

Smithsonian Institution  
Department of Botany, National Museum of Natural History  
Editor: Jane Villa-Lobos

## ENDANGERED MEDICINAL PLANTS OF KASHMIR HIMALAYA

By M.A.A. Siddique

The flora of India, particularly in the Himalayas, has a very high degree of endemism. It is estimated that about 4000 to 5000 plants out of an estimated 15,000 species of the Indian flora, may be endemic. Kashmir Himalaya, located in the northwestern section of the mountain range, occupies an area of nearly 222,800 sq. km and has a rich flora containing highly variable germplasm. This richness is due to a diversity of habitats (temperate to alpine zones), a wide range in altitude (1500 - 5500 m), and its close proximity to Central Asia - the center of origin of numerous angiosperm taxa. Included in the flora of this region are many endemic species of high economic value, such as medicinal and aromatic plants, wild vegetables, and beverage resources, as well as a variety of fodders.

Unfortunately, the biological resources of this young mountain system are threatened by developmental programs, including river valley projects, agricultural expansion, construction of a network of roads in the heart of forest areas and an increasing influx of tourists. According to some estimates, the irretrievable loss of forest area due to some of these biotic interferences amounted to 90.8 thousand hectares between 1951 and 1976 in Kashmir state when development was lower than at the present. Others estimate 10% of the total area of the state was deforested during 1972-1976, which was further reduced to 6.5% by 1982. These rates of destruction severely inhibit the survival of all biological resources in the region.

As a result of the loss of habitat, many important species are near extinction. They include: *Aconitum heterophyllum*, *Arnebia benthamii*, *Atropa acuminata*, *Gentiana kurroo*, *Orchis latifolia*, *Picrorhiza kurrooa*, *Podophyllum hexandrum*, *Rheum emodi* and *Saussurea costus*. Besides being employed in the pharmaceutical industry,

these species are highly regarded in many compound formulations of the indigenous systems of medicine (Ayurveda, Amchi, Unani) as well, and constitute an important export of Kashmir. To date, these crude drugs have been extracted from their natural habitats, leading to the extirpation of their populations. These taxa are Himalayan endemics and if their protection is not guaranteed, they will be lost forever. Unfortunately, little is known of their growth behavior, physiological and ecological requirements which would aid in planning conservation strategies. Therefore, it is urgent that research be conducted on these species which are in danger of extinction.

The state government has initiated several steps to preserve its biological diversity, but these programs need to be expanded, such as cultivating endangered species in botanical gardens or "rescue centers". Presently there are three national parks - Dachigam National Park (141 sq. km); Kishtwar high altitude National Park (400 sq. km); and Hemis high altitude National Park (600 sq. km); a wildlife sanctuary (32.27 sq. km) and two biosphere reserves, totally 580 sq. km in this part of the Himalaya. These conservation sites offer a safe haven for plants and provide an opportunity to study the biology of rare and threatened species. However, additional conservation measures must be taken to ensure the survival of the medicinal species as well as other endemic taxa which comprise the rich and valuable flora of this part of the world.

## NOTES ON VENEZUELAN CONSERVATION

By Aldemaro Romero

On November 16, 1989, BIOMA, the Venezuelan foundation for the conservation of biological diversity, and the La Salle Foundation of Natural Sciences, signed a technical cooperative agreement through which records of the vertebrate collection of the La Salle Natural History Museum will be computerized. Through this arrangement, the

La Salle Natural History Museum, one of the most important and complete in Venezuela, will now have a large part of its biological collections automated. BIOMA has been instrumental in computerizing the knowledge of Venezuela's fauna, flora and ecosystems with the objective of recommending measures for their conservation in perpetuity.

The "Second International Course on National Parks" was held on November 13, 1989 and began in Caracas, Venezuela with visits to protected areas and national parks, including El Avila, Guatopo, Morrocoy, Sierra Nevada, El Tama and BIOMA's Paramo de Piedras Blancas Biological Reserve. The course was sponsored and coordinated by BIOMA, in collaboration with the Venezuelan National Parks Institute, and with financial support from WWF- U.S., the U.S. Fish & Wildlife Service, the U.S. National Park Service and The Nature Conservancy. Participants from Colombia, Ecuador, Peru, the United States, and Venezuela attended workshops resulting in recommendations for improved management of the protected areas visited. The course lasted 3 weeks and closed on December 2nd in San Cristobal in western Venezuela.

#### NEW PUBLICATION

*Conservation for the Twenty-first Century*, edited by David Western and Mary Pearl, contains contributions written by an international group of professionals working in fields as diverse as genetics, philosophy, species ecology, zoo management, national park planning and television broadcasting. Each author speculates on what the future holds for wildlife and wildlands in relation to human needs, and discusses changes in human activity in the coming decades, the biological basis of sustaining nature, the tools and techniques of saving species and ecosystems, and what it will take to secure public support for these endeavors. This book hopes to provide a new basis for future thinking by conservationists, government decision makers, managers of wildlife resources and others who care about our living world.

Oxford University Press is offering this publication at a special price of \$31.40 (List price: \$36.95), plus \$1.50 for postage and handling for the first copy, 75 cents each additional copy. Mail your order to: Marketing Director, Science and Medical Books, Oxford University Press, 200 Madison Avenue, New York, New York 10016 USA.

#### FUTURE MEETINGS

January 23-27. The 1st Pan American Congress on Conservation of Wildlife through Education will be held in Caracas, Venezuela. For more information, contact: Education Dept., Bronx Zoo, Bronx, New York 10460 USA.

#### JOB ANNOUNCEMENTS

The Manomet Bird Observatory in Plymouth, Massachusetts has a research assistantship available 1 February 1990. It is a full-time, year-round position with possible renewal. The job involves field work, data analysis and interpretation, and supervision of field assistant(s) for an ecological study of mixed-species heronries in New York City. The incumbent will spend 7-8 months at Manomet Bird Observatory where free room will be provided. During the 4-5 month field season, the research assistant will reside in the New York City area (Staten Island). Previous field experience necessary; experience with outboard motors desirable. Analytical experience (preferably SAS) also desirable. Salary and benefits commensurate with experience. Interested persons should send a resume, course listing, names and phone numbers of two references, and description of research experience to: Katherine C. Parsons, Director, Harbor Herons Project, Manomet Bird Observatory, Box 936, Manomet, MA 02345; (508) 224-6521.

The Manomet Bird Observatory also conducts a field biology training program which offers a full semester of college credit to students who participate in on-going environmental studies of tropical forests and avian migrants in Belize, Central America and Puerto Rico; migration and breeding ecology of landbirds on the Gaspé Peninsula, Quebec; colonial bird ecology; marine mammal distributions in the Northwest Atlantic; and others. Transfer credit through their affiliates. For information, write: Field Biology Training Program, Manomet Bird Observatory, P.O. Box 936, Manomet, MA 02345.

Research apprenticeships (2-4 mo.) are available throughout the year in ongoing research in avian, marine mammal, estuarine and tropical forest ecology. Apprenticeships are designed for beginning biologists with some field experience. Salary is \$250/month with room provided. For project details, write: Research Apprentice Program, Manomet Bird Observatory, P.O. Box 936, Manomet MA 02345.