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Spring Equinox

the Seedhead News

How Is Land Degradation Affecting Plants?

Both rainforest destruction and drought-related but man-made problems in dry lands are often in the news these days. While the biological depletion associated with tropical deforestation is implicit in most accounts, oftentimes soil erosion rather than genetic erosion is cited as the most significant long-term effect of desertification. The following commentary has been written toward remedying that oversight, comparing the deserts and moist tropics in terms of their plant resources.

There can be no doubt that the accelerating conversion of moist tropical forests is about the most alarming kind of ecological destruction on this planet today. Not only do these ancient communities contain many undescribed plants that are threatened with extinction, but two to three dozen coevolved animal species may be endangered per plant when certain tropical trees are lost.

We are therefore witnessing the wasting away of more than just scattered plant species, for long-evolved ecological relationships are vulnerable as well. Entire genera and key links in particular food chains have been lost as over half the land area once covered by moist tropical vegetation has already been converted. Whether turned into cow pastures, lumber plantations or degraded second growth, it is a mere shadow of what the rainforest once was. The Global 2000 report suggested that a million kinds of moist tropical forest organisms will not last until the turn of the century if deforestation continues at its present rate.

Conservationists have voiced several arguments against this devastation. One of their attempts to arouse the public on this issue is by claiming that this loss of biological diversity

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can be measured as a loss of the richest source of genetic resources useful for human welfare.

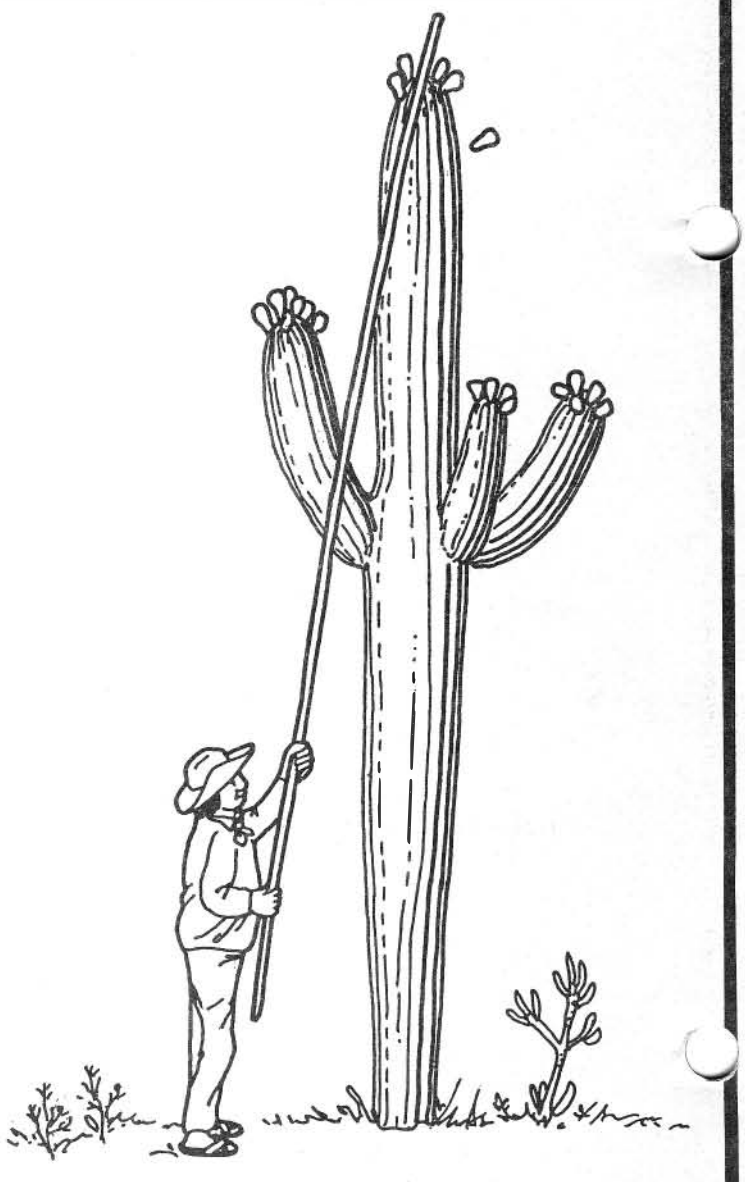
For instance, the International Institute for Environment and Development recommends that we must "put a value on forests." It suggests that the economic worth of genetic resources found within intact forests may be one measure that politicians and planners can be taught to understand. Following suit, admirable science writers such as Norman Myers and Catherine Caufield have stressed that tropical rainforests are "the [primary] source of undiscovered foods, medicines and materials" which, if destroyed, will drive society's agricultural economy toward "genetic bankruptcy" (Caufield).

There are many reasons to protect large reserves of minimally degraded forests. These reasons have been raised by the many involved legal actions, economic boycotts, and non-violent civil disobedience that attempt to slow absentee-owned companies in their logging and grazing the life out of these habitats.

But as a student of plants suitable for forms of sustainable agriculture far more "benevolent" than those which most of us eat from today, I feel queasy about emphasizing this "food and pharmaceutical storehouse" argument for saving the rainforests. For one thing, the loss of genetic resources may be far more pervasive in intermediate arid lands than in moist tropical forests. By not challenging the truism that the rainforest's biological diversity will translate into the richest source of plant genetic diversity beneficial to modern society, I sense that we are selling the deserts short, and misunderstanding the rainforest at the same time.

Let's compare the moist tropical forests with drier lands. This, by the way, is seldom done. Tropical forests are inevitably compared with temperate forests, I suppose, for the benefit of those in Washington, Bonn and London. Global climatic classifications hierarchically sort out the temperate and tropical zones on the basis of temperature, arbitrarily dividing up a third of the world's land surface where moisture not temperature is most limiting to life. Deserts which cohesively extend from cool temperate to hot tropical climes get lost in the statistical shuffle.

Estimates vary, but one reliable source suggests that true tropical rainforest now covers 9-10 million square kilometers, or 1/16th of the world's land surface. This includes true rainforest, and semi-evergreen forests,



but primary stands of these cover only half the area they did a few decades ago. Desert scrub (including intermediate desert and degraded semi-desert) covers 18 million square kilometers, but extreme dry desert covers even more surface--- an additional 8.5 million sq. km. Plant communities adapted to dry climates clearly cover more of the global land surface than do those adapted to hot, moist climates.

Of course, areal extent is not the best indicator of importance. Net primary plant productivity of a hectare of rainforest is roughly four times that of the same area covered by desert scrub. Many rainforests house 50 to 130 species of trees, vines and epiphytes per meter, with exceptional stands peaking at 750 species of plants within 50 meters. In desert scrub, finding 30 to 50 plant species per hectare is rare but possible during a wildflower bloom in an exceptionally rainy season. When soil moisture is more limited, 10 to 15 species of shrubs and succulents may be the only cover apparent over kilometers of extreme desert. Another 20 to 30 ephemeral herbs may still be in reserve in the soil during droughts, for unlike moist tropical floras, desert plants invest in seed dormancy. The percent of ephemerals in intermediate desert floras is lower, but 75 to 100 species of a dozen lifeforms may be found within a 50 hectare area.

Despite these differences, there are some similarities between rainforest and desert. There is high endemism in both. Additional species may be found over a wide geographic range, but in miniscule patches within this range. They may depend on co-evolved pollinators, seed dispersers or fruit detoxifiers that are tightly specialized on one or two plant species.

But what about characteristics which relate more directly to plant genetic resources and their presumed vulnerability? One of the most striking difference between these two biomes is in their lifeform diversity.

Ecologists R. M. May and T. Givnish have demonstrated that desert vegetation is the most diverse and rainforests the least diverse in Raunkiaer lifeforms or plant architectural strategies for reproduction. Moist tropical forests are dominated by woody-trunked plants which place their fruits or seeds high above the ground before letting them loose for dispersal. Throw in epiphytes and lianas, but rainforests still do not approach the lifeform diversity of other vegetation types. The twenty-five lifeforms found in deserts range from deep-rooted trees to columnar cacti, dwarf shrubs and rhizomatously-propagating yuccas, through tuber-bearing herbs and vines, to root parasites, short-lived bellyflowers and rock-mimicking succulents.

Whereas the tropical agroforester has few growthforms but many tree species to choose from, desert agroecologists are actively investigating the genetic resources of water-efficient cacti, drought-evading annuals, drought-escaping perennial tubers and salt-tolerant shrubs. Of this latter category alone, hundreds of species of halophytes from coastal deserts are now being evaluated as new crops, while the moist tropical coastlines of the world have hardly contributed any crop candidates for saline agriculture. Since salt build-up on farmlands has become a problem of global magnitude, even a few successful candidates could salvage the productivity of millions of hectares of degraded fields, rather than forcing the cultivation of additional wildlands.

Yet can such plants contribute to the world food supply? Desert floras seem particularly well-endowed with non-toxic seeds rich in oil, protein, and hygroscropic gums. The Sonoran Desert of Mexico and the U.S. harbors 450 edible plant species,

20% of its flora. Particular moist tropical floras are also high in the number of edible plants, but perhaps their percent contribution is relatively lower.

My own research has shown that intermediate arid lands are the homes of a high number of crop wild relatives. In the arid Americas, we find that wild beans, sunflowers, amaranths, potatoes, maniocs, gourds, prickly pears and agaves--- to name only a few--- are sources of genes for resistance to drought, heat, pests and diseases. The Old World deserts have contributed wild wheats, barleys, melons, watermelons, millets, sorghums and many pulses. In fact, desert fringes appear to be the cradles of seed agriculture in part because of their diversity of species of economic annuals.

The rainforests are relatively richer in plants capable of rapid vegetative propagation, particularly specialty fruits and pharmaceutical precursors. Multinational genetic engineering firms have already funded private expeditions to obtain these tropical materials in order to see if their products are suitable for laboratory tissue culture. Any patented medicines or high-value fruits that suit themselves to such biotechnological endeavors are less likely to directly benefit indigenous tropical peoples from whose lands this germplasm has been obtained. They may permanently leave the rainforest behind for a life confined to the petri dish.

In my opinion, the hidden utilitarian treasures of these plant communities should not become the major agrument for preserving them. Following ecologist David Ehrenfield, I feel we must stress the intrinsic right of any lifeform to exist regardless of its perceived worth. We must also reiterate the life support services offered by these ecosystems as wholes, including their role in climatic stabilization, watershed buffering from floods and erosion, or other less-tangible functions.

Currently, there are less than 50 biosphere reserves of any size in each of these biomes. These are not enough to adequately represent the various habitat or community types found within either the desert or the rainforest. They are entirely inadequate to conserve even a small percentage of the genetic variation found within the most useful, widespread plant species, let alone the obscure, localized endemics.

If we have any obligation to future generations of our species or of others, it is to protect any sizeable tracts of deserts and rainforest that remain. These lands need to managed in a way which allows plant evolution continue. This cannot happen if we simply collect the remaining representative species and lock them up in a liquid nitrogen gene bank. Unless we want to see ourselves swept away with the draining of their gene pools, we must become the plugs that keep the fullness of this planet's life from being emptied.

Gary Nabhan

Book Reviews

GRASSROOTS CONSERVATION OF BIOLOGICAL DIVERSITY IN THE UNITED STATES

By the Office of Technology Assessment, Congress of the United States. Published by the Government Printing Office, Superintendent of Documents, Washington, D.C., 20402. Stock Number 052-003-01019-4. 67 pages. $3.50.

This document provides the general reader with an overview of the variety of non-governmental organizations currently trying to conserve domestic and wild plants and animals both in situ and at off site localities. It shows the network of genetic diversity conservation and how SEARCH fits into this picture.

The report reviews the efforts of a number of grassroot groups across the country that are representative of an even greater number of like-minded organizations. Short presentations are made about activities of groups as diverse as the Prairie Preservation Society of Ogle County (Illinois), The Land Trust Exchange, Desert Fishes Council, Desert Botanical Garden, American Federation of Aviculture, The Seed Savers Exchange, Native Seeds/SEARCH, and the American Minor Breeds Conservancy. Many other groups and even outstanding individuals are mentioned.

Interestingly the efforts of groups like SEARCH do not usually duplicate those of U.S. governmental agencies such as the U.S. National Seed Storage Laboratory. In fact, grassroots groups quite often recognize and address problems long before the larger bureaucracies can be mobilized into action.

Many of the groups discussed in this worthwhile report are really very new. Most of the groups have been founded or incorporated in the last 20 years. Seven of the groups got their start in the 1970's, while five other groups began since 1980. Most of these are located in the western U.S. The public perception of the value of genetic diversity is obviously growing at a rapid rate.

Of special interest to members of SEARCH is the fact that our own Gary Nabhan and Kevin Dahl prepared one of the four papers commissioned by O.T.A. as background for this report. Their influence on the final presentations can clearly be seen. Other contributors include such notables as Cary Fowler, Elizabeth Hensen, Elliot Norse, and Kent Whealy.

Barney Burns...

SEASONS OF THE WIND: A NATURALIST'S LOOK AT THE PLANT LIFE OF SOUTHWESTERN SAND DUNES

By Janice Emily Bowers. 1986. Published by Northland Press, Flagstaff, AZ. Photos and drawings. 154 p. $10.95, paper.

Although dunes cover less than a hundredth of the Southwestern deserts, they have a unique flora which exhibits many fine-tuned adaptations. The beauty and natural history of dune plants are the subject of an elegant new book by Jan Bowers, one of the most diligent field botanists in Arizona. Seed Searchers will be interested in her coverage of silvery sunflower, sandfood and dunes devil's claw, as well as her handling of conservation issues affecting sand habitats. Overall, this is an informative, well crafted gem.

Gary Nabhan

Grow Your Corn And Eat It Too

Roasted elote,or corn on the cob, is a popular way to eat maize in Mexico. Many types of corn in addition to sweetcorn are suitable for roasted elote. Sweet corn is higher in sugar content and texture and is therefore cooked differently. Roasted corn has a caramelized flavor and is crunchy and filling.

Any dent, flour or flour/-flint type of corn can be roasted at a young stage. This stage is often called greencorn in the Greater Southwest and is also used for green corn tamales. Corn is considered to be in the elote stage any time from kernel development until just before drying. Perhaps the best guide to use for picking is the same as for sweet corn: the ear feels developed and the silks have just dried. If you have been growing any of the many varieties of corn offered on the SEARCH seed listing this is a great way to eat the fruits of your labor without grinding or lime-washing.

Recipe

1.Soak ears in husks for at least two hours in water to cover.
2. Roast on a grill over good coals for about 1/2 hour, turning frequently.
3. Strip the husks and soak for 5-10 minutes in salt water (1 Tablespoon per gallon.)
4. Roast again on the grill, turning frequently until warm, up to 15 minutes.
Some kernels may be nearly burned. No butter or salt are required, but can be applied.

Mahina Drees

Boxes On A Low Budget

A number of you who have ordered seeds from SEARCH have commented on the unusual boxes we use. Several of you have even tried to wheedle out of us our source. It is time to share one of our best kept secrets - SEARCH's shipping box supplier.

Originally Barney was able to convince Rick Scherb of R & P Auto Service in Tucson to save empty car parts boxes for SEARCH. Barney would drop by weekly (usually while getting more repairs on his aging Blazer) and pick them up. While this supply was adequate for a year or so, our demand quickly outpaced Rick's ability to supply SEARCH.

Barney began a broad inventory of trash dumpsters within several miles of the New York address. His diligence quickly pinpointed Lowry Hardware at 975 W. Prince Rd. as the best source of reusable small boxes. Barney monitored the white trash dumpster behind the hardware store and soon determined the best day for collecting boxes.

One day, Jerry Allen of Lowry Hardware suggested that perhaps Barney was overqualified for crawling around in dumpsters. He approached Mr. Ed Lowry to see if the store could save reusable boxes for SEARCH. Mr. Lowry agreed that our project was worthwhile and graciously instructed employees to save boxes on a regular basis.

We would like to thank the entire Lowry family as well as Jerry and Harold Bender who actually save the boxes. We expect to use about 1,000 of them this year.

Now the only time Barney can be seen crawling through dumpsters is when we need additional styrofoam packing materials. He has located two good sources, but he is not willing to reveal their exact address - at least not yet.

Wish List

We know that Native Seeds/ SEARCH is largely powered by the generous donations and volunteer labor from our wonderful supporters. So, as we sat down to think about what supplies and equipment we need here at the new office, we decided to list some of our needs in case somebody had some to donate. If you think you have something we could use that's not on the list, please contact us anyway (our very successful brainstorm produced a very long list -- these are just a few of the items).

Office needs: zip code book; slide projector, screen and slide files; small refrigerator; large, frost-free freezer; copying machine; bulletin board.

Garden & seed cleaning needs: garden tools (shovels, rakes, etc.); roto-tiller; wheelbarrow; hoses and sprinklers; saguaro ribs and mesquite posts; wooden chopping block; dissecting microscope.

Kevin Dahl

SEED SAVING WORKSHOP AND SEMINAR

On May 5, 1986, The Accokeek Foundation is sponsoring a one day workshop and seminar at the National Colonial Farm. The program includes: verification and interpretation of heirloom varieties, seed conditioning and storage, background and up-to-date information on genetic erosion and loss of traditional varieties, and how the federal government, international organizations, preservation groups, and U.S. seed companies are working toward common goals.

For more information or a registration packet please write before March 20, 1986 to:

Mary Ann Klein
National Colonial Farm
%Seed Saving Seminar
3400 Bryan Point Road
Accokeek, MD 20607
(301) 283-2113

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Notes From Our Office

Our new home at the Tucson Botanical Garden, 2150 N. Alvernon, Tucson 85712 (602/327-9123), has become a happy workplace for staff and volunteers. We welcome visitors, but because of our irregular schedule it is important to phone ahead for an appointment. Out-of-town visitors are especially encouraged to come get a tour of our grow-out and Indian demonstration gardens.

Our mailing address remains the same as it has always been: 3950 W. New York Drive, Tucson, 85745. We do not handle seed orders at the new office and cannot take orders over our new phone.

What are we doing at the new office? Here's a sample: managing the small and rare seeds collection; organizing the new grower's network; writing grants; giving tours and information to visitors; computerizing our membership and seed-buyers lists; and starting to put together a guidebook on growing native crops.

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