朝版图之前, 全岛的森林覆盖率达 90%¹。汉代, 汉人大量南迁海南, 带来了先进的金属工具, 开荒耕种, 加速了人类对海南岛原始森林的开发利用。

到了唐代, 朝廷把环海南岛列入开发范围, 此时由于人口增长, 手工业、建筑业和运输业的发展, 对珍贵木材资源的需求加剧, 导致了海南热带森林资源的消减。在宋朝, 大陆南来的移民更多, 对土地资源的需求更甚, 人们不得不从沿海地区向山区扩展, 此时海南中部的五指山区土著也学会了使用金属工具, 加上海上贸易发达, 对珍贵木材和南药、藤条等资源的需求量大增, 更加快了对热带森林干扰破坏, 同期, 沿海红树林也开始作为利用物件而遭到了砍伐。明、清是海南岛全面开发

Hainan Island, China's youngest province and largest special economic zone, is renowned as a "Green Pearl". Its lush green originates from its mysterious tropical rainforests. With an area of 33,900 km², Hainan is at the northern margin of tropical Asia. The landscape, characterized in the centre by high mountains, mainly in the Wuzhishan and Yinggeling ranges, and at the margins by flat low-lying land, places the tropical rainforests in a very important position in the ecological conservation and sustainable development of Hainan. Tropical rainforests are the radiance of this green pearl.

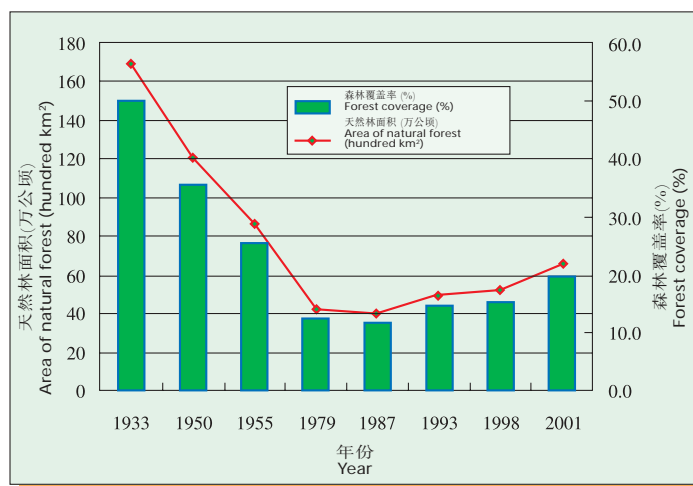


图1. 海南省热带天然林变化图 (上世纪 80 年代降至低谷, 90 年代开始回升)
Fig.1 Changes of Hainan tropical natural forest cover (a minimum was encountered in the 1980s, and forest area began to recover in the 1990s)

palynological studies also indicate Hainan's forest cover was as high as 90% before its inclusion in the territory of the Western Han Dynasty in 111 B.C.¹. Mass migration of Han people to Hainan, bringing along advanced metal tools for forest clearance and to assist farming, accelerated the exploitation of primary forests during the Han Dynasty.

In the Tang Dynasty (618 A.D. -907 A.D.), the Government designated the coastal region of Hainan for development. The growth of the human population, together with developments in handicrafts, construction and transportation, saw an escalation of the demand for precious timber, resulting in a reduction of forest cover on the island. The influx of more and

Sadly, the tropical rainforests in Hainan have suffered immeasurable human destruction, with changes in forest size linked closely to population growth and socio-economic development. According to "Han Shu" (the History of the Han Dynasty (140 B.C. to 220 A.D.), Hainan Island remained unexplored in ancient times, being almost covered by primeval tropical rainforests;

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利用土地的时期, 森林已成为主要的资源开发物件, 并且向更深的山区进发, 致使山区腹地的森林遭到了不同程度的破坏^{1,2}。

如果说历史上的几次开发浪潮对海南岛热带森林的破坏程度还有限, 那么, 近代对其开发则在某种程度上来说是毁灭性的。近代的开发始于 20 世纪 30 年代的日军侵华时期, 当时有岛田、王子等四家大公司在崖县 (三亚)、陵水、感恩 (东方)、昌江等县进行大规模的采伐, 光木材加工厂就有 18 家, 工作人员达 1500 人, 铁路修到了伐区, 引进了先进的机械化设备, 每年的木材产量达 1 万立方米、森林资源消耗达 2 - 3 万立方米以上, 且只采伐不抚育。1933 年日资公司进驻海南前的森林覆盖率为 50%, 但到 1950 年时仅剩 35%, 面积由近 17,000 平方公里减少到约 12,000 平方公里^{2,3}。

20 世纪 50 年代中后期, 为了给国家提供更多高素质热带硬木资源, 海南岛成立了 11 家森工企业采伐热带森林, 尽管当时已意识到森林后备资源的重要性, 也提出了“采育择伐”的模式, 但限于当时的认知水平和条件, 在实施过程中多形成了变样的采育择伐, 致使森林更新不良, 许多地段演变为退化生态系统⁴。同期, 海南还掀起了开荒种植橡胶的热潮, 当时有关部门划定了 8,000 平方公里的土地 (其中 4,340 平方公里为热带雨林, 占当时天然林的 50.3%) 来种植橡胶, 受影响天然林地中多为以龙脑香科树种青皮 (*Vatica mangachapoi*) 为优势的热带低地雨林。

至 80 年代中后叶, 海南的热带天然林面积下降到历史的最低点⁵, 仅有 30 余万公顷, 森林覆盖率约 9%。此时, 各级政府、学术界和社会有关人士意识到海南岛的热带森林如果再不加以保护, 就会对全岛的生态环境产生严重的影响, 为此海南各级政府加大了对热带天然林保护的力度, 对一些极度退化的灌丛草地和质

more migrants to Hainan in the Song Dynasty (960 A.D. -1279 A.D.) further intensified the demand for land, increasing exploitation in the mountainous interior. Mastery of metal tools by indigenous tribes in the Wuzhishan range, coupled with the flourishing maritime trade, aggravated the pressure on precious timbers, traditional herbal medicine and rattan, and accelerated the disturbance and destruction of the tropical rainforests. Logging of coastal mangroves also surged. Land exploitation was at full speed in the Ming (1368 A.D. -1644 A.D.) and Qing (1644 A.D. -1911 A.D.) Dynasties, and forests were inevitably opened up. Those in the hinterland in particular were damaged to varying extents by encroachment in mountainous areas^{1,2}.

If the various historical phases of exploitation had only limited destructive impact on Hainan's tropical rainforests, recent events were more detrimental. During the Japanese invasion in the 1930s, large-scale logging was carried out in places like Yaxian (Sanya), Lingshui, Gan'en (Dongfang) and Changjiang Counties by four big enterprises; for timber processing alone there were 18 factories, employing 1,500 staff. With construction of railways to the logging concessions and introduction of advanced machinery, annual timber production reached 10,000 m³ at the expense of consuming more than 20,000-30,000 m³ of forest resources per annum. These logging activities took place without any subsequent replanting. Before the stationing of Japanese firms on Hainan in

1933, forest cover was 50%, but it was down to 35% by 1950, with forest area decreasing from 17,000 km² to 12,000 km²^{2,3}.

To provide the country with more high-quality hardwood resources, 11 forestry enterprises were established in Hainan in the mid- to late-1950s to log tropical rainforests. Though people were aware of the importance of forest "reserves" and espoused a "nursing the young and strong and culling the old and weak" model, limitations in knowledge and conditions resulted in poor implementation and forest regeneration was poor, with much degradation of the ecosystem⁴. Meanwhile, with the rush to clear lands for rubber plantation, local authorities designated 8,000 km² of woodland for rubber monoculture, of which 4,340 km² - 50.3% of the natural forest remaining at the time - was tropical forest. Much of this tropical forest was lowland rainforest dominated by the dipterocarp *Vatica mangachapoi*.



图2. 上世纪 80 年代, 刀耕火种盛行, 在五指山地区已烧垦至海拔 800 米的山地, 产生了严重的水土流失等生态环境问题 (李意德摄于 1989 年五指山市毛阳乡)
Fig.2 In the 1980s, the prevalence of slash-and-burn cultivation cleared hilly areas of Wuzhishan up to 800m, causing serious environmental problems such as soil erosion. (Photo taken by Li Yide at Maoyangxiang, Wuzhishan in 1989).



照片由作者李意德提供 Photo by author

图三. 海南尖峰岭保存较好的热带原始山地雨林(李意德摄于2003年)
Fig.3 A well-preserved tropical primary montane forest at Jianfengling, Hainan (Photo taken by Li Yide in 2003)

量低劣的次生林实施封育保护；1993年在海南林业经济极度困难的情况下，由尖峰岭林区开始率先实施停止采伐热带天然林，1994年全岛全面停止商业性的采伐，为此海南省每年投入了3,650多万元人民币的天然林保育资金，用于各森工采伐企业的人员分流、封山育林、次生林改造等。到1998年，热带天然林面积已有较程度的恢复，面积达5,136平方公里，但原生性较强的热带森林面积已很少，大约只占全岛面积的约6%左右，面积不到2,000平方公里⁶。同年开始，国家实施天然林保护工程和退耕还林还草工程，每年国家投入资金2,200多万元人民币，海南省配套投入1,000多万元人民币，使海南天然林进入到一个有法制条件保障下的休养生息时期，至2001年底，海南岛的热带天然林面积已恢复到6,590平方公里。

显然，天然林保护工程的实施，对海南森林和生态环境的保护不仅是一个福音，也取得了世人瞩目的成效。但是，国家天然林保护工程只是一个中期的政策，到2010年后怎么办？国家目前在森林保护的财政不够，海南也是一个财力弱省，天然林又集中在省内中南部的贫困山区，如何解决区内居民的生活出路，提高他们的生活水平是摆在各级政府面前的重要议题。生态公益林补偿是一个可行的办法，可以借鉴广东省的经验(见框图)，同时以长短结合的方法种植海南名贵乡土树种和南药等，进行立体经营，政府应在技术、资金、市场等方面进行引导，促使林区老百姓脱贫致富，同时严禁大规模的破坏性开发，相信海南岛未来的热带森林将会保护得更好，生态环境将会更加优美。

In the mid- to late-1980s, the extent of tropical rainforest fell to a historical low of around 3,000 km², with a forest cover of 9%⁵. Governments at all levels, the academic sector and other concerned parties sensed that without greater protection of Hainan's remaining tropical forests, there would be grave impacts on the ecological environment of the island. The Government accelerated its forest conservation efforts by closing extremely degraded shrubland and secondary forests of low quality for regeneration. A logging ban was first adopted at Jianfengling in 1993, during a time when Hainan forestry faced extreme economic hardship. In 1994, a commercial logging ban was implemented all over Hainan, and annual investment of over RMB¥36.5 million was made as a natural forest conservation fund, available for redeployment of staff in the logging industry, mountain closure for forest recovery and enhancement planting of secondary forests. Major progress was achieved by 1998 when total tropical forest area had increased to 5,136 km², but there remained few relatively pristine forests, occupying merely around 6% of the island with less than 2,000 km². The same year, the "Natural Forest Protection" and "Grain for Green" programmes were launched with an annual national capital investment on Hainan of RMB¥22 million and subsidiary financial input of RMB¥10 million from Hainan Province. These programmes offer a legally supported framework allowing the natural forests of Hainan to recover. By the end of 2001, tropical forest cover had increased to 6,590 km².

Obviously the implementation of the Natural Forest Protection Programme has been good for protection of Hainan's forests and ecological environment, and has had great accomplishments. But this is only a medium-term policy; how will the forests be after 2010 when the programme comes to an end? Currently, China lacks adequate financial resources for forest conservation, while Hainan is a relatively poor province whose natural forests are mainly in poverty-stricken mountain areas in the centre and south. Finding alternative livelihoods for local villagers and raising their standard of living thus remains the preoccupation for Government at all levels. A compensation mechanism for Ecological-Community Forests, as in Guangdong Province [see text Box], may provide a more long-term alternative. Agroforestry could be established with a combination of slow- and fast-growing species, such as precious native trees and Chinese medicinal plant species. Government should provide guidance on aspects of technology, investment and markets. Large-scale destructive exploitation of natural forests should be strictly forbidden. With such steps, there will hopefully be a brighter future for Hainan's ecological environment and tropical forests.

广东省生态公益林的补偿

为了扭转森林资源下降的趋势，广东省于1994年，结合森林资源二类调查，初步完成了生态公益林的划定工作，并于1998年颁布了《广东省生态公益林建设管理和效益补偿办法》。生态公益林一般不允许经营，以保护生态效益为主。以生态旅游为主的生态经营需经县级以上林业主管部门批准。1999年全省核定了生态公益林34,000平方公里，占全省林业用地的31.7%，按每平方公里3,750元人民币进行补偿（以木材的生产量和市场木材售价为依据）。但有专家提出补偿标准未考虑生态环境效益的价值，建议每公顷至少应补偿630元人民币。省委省政府为此同意在10年之内逐步将补偿标准提高到每平方公里52,500元人民币，如2003年就提高到每平方公里12,000元人民币（未含地方政府配套资金），补偿费直接发到农民手中。同时，扩大了全省生态公益林的面积，至2003年底，全省生态公益林面积增加到34,500平方公里，其最终目标是60,000平方公里。生态公益林建设对广东省环境品质的改善起到了重要的作用。

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Compensation scheme for Ecological Community Forests in Guangdong Province

With reference to the results of forest resource surveys, Guangdong Province sought to reverse forest declines by undertaking a preliminary planning of ecological community forests in 1994, and stipulated a "Regulation for Establishment, Management and Compensation of Ecological Community Forests" in 1998. Ecological community forests are protected from any form of extractive exploitation, in recognition of the environmental services they provide, with an exemption for eco-tourism, for which approval must be obtained forestry departments above county level. In 1999 ecological community forests occupied 34,000 km², or 31.7% of the total forestry land in Guangdong. Based on timber production volume and market price, compensation for ecological community forests was set at RMB¥3,750/km². Upon considering the ecological and environmental services provided by the forest, experts suggested a rate of at least RMB¥63,000/km². The Guangdong Provincial Committee and the Provincial Government thereafter agreed to gradually adjust the rate to reach RMB¥52,500 in ten years' time; in 2003 the rate was raised to RMB¥12,000/km² (excluding the contribution from local governments). This compensation is directly passed to farmers. With an ultimate goal of covering 60,000 km², the area of ecological community forests was further extended to 34,500 km² in 2003. Establishment of ecological community forests has played a significant role in improving the environmental quality of Guangdong.

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为了海南绿色明天 —海南野生动植物资源考察队 工作小记

Gaining a green future for Hainan—Notes from Hainan Wildlife Resources Survey Team

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图一. 兴建自然保护区综合资源考察
Fig.1 Comprehensive resource survey in a nature reserve

海南是中国最南端的省份, 是中国热带林面积最大和最典型的地区之一, 它地处热带北缘, 气候环境和地理环境下形成了独特的热带山地雨林和热带季雨林生态系统, 生物种类数量繁多, 是中国热带森林生物多样性十分丰富的地区。在这广阔的热带天然林中, 生长有4,600多种野生植物和至少拥有580种陆生脊椎动物。

存在的问题

海南岛由于多年来不合理的开发、乱砍滥伐、刀耕火种、烧山狩猎等, 使生物资源不断减少, 至1986年仅剩下3,800平方公里森林面积。热带森林的破坏和消失, 不仅使海南的生态环境严重恶化, 灾害频繁, 河流乾涸, 水土流失严重, 而且造成多种动植物物种灭绝。1992年出版的《中国植物红皮书》记录了中国388种稀有濒危植物, 原产于海南的达56种(14%)。

保护海南原始天然林, 拯救珍稀濒危物种, 强化海南岛生物多样性的保护已成为一项紧急的任务, 已引起世界的广泛关注。2000年, 美国世界自然基金会公布了名为「全球200」(Global 200)的全球生物多样性最具优先保护的238个地区名单, 而我国的海南岛雨林便是被点名保护的区域之一。

Hainan Province is situated in the far south of China and has some of the largest and most typical tropical forests. Being at the northern margin of the tropics, Hainan climatically and geographically favours the formation of tropical montane forest as well as monsoon rainforest ecosystems. Hainan has high tropical forest biodiversity endowed with plentiful flora and fauna. Over 4,600 wild plants and at least 580 terrestrial vertebrates are found in this vast tropical forest area.

Current problems

Due to past practices of unsustainable exploitation, deforestation, slash and burn cultivation and hill burning to assist hunting, the forest area on Hainan Island had shrunk to 3,800 km² by 1986. Degradation and destruction of tropical forests has not only resulted in deterioration of the environment, with frequent natural disasters such as drying up of streams and serious soil erosion, but also threatens extinction of various wildlife species. The "China Plant Red Data Book" (published in 1992) recorded 388 rare and endangered species, 56 (14%) of which are native to Hainan.



图二. 队员合照
Fig.2 Team photo

海南野生动植物资源考察队



图三. 海南湿地资源调查
Fig.3. Wetland Resource Survey in Hainan

对策及行动

由于海南岛远离大陆, 以及海南建省时间不长, 百业待举, 尤其是在科研机构、专家及技术力量等方面还存在严重不足, 远远不能满足海南生物多样性保护和管理的需要。为了培养和锻炼海南本土的有关自然保护的队伍, 解决专家少, 技术力量薄弱的问题, 结合海南的实际, 自1997年来, 主要采取了如下对策:

1. 以全国开展陆生野生动物调查为契机, 抽调各自然保护区人员, 组成海南野生动物资源考察队。在专家们的积极指导和带领下, 历经两年, 不仅完成了海南陆生野生动物调查任务, 而且组织和培养了海南本土队伍。
2. 利用专案和各种工作任务, 持续锻炼和强化队伍建设。在完成陆生野生动物调查任务后, 因地制宜, 结合各种资源考察和自然保护区建设专案和任务, 进一步的强化队伍建设, 发挥队伍作用。自2001年来, 海南野生动物资源考察队成功完成和配合完成了:



图五. 调查方法培训
Fig.5 Training in survey methodology

In view of this environmental deterioration, protecting of natural forest and rare species, and strengthening the capacity for biodiversity protection, have become urgent tasks in Hainan with increasing global attention. In 2000, Hainan's tropical rainforest was listed in the "Southeast China-Hainan Moist Forests" Ecoregion in WWF's "Global 200" list of 238 areas of biodiversity conservation priority.

Counter-measures and actions

In view of its separation from the mainland and its short history as a province, much remains to be done in Hainan. At present local resources for scientific research, expertise and technical skills cannot meet the needs of biodiversity protection and management. To tackle these problems, the following measures have been implemented since 1997 to cultivate and train up local expertise for nature conservation:



图四. 讨论调查范围及布点
Fig.4 Discussion of survey scope and locations

1. Given the opportunity during the nation-wide survey of terrestrial wildlife, we recruited staff of different nature reserves to establish a Hainan Wildlife Resources Survey Team ("the Survey Team") to conduct a province-wide survey of terrestrial wildlife. With the keen guidance of various experts, the survey was accomplished in two years and a well-trained team was established.
2. Continued training and strengthening of the Survey Team via opportunities arising from different tasks and projects. The Team has gained further experience and learned new techniques through a series of biodiversity surveys and nature reserve establishment projects. Since 2001, Hainan Wildlife Resources Survey Team has assisted in and/or accomplished:



- i) 海南尖峰岭和五指山两个国家级自然保护区的资源调查和申报材料组织和编写工作（工作时间：1年，参加队伍的队员人数约30人次）；
 - ii) 海南省湿地资源调查工作（工作时间：半年，参加队伍的队员人数约20人次）；
 - iii) 海南6个拟建省级自然保护区综合科学考察和申报材料组织和编写工作（工作时间：2年，参加队伍的队员人数约28人次）；（请参阅第17-21页吴世捷及陈辈乐撰写之文章）
 - iv) 海南长臂猿种群数量调查工作（工作时间：3周，参加队伍的队员人数约20人次）（请参阅第22页费乐思及陈辈乐撰写之文章）；
 - v) 海南GEF专案尖峰岭国家级自然保护区动物资源调查工作（工作时间：2周，参加队伍的队员人数约18人次）；
 - vi) 海南南湾猕猴种群数量调查工作（工作时间：1周，参加队伍的队员人数约15人次）。
3. 以点带面，以老帮新，补充和强化自然保护区技术力量。在完成各项工作任务的同时，充分发挥队伍中的技术骨干作用，在保证队伍的稳定性的条件下，以老带新，不断补充和调换队伍成员。这些技术骨干主要来自：海南霸王岭国家级自然保护区、海南大田国家级自然保护区、海南尖峰岭国家级自然保护区、海南五指山国家级自然保护区、海南东寨港国家级自然保护区、海南邦溪省级自然保护区、海南番加省级自然保护区、海南吊罗山省级自然保护区等。这几年来，经过不断的更新和调换成



图七. 调查途中的惊险
Fig.7 Challenges in the course of surveying

- i) Surveys of biodiversity resources and preparation of relevant documents for the proposals to upgrade Jianfengling and Wuzhishan Nature Reserves (duration: 1 year, with 30 team members participating);
- ii) Survey of wetland resources in Hainan (six months, 20 team members);
- iii) Comprehensive surveys and preparation of relevant documents for six proposed provincial nature reserves (2 years, 28 team members) [see article by Ng & Chan on p17-21]
- iv) Population survey of Hainan Gibbon (3 weeks, 20 team members) [see article by Fellowes & Chan on p.22]
- v) Hainan GEF Project: Survey of wildlife resources in Jianfengling National Nature Reserve (2 weeks, 18 team members);
- vi) Population survey of Rhesus Monkey in Nanwan, Hainan (1 week, 15 team members).



图六. 核实调查线路
Fig.6 Confirmation of routes to be surveyed

3. Strengthening of technical skills of nature reserves by capacity building. As appropriate, less experienced team members were rotated and deployed regularly and gradually so that they gained knowledge and experience by working with a core group of experienced team members. The core group comes mainly from Bawangling National Nature Reserve (NNR), Datian NNR, Jianfengling NNR, Wuzhishan NNR, Dongzhaigang NNR, Banxi Provincial Nature Reserve (PNR), Panjia PNR and Diaoluoshan PNR. Experience gained in the Survey Team has nurtured a group of local nature reserve staff from Hainan, and has proven

海南野生动植物资源考察队

员，培养和培训了一批真正属于自然保护区的业务技术骨干，这些人已在各自的工作岗位上发挥了重要作用。

下一步工作计划

1. 聘请专家，进一步巩固和强化队伍建设，尤其是各种技术培训工作；
2. 全力以赴，发挥队伍作用，继续自然保护区建设和管理各项任务，特别是拟建省级自然保护区工作任务；
3. 结合实际，建立海南野生动植物资源监测网路。发挥队伍成员来自不同自然保护区的优势，以此为框架，建立野生动植物资源监测站和监测网。

useful when members returned to their respective posts in the reserves.

Future work plan

In future we propose:

1. To invite experts to further reinforce and strengthen team development, particularly building capacity to perform technical tasks;
2. To maintain the spirit and performance of the Survey Team to undertake nature reserve development and management, particularly projects related to establishment of new nature reserves;
3. To establish a wildlife resource monitoring network. To capitalise on the advantage of having team members from different nature reserves all over Hainan and build up monitoring stations and a network upon this framework.

走访鹦歌岭—

海南岛上仅存面积最大的原始林

A biodiversity expedition at Yinggeling –

the largest remaining primary forest on Hainan Island

吴世捷及陈辈乐 (嘉道理农场暨植物园)

Ng Sai-chit and Bosco Chan (KFBG)

黎母山位于海南岛中部偏西、北部平原及南部山脉的交界，连绵不断的山脉由西南向东北方向延伸，横跨琼中县、儋州市、白沙县、昌江县、乐东县与五指山市。经数百年人为开发活动的蹂躏，黎母山低海拔地区的植被早已演化为灌丛或次生林。可是，中部的鹦歌岭却因

地势崎岖及地理偏远而幸免于难。

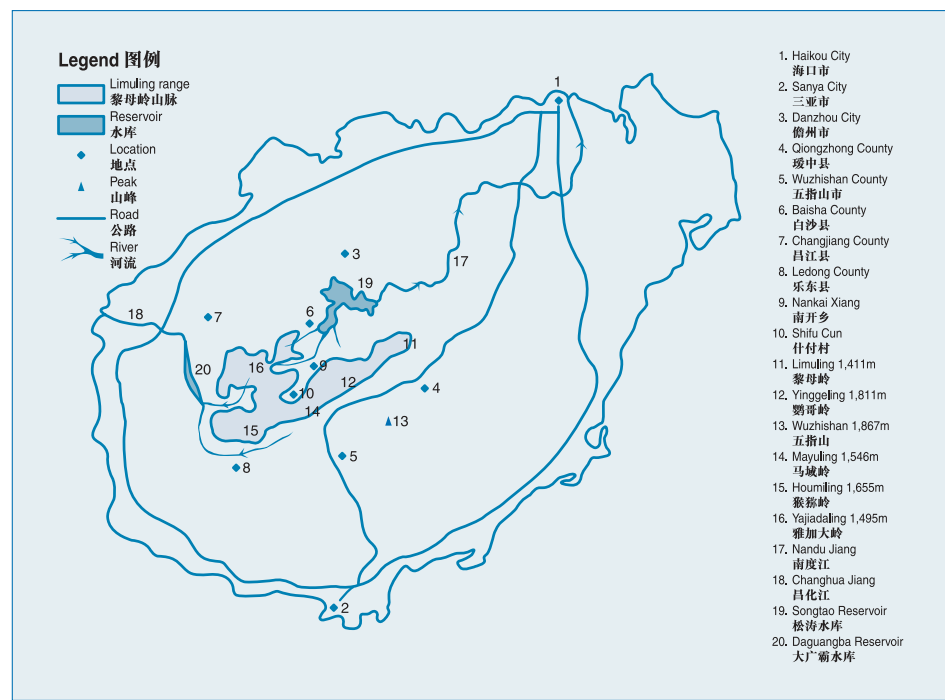
海拔1,811米的鹦歌岭是海南的第二高峰，仅次于五指山。鹦歌岭西临乐东猴猕岭，西北濒昌江雅加大岭(图一)，是南渡江和昌化江这两大河系的集水区。

教人啧啧称奇的是，生物学家从未对鹦歌岭的森林及其野生动植物进行研究。海南野生动植物资源考察队(下称考察队)于1997-1998年进行全岛野生动植物普查时，获知白沙县南开乡有大片森林存在。直至考察队在2002年深入崎岖不平的山岭，才终于证实这一片原始林的存在(请参阅第13-16页苏文拔撰写之文章)。

The Limuling range in west-central Hainan effectively demarcates the northern plains and southern mountains of the island. The extensive mountain range runs in a northeast-southwest direction stretching across Qiongzong, Danzhou, Baisha, Changjiang, Ledong and Wuzhishan counties. Although much of the vegetation on the rolling low hills of Limuling has

been transformed into shrub and secondary forest by centuries of human activities, the central part, represented by Yinggeling, has been protected by its remoteness and rough terrain from large-scale exploitation in the past. At 1,811 m Yinggeling is

the second highest peak in Hainan after Wuzhishan. It extends west to Houmiling in Ledong County and northwest to Yajiadaling in Changjiang County (Fig.1). The Yinggeling range is the watershed of the two largest river systems in Hainan - the Nandu Jiang (river) and Changhua Jiang.



图一. 海南中部鹦哥岭山脉的位置图
Fig.1 Map showing location of Yinggeling range, Central Hainan, China.



姜恩宇摄 Photo taken by Jiang Enyu

图二. 以往什付村为人迹罕至之地，但公路将会在未来一两年落成通车
Fig.2 Access to Shifu Cun is difficult - until the new vehicular road is built in a year or two

为得出合适鹦歌岭的保育策略，海南省林业局海南野生动植物自然保护中心(保护中心)联同嘉道理农场暨植物园(本园)于2003年3月开进未受保护的鹦歌岭林区进行

生物多样性考察，初步搜集此地区生物多样性的资料。由于卫星图象显示鹦歌岭的原生林面积超过200平方公里，是次考察选了位于白沙县和五指山市之间、海拔1,540米的马域岭北坡为调查重点。参与2003年调查的人

士全是生物多样性的保育专家，分别来自华南濒危动物研究所、海南师范大学、海南大学、中国科学院北京植物研究所、本园、华南农业大学及野生动植物保护国际(FFI)，总人数超过50名。

2003年3月16日，考察队的核心成员预先在海拔约1,300米的森林深处驻扎大本营，其他成员随后到达，并于3月20日前往南开乡海拔345米、黎族人聚居的什付村。我们的吉普车沿著南开河乾涸的河谷向前进发，道路蜿蜒曲折，单是涉水过河已不下十数次(图二)。什付村是在白沙县方向最接近马域岭森林的村落。当地交通设施匮乏，只有极其颠簸的泥路供少数车辆进入，是个非常偏僻的村落。村内缺乏卫生设施，有些泥房仅以棕榈树叶盖顶，村内不少老婆婆的面上仍旧展示著传统的刺青。当晚，我们得到村民的热切款待，翌日随即展开历时八小时的艰巨旅程，攀山越岭抵达山上的大本营。一众队员在往后的四天分成小队，在营地至山顶一带及往五指山市方向达800米以下的山坡进行调查。考察队的核心成员在接著五天仍留守在较低海拔地区，调查白沙境内900米以下的山地。

调查期间，发现800米以下沿著由什付村上山的山坡均为农地、高灌木丛及6-15米高以银柴(*Aporosa dioica*)，盾叶木(*Macaranga adenantha*)，黄牛木(*Cratoxylum cochinchinense*)和鸭脚木(*Schefflera heptaphylla*)为优势

Somewhat surprisingly, the forest of Yinggeling has remained unknown to the scientific world, and its flora and fauna had never been studied by naturalists. It was not until the 1997-1998

island-wide wildlife survey that the Hainan Wildlife Resources Survey Team (the Hainan Team) first received reports of extensive forest around Nankai Xiang (= village) in Baisha County, and the existence of a tract of intact forest was only confirmed when the Hainan Team finally ventured into the rugged interior during a 2002 survey [see article by Su Wenba on p.13-16 in this issue].

To derive an appropriate conservation strategy for the unprotected Yinggeling, a biodiversity expedition was conducted in March 2003 to collect preliminary biodiversity information on this forest.

The survey was jointly organised by the Hainan Wildlife Conservation Centre of Hainan Forestry Department (HWCC) and Kadoorie Farm & Botanic Garden. Since satellite imagery suggests the forest tract of Yinggeling is over 200 km² in size, a representative site was selected on the northern slope of Mayuling, a peak at 1,540 m. Mayuling is the demarcation line of Baisha and Wuzhishan Counties. Over 50 personnel were involved in the expedition, with participation of biodiversity experts from South China Institute of Endangered Animals, the Hainan Team, Hainan Normal University, Hainan University, Beijing Institute of Botany (Chinese Academy of Sciences) and KFBG, as well as South China Agricultural University and FFI China.

On 16 March 2003, the Hainan Team first set up a base camp in the forest interior at an elevation of almost 1,300 m prior to the arrival of other expedition members, who travelled to Nankai Xiang on 20 March 2003. The team then proceeded to a Li Minority village called Shifu Cun (= village) at an elevation of 345 m, via an extremely demanding route in which the jeeps were literally travelling on the dried riverbed of Nankai River and had to cross the river a dozen times (Fig 2). Shifu Cun is the nearest settlement to the forest of Mayuling on the Baisha side, and is a sleepy village with no proper vehicular access from the outside world. The whole village has no sanitary facilities and some of the village buildings were mud huts with palm-leaf roofs; some old ladies still sport traditional facial tattoos. The team members spent a night in the houses of the hospitable Shifu villagers before the eight-hour hike up to the base camp at Mayuling. For the next four days the expedition split into

种的次生林。海拔 800 至 1,000 米间的山坡路上，树高 1 0 至 3 0 米，胸径达 5 0 厘米，植被遭以枫香树 (*Liquidambar formosana*)、柄果柯(*Lithocarpus longipedicellatus*)、白颜树(*Gironniera subaequalis*)和黄叶树(*Xanthophyllum hainanense*)为优势种的次生林取替。但在同一海拔较为偏远及人为干扰较少的山地，则保存了相对较为完整的森林，这些树林达40米高，以刺栲(*Castanopsis hystrix*)、海南木莲(*Manglietia hainanensis*)、圆果杜英(*Elaeocarpus sphaericus*)、红毛山楠(*Phoebe hungmoensis*)、海南韶子(*Nephelium topengii*)和黄叶树(*Xanthophyllum hainanense*)为优势种。海拔1,000 至 1,200 米间的山地，分布著由陆均松(*Dacrydium pectinatum*)、线枝蒲桃(*Syzygium araiocladum*)、红柯(*Lithocarpus fenzelianus*)、杏叶柯(*L. amygdalifolius*)、白花含笑(*Michelia mediocris*) 和红毛山楠(*P. hungmoensis*)为优势种的原始山地雨林。平均林冠高度达 20-30 米，胸径达 80 厘米。海拔 1,200 米以上的山顶部分，则以红柯(*Lithocarpus fenzelianus*)、陆均松、米槠(*Castanopsis carlesii*)、饭甑青冈(*Cyclobalanopsis fleuryi*)和隐脉红淡比(*Cleyera obscurinervia*)为优势种。因高山上的微气候条件较差，这个海拔以上的树林林冠也较为低矮，界乎 6 至 15 米高，树木胸径为 40 厘米。虽然马域岭 800 米以下的低山植被经已退化，但 1,000 米以上仍可发现大片原始山地雨林。

是次调查录得数个具保育价值的植物物种。调查队在海拔 1,000 至 1,200 米发现数棵伯乐树(*Bretschneidera sinensis*)(濒危、一级*)。虽然它在华南地区分布较广，但这次发现是海南录得的首个记录。油丹(*Alseodaphne hainanensis*) (易危，二级)在海拔800-1000米的数量颇为丰富，但多为胸径在 40 厘米以下的中龄树。于海拔 1,000 至 1,200 米的地区发现 20 棵胸径达 20 厘米的海南粗榧(*Cephalotaxus hainanensis*) (濒危)。土沉香(*Aquilaria sinensis*) (易危，二级)在山地雨林仅有少量树苗。调查队在什付村旁周边海拔 800 米以下的次生林内发现青梅(*Vatica mangachapoi*) (濒危、二级)、坡垒(*Hopea hainanensis*) (极危、一级)、海南大风子(*Hydnocarpus hainanensis*) (易危) 和降香黄坛(*Dalbergia odorifera*) (易危、二级)的树苗，同时亦发现黏木(*Ixonanthes*

smaller teams; they worked around the base camp towards the summit of Mayuling from the Baisha side and surveyed the slope on the Wuzhishan side down to 800 m. The Hainan Team stayed on at lower altitude for an extra five days to survey areas on the Baisha side below 900m.

At the time of the survey, the vegetation along the footpath from Shifu Cun up to 800m was a mosaic of farmland, tall shrubland and young secondary forest about 6-15m tall, dominated by *Aporosa dioica*, *Macaranga adenantha*, *Cratoxylum cochinchinense* and *Schefflera heptaphylla*. Between 800 and 1,000m, the survey team visited secondary forest dominated largely by *Liquidambar formosana*, *Lithocarpus longipedicellatus*, *Gironniera subaequalis* and *Xanthophyllum hainanense*. Such forest varied from 10m to 30m in height, with trees up to 50cm dbh (diameter at breast height). At a similar altitude, relatively undisturbed forest dominated by *Castanopsis hystrix*, *Manglietia hainanensis*, *Elaeocarpus sphaericus*, *Phoebe hungmoensis*, *Nephelium topengii* and *Xanthophyllum hainanense* could be found on more inaccessible hillsides, with trees up to 40m in height. Between 1,000 and 1,200m, the survey area had relatively pristine montane rainforest dominated by *Dacrydium pectinatum*, *Syzygium araiocladum*, *Lithocarpus fenzelianus*, *L. amygdalifolius*, *Michelia mediocris* and *Phoebe hungmoensis*. Canopy of such forest averaged 20 to 30 m tall, with trees up to 80cm dbh. Above 1,200m around the summit of the Mayuling, the forest was dominated by *Lithocarpus fenzelianus*, *Dacrydium pectinatum*, *Castanopsis carlesii*, *Cyclobalanopsis fleuryi* and *Cleyera obscurinervia*. Because of the harsh microclimate this forest type had a lower canopy, around 6-15m, with trees up to 40cm dbh. Although much of the lower slopes up to 800m in the survey area had been degraded, continuous cover of relatively pristine montane rainforest could be found above 1,000m.

The present survey recorded several plant species of conservation concern. Several trees of *Bretschneidera sinensis* (EN, Class I*) were found between 1,000-1,200m on the northern side of Mayuling. Although it is fairly widespread in South China, the present finding represents the first record for Hainan. *Alseodaphne hainanensis* (VU, Class II) was fairly abundant between 800 and 1,000m, although large trees more than 40cm dbh were rare. Twenty trees of *Cephalotaxus hainanensis* (EN) were found between 1,000-1,200m, some reaching 20cm dbh. Saplings of *Aquilaria sinensis* (VU, Class II) occurred in low numbers in the montane rainforest. Saplings of *Vatica mangachapoi* (EN, Class II), *Hopea hainanensis* (CR, Class I), *Hydnocarpus hainanensis* (VU) and *Dalbergia odorifera*

chinensis) (易危)。是次调查共发现 5 个树蕨物种，包括桫欏(*Alsophila spinulosa*)、阴生桫欏(*A. latebrosa*)、大叶黑桫欏(*Gymnosphaera gigantea*)、黑桫欏(*G. podophylla*) 及海南白桫欏(*Sphaeropteris hainanensis*) (全为二级)。金毛狗(*Cibotium barometz*) (二级)在海拔1,000 米以下的地区普遍分布，而钩叶藤(*Plectocomia microstachys*) (二级)在南坡的山地雨林数量亦甚为丰富。马域岭的森林仍孕育著许多依赖森林生活的动物。是次调查发现了不少水鹿 *Cervus unicolor* (二级)的痕迹，松鼠亦很常见。调查期间发现黑白飞鼠(*Hylopetes alboniger*) (濒危)的尸体，亦多次看到海南鼯鼠(*Petaurista hainana*(编者按：Corbet & Hill¹等专家将其列为 *P. philippensis* 的同种异名) 及巨松鼠(*Ratufa bicolour*) (二级)的踪影。考察途中常看到或听到海南山鹧鸪(*Arborophila ardens*) (易危、一级)，白鹇(*Lophura nycthemera*) (二级)、灰孔雀雉(*Polyplectron katsumatae*) (一级)、银胸丝冠鸟(*Serilophus lunatus*) (二级)、淡紫鹇(*Sitta solangiae*)和海南柳莺(*Phylloscopus hainanus*) (易危) 等林鸟。林内山溪水生动物丰富，在营地附近发现平胸龟(濒危) 及 *Rhacophorus* 属的树蛙，后者很可能是科学新种。什付村村民指近年曾看见一头长臂猿，而他们晓得区分长臂猿与当地经常出没的獼猴。虽然是次调查未能寻获长臂猿的踪迹，但从马域岭的森林面积及生境素质看来，这里仍有可能是极危的海南长臂猿的栖身之所。

调查队花了整整四天在营地四周进行调查，在我们眼见所及的范围内满目皆是成熟的森林。马域岭山地雨林广阔茂密，从它相对原始的组成及结构看来，应该从未被大肆砍伐，似乎可以认定它为原始林(图三)。然而，调查期间却发现大量的人为活动痕迹，森林内清晰的路径，很可能是村民到山上狩猎或砍伐木材及柴薪的路线。同时，我们亦发现数个猎人搭建的草棚，而各种大



图三. 于马域岭北坡原始山地雨林内的大本营，海拔约 1,300 米
Fig.3 Base camp #1 amidst primary montane rainforest, ca. 1,300 m, northern slope of Mayuling

(VU, Class II) were found by the survey team in the secondary forest below 800m near Shifu Cun. *Ixonanthes chinensis* (VU) was also found. Five species of tree fern - *Alsophila spinulosa*, *A. latebrosa*, *Gymnosphaera gigantea*, *G. podophylla*, and *Sphaeropteris hainanensis* (all Class II) were found in the present survey. *Cibotium barometz* (Class II) was fairly common below 1,000m. *Plectocomia microstachys* (Class II) was fairly common in the montane rainforest on the southern slope.

The forest of Mayuling is still home to many forest-dependent animals. The expedition found numerous tracks of Sambar *Cervus unicolor* (Class II) and squirrels were still abundant. For instance a dead specimen of Particolored Flying Squirrel *Hylopetes alboniger* (EN) was found, and both Hainan Giant Flying Squirrel *Petaurista hainana* [considered a synonym of *P. philippensis* by some experts, such as Corbet & Hill¹] and Black Giant Squirrel *Ratufa bicolor* (Class II) were seen on many occasions. Forest birds such as Hainan Partridge *Arborophila ardens* (VU, Class I), Silver Pheasant *Lophura nycthemera* (Class II), Hainan Peacock

Pheasant *Polyplectron katsumatae* (Class I), Silver-breasted Broadbill *Serilophus lunatus* (Class II), Yellow-billed Nuthatch *Sitta solangiae* and Hainan Leaf Warbler *Phylloscopus hainanus* (VU) were also commonly heard or seen. The forest stream supports a host of aquatic animals; a possibly new species of tree frog in the genus *Rhacophorus* was found around the base camp, as well as a Big-headed Turtle *Platysternon megacephalum* (EN). Villagers of Shifu Cun reported recently seeing a gibbon nearby, which they could distinguish from the macaques which frequent the area. Although the present survey failed to detect any signs of gibbon presence, judging from the forest size and habitat quality, it is not impossible the Critically Endangered Hainan Gibbon may survive in this area.

The expedition spent four full days exploring all directions from the base camp and all we saw was mature forest. The extensive and continuous cover of montane rainforest at Mayuling and the forest's relatively pristine composition suggested it had not been commercially logged in the past, and can be considered primary (Fig 3). However, the survey team noticed considerable human activities in the present survey. There were well-defined



小的捕兽夹也很容易在林下找到。森林内偶尔也可以发现陆均松和白花含笑被砍伐后留下的树桩。3月24日，我们在马域岭南坡遇到数个非法砍伐者，他们手持乌枪，正在试图把几棵白花含笑的大树锯成木板。

纵使马域岭山地雨林的结构仍相当完整，但随著市场需求量日增，木材及野生动物资源的耗取肯定不能持续。较大规模的破坏活动在村寨周边正日趋活跃，什付村的老百姓也跟上橡胶种植热潮，为此，这片原始林亟待保护。1997年考察队调查过后，低地两林已被砍伐一空。连接什付村与南开乡的公路亦已在规划当中，此举势必鼓吹商品贸易，林制品自是不在话下。

调查过后，保护中心旋即建议把马域岭纳入鹦哥岭省级自然保护区。为保护马域岭鲜为人知的森林以及邻近少数民族的传统生活模式，这是刻不容缓的举措。在不损耗森林资源的情况下开展改善居民福祉的社区工作变得非常重要。藉著有关政府部门的关注及原住民的支持，我们期望能为鹦哥岭的原始林开拓更美好的将来。

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*国际濒危等级是以世界自然保护联盟(IUCN)物种生存委员会的名录²为准。(极危 = Critically Endangered; 濒危 = Endangered; 易危 = Vulnerable)。植物及动物的国家保护等级(一级和二级)分别以于永福³及汪松^{4,5}为准。

*Global threatened status (CR = Critical endangered; EN = Endangered; VU = Vulnerable) follows IUCN Species Survival Commission². National Protection Status (Class I & II) follows Yu³ for plants and Wang^{4,5} for animals.

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trails in the forest, which are possibly used by hunters and subsistence loggers. Several hunters' huts were found in the forest, and leg traps of various sizes were commonly found on the forest floor. Large tree stumps of *Dacrydium pectinatum* and *Michelia mediocris* were occasionally seen in forest. The survey team also came across a small team of illegal loggers operating on the southern slope of Mayuling on 24 March; they were carrying rifles and were preparing wooden planks from several large trees of *Michelia mediocris*. Although the forest structure of the montane rainforest at Mayuling has been relatively well preserved, such extraction of timber and wildlife is unlikely to be sustainable given the encroachment of market pressures. Protection of this virgin forest is particularly urgent because larger-scale destruction has already begun - the lowland rainforest around Shifu Cun was logged only after the visit of the Hainan Team in 1997, when rubber plantation was introduced to these rural villages. And the planned vehicular road connecting Shifu Cun and Nankai Xiang will surely encourage trade in all commodities, including forest products. Shortly after the survey, HWCC prepared a proposal to designate the Mayuling area as the Yinggeling Provincial Nature Reserve. It is a vital and urgent step towards preserving this little known forest, together with the traditional way of living practised by the nearby minority villages. Community work aimed at improving the wellbeing of residents without depleting forest resources is now essential. Hopefully, with the attention of relevant government departments and support of the indigenous people, there should be a future for the primary forest of Yinggeling.



合力抢救全球最濒危的类人猿—

海南长臂猿

Hainan Gibbon: concerted action for the world's most endangered ape

费乐思及陈辈乐 (嘉道理农场暨植物园)
John Fellowes and Bosco Chan (KFBG)

2003年10月，我们应海南省林业局海南野生动植物自然保护中心(保护中心)的邀请，前往海南长臂猿(*Nomascus cf. nasutus hainanus*)最后的栖息地—坝王岭国家级自然保护区，对长臂猿的状况进行详细的调查。是次行动汇聚了不同的力量；由嘉道理农场暨植物园(本园)，坝王岭林业局(林业局)，坝王岭国家级自然保护区管理处(保护区)及保护中心赞助及统筹，来自瑞士苏黎世大学的托马斯博士(Dr. Thomas Geissmann)负责培训及调查方法，而海南省各保护区、华南濒危动物研究所(华濒所)、野生动植物保护国际(FFI)均派员全力参与。训练有素的调查员以两人为一组，共16组组员每天黎明前抵达长臂猿生境内的监测点，并于点上驻守5小时调查长臂猿的踪迹。

调查结果令人大失所望：海南长臂猿种群近来一般都被认为维持在廿数只的水平，但经这次调查证实，长臂猿现时的数字已下滑至最少13只，调查期间只能确认两群及2只雄性独猿。这个教人忧心的调查结果为于同月29-31日在坝王岭镇举办的首个「海南长臂猿保育行动研讨会」掀起了序幕。

然而，与会者并未受强差人意的结果影响，随即便投入讨论。大会回顾过往及现正进行的长臂猿研究工作，先由华濒所刘振河教授从1960年代其开首性的保育长臂猿研究工作娓娓说起，然后由刘教授的爱徒江海声教授、中国科学院北京动物研究所的周江先生以及华东师范大学的吴巍先生汇报最新的研究资料。接著与会者提出限



图一. 海南长臂猿母子
Fig.1 Mother and infant Hainan Gibbon

In October 2003, at the invitation of the Hainan Wildlife Conservation Centre (HWCC) of Hainan Forestry Department, a comprehensive new survey of the Hainan Gibbon *Nomascus cf. nasutus hainanus* was conducted at Bawangling, the gibbon's last stronghold. With training and survey methodology provided by Dr. Thomas Geissmann of Zurich University, funding and coordination by KFBG, Bawangling Forestry Bureau (BFB), Bawangling National Nature Reserve (BNNR) Management Office and HWCC, and human resources from Hainan's nature reserves, South China Institute of Endangered Animals (SCIEA) and Fauna and Flora International (FFI), it was a truly collaborative effort. Each morning sixteen well-trained teams of two diligently set off before light to reach listening posts around the gibbons' forest habitat, and spent five hours surveying for gibbons.

The results revealed something none of us wanted to hear: that the population, long thought to have been stable at around 20 individuals, was now as low as 13, with just two social groups and two extra-group males confirmed. This result made for a sombre start to the first *Workshop to Conserve the Hainan Gibbon*, held on 29-31 October 2003, at Bawangling Town.

Undaunted, the workshop participants began their discussions. Past and ongoing studies on the gibbons were reviewed, beginning with the studies in the 1960s of Prof. Liu Zhenhe of SCIEA, who spoke modestly of his pioneering work at the meeting. More recent work on the Bawangling population was reported by Prof. Jiang Haisheng, Liu's successor at SCIEA, and by postgraduates Zhou Jiang of Beijing Institute of Zoology (IoZ) and Wu Wei of East China Normal University (ECNU). Discussions led to a preliminary impression of the possible limits on the recovery of the gibbon population, including human activity and



制种群恢复的各种因素，如人为活动及生境限制等。林业局的李大江先生报告坝王岭林业局就保护区改善及扩建工程上的贡献，令保护区终于在 2003 年 9 月正式取得国务院的批准，把原有的面积扩大233平方公里。他本人及其他来自昌江县、七差乡及坝王岭的官员都对研讨会各代表的投入深表欢迎。

研讨会的第二天，大会把与会者分成数个小组到野外考察，探讨保育长臂猿所面对的种种问题。其中有两组考察保护区分别位于昌江及白沙两县的周边社区，另有两组则到野外探讨短、长期改善生境素质及其连贯性的策略。各组在稍后时间向大会汇报观察所得并提出相关建议，并就如何解除上述种种威胁一直讨论到晚上。

研讨会结束当日，与会者总结连日来的感想及建议。他们一致认为坝王岭长臂猿的出生率大致正常，雌猿每两年均产一子，较其他野生长臂猿物种的平均出生率为高。可是，种群数字却不增反降。刚成年离群个体的存活率低从而影响新群的组成看来是坝王岭长臂猿生命史的主要障碍。

现存森林生境素质低劣引致食物供应不足、林内适合长臂猿生境面积有限、合适生境受松树林、荒草地、输电线及废弃采伐路阻隔令长臂猿需绕路而行及保护区周边大量居民的活动令森林质量下降等，都是对长臂猿的主要威胁。会上热烈讨论了偷猎近年对长臂猿的影响；显然，偷猎一直也是区内各种野生动物的主要威胁，但有与会者指现行法规及当地信仰已能有效阻吓偷猎长臂猿的行为。另有人提出应正视

在捕猎其他树栖动物期间意外射杀及少数害群之马的蓄意捕猎的行为，最后大家一致认同捕猎是主要的潜在威胁。会上浅谈到长臂猿数量下降对种群存活的影响，配偶选择减少想必是种群恢复的一大桎梏。本研讨会把焦点侧重于较能避免及较明显的威胁上，但由于种群细小，其他潜在威胁如疾病、种内攻击行为、遗传多样性低令适应性下降等因素在会上并未有充分探讨，但亦未能排除其影响。

habitat limitations. Mr Li Dajiang of BFB described the Bureau's efforts to get BNNR enlarged and improved, culminating in the acceptance of a 233 km² extension by the State Council in September 2003. He, and other officials from Changjiang County, Qicha Town and Bawangling, welcomed the workshop's input.

On the second day the group split into groups for field excursions to consider aspects of the conservation challenge. Two groups considered the human populations living around the reserve in Changjiang and Baisha Counties. Two other groups considered short- and longer-term improvements in habitat quality and connectedness. Each group reported its observations and suggestions to the main workshop later in the day, and discussions continued late into the evening on how to overcome threats.

On the last day the workshop members summarised their collective impressions and recommendations. It was agreed that the birth rate in the social groups at Bawangling appears to be normal, with each adult female giving birth every two years - above the average for other wild gibbon species - but that the population was failing to increase. The main limiting life-history stage appears to be survival of maturing individuals and hence the establishment of new groups.

Major threats to survival include: low quality (i.e. limited food availability) in the remaining habitat; the limited habitat area within the forest block occupied by gibbons; the interruption of suitable habitat by unsuitable habitat (including pine plantation, grassland, power lines and disused logging tracks), necessitating circuitous movements by gibbons; and forest degradation caused by activities of the large human population living around the nature reserve margins. The impact of hunting on gibbons in recent years was debated; while extensive hunting was clearly a threat to the reserve's wildlife in

general, some felt that legal deterrents and local beliefs prevented the hunting of gibbons. Others thought the possibility of accidental shooting (while hunting other arboreal animals), or deliberate hunting by a small number of people, should be taken seriously, and the workshop agreed it must be considered a major potential threat. Social consequences of gibbon population reduction were briefly discussed, and reduced mate choice was thought likely to be a significant limitation on population recovery. Other potential threats associated with small population size, such as heightened



图二. 研讨会与会者摄于坝王岭
Fig.2 Workshop participants at Bawangling Town

与会者对坝王岭林业局及保护区深表支援，并愿意一同开展海南长臂猿保护行动计划。本园与下列团体已组成了非正式的夥伴关系，包括海南野生动植物自然保护中心、FFI、中国科学院北京动物研究所、华东师范大学、巴黎动物学会(Zoological Society of Paris，由Francoise Claro博士及其研究队代表)、昌江县人民政府及中华人民共和国濒危物种科学委员会 (由蒋志刚博士代表)。

在各合作夥伴的投入下，下列行动已开展或在筹划当中，作为整个保护行动计划的基础。

1. 继续并加强长臂猿种群的监察；
2. 在长臂猿有机会出没的地区内杜绝一切有害的人为活动(包括捕猎、砍伐、垦荒及基建)；
3. 在重要位置的退化生境内种植有利于长臂猿生长的本土树木；
4. 了解对长臂猿生存构成直接威胁的因素；
5. 调查其他可能还有海南长臂猿残存的地区；(请参阅第 17-21 页由吴世捷及陈辈乐撰写之文章)
6. 在扩建的保护区内著手制定具前瞻性的生态恢复策略；
7. 对保护区的职工进行能力建设培训，加强他们保育海南长臂猿以至整个森林生态系统的能力；
8. 进行宣传活动，提升大众对海南长臂猿的关注，使他们多加留意我们为保护该物种所作出的努力。

来自坝王岭及昌江县的与会者提到在保护区内外生活的下岗伐木工人，少数民族人口及其他居民所带来的问题，以及为他们提供一个可持续的生活模式的需要。我们一致认为对人为活动及周边居民的冀望有更深切认识，不论对保育长臂猿或是排解生物多样性保育与人为发展间的冲突都是有利的，但上述议题已远超于本研讨会刻下的讨论范围。

与会者对昌江及白沙两县的人民以及坝王岭全体职工致敬，以表扬他们作出前所未有的保育工作——维持一个海南长臂猿种群到廿一世纪。若要海南长臂猿多活半个世纪，不单要扭转当下及潜在的种种威胁，更须靠多点的运气方能成事。

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海南长臂猿

impacts of disease and intraspecific aggression, and impaired fitness due to low genetic diversity, were not discounted but emphasis was placed on the more avoidable and evident threats.

Workshop participants expressed strong willingness to assist BFB and BNNR in their efforts, and it was agreed to launch a collaborative Hainan Gibbon Action Plan. An informal Action Partnership was formed including HWCC, KFBG, SCIEA, FFI, IoZ, ECNU, Zoological Society of Paris (represented by Dr Francoise Claro and her team), Changjiang County People Government, and the Endangered Species Scientific Commission of China (represented by Dr. Jiang Zhigang).

The following actions, already under way or planned by one or more partners, will form the basis of the plan:

- a. Continue and intensify monitoring of the gibbon population.
- b. Prevent all harmful human activities (e.g. hunting, logging, forest clearance and infrastructure developments) in areas likely to be used by gibbons.
- c. Afforest degraded habitats in strategic locations with native tree species valuable to gibbons.
- d. Understand the direct threats to gibbon survival.
- e. Locate any additional gibbons surviving in Hainan. [see article by Ng & Chan on p.17-21 of this issue]
- f. Instigate a visionary strategy of ecological restoration in the enlarged NR area.
- g. Build the capacity of BNNR to conserve Hainan Gibbon and the forest ecosystem as a whole.
- h. Implement a publicity campaign to raise awareness of the Hainan Gibbon and efforts being made to conserve it.

Workshop participants from Bawangling and Changjiang County discussed the problems created by activities of former loggers, indigenous minority people and other residents living in and around the reserve, and the need to provide alternative, sustainable livelihoods. It was agreed that this was beyond the immediate scope of the workshop, but that greater collective understanding of human activities and aspirations would help in both gibbon conservation and the resolving of conflicts between biodiversity conservation and human development.

Visiting participants paid tribute to the people of Changjiang and Baisha Counties, and the dedication of Bawangling staff, for doing what no-one else has done: sustaining a population of Hainan Gibbon into the 21st Century. Their survival even for another half-century will require comprehensive reversal of all the known and potential threats - and more than a little luck.

利用藤本种植 以助扶贫及保护次生林

Poverty alleviation and protection of secondary forests through cultivation of rattan

竺肇华教授 (国际竹藤组织) 及 Frank Flasche (德国技术合作公司)
Zhu Zhaohua (INBAR) and Frank Flasche (GTZ)

现代人称为「椰子岛」的海南，昔日为生物多样性丰富的热带岛屿，全岛曾被独特的天然林覆盖，受过度砍伐影响，天然热带原生林覆盖率由 1950 年代的 35% 下降至 2003 年的 4%，但至今仍保留著约 6,400 平方公里原生及次生林。中部山区的数个保护区仍有天然林的存在，但这些森林的质

量亦已改变：大部分天然林的林冠密度已由 1950 年代的 80% 降至现时的 35%。数百个动植物物种已趋濒危。超过 220 平方公里的土地正受水土流失的严重威胁；而有 1,060 平方公里已出现沙漠化现象。

陡峭的中部山地可粗略分为四大类：第一类为完整的天然林，现馀 400 平方公里。第二类是林冠荫闭度高及能快速恢复的茂密次生林(3,000 平方公里)。第三类是低生态价值的稀疏次生林，林内以枫香树为主，可快速重建林冠。第四类则是灌丛，趋向呈草地面貌，

在那裏，森林很难自然恢复。第三及四类共占 3,000-3,500 平方公里。藤本在第一至三类都很普遍。可是，第三及四类多被用作牧放地，以致毁林情况严重。中部山区多为国有土地，只有少部分为集体拥有的私有土地。当地农民都享有耕地使用权，但却无权使用林地。



图一. 次生林下种藤
Fig.1 Rattan cultivation in secondary forests

Nowadays Hainan is known as the “coconut island”, but in history it was a tropical island covered with unique natural forest of high biodiversity. The primary natural tropical forest cover has been reduced by excessive logging from 35% in the 1950s to 4% in 2003. Nonetheless some 6,400 km² of natural forest, both primary and secondary, still remains. Natural forest remains in a few nature reserves in the central mountainous region, but the quality of even this forest has changed: crown density of most of the natural forest has been reduced from 80% in the 1950s to 35% now. Several hundred animal and plant species are endangered. More than 220 km² of land are threatened by serious erosion; 1,060 km² of land is already desertified.

Vegetation of the steep central mountains can be roughly classified into four types. Type 1 is intact natural forest, of which only 400 km² remains. Type 2 is secondary forest with a high crown cover and the potential to recover quickly to dense forest (3,000 km²). Type 3 is low-value open secondary forest, in which *Liquidambar formosana* seeds prolifically and rapidly re-establishes crown cover. Type 4 is shrubland, tending to grassland where forest is not rehabilitating naturally. Types 3 and 4 together cover 3,000 - 3,500 km². Rattan plants are common throughout types 1-3. However, types 3 and 4 are attractive as grazing land and this often results in deforestation. Most areas in the central mountainous region are state-owned, and only small parts are collective-owned. Local farmers have user rights on arable land, but none on forest land.

The provincial government has already taken measures to protect the remaining forests through the implementation of national forest programmes, particularly the “Natural Forest



图二. 藤苗圃
Fig.2 A rattan nursery

为保护岛上仅余的森林，省政府已采取相应措施，包括落实一系列国家森林保护政策，特别是天然林保护工程(海南自 1994 年开始实施禁伐)。自去年起，政府便著意发展保护区建设及发展退耕还林工程。这些政策对打击森林破坏的成效故然理想，但却对非常依赖中部山区森林资源的苗族和黎族人民带来经济损失。他们历来都是最穷困的一群，特别易受外来因素影响而导致收入大幅减少。纵使当地政府已采取相应措施改善基础设施状况(如提供技术上的基建设备及资助密集式农业)以帮助当地发展，山区居民的生活水平仍比沿岸农村地区的人民为低。海南中部有关保护与发展之间的冲突，因农地面积有限及农民“靠山吃山”的经济模式而没完没了。

与一般农产品相比，藤属高价货品，除有助穷困地区增加收益之馀，更为森林保护提供良好基础，因藤本必需要在林地内种植(海南并无实施藤的单一种植)。藤本最宜种于局部树荫下，由树木提供支撑(图一)。虽然过去也曾有在被砍过的树林内成功种植藤本的例子，但适量的林荫可确保藤的高产量。在海南官方认定的贫困县市发展藤本的生产及加工正好配合当地经济发展与天然林保护

并重的中期目标。只要村民收入能维持在稳定的水平，更可舒缓村民由农村地区迁往城市的压力。

种藤及扶贫

Protection” Programme (in Hainan the logging ban has been implemented since 1994); since last year, emphasis has been on implementing the national “Grain for Green” Programme and establishing further nature reserves. The consequence of these policies on the one hand is a desired halt of the destruction of forests, but on the other the local communities, mainly Miao and Li ethnic groups who very much depend on forest resources in the central mountain region, have suffered a significant loss of income. These people have, historically, been amongst the poorest on the island and are susceptible to further reductions in income. Although the local government has taken various actions to improve the framework conditions for the development of these areas (providing technical infrastructure and assistance in intensive agriculture) the people in mountainous areas remain poor compared to living standards in coastal rural regions. The limited available agricultural land and the extent of the subsistence economy of the farmers characterize the unresolved conflict between protection and development goals in the centre of Hainan.

The production of rattan, a high-price commodity compared to common agricultural products, helps reduce poverty in the poor regions and provides a good basis for forest protection, as rattan is restricted to forest stands. (Monoculture with rattan has not yet been practised in Hainan). Rattan is best grown under partial shade with support from trees(Fig.1). There have been successful attempts to grow it in logged forest, although a moderate degree of overhead shade was found to be critical for high-yield production. The promotion of rattan production

and processing is compatible with a mid-term perspective for both economic development and protection of natural forests in the officially-acknowledged poverty counties of Hainan. Furthermore it helps reduce migration from poor rural areas to the cities, as long as the communities can earn their living.

The promotion of rattan has therefore, since 2001, been one component of the Sino-German technical co-operation project “Rehabilitation and Protection of Tropical Forests in Hainan”. The project is carried out by Hainan Provincial Forestry Department and the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ). For the promotion of bamboo and rattan in this project, the International Network on Bamboo and

Rattan (INBAR) is supporting the co-operation. To date the focus has been on native rattan species of Hainan; introduction of mainland subspecies is being considered(Fig.2).



图三. 领到藤权证书的农民
Fig.3 A farmer obtaining a user license

海南公众保护意识教育的探索与实践

Raising conservation awareness among the people of Hainan

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生态文化和社会公众意识在野生动物保护中的重要作用

在海南, 狩猎活动仍很频繁。1970 — 1973 年, 每年猎获毛鸡 (褐翅鸢) 的数量达 200 万只¹。1995 年仅上半年, 海南省查处违法经营野生动物的单位就有 454 家, 依法没收野生动物 7,950 只, 其中绝大部分为国家或省级重点保护动物²。1999 年 5 月 1 日, 在海口市 6 家饭店和一农贸市场统计到公开出售的野生动物就有 36 种 1,797 只³。笔者 2002 年 11 月在文昌市一农贸市场上一早上就见到 13 只褐翅鸢出售。2003 年 3 月在东方市一农贸市场见到 11 只。

我们在野外常发现猎人所布的套夹 - 这些套夹不仅威胁著野生动物, 也威胁著人自身。令人关注的是, 这些狩猎者有许多往往来自比当地周边村落稍远些的城镇。这意味著, 狩猎并不一定是为生计所迫的活动。狩猎压力也不一定直接来自距当地森林最近的村落。它表明, 某些外来开发活动对当地传统和原本价值观念的冲击以及由此而引发的对野生动物保护的影响不容忽视。

我们注意到人们在砍伐森林时, 并非毫无选择。有时宁愿舍近求远, 往往将其居住附近的森林保存得很好 - 尽管这样的森林对野生动物来说毫无价值。这说明, 人们虽然已经在某程度上对诸如森林破坏的直接效应有所预感, 但对其潜在威胁和远期影响却估计不足; 或者说, 人们尚不能很好地同时兼顾眼前利益和长远利益。

很明显, 物种在某一地区的命运和资源状况与当地的生态文化和社会公众保护意识有很大关系。良好的传统及其生态文化有利于当地野生动物的保护。人们保护意识的增强反过来会使这一传统和文化得以发扬。金丝燕和白鹭在海南截然不同的命运是这方面最为典型的一个很好例子。爪哇金丝燕 (*Aerodraamus fuciphagus*) 在中国仅发现于海南万宁的大洲岛, 因产可食燕窝而作为传统利

The importance of ecological culture and public awareness in wildlife conservation

Hunting activities are ceaseless in Hainan. From 1970 to 1973, 2 million greater coucals (*Centropus sinensis*) were captured each year in the island¹. Subsequently national and provincial legislation were brought in to control the wildlife trade. In the first half of 1995, 454 wildlife vendors were found to violate the law, and a total of 7,950 wild animals were confiscated, most of which were nationally or provincially key protected animal species². But such controls have not reduced the scale of the wildlife trade, or stopped trade in protected species. On 1 May 1999, 1,797 animals of 36 species were on sale in six restaurants and a farmers' market at Haikou³. In November 2002, 13 individuals of Greater Coucal (A nationally Protected species) were for sale in the early morning at Wenchang City farmers' market and we came across 11 individuals at a farmers' market in Dongfang City in March 2003.

We often discover hunters' traps in the wild, where they threaten both wildlife and human beings. It is our experience that most hunters in nature reserves come not from local villages but from towns farther away. It appears that hunting is not a pressing need of local livelihoods and that the main hunting pressure on forests may not come directly from the nearest villages. This example tells us we should never ignore the impact of outside development on local tradition and values and consequently on wildlife conservation.

We notice that local people still practice logging in spite of the availability of other livelihood alternatives. But villagers generally prefer to cut trees far away from their dwellings, to protect the forests nearby from destructive activities, though such forests are of minor value in conserving wild animals. They sense the effects of forest destruction to a certain extent, but are unable to evaluate the potential threats and long-term effects; in other words, they cannot strike a balance between immediate and long-term benefits.



图一. 面向全省中、小学生的环境教育, 图为中心副主任梁伟博士 (右一) 向参观学生讲解
Fig.1 A province-wide environmental education for primary and secondary students; Dr. Liang(right) provides a guided tour

用物件。自 1944 年人们在大洲岛发现该鸟之后, 采挖燕窝的活动便从未间断过。由于利用几乎是掠夺性的, 至 2002 年仅采到两窝, 这对一个种群来说是灾难性的。这又是人们过度利用而导致濒临灭绝的典型例子。与此形成鲜明对比的是, 白鹭 (*Egretta garzetta*) 种群在海南许多地方由于人为加以保护而明显增长。

因此, 加强生态文化建设, 对社会公众进行全面、系统而持久的保护意识教育, 以转变人们的观念, 增强公众的保护意识是海南生态省建设的一项重要内容。

公众保护意识教育的实践

2001 年 8 月, 由海南省生态学重点学科倡导成立的海南省生态环境教育中心在海南师范大学正式挂牌, 受海南生态省建设联席会议办公室和海南师范大学的双重领导。中心以海南师大生物多样性博物馆为依托和教育平台, 一直义务为海南建设生态省服务, 积极主动纳入世界自然基金(WWF)的环境教育培训体系 (许多大学的环境教育中心是 WWF 投资与教育部共同建立)。主要面向海南的中、小学校开展绿色行动教育计划, 培训中小学教师将可持续发展思想融入各门课程的教学过程中去; 先后开展了“呵护我们的家园”大型系列教育活动; 举办了五指山地区中小学教师绿色教育培训; 在全省范围的中心小学进行“野生动物历史变迁问卷调查与宣传教育活动”; 积极配合省有关部门开展“科技周”、“爱鸟周”、“救助野生动物”、“科学认识 SARS”等活动, 教育广大群众爱护自然资源并争取到世界自然基金会、国际动植物保护协会等多个国际组织对海南生态保护的支援。

It's obvious that the survival and abundance of species in a certain region is closely linked with the local ecological culture and public conservation awareness. Respect for traditions and an inherited ecological culture both favour wildlife conservation. The enhancement of conservation awareness in turn reinforce local tradition and culture. The following example is best to support the above statement. Edible-nest Swiftlet (*Aerodramus fuciphagus*) is restricted in China to Dazhou Island in Wanning; its edible nests are subject to traditional exploitation. Its discovery in 1944 prompted the continual collecting of bird nests. Harvesting was so rapacious that only two nests were left in 2002; over-exploitation has led to its virtual extinction. In contrast, the population of Little Egret (*Egretta garzetta*) is significantly increasing due to efforts in conservation by the public.

In order to develop Hainan as an ecological province, certain actions should be taken, e.g. enhancing the development of an ecological culture, promoting a comprehensive, systematic and long-lasting public education on conservation awareness and increasing public awareness of conservation.

Public education of conservation awareness in practice

Hainan Province Education Centre of Ecology and Environment (HECEE) was set up at Hainan Normal University in August 2001. The centre is run jointly by the Conference Office for Hainan Eco-Province Construction and Hainan Normal University, and is based in a Biodiversity Museum as an educational platform. It provides ecological education services for Hainan on a voluntary basis and has taken the initiative to participate in the World Wide Fund for Nature (WWF) environmental education capacity building system (most environmental education centres of local universities were co-established by WWF's Department of Investment and Education). The centre targets



图二. 博物馆生物多样性展厅
Fig.2 Biodiversity exhibition hall



图三. 博物馆人·社会·自然展厅
Fig.3 Exhibition hall with the theme of "Humans, Community and Nature"

公众意识在保护方面的具体建议及未来方向

- 1) 公众意识在保护方面应该侧重于教育当地人真正认识到保护自然的价值，并关心他们的生计。很明显，如果当地人认为保护起来的资源对他们没有好处，或这种保护变成外来开发的某种工具时，他们不可能志愿投身保育行列。我们发现，在许多地方，保护区建立之前当地人对资源的利用是可持续的，在保护区建立之后当地人对资源的利用反而变得不可持续了。这是由于保护区与当地社区在公众意识方面的冲突所致。一味只是强调“这不能砍，那不能动”，却又不能给当地发展指明出路和方向，无视当地利益的公众意识教育至少是不成功的。
- 2) 公众意识在保护方面应该取得当地政府及其相关职能部门和媒体的支援。任何保育计划，如果没有当地政府及其相关职能部门的支援和配合，就不能变成切实可操作的行动。而媒体的宣传和参与则不仅可让更多的人能了解到事实的真相并受到教育，而且也使社会监督的作用进一步得到加强。
- 3) 为进一步争取得到政府的更大支援，同时加强与更多的国际组织合作，应把公众意识教育深入到大学、中学、小学和社区中，探索适合海南当地发展

primary and secondary schools and its goals are achieved mainly by promoting educational programmes for environmental protection, and educating teachers to incorporate the concepts of sustainability in all subjects through different kinds of activities, such as "protecting our homeland" (a series of large-scale educational activities); capacity building for primary school teachers in the Wuzhishan area; the "census of historical changes of wildlife and public education" in all core primary schools; and active co-operation with relevant provincial departments in promoting "Science and Technology Week", "Bird-Loving Week", "Saving Wildlife" and "Scientific Facts of SARS". All these activities are aimed at educating the public to endeavour in conservation, with support from international organisations WWF and Fauna & Flora International.

Suggestions and future directions in public conservation awareness-raising

- 1) Public conservation awareness-raising lets local people realize the values of nature conservation and care for their future livelihoods. Obviously, people are not willing to take voluntary action in conservation with no benefits to themselves or if their efforts in protection will be exploited by outside agents. It has been commonly found that sustainable use of resources occurred before the establishment of nature reserves, but not afterwards. This was aroused by a perceived conflict between nature reserves and the interests of the local community. Public education on environmental awareness will not be successful unless people are provided with clear solutions and directions for local development.
- 2) Technical support in promoting public awareness should be gained from local government and relevant departments and the mass media. Conservation projects are not feasible without government support and facilitation. The mass media is an effective channel to deliver the facts and education on conservation, and to reinforce the function of social supervision of conservation work.
- 3) Using stronger support from local government and greater co-operation with international organizations, we should explore all possible channels (schools at all levels as well as local communities) to raise public conservation awareness.



图四. 博物馆海兽多样性展厅中的鲸骨骼标本
Fig.4 Skeleton specimen of Bryde's whale in the marine biodiversity exhibition hall



图五. 泰国诗琳通公主（右二）访问中心和博物馆；右三为中心主任史海涛博士
Fig. 5 Princess Maha Chakri Sirindhorn(second from right) of Kingdom of thailand visited the centre and the museum; (middle) Dr Shi Haitao, director of the centre.

的公众意识教育模式作为未来的发展方向。

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二零零三年具保育价值的

野生动植物纪录

Wildlife Whereabouts – some recent records of conservation importance 2003

以下是 2003 年嘉道理农场暨植物园考察队专家在本项目的野外调查所作的纪录。

The following records were made by specialist team members during KFBG surveys in 2003.

国际濒危等级是以世界自然保护联盟 (IUCN) 提供的濒危物种红色名录为准；国家濒危等级是以中国的濒危物种红皮书为准。

Global status is based on IUCN Red List of Threatened Animals and Plants; national status is based on respective Red Data Books.

注释 Key: CR = 极危 Critically Endangered; EN = 濒危 Endangered; VU = 易危 Vulnerable; NT(LR) = 接近受危 Near-threatened (Lower Risk); R = 稀有 Rare; NR = 自然保护区 Nature Reserves; NNR = 国家级自然保护区 National Nature Reserves; Class I = 国家一级保护 Class I National Protection; Class II = 国家二级保护 Class II National Protection.

植物 Plants

- **翠柏** *Calocedrus macrolepis* Kurz (全球：易危) 10月26日，于海南昌江县坝王岭国家级自然保护区的东五(海拔约 1,050 米)看到一株 15 米高的大树，胸径 80 厘米。

Calocedrus macrolepis Kurz (Global: VU) One tree 15m tall and 80cm dbh was seen at Dongwu (Bawangling NNR, Changjiang County, Hainan) at around 1,050m on 26 October.

- **海南粗榧** *Cephalotaxus mannii* Hook. f. (全球：易危) 在为期 6 天(3 月 21 至 26 日)的海南鹦歌岭考察中，于由白沙县南开乡什付村往马域岭的小径及由马域岭往海南五指山市毛阳的小径共看到约 30 株零散分布的小树，胸径 5 至 20 厘米，树高 3 至 6 米。12 月 11 日，于海南昌江县坝王岭国家级自然保护区的榕树沟(海拔约 750 米)看到一棵 20 厘米胸径，6 米高的小树及 5 株 1.5 米高的小树。

Cephalotaxus mannii Hook. f. (Global: VU) About 30 trees varying in size from 5-20 cm dbh and 3-6m tall scattered along the route from Shifu Cun (Nankai Xiang, Baisha County, Hainan) to Mayuling and along paths from Mayuling to Maoyang (Wuzhishan City, Hainan) in a 6-day survey of Yinggeling range from 21-26 March. One tree about 20cm dbh and 6m tall, and 3-5 saplings up to 1.5m tall were seen at Rongshugou (Bawangling NNR, Changjiang County, Hainan) at around 750m on 11 December.

- **海南油杉** *Keteleeria hainanensis* Chun & Tsiang (中国：濒危) 10月25日，在海南昌江县坝王岭国家级自然保护区的黑岭山地雨林(海拔 1,100 米)看到一棵高 10 米，胸径 40 厘米的大树。

Keteleeria hainanensis Chun & Tsiang (China: EN) One tree about 10m tall and 40cm dbh was seen in montane rainforest at Heiling (Bawangling NNR, Changjiang County, Hainan) at 1,100m on 25 October.

- **马蹄参** *Diplopanax stachyanthus* Hand.-Mazz. (全球：易危) 常见于广西金秀县大瑶山国家级自然保护区圣堂山的山地苔藓矮林。9 月 25 及 26 日于海拔 1,600 至 1,900 米看到 200 棵以上，树高 4 至 6 米，胸径达 50 厘米。

Diplopanax stachyanthus Hand.-Mazz. (Global: VU) Locally abundant, with more than 200 trees, 4-6m tall and up to 50cm dbh, seen at Shengtangshan (Dayaoshan NNR, Jinxiu County, Guangxi) in montane mossy dwarf forest between 1,600 and 1,900m on 25 and 26 September.

- **伯乐树** *Bretschneidera sinensis* Hemsl. (全球：濒危) 3月21至25日，于海南白沙县南开乡的马域岭北坡(海拔 1,000 至 1,200 米)看到 4 棵 20 至 30 米高的开花植株。

Bretschneidera sinensis Hemsl. (Global: EN) Four flowering trees 20-30m tall were seen in montane rainforest on the north-facing hillsides of Mayuling (Nankai Xiang, Baisha County, Hainan) between 1,000 and 1,200m on 21-25 March.



伯乐树 *Bretschneidera sinensis* Hemsl.

野生动植物

- **望天树** *Parashorea chinensis* H. Wang (全球：濒危) 于云南勐腊县西双版纳国家级自然保护区的补蚌相当普遍，1 月 23 日，看到 30 棵以上 50 至 70 米高的大树。

Parashorea chinensis H. Wang (Global: EN) Locally fairly common, with more than 30 trees, ranging from 50 to 70m tall, seen at Bubang (Xishuangbanna NNR, Mengla County, Yunnan) on 23 January.

- **坡垒** *Hopea hainanensis* Merr. & Chun (全球：极危)

3 月 28 日，于海南东方县猴猕岭自然保护区大窝口的次生林(海拔约 650 米)内看到一株 80 厘米高的树苗。

10 月 26 日，于海南昌江县坝王岭国家级自然保护区东五的森林内(海拔约 1,050 米)看到一株 40 厘米高的树苗。

12 月 11 日，于海南昌江县坝王岭国家级自然保护区榕树沟森林内(海拔约 750 米)看到 1 株 60 厘米高的树苗。

12 月 12 日，于海南昌江县坝王岭国家级自然保护区三班下的引水道旁(海拔约 740 米)看到 1 株 60 厘米高的树苗。

11 月 2 日，于海南陵水县吊罗山自然保护区石睛的次生林(海拔约 700 米)内看到一个逾 20 棵植株组成的种群，树高 0.7 至 2 米。

Hopea hainanensis Merr. & Chun (Global: CR) One sapling about 80cm tall was seen in secondary forest at Dawokou (Houmiling NR, Dongfang County, Hainan) at around 650m on 28 March. One sapling about 40cm tall was seen in forest at Dongwu (Bawangling NNR, Changjiang County, Hainan) at around 1,050m on 26 October. One sapling about 60cm tall was seen in forest at Rongshugou (Bawangling NNR, Changjiang County, Hainan) at around 750m on 11 December. One sapling about 60cm tall was seen along the catchwater below Sanban (Bawangling NNR, Changjiang County, Hainan) at around 740m on 12 December. A small population of over 20 saplings ranging from 70cm to 2m tall were seen in secondary forest at Shijing (Diaoluoshan NR, Lingshui County, Hainan) at around 700m on 2 November.

- **青梅** *Vatica mangachapoi* Blanco (全球：濒危) 常见于海南东方县猴猕岭自然保护区(海拔 400 至 800 米)，在 3 月 27 日看到 200 棵以上，树高 3 至 30 米。

Vatica mangachapoi Blanco (Global: EN) Locally abundant, at Houmiling NR (Dongfang County, Hainan) with more than 200 trees 3 to 30m tall, seen between 400-800m on 27 March.

- **海南巴豆** *Croton lauii* Merr. & F.P. Metcalf (中国：易危) 3 月 27 日，于海南东方县大广坝水库(海拔 200 米)的报白的猴猕岭自然保护区高灌木内看到 4 棵 2 至 3 米高的植株。

Croton lauii Merr. & F.P. Metcalf (China: VU) Four plants about 2-3m tall were seen in tall shrubland at Baobai (200m), Daguangba Reservoir (Houmiling NR, Dongfang County, Hainan) on 27 March.

- **水青冈** *Fagus longipetiolata* Seemen (全球：易危) 3 月 29 日，于广西融水县九万山自然保护区张家湾保护站的阔叶林(海拔 800 米)内看到一个由 10 棵树组成的小种群，树高 10 至 15 米，胸径达 60 厘米。

Fagus longipetiolata Seemen (Global: VU) A small population of 10 trees varying from 10 to 15m tall and up to 60cm dbh was seen at Zhangjiawan substation (Jiuwanshan NR, Rongshui County, Guangxi) in broadleaf forest at 800m on 29 March.

- **海南大风子** *Hydnocarpus hainanensis* (Merr.) Sleumer (全球：易危) 3 月 20 日，海南白沙县南开乡什付村溪边的高灌木内(海拔 350 米)看到一棵 2 米高的小树。3 月 29 日，于海南东方县猴猕岭自然保护区大广坝水库旁的保丁石灰岩季雨林内(海拔 200 米)看到一棵 1.5 米高的小树。

Hydnocarpus hainanensis (Merr.) Sleumer (Global: VU) One sapling about 2m tall was seen at Shifu Cun (Nankai Xiang, Baisha County, Hainan) in streamside tall shrubland at 350m on 20 March. One sapling about 1.5m was seen at Baoding (200m), Daguangba Reservoir, in limestone seasonal rainforest (Houmiling NR, Dongfaug County, Hainan) on 29 March.

- **油丹** *Alseodaphne hainanensis* Merr. (全球：易危) 普遍见于海南白沙县南开乡的马域岭，3 月 21 至 25 日期间于海拔 1,000 至 1,200 米看到 100 棵以上，树高 6 至 15 米，胸径达 60 厘米。常见于海南昌江县坝王岭国家级自



然保护区，12月11至12日于海拔800至1,100米看到100棵以上，树高6至25米，胸径达80厘米。

***Alseodaphne hainanensis* Merr. (Global: VU)** Locally common, with more than 100 trees, ranging from 6 - 15m tall and up to 60cm dbh, seen at Mayuling (Nankai Xiang, Baisha County, Hainan) between 1,000-1,200m on 21-25 March. Locally abundant, with more than 100 trees, ranging from 6-25m tall and up to 80cm dbh, seen at Bawangling NNR (Changjiang County, Hainan) 800-1,100m on 11 and 12 December.

- **香籽含笑 *Michelia hedyosperma* Y.W. Law (中国：濒危)**12月12日，于海南昌江县坝王岭国家级自然保护区三班往引水道的旧采伐路旁的沟谷 (海拔750-900米)看到4棵，树高约20至30米，胸径达80厘米。

***Michelia hedyosperma* Y.W. Law (China: EN)** Four trees about 20-30m tall and up to 80cm dbh were seen in a ravine, at 750-900m, from the old logging trail at Sanban to the catchwater (Bawangling NNR, Changjiang County, Hainan) on 12 December.

- **海南风吹楠 *Horsfieldia hainanensis* Merr. (全球：易危)**10月30日，于海南昌江县坝王岭国家级自然保护区东一公路旁的低地雨林内 (海拔约650米)看到一棵，树高约20米，胸径80厘米。

***Horsfieldia hainanensis* Merr. (Global: VU)** A tree about 20m tall and 80cm dbh was seen in lowland rainforest at Dongyi (Bawangling NNR, Changjiang County, Hainan) along a tourist trail next to the main road at about 650m on 30 October.

- **马尾树 *Rhoiptelea chiliantha* Diels & Hand. – Mazz. (全球：易危)**9月28日，于广西融水县九万山自然保护区内，沿九万山林场往张家湾保护站小径途中的阔叶林内(海拔550米)看到一棵，树高6米，胸径30厘米。

***Rhoiptelea chiliantha* Diels & Hand. – Mazz. (Global: VU)** A tree 6m tall and 30cm dbh was seen in broadleaf forest along the path from Jiuwanshan Forest Farm to Zhangjiawan substation (Jiuwanshan NR, Rongshui County, Guangxi) at 550m on 28 September.

- **蝴蝶树 *Heritiera parvifolia* Merr. (全球：易危)**11月2日，于海南陵水县吊罗山自然保护区石睛的次生林(海拔约700米)看到三棵0.7至1.5米的小树。

***Heritiera parvifolia* Merr. (Global: VU)** Three saplings 0.7-1.5m tall were seen in secondary forest at Shijing (Diaoluoshan NR, Lingshui County, Hainan) at around 700m on 2 November.

- **土沉香 *Aquilaria sinensis* (Lour.) Spreng. (全球：易危)**3月22日，于海南白沙县南开乡道银毗邻的马域岭山地雨林内(海拔1,000米)分别看到三株50厘米的树苗及一个树桩。于海南东方县猴猕岭自然保护区大窝口旁的次生林内相当普遍。3月28日于海拔约650米看到20棵以上胸径达20厘米的土沉香。这些树都曾被砍劈，以采得高价的沉香。10月26日，于海南昌江县坝王岭国家级自然保护区东五的沟谷雨林(海拔约1,000米)看到五棵胸径达20厘米的小树。这些树都曾被砍劈，以采得高价的沉香。

***Aquilaria sinensis* (Lour.) Spreng. (Global: VU)** Three saplings 50 cm tall and a tree stump were seen at Mayuling near Daoyin (Nankai Xiang, Baisha County, Hainan) in montane rainforest at 1,000m on 22 March. Locally fairly common with more than 20 trees up to 20cm dbh seen in secondary forest near Dawokou (Houmiling NR, Dongfang County, Hainan) at around 650m on 28 March. All trees seen had been hacked for collection of "chenxiang". Five trees up to 20cm dbh were seen in ravine rainforest at Dongwu (Bawangling NNR, Changjiang County, Hainan) at around 1,000m on 26 October. All trees seen had been hacked for "chenxiang".

哺乳类 Mammals

- **海南黑冠长臂猿 *Nomascus nasutus hainanus* (全球：极危；中国：濒危、一级)** 十月十四至二十四日，在海南坝王岭国家级自然保护区进行长臂猿调查时记录到(详情请看本期第22-24页)

Hainan Gibbon *Nomascus nasutus hainanus* (Global: CR; China: EN, Class I) At Bawangling NNR, Changjiang County, Hainan. Recorded during the Hainan Gibbon Survey between 14-24 October. (For details see page 22-24 of this issue)

- **獼猴 *Macaca mulatta* (全球：接近受危；中国：易危、二级)** 十一至十二月期间，在海南陵水县吊罗山自然保护区进行野外兽类调查时，以红外线自动照相机拍摄到一只。

Rhesus Macaque *Macaca mulatta* (Global: LR/nt; China: VU, Class II) One was captured by infrared auto-trigger camera at Diaoluoshan NR, Lingshui County, Hainan, during a wild mammal survey between November and December.

- **黑熊 *Ursus thibetanus* (全球：易危；中国：易危、二级)** 九月二十八日，在广西融水县九万山自然保护区进行野外兽类调查时，在张家湾保护站附近(海拔730米)看到很多爪痕。

Asiatic Black Bear *Ursus thibetanus* (Global: VU; China: VU, Class II) Many claw marks were found around Zhangjiawan substation(730m) at Jiuwanshan NR(Rongshui County, Guangxi) during a wild mammal survey on 28 September.

- **椰子猫 *Paradoxurus hermaphroditus* (中国：易危)** 四月至九月期间，在海南昌江县坝王岭国家级自然保护区进行野外兽类调查时，以红外线自动照相机拍摄到三只。

Common Palm Civet *Paradoxurus hermaphroditus* (China: VU) Three were captured by infrared auto-trigger cameras at Bawangling NNR(Changjiang County, Hainan) during a wild mammal survey between April and September.

- **小灵猫 *Viverricula indica* (中国：二级)** 九月二十九日晚上，在广西融水县九万山自然保护区附近的怀保镇看到一只。

Small Indian Civet *Viverricula indica* (China: Class II) One was seen at Huaibao Town near Jiuwanshan NR (Rongshui County, Guangxi) in the evening of 29 September.



水鹿 *Cervus unicolor*
Sambar *Cervus unicolor*

- **水鹿 *Cervus unicolor* (中国：易危、二级)** 四月至九月期间，在海南昌江县坝王岭国家级自然保护区作野外兽类调查时，以红外线自动照相机拍摄到五只。

Sambar *Cervus unicolor* (China: VU, Class II) Five were captured by infrared auto-trigger cameras at Bawangling NNR, (Changjiang County, Hainan) during the wild mammal survey between April and September.

- **巨松鼠 *Ratufa bicolor* (中国：易危、二级)** 三月二十三及二十五日，于海南白沙县南开乡马域岭林区共看到三只。七月二十四日，于云南保山市高黎贡山国家级自然保护区的百花林看到一只。十月于海南昌江县坝王岭国家级自然保护区，看到两只。

Black Giant Squirrel *Ratufa bicolor* (China: VU, Class II) A total of three were seen in forest of Mayuling (Nankai Xiang, Baisha County, Hainan) on 23 and 25 March. One was seen in Baihualin at Gaoligongshan NNR, (Baoshan City, Yunnan) on 24 July. Two were seen in Bawangling NNR(Changjiang County, Hainan) in October.

- **海南鼯鼠 *Petaurista hainana* (中国：易危)** 十月十八日傍晚于海南昌江县坝王岭国家级自然保护区南差河地区看到两只。〔编者按：某些国际专家将其列为 *P. philippeusis* 的同种异名〕

Hainan Giant Flying Squirrel *Petaurista hainana* (China: VU) Two were seen in the evening of 18 October at Nanchahe area, Bawangling NNR(Changjiang County, Hainan). [Editor's note: considered a synonym of *P. philippensis* by some international experts]



- **黑白飞鼠***Hylopetes alboniger* (全球：濒危；中国：濒危) 三月二十三日，于海南白沙县南开马域岭林区捡到一具尸体。
Particolored Flying Squirrel *Hylopetes alboniger* (Global: EN; China: EN) A dead individual was picked up in forest of Mayuling (Nankai Xiang, Baisha County, Hainan) on 23 March.
- **扫尾豪猪***Atherurus macrourus* (中国：易危) 四月至九月期间在海南昌江县坝王岭国家级自然保护区及十一月至十二月期间于海南陵水县吊罗山自然保护区进行野外兽类调查时，以红外线自动照相机拍摄到很多。
Asiatic Brush-tailed Porcupine *Atherurus macrourus* (China: VU) In Hainan, many were captured by infrared auto-trigger cameras at Bawangling NNR(Changjiang County) between April and September and at Diaoluoshan NR(Lingshui County) between November and December, during the wild mammal survey.

鸟类 Birds

- **血雉***Ithaginis cruentus* (中国：易危) 七月二十九日于海拔3,500米，往云南德钦县白马雪山国家级自然保护区丫口的路上看到六只。
Blood Pheasant *Ithaginis cruentus* (China: VU) Six were seen at 3,500m, on the way to Baimaxueshan NNR Yakou, Deqin County, Yunnan, 29 July.
- **海南山鹧鸪***Arborophila ardens* (全球：濒危；中国：濒危、国家一级保护) 四月至九月期间，在海南昌江县坝王岭国家级自然保护区进行野外兽类调查及在十月的长臂猿调查时，都有记录。
Hainan Partridge *Arborophila ardens* (Global: EN; China: EN, National Protection Class I) Recorded during the wild mammal survey between April and September and during the Hainan Gibbon Survey in October, in Bawangling NNR, Changjiang County, Hainan.
- **灰孔雀雉***Polyplectron katumatae* (中国：国家一级保护) 四月至九月期间，在海南昌江县坝王岭国家级自然保护区进行野外兽类调查及在十月的长臂猿调查时，都有记录。
Hainan Peacock Pheasant *Polyplectron katumatae* (China: Class I) Recorded during the wild mammal survey between April and September and during the Hainan Gibbon Survey in October, in Bawangling NNR, Changjiang County, Hainan.



栗树鸭 *Dendrocygna javanica* (详见第 39 页)
Lesser Tree Duck *Dendrocygna javanica* (see p.39 for details)



蓝背八色鸫 *Pitta soror*
Blue-rumped Pitta *Pitta soror*

- **斑尾鹇鸪***Macropygia unchall* 十二月十二日在海南昌江县坝王岭国家级自然保护区的南差河地区看到一只。
Barred Cuckoo Dove *Macropygia unchall* One was seen in the Nanchahe area, Bawangling NNR, Changjiang County, Hainan, 12 December.
- **栗鸚***Phodilus badius* (中国：二级) 十月十四及十五日在海南昌江县坝王岭国家级自然保护区的东三地区每晚各听到一只。
Oriental Bay Owl *Phodilus badius* (China: Class II) One was heard each night at Dongsan, Bawangling NNR, Changjiang County, Hainan, 14-15 October.

- **蓝背八色鸫***Pitta soror* (中国：二级) 四月至九月期间，在海南昌江县坝王岭国家级自然保护区进行野外兽类调查及在十月的长臂猿调查时，都有记录。
Blue-rumped Pitta *Pitta soror* (China: Class II) Recorded during the wild mammal survey between April and September and during the Hainan Gibbon Survey in October, in Bawangling NNR, Changjiang County, Hainan.
- **三趾翠鸟***Ceyx erithacus* 十月，在海南昌江县坝王岭国家级自然保护区作野外兽类调查时，以红外线自动照相机拍摄到一只。
Oriental Dwarf Kingfisher *Ceyx erithacus* One was captured by infrared auto-trigger camera at Bawangling NNR, Changjiang County, Hainan in October during the wild mammal survey.

两栖及爬行类 Amphibians & Reptiles

- **红瘰疣螈***Tylototriton shanjing* 七月二十三日于云南高黎贡山国家级自然保护区南部腾冲县五合乡看到七条。
Red Knobby Newt *Tylototriton shanjing* Seven were seen at Wuhe Xiang in Tengchong County, southern Gaoligongshan NNR, Yunnan, 23 July.
- **金秀小树蛙***Philautus jinxiuensis* 九月二十四日于广西金秀县大瑶山国家级自然保护区圣堂山的竹林内看到十多只。
Jinxiu Small Treefrog *Philautus jinxiuensis* About a dozen were seen in bamboo forest at Shengtangshan in Dayaoshan NNR, Jinxiu County, Guangxi, 24 September.
- **树蛙***Rhacophorus* sp. 三月二十一日于海南白沙县南开马域岭林区见到两只，这可能是一个科学新种。
Treefrog *Rhacophorus* sp. Two were seen in forest of Mayuling(Nankai Xiang, Baisha County), Hainan on 21 March. Probably a new species.
- **平胸龟***Platysternon megacephalum* (全球：濒危；中国：濒危) 三月二十一日晚，于海南白沙县南开马域岭林区见到一只。
Big-headed Terrapin *Platysternon megacephalum* (Global: EN; China: EN) One was seen in forest of Mayuling (Nankai Xiang, Baisha County), in the evening of 21 March.
- **海南闪鳞蛇***Xenopeltis hainanensis* (中国：濒危) 八月三十日晚，于广东始兴县车八岭国家级自然保护区内看到一条。
Hainan Sunbeam Snake *Xenopeltis hainanensis* (China: EN) One was seen in Chebaling NNR, Shixing County, Guangdong in the evening of 30 August.
- **玉斑锦蛇***Elaphe mandarina* (中国：易危) 九月二十四日，于广西金秀县大瑶山国家级自然保护区圣堂山的山地阔叶林内看到一条。
Mandarin Rat Snake *Elaphe mandarina* (China: VU) One was seen in montane broadleaf forest at Shengtangshan in Dayaoshan NNR, Jinxiu County, Guangxi, 24 September.



玉斑锦蛇 *Elaphe mandarina*
Mandarin Rat Snake *Elaphe mandarina*

海南岛水鸟调查的特别发现

Interesting findings from Island-wide Hainan waterbird survey

2003年12月底，本园中国项目、香港观鸟会、海南省林业局辖下的野生动物保护中心及海南师范大学的代表于海南开展了首个全岛的水鸟调查。调查地点为岛上主要的沿海及淡水湿地，调查中共录得125种鸟类。重要记录如下：

In late December 2003, the first simultaneous island-wide waterbird survey in Hainan was conducted by KFBG's China Programme, members of the Hong Kong Bird Watching Society, Hainan Wildlife Conservation Centre of the Hainan Provincial Forestry Department and Hainan Normal University. The survey covered major coastal and freshwater wetlands across Hainan Island and a total of 125 species of birds were recorded. Significant records include:

- **白琵鹭** *Platalea leucorodia* (中国：易危、二级) 二零零四年一月五日于海南东方市看到一只，海南新记录。*European Spoonbill Platalea leucorodia* (China: VU, Class II) One was seen at Dongfang City in Hainan, 5 January 2004. A new record for Hainan.
- **黑脸琵鹭** *Platalea minor* (全球：濒危；中国：濒危、二级) 十二月二十九日于海南琼山市东寨港国家级自然保护区看到一只。二零零四年一月一日于海南临高县看到十只。二零零四年一月三日于海南东方市看到四十八只。*Black-faced Spoonbill Platalea minor* (Global: EN; China: EN, Qiongzhan City Class II) One was seen at Dongzhaigang NNR(Qiongzhan city, Hainan) on 29 December. Ten were seen at Lingao County (Hainan) on 1 January 2004. Forty-eight were seen at Dongfang City(Hainan) on 3 January 2004.
- **栗树鸭** *Dendrocygna javanica* (中国：易危) 十二月三十一日于海南琼中县看到约一千二百只。*Lesser Tree Duck Dendrocygna javanica* (China: VU) About 1,200 were recorded at Qiongzhan County, Hainan on 31 December.
- **鸳鸯** *Aix galericulata* (中国：易危) 十二月三十一日于海南琼中县看到一只。海南新记录。*Mandarin Duck Aix galericulata* (China: VU) One was seen at Qiongzhan County, Hainan on 31 December. A new record for Hainan.



于海南中部看到的一群栗树鸭 *Dendrocygna javanica*
Flock of Lesser Whistling Duck *Dendrocygna javanica* seen inland on Hainan.



队员在东寨港国家级自然保护区观鸟
Team members 'birding' at Dongzhaigang National Nature Reserve, Hainan

- **渔雕** *Ichthyophaga humilis* (全球：接近受危；中国：二级) 二零零四年一月一日，于海南儋州市松涛水库看到一只。*Lesser Fish Eagle Ichthyophaga humilis* (Global: LR/nt; China: Class II) One was seen at Songtao Reservoir in Danzhou City, Hainan on 1 January 2004.

调查前我们先向海南自然保护区的前线工作人员及师范大学生物系的学生讲解水鸟普查及湿地保育。是次培训及调查有助整合海南湿地保育的力量。

Prior to the survey a training course on waterbird census and wetland conservation was delivered to Hainan nature reserve frontline staff and biology students of the Normal University. The training and survey helped to consolidate wetland protection capacity in Hainan.

广西鳄蜥 (*Shinisaurus crocodilurus* Ahl.) 的现状调查

Survey of the current status of Crocodile Lizard (*Shinisaurus crocodilurus* Ahl.) in Guangxi

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二十世纪初发现的鳄蜥，凭藉其独科、独属、独种的分类地位以及极为狭窄的分布范围，一直以来，都位居我国特有珍稀物种之首列。近年来，在物种栖息地频遭破坏、环境恶化、野生种群遭遇人类枯竭式开采的严峻形势下，鳄蜥的栖息地面积及种群数量正在急剧减少。

据记载¹，鳄蜥仅分布于广西境内的金秀县、贺县、平南、桂平县以及蒙山县部分山区，1978年调查的种群数量结果分别为：金秀县罗香片700至800只，昭平县九龙片1,700只，贺县裹松片3,000只，桂平和平南片500只，总数为6,000只左右。其后观察显示，广西境内鳄蜥的数量一直保持平均，直至1990年鳄蜥种群数量开始呈直线下降趋势。

2001至02年，我们对广西境内鳄蜥的调查，发现其分布与种群数量变化极大，原分布地贺县裹松片、桂平、平南等地鳄蜥已绝迹，其他点分布情况为：金秀县罗香片190只，主要分布在罗香村、龙军村、大垌村、白牛村。昭平县九龙片388只，主要分布在上贤村、大龙村、山秀村、黄连村、平恩村等地，贺县大桂山林场86只，零星分布与北茭分场的山冲内。三个点鳄蜥总数仅为664只左右。现存种群数量仅为十年前的10%。对于致使鳄蜥资源枯竭的原因可分为直接及间接人为因素：

Since its discovery in the early 1900s, Crocodile Lizard has been of prime concern among rare endemic species in China because of its unique taxonomic status (it is the sole member of the Shinisauridae family) and extremely limited range. Relentless habitat destruction, environmental deterioration and exhaustive exploitation of wild populations in recent years have led to a diminution in habitat area and drastic population

decline. According to previous survey data¹, Crocodile Lizard was restricted to Jinxiu County, He County, Pingnan County, Guiping County and some mountainous areas of Mengshan County in Guangxi. A survey in 1978 indicated 6,000 lizards were left, including 700-800 individuals in Luoxiang Section of Jinxiu County, 1,700 individuals in Jiulong Section of Zhaoping County, 3,000 individuals in Lisong Section of He County

and 500 individuals in Guiping and Pingnan. Subsequent observations suggested the population apparently remained quite stable until around 1990, when it began a marked decline.

A new survey was conducted in 2001-02, revealing great changes in distribution and population size. Crocodile lizards are already extirpated from parts of their former range, such as Lisong Section of He County, Guiping and Pingnan. Only 664 lizards were estimated to remain in three other areas: 190 in Luoxiang, Longjun and Datong Villages in Luoxiang Section of Jinxiu County; 388 in Shangxian, Dalong, Shanxiu, Huanglian and Ping'en Villages in Jiulong Section of Zhaoping County; and 86 in Daguishan Forest Farm, in Shanchong of Beilou Forest Farm. The existing population is thus only 10% of that of a decade earlier; the decline can be attributed to direct and indirect human impact.



图一. 鳄蜥 *Shinisaurus crocodilurus*
Fig.1 Crocodile Lizard *Shinisaurus crocodilurus*



间接威胁

砍伐 -

当地农民为了生计，将一片片原生林砍伐掉，这种情况在鳄蜥出没的河岸溪流林木亦时有发生。失去大树的遮阴使杂草猛长，不再适合鳄蜥生存，从而使鳄蜥的繁殖地遭到惨重的破坏。金秀罗香乡罗香村罗顶冲，昭平县九龙乡大龙村塘冲、上贤村及贺州大桂山林场的部分山冲便出现这个情况。

水质污染 -

在鳄蜥栖息的山溪边，分布著许多矿区，采矿造成了河段的水质污染。另外，山区水田中农药、化肥的施用量越来越高，经雨水不断流入山溪中。这些因素严重地污染了鳄蜥的栖息环境。如昭平县九龙乡山秀村有村民在鳄蜥分布的山冲内淘金开矿，其冲洗液（硫酸）直接注入小溪内；大龙村塘冲上游有农田，喷洒在庄稼上农药会随雨水注入小溪内，造成污染。如此的情况在金秀也存在。

不当的捕鱼活动 -

农村屡禁不绝的电鱼、炸鱼、毒鱼现象，使当地的鳄蜥种群遭到灭顶之灾。鳄蜥常伏于溪流积水坑上方细枝上或溪旁石块上，受到惊扰，纵身跃入水中，正好成为捕鱼者囊中之物。几乎在每一个鳄蜥分布点都有此现象。本人在金秀罗香乡大垌村、罗香村、白牛村、昭平县九龙乡大龙村、山秀村、贺州大桂山林场内都曾遇上过。

由于上述原因，使各条山溪中、下游的鳄蜥栖息地条件恶化，进而导致本已狭窄的鳄蜥分布区大面积缩小。

直接威胁

鳄蜥的贸易 -

高价高利导致偷捕乱猎屡禁不止。就其性质而言，可谓之毁灭性因素。鳄蜥的贸易从二十世纪80年代便开始了，90年代达到最为倡狂程度。据访问，上世纪80-90年代上期，鳄蜥贸易价格约为0.5至10元人民币一只，而最近几年的贸易价格却高得格外惊人，黑市上一只成年鳄蜥价格在500至2,000元人民币不等，就连幼蜥都卖到200元人民币一只。例如2002年8月，在金秀县罗香乡大垌村委平余屯，一村民贩卖一成年鳄蜥成交价1,100元人民币一只，8只幼蜥成交价200元人民币一只，贩子为平南县马练乡人。鳄蜥贸易市

Indirect threats

Logging:

Local farmers are used to cutting patches of forest for their livelihoods, and this still takes place in riparian forests used by the lizards. The lack of shade cover from large trees favours the spread of weeds. Disturbed habitats become unsuitable for crocodile lizards, and hence key breeding grounds are lost. Crocodile lizards are now extirpated from Luodingchong in Luoxiang Village, Luoxiang Township of Jinxiu County, Tangchong of Dalong Vllage and Shangxian Village, Jiulong Township of Zhaoping County and some hill streams of Daguishan forest farm of Hezhou.

Water pollution:

Many of the hill streams supporting crocodile lizards are mining areas, and have been contaminated. For instance, hill streams in Shanxiu Village, Jiulong Township of Zhaoping County, where crocodile lizards live, are badly polluted by gold-extraction and mining, during which sulphuric acid is directly discharged into streams. In addition higher and higher dosages of pesticides and chemical fertilizers are applied in the paddy fields, and the chemicals drain into the hill streams when it rains. Leaching of pesticides by rainfall from the farmland on the upper reaches of Tangchong in Dailong Village has also resulted in serious pollution, and the same occurs in Jinxiu.

Harmful fishing practices:

The ongoing practice of fishing by electrification, explosives and poisoning has posed a threat. Crocodile lizards often lie on branches or rocks beside streams. They dive into the water if threatened and are susceptible to capture by fishermen. Such incidents occur in nearly all of its habitats, such as Datong Village, Luoxiang Village and Bainiu Village of Luoxiang Township, Jiuxiu, Dalong Village and Shanxiu Village of Jiulong Township, Zhaoping County and Daguishan forest farm of Hezhou. Thus, key habitats in the middle and lower reaches of hill streams are deteriorating in quality and extent.

Direct threats

Illegal hunting:

In spite of the ban imposed, illegal hunting still prevails. The high prices and profits derived from trade help motivate hunters. Extensive trade in crocodile lizards began in the 1980s and reached its peak during the 1990s. Interviewees said the price increased from RMB¥0.5 to RMB¥10 from the 1980s to the 1990s, but the price has now rocketed: an adult costs RMB¥500 to RMB¥2,000 on the black market, and even a juvenile reaches RMB¥200. In August 2002, a local villager in Datongcun at Luoxiang, Jinxiu County sold an adult at RMB¥1,100 and eight juveniles at RMB¥200 each to a villager from Malianxiang, Pingnan County. Demand for food and pets underlie the trade in crocodile lizards. People purchase the lizards either through superstition or curiosity, some believing in their ability to cure particular diseases, others eager to own a peculiar pet. The rampant trade in crocodile lizards drives poaching.

场存在的主要原因在于满足部分人群对饮食和饲养宠物的需要。有的鳄蜥被人们迷信为可以治疗某种疾病的灵丹妙药而被捕捉和收购，更多的鳄蜥被好奇的人用来饲养，作为他们的宠物。鳄蜥的贸易猖獗，进一步刺激了捕猎者的贪欲，对野外残存的鳄蜥大肆偷捕。

除了鳄蜥分布范围狭窄，迁徙能力弱，种群分布严重片段化；野外繁殖力低，妊娠周期长，存活率低下，活动范围狭窄，不好活动，夜间极易被捕等因素，都可能是造成鳄蜥濒危的原因。

群众欠缺保护意识 -

中国大部分农村普遍沿用祖先遗留下来的刀耕火种，靠山吃山靠水吃水的生活方式，不能马上就能改变，而这又无疑是对生态环境、对野生动植物造成破坏的一大因素。所以必须靠外来力量才可使情况得到改善。

但最近，在广东省一个保护区内发现鳄蜥²，数量可观，这对于保护鳄蜥免遭灭绝意义重大，对该地区的种群数量有待进一步调查。

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图二：广西境内鳄蜥历年来分布情况简图
Fig.2 Map showing the historical distribution of crocodile lizards in Guangxi

(△为鳄蜥历史分布点，⊙为鳄蜥现在的分布范围)
(△ historical distribution, ⊙ are the current distribution range)

Besides their restricted and fragmented distribution, various features of crocodile lizards make them susceptible to these human impacts. Their restriction to stream habitats and inactivity make them susceptible to catching at night; their poor mobility, low breeding rate in the wild, long gestation, low survival rate and small home range reduce the chances of population recovery.

Lack of public conservation awareness in most villagers:

Deep-rooted practices of shifting cultivation, and villagers' heavy reliance on the natural environment for their livelihoods, constrain them from voluntarily making immediate changes that would relieve pressure on the lizards. Thus the outlook for the habitat and wildlife is bleak without outside intervention. Recently, a sizeable population of Crocodile Lizards was found in a Guangdong nature reserve², and this positive news calls for more detailed study of the Guangdong population.

Acknowledgement

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¹ Li Zhenchang, Xiao Zhi. Crocodile lizards in Qujiang County, Guangdong. *Chinese Journal of Zoology*, 2002, 37(5):76-77.
² Zhang Yuxia, 1991. *Crocodile Lizards of China*. China Forestry Publishing House, Beijing.

复活岛的终结

Easter's End

数个世纪过后，波利尼西亚人依照祖先的雕刻法，开始在祭坛上竖立石像。随年月过去，石像和祭坛变得越来越大，人们开始在石像的头部加以十吨重的红头冠——为向其他部族炫耀自家的财富与权力，他们会争相把头冠加高，石像体积因而越来越大。复活岛如同当今的美国一样，复杂的政治系统，掌管着当地社会的资源的重新分配及负责整合各区经济。

随著岛上人口增长，伐林的步伐远远超于森林再生的速度。波利尼西亚人在地上建造花园，以木材生火、造船及建屋，搬运雕像更是不在话下。当森林消耗殆尽，他们再掏不出木材和绳子来运送及竖立石像，生活条件自此变得越来越差，溪泉乾涸；水源匮乏，肆意砍伐；柴薪顿失。

陆栖鸟类、大型海螺及海鸟相继灭绝，粮食短缺使人们难以裹腹。人们再找不到木材建造船只，也就无法出海捕鱼，鱼获随之下降，人们也无法尝到海豚的味道。伐林造成水土流失，土壤在风吹、雨打和日晒下，养分渐被冲刷，使之更形贫瘠，农作物产量亦因而减少。纵然社会上出现了一股「养鸡热」及人吃人这类自相残杀的行径，也不足以取代往昔唾手可得的美味佳肴。现时仍保留著的小雕像面颊凹陷，肋骨凸现，可想而知，当时的波利尼西亚人普遍处于饥饿之中。

食粮日益减少，已不足以让岛上居民向酋长、官员及祭司们纳贡，复杂的社会结构亦随之瓦解。幸存者向早期的欧洲访客表示，当时整个社会处于战乱之中，中央集权的政府被推翻，皇位亦为军人所篡，世袭时期正式结束。战争在17世纪和18世纪达到了顶峰，昔日人们制造的石矛和石刀，现时仍随处可见。1700年左右，全岛饱经饥荒战乱，岛上人口仅界乎全盛时期的四分之一至十分一。约在1770年，岛上的部族开始互相推倒敌人的石像，并把它们的头砍下来。直至1864年，最后一尊石像也被破坏得体无完肤，颓然塌下。

在思考复活岛没落的悲剧时，我们会问，为什么他们不环顾身边的一切，想想自己到底在干什么，在还来得及补救的时候停止破坏的活动？在砍伐最后一株大棕榈树时，他们究竟在想些什么？

我相信那里的灾难并非一朝一夕的，而是由长年累月的破坏活动所引起。岛上被遗下数百尊被废弃的石像可作证。居民赖以制造滚轮及绳子的森林并非在一夜之间蒸

After a few centuries, they began erecting stone statues on platforms, like the ones their Polynesian forebears had carved. With passing years, the statues and platforms became larger and larger, and the statues began sporting ten-ton red crowns - probably in an escalating spiral of one-upmanship, as rival clans tried to surpass each other with shows of wealth and power. On Easter, as in modern America, society was held together by a complex political system to redistribute locally available resources and to integrate the economies of different areas.

Eventually Easter's growing population was cutting the forest more rapidly than the forest was regenerating. The people used the land for gardens and the wood for fuel, canoes, and houses - and, of course, for lugging statues. As forest disappeared, the islanders ran out of timber and rope to transport and erect their statues. Life became more uncomfortable - springs and streams dried up, and wood was no longer available for fires.

People also found it harder to fill their stomachs, as land birds, large sea snails, and many seabirds disappeared. Because timber for building seagoing canoes vanished, fish catches declined and porpoises disappeared from the table. Crop yields also declined, since deforestation allowed the soil to be eroded by rain and wind, dried by the sun, and its nutrients to be leached from it. Intensified chicken production and cannibalism replaced only part of all those lost foods. Preserved statuettes with sunken cheeks and visible ribs suggest that people were starving.

With the disappearance of food surpluses, Easter Island could no longer feed the chiefs, bureaucrats, and priests who had kept a complex society running. Surviving islanders described to early European visitors how local chaos replaced centralized government and a warrior class took over from the hereditary chiefs. The stone points of spears and daggers, made by the warriors during their heyday in the 1600s and 1700s, still litter the ground of Easter today. By around 1700, the population began to crash toward between one-quarter and one-tenth of its former number. People took to living in caves for protection against their enemies. Around 1770 rival clans started to topple each other's statues, breaking the heads off. By 1864 the last statue had been thrown down and desecrated.

As we try to imagine the decline of Easter's civilization, we ask ourselves, "Why didn't they look around, realize what they were doing, and stop before it was too late? What were they thinking when they cut down the last palm tree?"

I suspect, though, that the disaster happened not with a bang

发，而是经由数十年间缓慢地消失。人们在不知不觉间把最后一根绳子也用掉，至于是战乱逃亡的居民或是刚把新像雕好的雕塑家所作的好事也就无从稽考了。当时，任谁试图向官员、酋长及雕刻工人作出伐林的忠告也会被一概推翻，只因伐林是他们赖以谋生的经济活动。太平洋西北部的伐木工人是业界中最后知后觉的一群，他们把工作凌驾于保育之上，高呼「要工作，不要树木」。没有多少人注意到森林覆盖的年月变化：今年在这裹把所有树连根拔起，在那荒地上却有树长出。只有较年长的人才能重拾孩时的经历，洞悉个中的差别，可是，他们的子女对这改变的认识比起我那八岁的孩子们从我和妻子口中得知洛杉矶在这三十年间的转变不会多。

树木的数量越来越少，也没以往那么高，重要性也大不如前。当最后一株结著累累果实的大棕榈树也遭砍掉，人们再不能利用它作为主要经济收入来源的时候，他们唯有向小棕榈树下手，跟其他灌木及小树一样。可是年复一年的砍伐，连树苗也愈见稀少，没有人会注意到连最后一棵小棕榈树也倒下了。

复活岛的经验再也显浅不过。复活岛就是地球的缩影。如同复活岛一样，不断膨胀的人口正吞噬著地球的珍稀资源。交通四通八达使国际社会紧密连接、融为一体，却无路可逃。波利尼西亚人不能逃到海里去，我们也不能迁到外太空居住，正因为地球是我们唯一的家。若我们仍以现时模式过活，当儿子们长得与我现时一样大时，世上主要鱼获、热带雨林、化石燃料、还有大部分的土壤经已消耗殆尽。

我们大可扮作充耳不闻、视而不见又或是坐以待毙，反正聊聊数千的复活岛居民单凭简陋的石器及赤手空拳已足以摧毁家园，如今科技还要比前先进，数以亿计的人类要把地球弄至翻天覆地岂不是易如反掌吗？不过，我们跟波利尼西亚人有著重要的差别，那便是我们拥有他们所没有的东西。我们有文字，因而有历史和书籍的记载，可从其他国家的兴衰中引以为鉴。我最大的希望便是我们的子孙后代能够从复活岛灭亡的事迹中吸取教训。

复活岛居民在砍最后一棵棕榈树时在想什么？这一刻，你的脑际间又浮现了什么画面呢？

but with a whimper. After all, there are those hundreds of abandoned statues to consider. The forest the islanders depended on for rollers and rope didn't simply disappear one day--it vanished slowly, over decades. Perhaps war interrupted the moving teams; perhaps by the time the carvers had finished their work, the last rope snapped. In the meantime, any islander who tried to warn about the dangers of progressive deforestation would have been overridden by vested interests of carvers, bureaucrats, and chiefs, whose jobs depended on continued deforestation. Our Pacific Northwest loggers are only the latest in a long line of loggers to cry, "Jobs over trees!" The changes in forest cover from year to year would have been hard to detect: yes, this year we cleared those woods over there, but trees are starting to grow back again on this abandoned garden site here. Only older people, recollecting their childhoods decades earlier, could have recognized a difference. Their children could no more have comprehended their parents' tales than my eight-year-old sons today can comprehend my wife's and my tales of what Los Angeles was like 30 years ago.

Gradually trees became fewer, smaller, and less important. By the time the last fruit-bearing adult palm tree was cut, palms had long since ceased to be of economic significance. That left only smaller and smaller palm saplings to clear each year, along with other bushes and treelets. No one would have noticed the felling of the last small palm.

By now the meaning of Easter Island for us should be chillingly obvious. Easter Island is Earth writ small. Today, again, a rising population confronts shrinking resources. We too have no emigration valve, because all human societies are linked by international transport, and we can no more escape into space than the Easter Islanders could flee into the ocean. If we continue to follow our present course, we shall have exhausted the world's major fisheries, tropical rain forests, fossil fuels, and much of our soil by the time my sons reach my current age.

It would be easy to close our eyes or to give up in despair. If mere thousands of Easter Islanders with only stone tools and their own muscle power sufficed to destroy their society, how can billions of people with metal tools and machine power fail to do worse? But there is one crucial difference. The Easter Islanders had no books and no histories of other doomed societies. Unlike the Easter Islanders, we have histories of the past--information that can save us. My main hope for my sons' generation is that we may now choose to learn from the fates of societies like Easter's.

What were the Easter Islanders thinking as they cut down the last palm tree? *What are YOU thinking right now?*

Jared Diamond

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《庄子·内篇·人间世第四》

The oak and the carpenter Chuang Tsu, c4th Century B.C.

原文

匠人石之齐，至于曲辕，见栎社树。其大蔽数千牛，洁之百围，其高临山，十仞而后有枝，其可以为舟者旁十数。观者如市，匠伯不顾，遂行不辍。弟子厌观之，走及匠石，曰：「自吾执斧斤以随夫子，未尝见材如此其美也。先生不肯视，行不辍，何邪？」曰：「已矣，勿言之矣！散木也。以为舟，则沉；以为棺槨，则速腐；以为柱，则蠹。是不材之木也。无所可用，故能若是之寿。」匠石归，栎社见梦曰：「女将恶乎比予哉？若将比予于文木邪？夫柎梨橘柚，果蓏之属，其实熟则剥，剥则辱。大枝折，小枝泄。此以其能苦其生者也。故不终其天年而中道夭，自戕击于世俗者也。物莫不若是且求无所用。予可用久矣！几死，乃今得之，为予用。使予也而有用且死，乃今得之，为予用。若与予也皆物也，奈何哉其相物也？且死也之散人，又恶知散木！」匠石觉而诊其梦。弟子曰：「趣取无用，则为社何邪？」曰：「密！无言！彼亦直寄焉！以为不知己者诟厉也。不为社者，且几有翦乎！且乎！彼其所保与众异，而以义喻之，不亦远！」

译文

匠人石去齐国，来到曲辕这个地方，看见一棵被世人当作神社的栎树。这棵栎树树冠大到可以遮蔽数千头牛，用绳子绕著量一量树干，足有头十丈粗，树梢高临山巅，离地面八十尺处方才分枝，用它来造船可造十餘艘。观赏的人群像赶集似地涌来涌去，而这位匠人连瞧也不瞧一眼，不停步地往前走。他的徒弟站在树旁看了个够，跑著赶上了匠人石，说："自我拿起刀斧跟随先生，从不曾见过这样壮美的树木。可是先生却不肯看一眼，不住脚地往前走，为什么呢？"

匠人石回答说："算了，不要再说它了！这是一棵什么用处也没有的树，用它做成船定会沈没，用它做成棺槨定会很快朽烂，用它做成器皿定会很快毁坏，用它做成屋门定会流脂而不合缝，用它做成屋柱定会被虫蛀蚀。这是不能取材的树。没有什么用处，所以它才能有如此寿延。"

匠人石回到家裏，梦见社树对他说："你将用什么东西跟我相提并论呢？你打算拿可用之木来跟我相比吗？那楂、梨、橘、柚都属于果树，果实成熟就会被打落在地，打落果子以后枝干也就会遭受摧残，大的枝干被折断，小的枝丫被拽下来。这就是因为它们能结出鲜美果实才苦了自己的一生，所以常常不能终享天年而半途夭折，自身招来了世俗人们的打击。各种事物莫不如此。而且我寻求没有什么用处的办法已经很久很久了，几乎被砍死，这才保全住性命，无用也就成就了我最大的用处。假如我果真是有用，还能够获得延年益寿这一最大的用处吗？况且你和我都是"物"，你这样看待事物怎么可以呢？你不过是几近死亡的没有用处的人，又怎么会真正懂得没有用处的树木呢！匠人石醒来后把梦中的情况告诉给他的弟子。弟子说："旨意在于求取无用，那么又做什么社树让世人瞻仰呢？"匠人石说："闭嘴，别说了！它只不过是寄托罢了，反而招致不了解自己的人的辱骂和伤害。如果它不做社树的话，它还不遭到砍伐吗？况且它用来保全自己的办法与众不同，而用常理来了解它，可不就相去太远了么！"

来原：语文天地网

After Shih the carpenter had returned home, the sacred oak appeared to him in a dream, saying, "What are you comparing me with? Are you comparing me with useful trees? There are cherry, apple, pear, orange, citron, pomelo, and other fruit trees. As soon as the fruit is ripe, the trees are stripped and abused. Their large branches are split, and the smaller ones torn off. Their life is bitter because of their usefulness. That is why they do not live out their natural lives but are cut off in their prime. They attract the attentions of the common world. This is so for all things. As for me, I have been trying for a long time to be useless. I was almost destroyed several times. Finally I am useless, and this is very useful to me. If I had been useful, could I ever have grown so large?"

"Besides, you and I are both things. How can one thing judge another thing? What does a dying and worthless man like you know about a worthless tree?" Shih the carpenter awoke and tried to understand his dream.

His apprentice said, "If it had so great a desire to be useless, why does it serve as a shrine?"

Shih the carpenter said, "Hush! Stop talking! It is just pretending to be one so that it will not be hurt by those who do not know it is useless. If it had not become a sacred tree, it would probably have been cut down. It protects itself in a different way from ordinary things. We will miss the point if we judge it in the ordinary way."

Excerpted from *Inner Chapters*, in London, UK 1974. Copyright: Gia-fu Feng and Jane English, Wildwood House Ltd.

家国事 NATIONAL

联合国环境规划署扬言国家资源不足有碍经济增长
UNEP says China's growth aims environmentally impossible

联合国环境规划署署长 Klaus Toepfer 表示, 中国资源缺乏, 势难实践其雄心勃勃的经济发展大计, 全球资源并不足以让我国 13 亿人民依据西方消费模式生活。若中国要在 2020 年前把现时的经济实现四倍增长, 那么已发展国家非要改变现时的消费习惯不可, 腾出稀有资源予贫穷国家享用。中国政府估计 2003 年国民生产总值比 2002 年的增幅为 7%。

China's ambitious economic growth plans are environmentally unachievable because the world does not have enough resources to allow its 1.3 billion people to adopt Western consumers' lifestyle, said Klaus Toepfer, Executive Director of UNEP. China's aim of quadrupling its economy by 2020 can only be achieved if developed nations radically change their consumption

habits to free up scarce resources for the world's poor. Chinese government estimated that GDP would grow by 7% in 2003.

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中国木材需求激增 亚洲森林无端遭殃(一)
China demand impacts forests across Asia

2002 中国年的圆材进口量为 1,600 万立方米, 比 1997 年的数字激增 11 倍, 预计到 2010 年, 我国对工业用圆材的需求量将届 1 亿万立方米。经过为期三年的研究, 世界自然基金会已于 2003 年 12 月印行《中国木材贸易、市场及环境》报告。政府推行全国天然林保护及退耕还林等计划, 使国家的工业木材产量已由 1995 年的 1.05 亿立方米减产至 2001 年的 8,100 万立方米, 再者, 政府徵收的林业课税及费用亦使农民对林业发展望而却步。同时政府政策鼓吹经济发展, 激起社会对木材及木材产品的需求。为履行与亚太经济合作组织及世界贸易组织订定的承诺, 中国已减少开徵进口木材关税及撤消其他贸易限制, 以推动国际木材贸易。报告还建议了保障森林产品可持续供应的方法。

Global Witness 的报告 - 利益冲突: 缅甸森林的不明朗前景 (A Conflict of Interests: The Uncertain Future of Burma's Forests) 指出, 缅甸北部的原始温带雨林正被云南木材公司逐步歼灭。克钦邦内的中国伐木公司肆意毁境内森林, 而政府及叛乱份子榨取的伐林

利润, 则用作支持缅甸国内的武装冲突。因受西方国家孤立, 缅甸军事独裁政府遂与中国及泰国私相授受, 准许两国取用天然资源, 以求政治、经济及军事的援助。2002 年, 伐木业占缅甸外来总收入约 9.3%, 但非法伐木对森林造成更加沉重的压力。我国于 2002 年从缅甸

demand for wood and wood products. To meet its commitments to APEC and WTO, China has reduced tariffs and other barriers to wood imports, promoting international timber trade. The WWF report includes recommendations on how to guarantee a sustainable supply of forest products.

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进口的木材超过一百万立方米, 预料 2003 年的进口量为一百四十万立方米。此举已破坏了克钦邦大片的原始森林。据个别观察人士的统计, 缅甸现时的森林覆盖率为 30%, 似有骤降趋势。

中国木材需求激增 亚洲森林无端遭殃(二)
China demand impacts forests across Asia

Myanmar's northern old-growth temperate rainforests are being wiped out by timber companies from Yunnan, according to the new report *A Conflict of Interests: The Uncertain Future of Burma's Forests* by Global Witness. Chinese logging companies in Kachin State practise destructive and unsustainable logging, the report said, while the revenue derived by the regime and insurgents alike has perpetuated violent armed conflict throughout the country. Isolated by the West,

过去 5 年间, 印尼已有七成半以上的森林遭受严重破坏, 面积约 430,000 平方公里, 每年持续损失约 20,000 平方公里。砍伐木材大多会售卖到邻国, 如马来西亚或新加坡, 继而再转口到南韩、日本、台湾、中国、美国及欧洲等地。

the Myanmar junta is said to have allowed China and Thailand access to natural resources in exchange for political, financial and military support. In 2002, logging represented 9.3% of Myanmar's legal foreign earnings, but illegal logging has put still greater pressure on forests. China imported over one million m³ of timber from Myanmar in 2002, and was predicted to import over 1.4 million m³ in 2003. This has led to the destruction of large stretches of pristine forest in Kachin.

Over the past five years, 430,000 km² of forest have been destroyed in Indonesia, which has lost more than 75% of its forests, and continues to lose up to 20,000 km² annually. Many of the logs are sold to neighbouring countries such as Malaysia or Singapore for re-export to South Korea, Japan,

Independent observers put current forest cover in Myanmar at 30% and decreasing rapidly.

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世界自然基金会 WWF
2003.10.20

国内生态环境整体功能正在下降
Environmental function still declining

国家环境保护总局自然生态保护司司长杨朝飞表示, 国家抵御自然灾害的能力正在减弱。我国森林覆盖率虽然不断增长, 但生态功能较好的成熟林只有 30%。我国 90% 的草地出现不同程度的退化, 荒漠化土地的年增长率由 1980 年代中的 2,100 平方公里上升至 1990 年代末的 3,436 平方公里, 各地的水土流失面积亦不断扩大。国家水利部的记录显示, 单是上半个世纪, 我国已损失逾 50 亿吨泥土及 267,000 平方公里的耕地面积, 经济损失共超过 100 亿人民币 (约 12.1 亿美元)。国内的水源使用率分别为: 淮河 60%、辽河 65%、黄河 62% 及海河 90%, 高于国际认可的警戒线达 30-40%。因此, 河水未能发挥天然净化的功能。杨副局长透露, 一些地区为达到快速经济增长, 不惜牺牲生态环境, 对其构成巨大压力。

China's environment is losing its capacity to withstand natural disasters, according to Yang Chaofei, director general of the Dept. of Nature Environmental Conservation, SEPA. Yang said although forest cover was increasing, only 30% of forests are mature, with good ecological function. Some 90% of China's grassland is degraded to some extent, and the rate of desertification increased from 2,100 km² per year in the mid-1980s to 3,436 km² in the late 1990s. Water and soil erosion has been increasing in many places. According to the Ministry of Water Resources, China lost more than 5 billion tons of soil and 267,000 km² of arable land in the past half century, with total economic loss exceeding RMB¥10 billion (US\$1.21 billion). The

utilization rate of water resources is 60% for the Huaihe, 65% for the Liaohe, 62% for the Yellow River and 90% for the Haihe River, all surpassing the internationally accepted warning line of 30-40%. As a result, the rivers are unable to perform the natural process of water purification. "The idea of achieving fast economic growth at the cost of damaging the ecological environment still prevails in some regions, which brings great pressure to the ecological environment," said Yang.

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2003.10.25
[http://www1.chinadaily.com.cn/en/](http://www1.chinadaily.com.cn/en/doc/2003-10/25/content_275556.htm)
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林业是国家发展的根本大计 Forestry fundamental

国务院总理温家宝吁国民加紧努力，提倡生态平衡及实现经济社会可持续发展。他在全国林业会议上指林业在开发生态脆弱、资源匮乏的西部地区具有举足轻重的地位，更促请各级政府把造林工程列入社会经济发展项目中。

国家林业局局长周生贤指中国计划在未来五十年投入7,000亿元人民币(约850亿美元)开发国家六大林业重点生态工程，改善环境退化问题。国家每年用于对林业的支出攀升至347亿元人民币(约41.8亿美元)，增幅达93%。此外，中央及地区政府亦投入500亿元(约60亿美元)，在全国17个省内开展天然林保护工程。

环境影响评价法正式生效 EIA Law takes effect

国家环境保护总局颁布的环境影响评价法于2003年9月1日实施。本法旨在避免建设专案对环境造成不良影响，促进经济、社会和环境的协调发展。国家环境保护总局将制定国家环境影响评价的专家名单，并由地方组织列出当地评估专家名单。

Premier Wen Jiabao has called for improved efforts to promote the country's ecological balance and sustainable economic and social development. Addressing a national forestry conference, Wen said the forestry sector is fundamental in China's ambitious programme to develop its impoverished and ecologically fragile western region. He urged

Zhou Shengxian, director of SFA, said China has plans to invest RMB¥700 billion (US\$85 billion) in the coming five decades on the six major national projects to counter environmental degradation. Government annual spending in the forestry sector surged 93% to RMB¥34.7 billion (US\$4.18 billion). Central and local governments have injected RMB¥50 billion (US\$6 billion) into the Natural Forest

governments at all levels to include afforestation projects in their overall economic and social development programmes.

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2003.09.28
[http://news.xinhuanet.com/
english/2003-09/28/
content_1105173.htm](http://news.xinhuanet.com/english/2003-09/28/content_1105173.htm)*

Protection Programme, which now operates in 17 provinces.

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[http://news.xinhuanet.com/english/
2003-09/28/content_1105173.htm](http://news.xinhuanet.com/english/2003-09/28/content_1105173.htm)
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local authorities will manage local lists.

*中国环境与发展国际合作委员会通讯
CCICED Newsletter, September 2003.*

卡塔赫纳生物安全议定书正式生效 Cartagena Protocol on Biosafety enters into force

第50个国家帕劳共和国于2003年6月签署后，首项监管现代生物技术发展的活改良生物体(LMOs—living modified organisms)的跨国流动的国际协议——卡塔赫纳生物安全议定书已于2003年9月11日正式生效。这项具法律约束力的议定书确定活改良生物体在运输、处理及利用时应有的安全水平，因它对生物多样性的保护和可持续利用可能产生负面影响，同时亦考虑到它对人类健康的危害。我国已于2000年完成签署。

The Cartagena Protocol on Biosafety enters into force on 11 September 2003, following ratification by the 50th State, the Republic of Palau, in June 2003. The Protocol is the first legally binding international agreement governing the transboundary movement of living modified organisms (LMOs) resulting from modern biotechnology. It seeks to ensure an adequate level of safety in the

transfer, handling and use of LMOs which may have adverse effects on the conservation and sustainable use of biological diversity, also taking into account potential risks to human health. China ratified the protocol in 2000.

*2003.09.29
[http://www.biodiv.org/doc/press/
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中国环境与发展国际合作委员会制定可持续发展的行动计划 New CCICED task forces

中国环境与发展国际合作委员会(国合会)的第三阶段已经启动几个课题组：环境和自然资源价格与税收(ENRPT)、综合流域管理(IRBM)及WTO与环境。这些课题组将和已经建立的面源农业污染防治、保护地及农业和乡村发展等课题组一起在2004年向国合会汇报。随著中国政府改组，曾培炎副总理已代替温家宝总理出任国合会主席。

China Council for International Cooperation on Environment and Development (CCICED) has launched several task forces for its third phase: Environmental and Natural Resources Pricing and Taxation (ENRPT); Integrated River Basin Management (IRBM); and WTO and the Environment. These, and existing task forces on Non-Point Agriculture Pollution

Prevention, Protected Areas, and Agriculture and Rural Development, will report to the Council in 2004. Following the reorganization of the China Government, Vice Premier Zeng Peiyan has replaced Wen Jiabao as CCICED Chairman.

*中国环境与发展国际合作委员会通讯
CCICED Newsletter, September 2003.*

5处国家级自然保护区范围扩大 Extension of five nature reserves

国务院办公厅日前发出通知，决定扩大云南南滚河、云南哀牢山、海南霸王岭、福建龙栖山、宁夏贺兰山等5处国家级自然保护区范围。当中；扩大后的海南霸王岭国家级自然保护区总面积为300平方公里，其中，新增加面积234.54平方公里。

State Council recently agreed to extend the areas of five national nature reserves, namely Nangunhe and Ailaoshan in Yunnan, Bawangling in Hainan, Longqishan in Fujian and Helanshan in Ningxia. With an extension of 234 km², the

total area of Bawangling NNR is now 300 km².

*国家环境保护总局
SEPA
2003.10.09
[http://www.zhb.gov.cn/
649094490434306048/20031009/
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广西自然保护区建设举步维艰

Guangxi lacks funding for nature reserves

尽管广西政府从 1987 年起每年从财政拨款二百万至一千万元人民币用于保护区的专项补助经费,但对保护区的发展来说依然是杯水车薪。按全广西保护区面积计算,每亩(约 1/15 公顷)还不到五角人民币。经费投入不足,使保护区科研工作难以展开。同时,自一九九八年颁布停止采伐天然林以来,农民生活与保护区的保护管理矛盾日趋尖锐,亦削弱了保护区的发展。

Though Guangxi has directed RMB¥2-10 million each year to create nature reserves since 1987, the reserves do not have adequate resources for development. Average annual input per mu (= 1/15 ha) for Guangxi nature reserves is less than RMB¥0.5. Scientific research remains stagnant in the reserves due to the lack of funding. Increasing conflict between local villagers and nature reserves has

also impaired the effectiveness of nature reserves since the logging ban in natural forests in 1998.

中国新闻社
China News Service
2003.08.21

猴猕岭成海南坡鹿新乐园

Mihouling, a new refuge for Eld's Deer

据大田国家级自然保护区猴猕岭坡鹿保护站工作人员一段时间的跟踪观察和附近村民的反映,野放的 50 只国家一级野生保护动物海南坡鹿已逐渐适应海南省东方市猴猕岭保护区的生存环境。这 50 只在大田国家级自然保护区围网饲养的坡鹿,是 2003 年 7 月 3 日和 10 月 11 日送到猴猕岭野放的。据介绍,猴猕岭的自然环境完全可以满足坡鹿的生存条件,这两次野放积累了一些经验,今后保护区将分期分批实施野放计划,使更多的海南坡鹿真正返回大自然的怀抱。

Observations by staff from Mihouling (Eld's Deer) Management Station of Datian National Nature Reserve (NNR), and by local villagers, revealed that 50 Eld's Deer *Cervus eldii*, the Category I National Protected species, have gradually adapted to habitats in Mihouling Nature Reserve of Dongfang City after their release to the wild. 50 captive-bred individuals from Datian NNR were released to Mihouling on 3 July 2003 and 11 October 2003. It was

considered that Mihouling had suitable habitat for Eld's Deer. Based on the experience gained from these two trial releases, the Nature Reserve plans to conduct further staggered releases of deer in the near future.

海南日报
Hainan Daily
2003.11.13

广西自然保护区再添两个新成员

Two new nature reserves in Guangxi

最近,广西壮族自治区政府批复同意建立龙山和七冲两个自治区级自然保护区,新增保护区面积两万多公顷。位于上林县的龙山自然保护区属北回归线上森林生态系统自然保护区,所处区域是广西六大暴雨中心之一,保护区内有丰富的动植物资源,已知的植物资源有 1,000 多种,而且植物区系地理成分复杂,起源古老,保存有马蹄蕨、福建柏等许多孑遗植物。在昭平县的七冲自然保护区内,分布著连片的常绿阔叶林,林中不少树木具有 100 年左右的树龄。

Following the Guangxi government's recent approval, nature reserves will be set up in the autonomous regions of Longshan and Qichong, with a combined area of over 200 km². Longshan Nature Reserve in Shanglin County has over 1,000 known plant species with relict species including *Archangiopteris henryi* and *Fokienia hodginsii*. Qichong Nature Reserve in Chaoping County has a continuous cover of evergreen

broadleaf forest, with many trees about 100 years of age.

国家环境保护总局
SEPA
2003.12.05
<http://www.cenews.com.cn/news/2003-12-05/29842.php>

红水河截流为建水电站

Hongshui River blocked for power plant

为配合耗资 243 亿元人民币(约 29 亿美元)的龙滩水电站,中国将于广西红水河建造水坝。水电站的装机容量为 420 万千瓦,是继长江三峡堤坝后我国第二大水电工程¹。根据龙滩工程的环境保护方案,库区附近的布柳河自然保护区和穿洞河自然保护区裹,共生存了 58 群共 5000 多只獼猴。在龙滩水电站建设过程中,水库区将在一定程度上淹没獼猴的部分生境。但有关部门将投资 150 万元人民币对 800 平方公里的没獼猴栖息地进行封育,并营造 200 平方公里的饲料林。与此同时,在水库淹没初期和移民安置活动中,将投入 200 万元对这些珍稀野生动物实施必要的抢救性保护。同时,有关部门还将在珍稀野生濒危植物移植、河谷雨林恢复试验、苗圃建设等方面加大投入,并进一步对保护区进行包括植被状况、资源分布在内的调查研究和试验,以及建立珍稀濒危野生动植物基础资料库。

China will dam Guangxi's Hongshui River for a RMB¥24.3 billion (US\$2.9 billion) power plant. The Longtan power plant, the largest in the country after the Three Gorges Dam, will have a capacity of 4,200 megawatts¹. Studies have revealed that parts of Buliuhe and Chuandonghe Nature Reserves, which support over 5,000 Rhesus Monkeys (*Macaca mulatta*) in 58 groups, will be modified by flooding in the Longtan project. Consequently RMB1.5 million will be spent on closing 800km² of land for forest recovery and planting 200km² of fruit-tree forest in the macaques' habitat. A further RMB\$2 million will be spent on conserving the species at the stage of flooding and on relocation of residents from the reservoir area. Meanwhile, relevant authorities will transplant rare and endangered plants, carry

out trials of riparian rainforest recovery and establish nurseries. Research on status and distribution of vegetation, resources, flora and fauna in the reserves is also planned².

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www.forests.org, from Reuters.
¹2003.09.16
http://www.enn.com/news/2003-09-16/s_8444.asp

平顶山时报
Ping Dingshan Daily
²2004.01.15
http://www.pdsdaily.com.cn/big5/content/2001-07/07/content_19135.htm

农村能源建设扮靓桂林山水

Alternative energy in Guilin villages

近年广西桂林市大力推广"养殖+沼气+种植"三位一体的生态模式,共建成沼气池 30 多万座,农村沼气入户率达 30%,预计到 2007 年,桂林市将完成沼气池建设 50 万座,农村沼气入户率达 50%。

With the promotion of a 3-in-1 ecological energy model (i.e. breeding + biogas + planting), over 300,000 biogas reactors have been constructed in up to 30% of the village households in Guilin. It is expected that 500,000 biogas reactors will be set up by 2007,

serving 50% of total households.

国家环境保护总局
SEPA
2003.11.21
<http://www.cenews.com.cn/news/2003-11-21/29482.php>

华南虎繁殖计划

South China tiger breeding programme

待国家林业局批准后,18 只雌虎将于 2004 年参加繁殖计划。全国现存 64 只华南虎,其中雄虎 37 只,雌虎 27 只,它们全都是 1956 年从野外捕获回来的 6 只华南虎的后代。繁殖计划的目的是防止近亲交配及种群基因多样性减退为主。

On SFA approval, 18 captive-bred adult female tigers will join a breeding programme in 2004. There are 37 male and 27 female South China Tigers in China's zoos, descendants of six individuals caught from the wild in 1956. Breeding will be orchestrated to

avoid inbreeding and loss of genetic diversity.

中国新闻社
China News Service
2003.11.10

农户开发有机食品市场

Farmers exploit demand for organic food

为应付国外对有机农产品的日渐增长的需求，国内农民亦加快步伐，赶紧种植有机产品。美国在 2002 年及 2003 年的有机食品销售额分别为 110 亿及 130 亿美元。外国消费者甘愿缴付比一般产品高出 30-50% 的价钱购买有机产品，吉林农户早著先机，成功开发市场。可是，投资者在短期内的盲目扩充，令有机行业毁于一旦。例如黑龙江一带的一些森林就被砍伐殆尽以发展有机生产的工程，而在运往日本的 " 有机 " 食品中更发现残存农药。有见及此，外国买家现派员到国内农场或加工场所监管，以确保产品质量能至国际水平。

Chinese farmers are responding to the growing demand for organic food in the West. Sales of organic food in the USA reached \$11 billion in 2002 and are projected at \$13 billion in 2003. Foreign buyers pay farmers 30-50% more for organic food, and farmers in Jilin have embraced the sector. But some investors have jeopardised the sector with reckless practices. Forests in Heilongjiang are being cut down in the name of organic projects, said one industry source, while pesticide residues have been

found in "organic" exports to Japan. Foreign buyers are now sending more inspectors to farms or processing plants in China to enforce higher international standards.

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www.forests.org, from Reuters.
2003.10.22
http://www.enn.com/news/2003-10-22/s_9661.asp

农牧民为保金丝猴撤出芒康县

Farmers and pastoralists evacuated for golden monkeys

为给予滇金丝猴的生境有更大的空间，西藏芒康县红拉山滇金丝猴保护区中的农牧民将分批迁出保护区外。在 800 多户民居当中，已有 500 户分别于 2003 年 3 月及 10 月得到重新安置，此举动用了当地政府共 2,000 多万元人民币(约 242 万美元)的拨款。芒康县是滇金丝猴在国内栖境的最北端，4 个群体共 300 只至 500 只，约占全球种群的四分之一。

Farmers and herdsmen of Markam County, in Tibet, have begun moving out of the Hongla Mountain Nature Reserve to leave more habitat for Golden Snub-nosed Monkeys *Pygathrix roxellana*. Markam county government allocated over RMB¥20 million (US\$2.42 million) to relocate about 500 of over 800 households from the area, between March and October 2003. Markam is the northernmost

habitat of the species in China, supporting four populations with 300 to 500 monkeys, about a quarter of the world population.

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www.forests.org, from Xinhua.
2003.11.17
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Abbreviations: APEC = Asian Pacific Economic Cooperation; SEPA = State Environmental Protection Administration; SFA = State Forestry Administration; UNEP = United Nations Environment Programme; WTO = World Trade Organization; WWF = World Wide Fund for Nature.

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A selection of recent publications

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Scientific papers

科学文献

Bystriakova, N., Kapos, V., Lysenko, I. & Stapleton, C.M.A., 2003. Distribution and conservation status of forest bamboo biodiversity in the Asia-Pacific Region. *Biodiversity and Conservation* 12(9), 1833-1841.

- 发现华南林区(包括海南) 潜在拥有最丰富的竹类植物资源。
- Finds that the highest figures for potential bamboo species richness in forest are from south China forests, including Hainan.*

Caro, T., Borgerhoff Mulder, M. & Moore, M., 2003. Effects of conservation education on reasons to conserve biological diversity. *Biological Conservation* 114(1), 143-152.

- 探讨美国大学生在入学前后的保育意见。找出影响学生保育物种及生境动机的保育知识类型。
- Explores opinions of US undergraduates regarding conservation, before and after courses. Finds the type of conservation knowledge imparted affects students' views on the reasons to conserve species and habitats.*

Danielsen, F., Mendoza, M.M., Alviola, P., Balete, D.S., Enghoff, M., Poulsen, M.K. & Jensen, A.E., 2003. Biodiversity monitoring in developing countries: what are we trying to achieve? *Oryx* 37(4), 407-409.

- 由于大部分贫穷国家的推行生物多样性监察计划时流于不切实际、经营手法繁复，并无法以现有资源持续支持它们的运作，因而妨碍计划发展。大部分计划的失败，均由于它们忽略了成本，使计划不能长期持续，亦没有进行资料整合以纳入决策当中。笔者劝谏发展中国家切勿挪用现已所剩无几的基础管理优先项目基金来开展不切实际的监察项目。文中亦谈及科学性及其参与性兼而有之的监察方法的正面例子。
- Notes that most biodiversity monitoring programmes in less wealthy countries suffer from being unrealistically large, complicated and impossible to sustain with available resources. Most collapse after being funded because they are designed at unsustainable cost-levels, and most fail to integrate information into decision-making. The authors warn against diverting scarce funds from fundamental management priorities into unrealistic monitoring programmes. They discuss positive examples of combining scientific and participatory methods of monitoring.*



Deng W.-h. & Zheng G.-m., 2004. Landscape and habitat factors affecting Cabot's tragopan *Tragopan caboti* occurrence in habitat fragments. *Biological Conservation* 117(1), 25-32.

Elliott, S., Navakitbumrung, P., Kuarak, C., Zangkum, S., Anusarnsunthorn, V. & Blakesley, D., 2003. Selecting framework tree species for restoring seasonally dry tropical forests in northern Thailand based on field performance. *Forest Ecology and Management* 184(1-3), 177-191.

- 测试了37个原生种树苗有关其加速恢复退化常绿季节性森林的能力，当中9种Ficus hispida var. hispida, Gmelina arborea, Hovenia dulcis, Melia toosendan, Michelia baillonii, Prunus cerasoides, Rhus rhetoides 及 Spondias axillaris 均被评为 " 优秀 " 的建群种。
- *Thirty-seven native forest tree species were tested for their ability to accelerate recovery of degraded evergreen seasonal forest. Nine species* (Ficus hispida var. hispida, Gmelina arborea, Hovenia dulcis, Melia toosendan, Michelia baillonii, Prunus cerasoides, Rhus rhetoides and Spondias axillaris) *were ranked as 'excellent' framework species.*

费梁，叶昌媛，江建平，2003。中国蟾蜍科 - 新属。动物分类学报，第28卷第4期，762-766。

Fei L., Ye C. & Jiang J., 2003. A new bufonid genus *Parapelophryne* from China (Amphibia, Anura). *Acta Zootaxonomica Sinica* 28(4), 762-766. (In Chinese with English abstract.)

Geissmann, T., La, Q.T., Trinh, D.H., Vu, D.T., Dang, N.C. and Pham, D.T. 2003. Rarest ape species rediscovered in Vietnam. *Asian Primates* - A Newsletter of the IUCN/SSC Primate Specialist Group, Vol.8, 3,4: 8-10.

Geissmann, T., Nguyen X.D., Lormee, N. and Momberg, F. 2003. Status review of gibbons in Vietnam. *Asian Primates* - A Newsletter of the IUCN/SSC Primate Specialist Group, Vol.8, 3,4: 10-12.

Henle, K., Davies, K.F., Kleyer, M., Margules, C. & Settele, J., 2004. Predictors of species sensitivity to fragmentation. *Biodiversity and Conservation* 13(1), 207-251.

- 列出12种特徵并根据理论与实况来推测植物物种对生境片段化的灵敏度。当中有6种被认为是好的预报因子，包括种群面积、种群浮动及贮存影响、植物的竞争力及对干扰的灵敏度的相关特徵、微生境特性与基质运用、生境的物种资源匮乏及相对的生物地理位置。
- *Investigates the theoretical and empirical basis for 12 traits suggested to predict a species' sensitivity to habitat fragmentation. Finds good empirical support for six predictors: population size; population fluctuation and storage effects; traits associated with competitive ability and disturbance sensitivity in plants; microhabitat specialisation and matrix use; rarity in the form of low abundance within a habitat; and relative biogeographic position.*

黄建华，周善义，2003。广西猫儿山天牛科昆虫多样性研究。广西师范大学学报(自然科学版)，第21卷第3期，82-86。
Huang J. & Zhou S., 2003. Study on Cerambycidae (Coleoptera: Polyphaga) diversity in Mao Er Shan, Guangxi. *Journal of Guangxi Normal University* 21(3), 82-86. (In Chinese with English abstract.)

Lei F.-M., Qu Y.-H., Tang Q.-Q. & An S.-C., 2003. Priorities for the conservation of avian biodiversity in China based on the distribution patterns of endemic bird genera. *Biodiversity and Conservation* 12(12), 2487-2501.

李维贤，肖衡，咎瑞光，罗忠义，班川华，贲劲波，2003。广西洞穴金线鲃属一新种。广西师范大学学报(自然科学版)，第21卷第3期，80-81。

Li W., Xiao H., Zan R., Luo Z., Ban C. & Fen J., 2003. A new species of *Sinocyclocheilus* from caves in Guangxi. *Journal of Guangxi Normal University* 21(3), 80-81. (In Chinese with English abstract.)

Lu Y., Chen L., Fu B. & Liu S., 2003. A framework for evaluating the effectiveness of protected areas: the case of Wolong Biosphere Reserve. *Landscape and Urban Planning* 63(4), 213-223.

Ma Z., Li B., Zhao B., Jing K., Tang S. & Chen J., 2004. Are artificial wetlands good alternatives to natural wetlands for waterbirds? - A case study on Chongming Island, China. *Biodiversity and Conservation* 13(2), 333-350.

- 与人工(水生文化)池塘相比，崇明天然(潮汐)湿地是较为理想的水鸟生境，两者都是合适的冬季生境。天然湿地比人工湿地更能保育鸟类，为此，应多加保育天然湿地，避免以人工湿地取而代之。
- *Concludes natural (tidal) wetlands on Chongming are better waterbird habitats than artificial (aquaculture) ponds, while artificial ones are also suitable in winter. Conserving natural wetlands is better for bird conservation than replacing them with artificial ones.*

Pandit, B.H. & Thapa, G.B., 2003. A tragedy of non-timber forest resources in the mountain commons of Nepal. *Environmental Conservation* 30(3), 283-292.

- 接受调查的324个农户表示非木材林产品比山区林地的木材的组成部分损耗得快，但公益林内的非木材资源的损耗速度比政府管理的森林却要慢很多。由于缺乏合宜的制度及法规，因而耗损了不少资源。
- *A survey of 324 households revealed that non-timber forest products were being depleted more rapidly than timber components in a mountain forest area, but the pace of depletion was much lower in community forests than in government forest management systems. Depletion was due to the lack of proper institutional arrangements.*

Park, Y.-S., Chang, J., Lek, S., Cao, W. & Brosse, S., 2003. Conservation strategies for endemic fish species threatened by the Three Gorges Dam. *Conservation Biology* 17(6), 1748-1758.

Samways, M.J., 2003. Marginality and national Red Listing of species. *Biodiversity and Conservation* 12, 2523-2525.

- 指出国家红色名录很可能包括全球地域边缘的物种。这些名录对研究或起激励作用，但研究员不应把保育焦点局限在那些仅出现于国家名录的物种上，而忽略全球受危种。
- *Notes that national Red Lists are likely to have species at the edge of their global range. National lists may help stimulate research effort, but in general species occurring only on national lists should not divert conservation attention from globally threatened species.*

Thompson, P.M., Sultana, P. & Islam, N., 2003. Lessons from community based management of floodplain fisheries in Bangladesh. *Journal of Environmental Management* 69(3), 307-321.

- 社区渔业管理的试验是否成功，关键在于给予社区支配渔业的权利、强大的支持、清晰透明的资源管理行动、社区的划一性及没有外来威胁，而清晰界线及小规模渔业并非重要因素。
- *In trials of community-based fisheries management the following contributed to success: communities obtaining rights over the fisheries; strong facilitation; visible resource management actions; homogeneity of communities; and absence of external threats. Clear boundaries and small fisheries were not found essential.*

Van Gardingen, P.R., McLeish, M.J., Phillips, P.D., Fadilah, D., Tyrie, G. & Yasman, I., 2003. Financial and ecological analysis of management options for logged-over dipterocarp forests in Indonesian Borneo. *Forest Ecology and Management* 183(1-3), 1-29.

杨玉盛，林鹏，郭剑芬等，2003。格氏栲天然林与人工林凋落物数量、养份归还及凋落叶分解。生态学报，第23卷第7期。(英文及中文摘要)

Yang Yu-sheng, Lin Peng, Guo Jian-fen, et al. 2003 Litter production, nutrient return and leaf-litter decomposition in natural and monoculture plantation forests of *Castanopsis kawakamii* in subtropical China. *Acta Ecologica Sinica* Vol. 23, No. 7.

Yin R., Xu J. & Li Z., 2003. Building institutions for markets: experiences and lessons from China's rural forest sector. *Environment, Development and Sustainability* 5(3/4), 333-351.

- 指林业改革的影响视乎它们落实执行的手法：改善诱因结构及优待林业生产，农户享有土地使用权及自由开放市场，如北部农场区的政策措施及自由生产非木材林产品等。若改革使市场产生如南部木材生产地区相若的控制市场及扭曲现象，便有打击增加生产的可能。笔者呼吁政府部门审视那些市场制度并未放宽的南部地区之土地利用价值及树木拥有权，及以实践私营林业取代政府监管的可能性。
- *Finds the impact of reforms in the forest sector depends on how they are implemented: incentive structure improves, and forest production is favoured, if farmers have land use rights and liberalised market access, as in the northern farm region and in the production of non-timber forest products. But if reforms cause market control and distortions, as in the southern timber production region, there is reduced chance to increase production. The authors call on policymakers to review the value of land use and tree ownership in the south without the right to access markets freely and fairly, and the practicality of substituting government efforts for private initiatives in forestry.*

Yuan, W., James, P., Hodgson, K., Hutchinson, S.M. & Shi, C., 2003. Development of sustainability indicators by communities in China: a case study of Chongming County, Shanghai. *Journal of Environmental Management* 68(3), 253-261.



Zhang, L., 2003. An updated and annotated inventory of Hong Kong bryophytes. *Memoirs of the Hong Kong Natural History Society* 26, 1-133.

Zhang, L., & Corlett, R.T., 2003. Phytogeography of Hong Kong bryophytes. *Journal of Biogeography* 30, 1329-1337.

Zhang X.-Q. & Xu D., 2003. Potential carbon sequestration in China's forests. *Environmental Science and Policy* 6 (5), 421-432.

Zhong M., Fan W., Liu T. & Li P., 2003. Statistical analysis on current status of China forest fire safety. *Fire Safety Journal* 38(3), 257-269.

周善义，徐正会，2003。中国大陆瘤颚蚁属分类研究(膜翅目，蚁科) *动物分类学报*，第28卷第4期，737-740。
Zhou S. & Xu Z., 2003. Taxonomic study on Chinese members of the ant genus *Strumigenys* F. Smith (Hymenoptera, Formicidae) from the Mainland of China. *Acta Zootaxonomica Sinica* 28 (4), 737-740. (In Chinese with English abstract)

左停，周圣坤，李彬，2003。集体林区天然林保护工程实施中的问题及建议。*林业与社会*，2003年第4期。
Zuo Ting, Zhou Sheng-kun Li Ben, 2003. Problems and suggestions in implementing natural forest protection projects in collective forest areas. *Forestry and Society Newsletter*, No. 4, 2003. (In Chinese)



《森林脉搏》投稿须知:

范畴

《森林脉搏》由嘉道理农场暨植物园中国项目出版，每年两期，为致力从事华南地区自然保育人士报导环保资讯，提供讨论及交流渠道，藉以启发读者。《森林脉搏》的内容题材包罗森林和生物多样性各个保育范畴，尤以改善资源管理与减少威胁为报导主题。凡从事相关保育的工作者、森林管理人员、科研人员及顾问等都欢迎投稿。

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Living Forests magazine is published twice a year by the China Programme, Kadoorie Farm and Botanic Garden. It aims to inform, inspire and serve those dedicated to nature conservation in the South China region, providing a platform for discussion and information exchange. *Living Forests* publishes material on all aspects of forest and biodiversity conservation, particularly with the potential to improve management and reduce threats. We welcome submissions by forest managers, researchers, advisers and practitioners with related objectives.

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- Articles**
Feature articles (1,200 words) and *Short articles* (500 words), with photographs, are invited on topics relevant to the magazine's focus in South China.
- Letters**
Contributions (generally <500 words) in response to material published in previous issues of the magazine.
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