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Editor: Lyn Loveless
Department of Biology
College of Wooster
Wooster, OH 44691
Phone: (330) 263-2022
Fax: (330) 263-2378
Email: mloveless@wooster.edu

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Production Editor: Carol Mozell, OTS
Design by Katherine Hartman

A NEW CONSERVATION FOCUS FOR THE ASSOCIATION FOR TROPICAL BIOLOGY AND FOR BIOTROPICA

By Richard Primack, 2002-2003 President of ATBC (primack@bu.edu)

The membership of **ATB** has overwhelmingly voted to change our name to the **Association for Tropical Biology and Conservation**. Our journal ***Biotropica*** will now have a new section on conservation topics. These new developments reflect the changes occurring in the research of Association members. The Association and the journal will still publish and celebrate high-quality research in tropical biology. At the same time, we recognize that in most, if not all, tropical systems, human impacts along with natural ecological factors determine which species are present and how the biological community is structured and functions. Many members of the Association already investigate these impacts, and are restoring the damage that has been done. The change in name will help to identify the Association and journal with this expanding focus of inquiry and research. Conservation research was well-reflected at the symposia held in our two past meetings held in Panamá and Bangalore, and is apparent in the articles being published in ***Biotropica.*** Further symposia and a workshop at our upcoming meeting in Scotland will continue this direction. The following are a few of the major conservation themes which our society will take up in coming years.

Threats to tropical ecosystems: destruction

Everywhere we look as tropical ecologists, we see habitats in peril, from forests to coral reefs to mangroves to tropical alpine zones. Rain forests have been tracked most completely, as they can be monitored using remote sensing. In many tropical countries of the world, particularly on islands and in locations where human population density is high, most of the original forest habitat has already been destroyed. In tropical Asia, fully 65% of the primary forest habitat has been lost, with especially high rates of deforestation in the Philippines (only 6% left), Thailand (22%), Sri Lanka (18%) and Vietnam (17%). The extent of loss is similarly high in areas of Africa and Latin America. Recent rates of deforestation vary considerably among countries, with particularly high annual rates of over 2% reported in such tropical countries as Malaysia (2.5%), the Philippines (3.7%), Thailand (2.8%), Costa Rica (3.1%), and El Salvador (3.5%). These high rates of habitat destruction affect species extinction and ecosystem processes, and represent major topics for tropical ecologists. What is the most effective way to protect biological communities in the face of this destruction? On a larger scale, how will forest loss affect regional weather patterns and evolutionary processes? How can habitats be restored once they have been damaged by human activities? If these aren't urgent and central problems, what are?

Fragmentation

Even where habitat remains it is often extensively fragmented. Experimental studies carried out in the Amazon and elsewhere show that when a habitat is fragmented, the potential for dispersal and colonization of plants and animals is reduced. Fragmentation also changes the microenvironment at the fragment edge, impacting species composition. Important edge effects include changes in light, temperature, wind, humidity, and incidence of fire. Because species of plants and animals are often precisely adapted to temperature, humidity, and light levels, changes in these factors will eliminate species from habitat fragments. As large tropical areas are increasingly fragmented over large areas by logging, road construction and other human activities, we need to know how this affects the ecology of the region. In particular, how does habitat frag-

IDENTIFICATION, CONSERVATION AND MANAGEMENT PLANS IN THE AMAZON

BY MIKE HOPKINS and REGINA DA SILVA, SAPECA and EMBRAPA / AMAZONIA ORIENTAL, Belem, Pará, Brazil

The Amazon region still retains the largest area of rainforest on the planet and has the highest levels of plant diversity. Its forests probably contain 60,000 or more plant species, and of these perhaps only a third are known to science (M.Hopkins, unpubl.) Apart from its importance for biodiversity conservation and global environmental issues, the region is also important commercially, especially if its component species might be useful in agriculture, medicine and other areas. Potentially, forest products could provide a significant source of revenue for the region, and use of its products in sustainable ways could actively contribute to the survival of its forests. The main economic use of Amazonian forest trees is timber. If carried out in a way that causes minimal impact, logging too could contribute to long-term biodiversity conservation. Theoretically the Brazilian legislation controlling logging is designed to ensure long-term sustainability, as are the ecological attributes of the timber certification process.

In Brazil, forest inventories by timber companies use technicians skilled in identification using the common names of trees. These lists are then "translated" to Latin names for use in management plans, inspection, and trading. This process can cause difficulties. Local names for plants are often exactly that: local. The same species may be known by different names in different places (or by different plant identifiers), or the same name may be used for different species. A worse problem is that several biological species may be known only by a collective name, which really includes several closely related species that are difficult to distinguish in the field. When a forest plot of just one hectare may contain 300 or more of the larger tree species, including many species of taxonomically difficult genera such as *Pouteria, Ocotea* and *Protium*, a certain confusion of names is scarcely surprising, and the problem is compounded by a very real scientific problem of lack of investment in the collection and study of plants in the region.

The consequences of inaccurate identification can be serious at several levels. Confusion between species leads to an inconsistency in the final product. A buyer may wish to buy timber of a particular quality, but when reordering by the name he can have no guarantee that the new purchase will be of the same biological species, especially if the source is a different company or a different area. A lack of consistency in the name inevitably leads to a lack of consistency in the product, since timber properties (as well as pharmacological ones) vary considerably between species. This is a commercial [and conservation] problem that should attract the investment of logging companies in trained botanists and taxonomists.

Ecologists and conservationists should also be aware of the impact of inaccurate identifications on management plans. Accurate identification is essential for conservation. If the object of a management plan is to ensure local survival of a species through leaving mother trees as seed sources, the effect of confusion of several species under a single name invalidates the plan since some species (usually those that grow largest) may be 100% removed while the remaining trees, supposedly seed sources, may all belong to other species. Rare species treated as part of a common species would be especially susceptible to local extinction, including those that have not yet been scientifically catalogued.

While certification requires detailed plans for determining the selection of a certain percentage of seed-trees per species, little attention is given the problem of determining what constitutes a species, and this is not a part of evaluation for certification.

Although this problem may not be unique to Amazonia, the high biodiversity and the lack of literature available for the non-specialist user exacerbate it. One attempt to improve this situation was the production of the Guia da Flora da Reserva Ducke (Ribeiro *et al*, 1999), which treated about 2200 species using characteristics easily seen in the field. This book is used successfully in the teaching of botany in the region, as well as by professionals working with forest management. But it is only for one small region of central Brazil, and many important species are not included. More regional guides based on accessible field characters are urgently needed, but there is a conspicuous lack of investment towards that end.

Another approach to improved identification capacity specifically aimed at sustainable forest use is under way under the auspices of a project based in the city of Belém, near the mouth of the Amazon. The *Dendrogene Project* (Genetic Conservation in Managed Forests in the Amazon) is part of a bilateral collaboration program between Brazil and Great Britain (the Brazilian Agricultural Research Company-EMBRAPA and the Department for International Development-DFID). The botanical part of this project involves researchers of Embrapa Amazônia Oriental, SAPECA (The Amazonian Research and Conservation Society), MPEG (Museu Paraense Emílio Goeldi), UFPA (Universidade Federal do Pará), INPA (Instituto de Pesquisas da Amazônia), LPF-IBAMA (Laboratório de Produtos Florestais) and the IPT (Instituto de Pesquisas Florestais of São Paulo State). The aims include research to improve the capacity to identify plants in the region through the production of literature to aid identification of commercially important species and through training of those involved in identification. The project is described at http://www.embrapa.cpatu.br/dendro/index.

The botany training courses are for 20 students, with researchers and parataxonomists as teachers, and last for 6 days, with about 10 hours of instruction per day in basic botanical morphology, naming systems, collection methods, preparation of collected material, and the use of compass and GPS. The Flora of the Ducke Reserve is used as the text. The students also receive additional materials for later study. The course is field based, with as much as possible of the instruction being

given in the forest. Of course it is impossible to teach the details of how to identify all the tree species that foresters might encounter, and the main result is to break the barrier between local and common names. On the last day students who previously used only local names are talking amongst themselves using scientific names, the "-aceaes" have been implanted to help them arrange their local names in a scientific matrix, and they have the knowledge to start making good botanical collections. There are also courses of wood anatomy and identification undertaken by two researchers with three technical assistants, each course being five days of eight hours of instruction for 20 students. The students learn the importance of correct identification of woods, with reference to its exploitation and conservation, as well as collecting methods and the preparation and identification of wood samples. The courses take place at a sawmill and at the wood collection of Embrapa Amazônia Oriental, which includes 8000 wood samples, almost all from Amazonia.

Two types of publication are being produced by the project: **leaflets** for key species, and **booklets** for some problematic genera.

The leaflets are composed of text, photographs and drawings covering all plant parts including flowers and fruit, seeds and seedlings, leaf and trunk morphology, wood anatomy, technological data, as well as information about distribution, flowering and fruiting times, and taxonomic information. The project is initially producing leaflets for 50 species principally for use by the timber industry in Amazonia. The idea is that they can be obtained individually, and made up into collections of the relevant species, depending on the area.

The booklets are being prepared for five groups of frequently used timbers known colloquially as: "angelim" (*Hymenolobium* spp., *Dinizia excelsa*, *Andira* spp. - Leguminosae), "ipê" (*Tabebuia* spp.- Bignonianceae), "tauari" (*Couratari* spp. and *Cariniana* spp. – Lecythidaceae), "curupixá" (*Micropholis* spp. and *Diplõon* spp. - Sapotaceae) and "copaíba" (*Copaifera* spp. – Leguminosae). These were chosen because there is substantial confusion between the species known by these names, and separation of them into species has hitherto been very difficult for anyone without specialist knowledge. Each booklet will cover the Amazonian species with texts and illustrations to help separate the species in the field and the laboratory. The ultimate goal is to train parataxonomists to make species-level distinctions in the field, and to regularize identification surveys to make accurate and complete botanical identifications of forest trees.

Members of the community of Piquiatafuba, on the Tapajos river near Santarém, Pará, Brazil, examine the botanical leaflets of some common local forest tree species.

WEB RESOURCES FOR ECOLOGY AND CONSERVATION

Populus is a software product that is ideal for teaching ecology and evolution. A new upgrade of this software, Version 5.2, is available for free download at the **Populus** website, http://www.cbs.umn.edu/populus. It will run on any version of Windows, or on Mac OSX, Linux or Unix.

The Ecological Society of America has produce a collection of materials for teaching Ecology at the college level, in both the field and the classroom. While the collection is not yet complete, several labs are available online and more will be added in the future. The collection is at http://www.ecoed.net/tiee/exps/experiments.shtml

The National Biological Information Infrastructure web site has established an electronic forum on Biocomplexity and Conservation, directed at researchers, students, policy makers, and others in the conservation community. The site offers an eForum for accessing topics and discussions submitted by users. Go to the web location at www.nbii.gov/datainfo/bestpractices/index.html for information about the elements of this electronic resource.