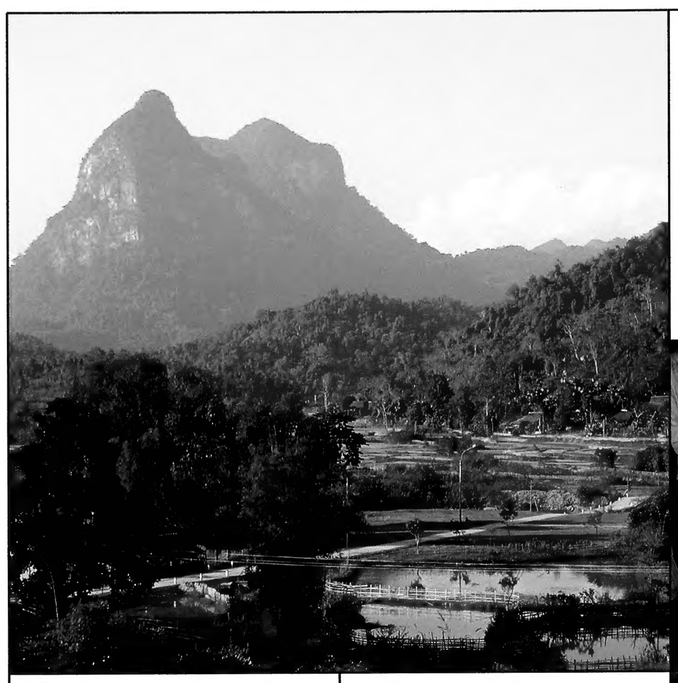
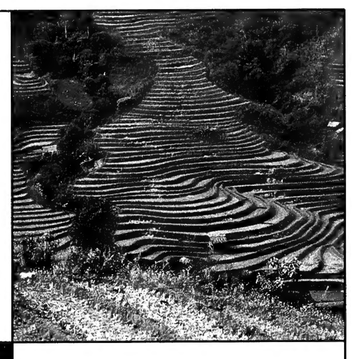
Missouri Botanical Garden

Plant Science and Conservation: Vietnam

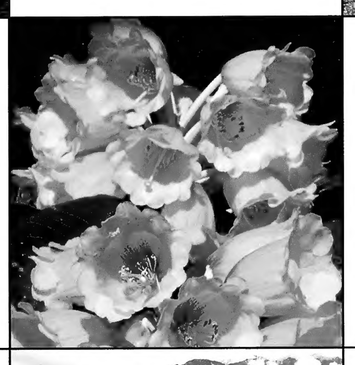


Biodiversity hotspot—Vietnam has a globally significant proportion of rare and endemic species of plants and animals. An estimated 12,000 plant species, representing 3.2% of the world's botanical diversity, occur in Vietnam, and nearly 10% of known plants are endemic. Over 2,300 plant species are used by local people for food, medicines, timber, oil, and other purposes. [VVD]

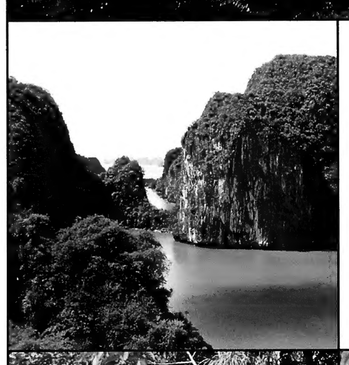
Geography—A long, S-shaped country on the eastern seaboard of Southeast Asia (Cam Ranh Bay pictured here), Vietnam has a total land area of about 330,000 km^2. Vietnam lies in the tropics, between 8 and 23 degrees north latitude. Its size and location and the historical interaction of complex topographic, climatic, and ecological factors contribute to the country's rich biodiversity. [PKL]



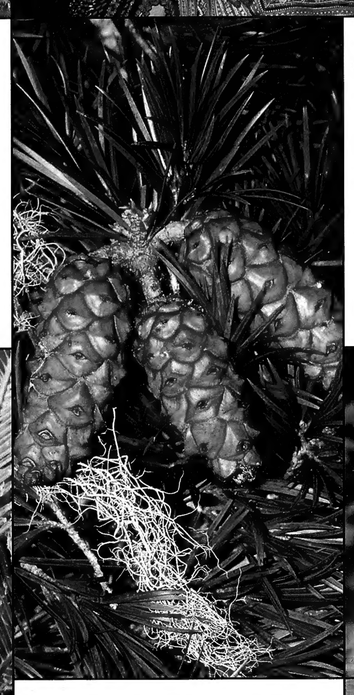
Cultural diversity—There are 54 ethnic groups in Vietnam, each with its own traditional knowledge of plants used in agriculture and forestry. In recent years, MBG and Vietnamese scientists have developed participatory models to incorporate local people's knowledge into natural resource management, thereby encouraging "citizen science" in the mountains of Vietnam. [LVA]



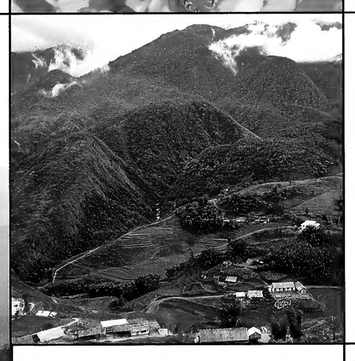
Rice-based agro-ecosystems—The Red River delta in the north and the Mekong River delta in the south are the major rice producing regions of Vietnam. Rice is also grown on mountain slopes converted to magnificent terraces. In addition to playing an important role in rice production, Vietnam is considered one of the world's ancient domestication areas for animals such as chickens, ducks, and pigs. [LVA]



Jewels of Descending Dragon—Ha Long Bay, a World Heritage Site in northern Vietnam, is renowned for its spectacular scenic beauty, with thousands of karst limestone islands and islets dotting the wide bay. In spite of the site's grandeur as a natural wonder and its popularity as a tourist destination, little is known about the plants on these islands. [NTH]



Central Highlands—Also known as Tay Nguyen Plateau, this region is one of Vietnam's centers of plant diversity. An enigmatic pine that puzzled botanists for many years grows here. Krempf's pine (*Pinus krempfii*) is most unusual in having flat, leaf-like needles. This conifer's high scientific value makes it a flagship species for biodiversity conservation in Vietnam. [LVA]

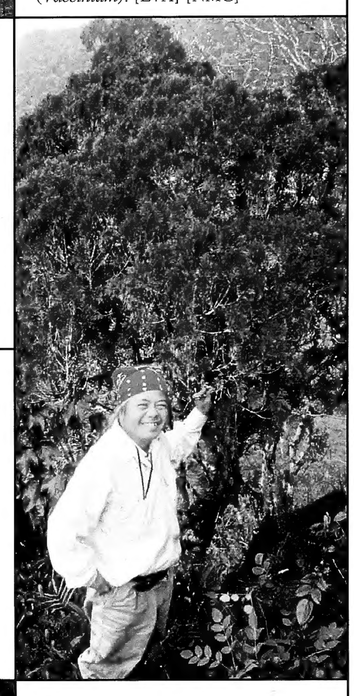


Roof of Indochina—One of the most fascinating biogeographical regions in the world, the Hoang Lien Son Range in northwest Vietnam represents a southern extension of the Himalayas. The highest peak, Mount Fan Xi Pan—which rises to 3,143 m—emerges above the cloud layer and exhibits a specialized montane heath vegetation with rhododendrons (*Rhododendron basilicum*) and blueberry relatives (*Vaccinium*). [LVA] [NMC]

Orchid extravaganza—Vietnam, with its highly varied topography and climate, is home to a great diversity of orchids, including many that are unique to the country. Professor Leonid Averyanov from Saint Petersburg, Russia, who has dedicated his career to the study of Vietnamese orchids, has described three new genera and nearly a hundred new species. [NTH]

Living fossils—Cycads are ancient palm-like plants that flourished during the age of dinosaurs. Vietnam is a center of cycad diversity; the diversity of cycads in the country—some 24 species—exceeds that of any other Asian country. Because of unsustainable exploitation for wildlife trade, colleagues at IEBR are adapting the IUCN methodology to assess the conservation status of these highly threatened species. [LVA]

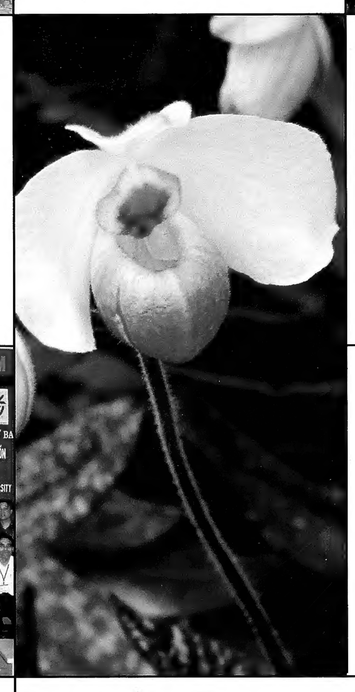
Lost World—The Truong Son (Annamite) Range forms a natural border between the moist evergreen forests of Vietnam and the drier monsoon forests of Laos. In the past decade, scientists exploring these forests have stunned the world with the discovery of several new mammals previously unknown to science, such as the saola (*Pseudoryx nghetinhensis*), pictured at left. [DH] [LVA]



Conifers—Vietnam is recognized as a global conifer conservation hotspot. There are 34 native species, making up about 5% of conifers known worldwide. In 2001, MBG botanists joined an international expedition to the remote karst limestone mountains close to the border with China that led to the discovery of a new genus and species of conifer, *Xanthocyparis vietnamensis*. [LVA]

Population pressure—Vietnam is facing a challenge because of the exploitation of natural resources to meet the needs of a rapidly growing population. In 2006 Vietnam's population was estimated at 85 million, making it the thirteenth most populous country in the world. [NKB]

Community-based conservation—In the buffer zone of Bach Ma National Park, MBG and partner institutions are drawing upon local knowledge of plants to help reduce pressures on management and protection of plant resources. Local communities receive assistance in identifying rare and endangered plant species, designing management plans for sustainable use of plant resources, and training in *ex situ* conservation. [NKB]



Rediscovery—*Paphiopedilum delenatii* look alike because they all descended from a single plant brought to Paris in the 1920s. Believed to be extinct in the wild, this rare slipper orchid was rediscovered in the early 1990s, but nearly vanished again because plant hunters have illegally exported plants stripped from their native habitat. [PKL]

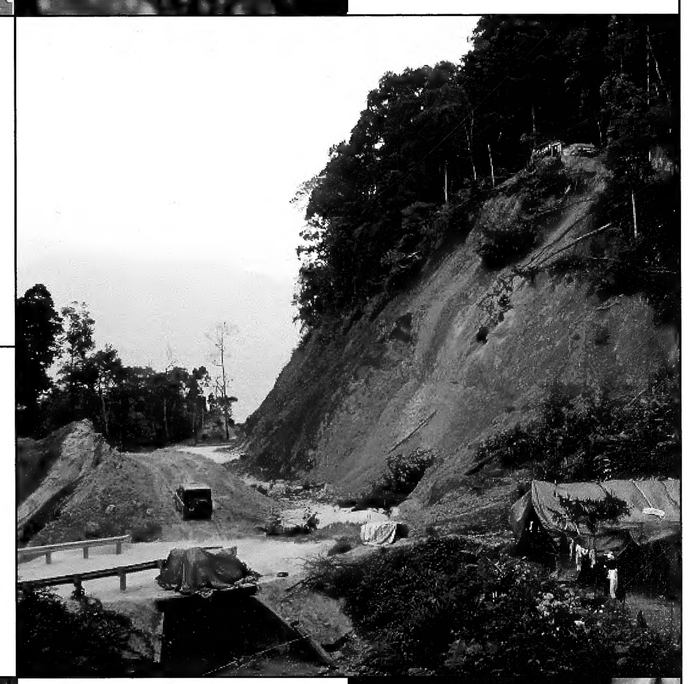
Palms—With 20 genera and 56 species of palms (10 of which are endemic), the palm flora of Vietnam is still poorly known. It is amazing that a species as large and conspicuous as the Ha Long Fan Palm (*Livistona halongensis*) has not been noticed and named by scientists before. [NTH]

Conifer Conservation Center—Developed in partnership with Flora and Fauna International, the Center will form the hub of conifer conservation activities in Vietnam. Local ethnic families will be involved in the care and maintenance of the nursery of five threatened conifers. Over 40% of Vietnamese conifer species are globally threatened, and nearly 90% are threatened at the national level. [JCR]

Deforestation—Vietnam's biodiversity is threatened by one of the world's fastest rates of deforestation. The country now supports only 10–12% cover of closed tropical forests; less than 1% is in a pristine state, restricted mainly to isolated patches on remote mountains. Agricultural expansion and massive land cleaning for road building are the main causes of deforestation nationwide. [JCR]

Botanical renaissance—Much of Vietnam's rich and unique flora is only now being explored and understood. Over two hundred and sixty plant taxa, including fifteen new genera of vascular plants, have been described since 1992. At least a hundred new records of plants have been similarly documented. These findings account for a remarkable 3% increase in the flora. [LVA]

Vietnam Botanical Conservation Program—MBG has been supporting Vietnam's biodiversity conservation efforts for more than a decade, accumulating scientific information on the country's flora, building capacity, and partnering with local people and institutions in conservation projects on threatened and endangered species of plants. Since 1999, MBG has operated an office in Hanoi staffed by a Garden botanist. [PKL]



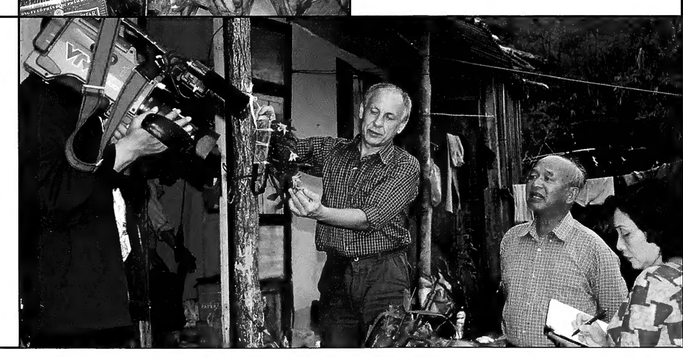
Training—MBG has provided multi-tiered instruction for Vietnamese junior scientists, technicians, students, and forest protection officers in conducting botanical inventories. The scientific data they generate help to prioritize conservation of habitats harboring rare and endangered species. A field training course in the central province of Quang Tri discovered new species and range extensions, bolstering support to the proposal to establish a new nature reserve there. [LVA]

Conservation education—MBG has worked with Bach Ma National Park to raise awareness of the importance of and need for biodiversity conservation. In the local community in the buffer zone, MBG sponsored conservation-themed poster-drawing contests in primary schools. Winning posters were printed in calendars that were then distributed to the school children. [NKB]

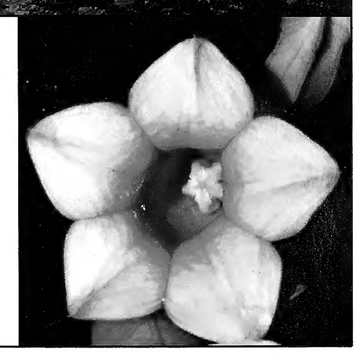
Medicinal plants—Nearly 2,000 species of plants and fungi are used in Vietnam's traditional medicine. The local medicinal plant resources were sustainably harvested in the past, but since the development of the market economy in Vietnam, many species are threatened by commercial exploitation. MBG is assisting local institutions to increase Vietnam's capacity to conserve medicinal plants. [NKB]

Capacity building—MBG is helping to revitalize study of the country's flora and to strengthen the capacity of Vietnamese institutions, scientists, and conservationists to manage its biological resources sustainably. Since 2002, the MBG has trained 19 forest protection officers, 146 park rangers, 57 junior staff of research institutions, 25 undergraduate students, and 9 graduate students. [JCR]

Collaboration—MBG botanists have joined Vietnamese colleagues in exploring and studying Vietnam's rich flora. Over the past thirteen years, botanical teams have conducted surveys in 32 of Vietnam's 64 provinces. More than 34,000 collection numbers with 100,000 duplicate specimens have been collected. New collections are needed to assess patterns of species richness and biogeographic relationships, essential to conservation of biodiversity. [NTH]



New records—Botanists working in Vietnam rely heavily on outdated floras prepared in the 1920s and on species catalogs that lack specimen citations. If the name of a plant is not listed in these publications, then the correct classification of an unknown plant will be missed, until a taxonomic specialist identifies the specimen. The genus *Acranthera* in the coffee family is a new genus record for Vietnam. [LVA]



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Research at the Missouri Botanical Garden

With operations in 35 countries around the globe, MBG collaborates with local institutions wherever MBG botanists conduct research and conservation, providing technical expertise, capacity building, and better communications with the scientific and conservation communities. The plant science and conservation division consists of 46 Ph.D. botanists and conservation biologists, assisted by 100 support staff and 26 graduate students. Studies concentrate on the plants of Meso- and South America, Madagascar, Vietnam, North America, sub-Saharan Africa, and China. Individual MBG scientists are specialists in the plants of particular regions, in the systematics of major plant families, and in the interactions between plants and people.

MBG serves as the headquarters for several major collaborative projects, such as *Flora Mesoamericana*, *Flora of China*, and *Flora of North America*. The Center for Plant Conservation also has its headquarters at MBG. Visit our website: www.mobot.org.

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Research Text: Jack Regalado

Photo Credits/Key

MBG	Missouri Botanical Garden
IEBR	Institute of Ecology and Biological Resources
IUCN	The World Conservation Union
DH	David Hulse, John D. & Catherine T. MacArthur Foundation
JCR	Jack Regalado, MBG
LVA	Leonid Averyanov, Komarov Botanical Institute, Saint Petersburg, Russia
NKB	Ninh Khac Ban, IEBR
NMC	Nguyen Manh Cuong, Cuc Phuong National Park
NTH	Nguyen Tien Hiep, IEBR
PKL	Phan Ke Loc, IEBR
VVD	Vu Van Dzung, Forest Inventory and Planning Institute

MBG Center for Conservation and Sustainable Development, Vietnam Program: http://www.mobot.org/plantscience/ccsd/Vietnam.shtml

MBG-IEBR Vietnam Botanical Conservation Program: http://www.mobot.org/MOBOT/research/vietnam/welcome.shtml

LICUALA I. II. spinosa; III. IV. acutifida; V. rotundifolia.

The fan palm genus *Licuala* occurs widely in Vietnam. The leaves of several species (including *L. spinosa*) are used to make the conical hats (*non la*) worn as protection from the sun. The *non la*, together with the long tunic (*ao dai*), constitutes the traditional dress of Vietnamese women.

©2007 Missouri Botanical Garden. Illustration of fan palms from *Historia naturalis palmarum* (Leipzig: 1823–1850) by Karl Friedrich Philipp von Martius, volume 3. The Missouri Botanical Garden maintains one of the world's finest botanical libraries, including over 6,500 rare books, the earliest dating from 1474. Select illustrations are available as fine art prints for purchase at the Missouri Botanical Garden Press website www.mbgpress.org. View the entire collection of digitized rare books online at www.botanicus.org.

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