



Lingua Botanica

The National Newsletter for FS Botanists & Plant Ecologists



I've noticed a trend lately. And this time it's a trend we can be happy about. I hear it in the halls, and I sometimes see it in my inbox. People are starting to speak out about success. For as long as I've been in the Forest Service I've seen good people doing great things. These people are on every Forest and every Grassland. What's new is that people are finally starting to talk to one another about it – Hallelujah! In the current “environment,”

where litigation seems to be an daily occurrence, where funds continue to tighten, and politics seem to play in increasingly evident role in natural resource decisions, it seems like bad news is the only news we know. Well, don't believe it! Success is everywhere to see, if we only knew where to look. You've probably don't know Kirk Larson of the Hoosier National Forest, Julie Schreck of the Bitterroot National Forest, or Jim Oftedal of the Sierra National Forest. Too bad. These three remarkable people have achieved some rather notable successes this year. Each of them deserves a great deal of praise, and yet each of these dedicated and innovative people continue to toil at their *raison d' etre*, or *joie de vivre* if you prefer, in relative obscurity. Why? Could it be modesty? Modesty is a trait often associated with selflessness, but this kind of modesty is misplaced. Now, more than ever, is the time to bear witness to success. It is in all of our best interests to hear about one another's good fortune. It's invigorating, it's inspirational, and who among us couldn't use a little more invigoration and inspiration? So here's a challenge. Everyone reading this should send an email to someone else (like a botanist two forests over, or maybe your staff officer, regional program leader, or Ranger) and tell about your greatest success of the past year. It doesn't even have to be something spectacular; anything that worked well will do. If you get one of these emails, email it to someone else. Hell, email it to me! Flood my inbox with your success. I dare you. It'll be good for you, it'll be good for all of us to know that, even these days, success is in the air.



the editor.

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Vol. 4, Issue 3 2003

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Linkiana

Medicinal and Aromatic Plants Symposium: It's in Philadelphia in mid-October, and if you have an interest in non-timber forest products you should check it out.

<http://www.plantconservation.org/mpwgconference/>

Fourth Eastern Native Grass Conference: Its October 3-5, 2004 in Lexington, Kentucky. Go!

http://www.uky.edu/Agriculture/Forestry/grass_symposium/

Plant Community Restoration Symposium: At Chicago Botanic Garden, 23 October.

<http://www.chicagobotanic.org/symposia/jmpsymp.html>

Titan Arum Blooms at National Botanic Garden: In case you missed the hub-bub, an *Amorphophallus titanum* bloomed this summer at the National Botanic Garden. See a gallery of images and time-lapse movies on their titan arum page.

<http://www.usbg.gov/your-visit/Titan-Day-1.cfm>

The Lewis and Clark Herbarium: This Lewis and Clark archive is full of great images. By far, the best of the online Lewis and Clark herbaria.

<http://www.life.umd.edu/emeritus/reveal/pbio/LnC/LnCpublic.html>

Alternative Pollinators – Native Bees: A great little primer on encouraging native bee populations. Contains lots of interesting natural history.

<http://attra.ncat.org/attra-pub/nativebee.html>

Non-native Invasive Plants of Southern Forests: This is a beautiful field guide from the good folks at the Southern Research Station. You can download a .pdf version here.

http://216.48.37.129/about/newsrelease/nr_2003-05-29-nonnative.htm

The Beinecke Rare Book and Manuscript Library: A cool archive of old and rare images, including lots of historic botany. Check it out...

<http://highway49.library.yale.edu/photonegatives/>

Polyploidy in Restoration: Download and learn!

<ftp://ftp2.fs.fed.us/incoming/r2/ro/botany/reveg/>

An Introduction to Restoration Genetics: Download it or view it on the web...

<http://www.nps.gov/plants/restore/pubs/restgene/index.htm>

Powers of 10: Very Cool. That is *Quercus nigra* at 10^{-1} by the way...

<http://micro.magnet.fsu.edu/primer/java/scienceopticsu/powersof10/index.html>

Playing with Time: Also very cool. Visit the gallery to see a wetland, forests, and other landscapes (and human-scapes) in time-lapse.

<http://www.playingwithtime.org/>

Your Botany Stories Still Needed!!

An upcoming issue of *Lingua Botanica* will be dedicated to your stories about botany, about botanizing, about your motivation to become a botanist, and about the wonders you've encountered while doing your botany job. Stories are one of the most important ways that we transfer knowledge and understanding, and they are the best way to explain to others the pleasure and awe we share for plants.

You need not be a Forest Service botanist to contribute. If you've had an enlightening or transformative or just funny experience related to botany, we want to hear about it. You don't have to be an eloquent writer to participate, just be honest.

Keep it clean (this is a family publication), pseudonyms are acceptable if you prefer, make sure anyone mentioned in your story is okay with what you say about them (don't slander or embarrass anyone), and your stories may be used in other FS publications. There is no minimum size, but try to keep your tales to less than two pages.

Submit your stories to the editor wowen@fs.fed.us

PLANTS Update

There have been a couple major updates at PLANTS (<http://plants.usda.gov/>) this summer. The image database now has 18,000 images online and another 12,000 in the quality control pipeline. You can contribute to the PLANTS image database by following the links on the home page.

Also new to PLANTS is the fully searchable Plant Materials Publications module. This module contains a veritable treasure-trove of propagation information, and literally hundreds of "fact sheets." Access this information via the PLANT TOOLS box on the main page.

Finally, PLANTS is bringing online a checklist of vascular plants of the Pacific Basin. The Caribbean (well, Puerto Rico and the Virgin Islands) has been covered by PLANTS since 1990. The areas covered by the new checklist include:

| | |
|--------------------------|------------------|
| American Samoa | Howland Island |
| Swains Island | Jarvis Island |
| Baker Island | Johnston Atoll |
| Northern Mariana Islands | Kingman Reef |
| Micronesia States | Midway Islands |
| Truk Islands | Palmyra Atoll |
| Kusaie | Marshall Islands |
| Ponape | Belau |
| Yap | Wake Island |
| Guam | |

Thanks to Scott Peterson, Director of the PLANTS Database, for the update on our favorite database.

Harry Potter and the US National Herbarium

The holotype of *Macrocarpaea apparata* J.R. Grant & Struwe
is housed in the US National Herbarium.

from The Plant Press (Dept Systematic Biol/Botany & the U.S. National Herbarium), July-Sept. 2003

As children and adults read the latest *Harry Potter* book by J.K. Rowling throughout the United States and the rest of the world this summer, it should be interesting to note that a collected plant specimen housed in the US National Herbarium has been named after a word found in the *Harry Potter* series. Jason Grant, a former intern of retired Botany curator Lyman Smith (1989), named a new species of the gentian family after a term from *Harry Potter and the Chamber of Secrets*. The plant *Macrocarpaea apparata* J.R. Grant & Struwe is described in the June 27 issue of *Harvard Papers in Botany* [8(1): 61-81. 2003]. The species name, *apparata*, is drawn from the term "to apparate" as in apparition, a verb used throughout the *Harry Potter* book. Rowling uses the word to refer to a wizard's ability to disappear and reappear elsewhere instantaneously.

Grant, now a graduate student completing a Ph.D. degree on the genus *Macrocarpaea* (Gentianaceae) at the University of Neuchatel, Switzerland, and Lena Struwe, an assistant professor at Cook College at Rutgers, The State University of New Jersey, discovered the species while doing field work in southern Ecuador in 2001 in Parque Nacional Podocarpus, one of the largest National Parks in the Andes. They were traveling along a road in the rain forest when they suddenly found a very strange looking plant without flowers. Since the plant had no flowers or fruits they could not be sure it was a gentian, and if it was, it was a very unique-looking one. They continued on the road and about the time they were ready to give up due to rain and impending darkness, a flowering tree of this plant suddenly appeared, or 'apparated.' From this event, the species got the name '*apparata*.'

"When we found the plant, the word came to mind," Grant says. "We actually decided on the name together, that day in the field. Our collection is the only one of this species." The holotype is housed in the US National Herbarium. Grant describes the plant as "a small tree, 12-15 feet tall, full with yellowish-white, bell-shaped flowers adapted to nocturnal pollination by bats and moths."

One in Ten Tree Species at Risk of Extinction

Environmental News Service, 4 August 2003

CAMBRIDGE, United Kingdom - More than 8,000 tree species, 10 percent of the world's total, are threatened with extinction, and the situation has grown worse over the past five years, according to a new report sponsored by the UK Department for Environment Food and Rural Affairs (DEFRA).

"Towards a Global Tree Conservation Atlas," published this week, shows that 976 tree species are in a critical situation, and very few of these endangered trees are being conserved in the wild. The report highlights the plight of five "flagship" species that the Global Trees Campaign is working to save.

The report provides new information about flagship species such as *Araucaria araucana*, Chile's national tree, called the monkey puzzle tree; *Swietenia macrophylla*,

Brazilian Mahogany; *Cinnamomum cebuense*, Cebu Cinnamon; *Baillonella toxisperma*, known as Moabi and used for decorative timber, animal feed and cosmetics; and *Caesalpinia echinata*, called Pau Brazil, the national tree of Brazil.

One of the flagship species, the monkey puzzle tree, *Araucaria araucana*, was damaged by a forest fire in Chile 18 months ago, which destroyed 71 percent of the araucaria forest in Malleco National Reserve. Some of the trees were 2,000 years old.

The Global Trees Campaign, developed by Fauna & Flora International in partnership with the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), is an effort to save the world's most threatened tree species and their habitats through information, conservation and wise use.

An important element of the information campaign is the development of a mapping program leading to a proposed World Atlas of Threatened Trees.

The Global Trees Campaign focuses on trees as flagship species for conservation of ecosystems and landscapes, and enables local people to carry out rescue and sustainable use operations. The campaign works in partnership with organizations around the world to save endangered trees.

The extent of the damage to the Chilean monkey puzzle trees was revealed in research by Cristian Echeverría, who is based at the UNEP-WCMC center in Cambridge. He is pioneering a technique for mapping the fragmentation of the forest, using remote sensing from satellite images of the last 25 years to assess the rate at which native forests are disappearing.

In one of the Chilean study areas, 64 percent of the wild forest has been lost in 25 years and the continuous forest cover broken. Reconstructed maps show that in 1550, when the Europeans arrived, the entire country would have been forest.

Echeverría said, "After years of destruction the monkey puzzle tree is now found in two small areas in the Andes and on the coastal mountain range. Fires in the summer season of 2001-2002 have destroyed 30,000 hectares of native forest, including 71 percent of the area of monkey puzzle and 61 percent of *Nothofagus*, a native beech, in one of the three reserves affected."

Mark Collins, director of UNEP-WCMC, said, "New research, such as that on the monkey puzzle, is revealing that fragmentation of wild forest and the re-plantation with potentially invasive foreign species are major threats, demonstrating the urgency of managing forests sustainably."

In 1990, the monkey puzzle tree was declared a protected species in Chile, and its logging was forbidden. As the araucaria species is highly prized for its timber, the government is under pressure to permit logging of the burned forest.

Echeverría warns that if logging is allowed, then human caused fires may increase, as only a small proportion of the native araucaria forests are in protected areas. The Valdivian ecoregion, declared by the World Bank as being an area of outstanding biodiversity, currently has no protection.

Araucaria seeds are a source of concentrated carbohydrates for the Pehuenche people, whose culture is



dependent upon the tree. A DEFRA funded project set up after the fires is helping the people of Villas de Araucana establish a tree nursery. But this project will take experimentation to develop successful cultivation techniques, and it will be 200 years before the trees mature and produce seed.

The Andean araucaria forests are adapted to survive in volcanic soils and support a unique community of other species such as the flowers of *Berberidopsis corilinla*, the Chilean lion, a small deer known locally as "pudu," and a species of woodpecker.

Previously wooded private land has been cleared and replaced with grazing or plantations of Monterrey pine and eucalyptus, Echeverría says. There are now two million hectares of pine compared to just one quarter of a million hectares of araucaria forest.

Echeverría believes that education of the private landowners about the value of ecotourism is key to the survival of wild forest. "Chile has a good transport infrastructure and is particularly inviting for ecotourists wanting to visit South America," he explains. "The country stretches from the desert in the north through every type of climatic zone to the Antarctic in the south. The forests of the Andes have a rare beauty and could be a considerable attraction for travellers."

Dr. Collins says "surprisingly little" is known about the status and distribution of tree species, including important timber species such as mahogany. "Our initial report demonstrates that conservation assessments are required for plant conservation targets to be achieved by 2010."

"In particular," Collins said, "we need spatial data, which will help us to identify the most crucial areas for tree conservation and ensure that these eco-regions are managed effectively to provide the protection required."

Destruction of woodland and forest and unsustainable logging of valuable timbers are causing the loss of many important species, the report shows.

Professor Peter Ashton, of Harvard and The Royal Botanic Gardens at Kew, warns that in the tropics many rare tree species are already "functionally extinct."

"The high diversity of plants in tropical rainforests means that specimens are naturally widely spaced, if forest cover is further fragmented then the probability of a pollinator being within range decreases. Some forests are becoming living museums," Dr. Ashton says.

UNEP-WCMC and Fauna & Flora International (FFI) are seeking public and private sector funding for a proposed "World Atlas of Threatened Trees," which will provide photographs of the species, full color maps showing their distribution, status reports compiled by workers in the field, and an analysis of policy options to prevent extinctions.

Mark Rose, FFI executive director, believes that further regulation of the timber trade is also required. "We estimate that almost 50 percent of the tropical timber in international trade has been illegally logged."

One thousand globally threatened trees are threatened in part by unsustainable levels of logging, Rose warns. "Accurate, objective information is required to strengthen international trade control mechanisms such as the Convention on International Trade in Endangered Species."

Copies of the preliminary report "Towards a Global Tree Conservation Atlas" are available on: <http://www.unep-wcmc.org/resources/publications/treatlas>

Native Bees - *What's the buzz?*

Mari Coyne, Chicago Wilderness Magazine, Summer 2003



A walk through Lake County's [Ryerson Woods](#) on an early spring day will reveal carpets of spring beauty, *Claytonia virginica*, blooming under expansive budding oaks. The hum of insects darting through this floral show includes a breathtaking 58 species of native bees.

Bees are nature's most important pollinators, but their vital role in the sustained health of our ecosystems is often overlooked. Bees use specialized hairs on their legs or abdomen to collect pollen for food — mixed with nectar, it becomes a nutritious paste. By grand design, this self-interested act moves pollen from

flower to flower. Without bees and other pollinators, many trees and flowers would go unfertilized or be unable to cross-pollinate. Lack of pollination means less fruit or seed production, and, over time, a decline in the hardiness and reproduction of the plants, including possible extinction. This, in turn, affects birds, mammals, and other species that depend on these plants.

Nearly 300 species of native bees inhabit Chicago Wilderness. Bumblebees usually steal attention from the wide range of shapes, sizes, and colors of many native bees. Though groups of bees have common names like the digger, leafcutter, carpenter, and mason bees, individual bee species are known mostly by their Latin names. *Anthidium psoraleae*, a black bee with prominent yellow abdominal markings, probes flowers with a long tongue. *Osmia cordata* sports a dramatic and hairy metallic blue-green body. The small *Ceratina metallica* measures only five milli-meters and has the same metallic blue-green coloring as *Osmia cordata*, but with less body hair. And towering above that tiny creature at 13 millimeters, *Cemolobus ipomoeae* has a black body with brown hair on its abdomen.

Most native bees are solitary, not social hive dwellers, and nest in the ground, tree holes, or other hollow plant matter. Most are so unassuming that if disturbed, they will choose flight over pursuit and will rarely sting.

While relatively unseen and unknown at home, native Illinois bees are renowned on the international stage. Thanks to Charles Robertson, a passionate naturalist, many today view Illinois as the bee capital of the world. Between 1884 and 1916, Robertson assembled one of the most extensive collections of native bees and their flora. His study concentrated around the southern Illinois town of Carlinville, where he discovered 296 bee species. Today his collection remains a significant reference for bee specialists.

In 1932, Jay Frederick Wesley Pearson, a doctoral candidate at the University of Chicago, based his dissertation on Robertson's findings. Pearson's research, conducted primarily in Chicago Wilderness, found that Chicago's flora and bee fauna were similar to Robertson's impressive findings in Carlinville.

"There are probably more bee species in the Chicago region than in Carlinville because the habitats are more diverse here," explains entomologist John Marlin of Illinois Department of Natural Resource's Waste Management and Research Center. Marlin

observed Carlinville bees in the early 1970s and found that, despite habitat changes, native bee diversity had changed little since Robertson's time. He believes that the same is true today in the wilder parts of the Chicago region.

Native bees live simply and have two basic needs: a suitable nesting habitat free from insecticides and, since they don't fly long distances, a locally abundant food source. Unfortunately, their basic needs are threatened by loss of native plants, habitat fragmentation, roadside herbicide spraying, and especially the massive sprayings of broad-impact insecticides used in some mosquito abatement programs. Today, the best bee sanctuaries in the Chicago area are places that are relatively undisturbed, are rarely sprayed, and support a wealth of native plants. Vacant lots and abandoned cemeteries or railways are sometimes good spots to see native bees. More important though are the native prairie and woodland preserves that represent the past and future of local bee populations. By protecting the full range of native wildflowers that bloom throughout the growing season, natural lands provide more consistent food sources for bees, and the native plants benefit in turn from a broader range of pollinators. With continued attention to habitat preservation and reduced spraying, we can ensure that Chicago Wilderness remains a vital part of the world's bee capital.

New farming buzz: wild bees

Robin White, Special to The Christian Science Monitor, 28 August 2003

DAVIS, CALIF. – Each year for as long as he can remember, Rick Rominger and his father before him have rented honeybees to pollinate the crops on their sunbaked farm near Davis, Calif. When the days get long they pay a beekeeper to truck hives into their fields. For a few weeks the honeybees fan out to collect pollen and nectar and in the process they turn sunflowers into sunflower seeds and bean flowers into beans.

Occasionally, the honeybees misbehave and abscond to the local town, bringing back the wrong kind of pollen for Mr. Rominger's hybrids. But for the most part the relationship between honeybee and farmer has stood the test of time.

Some bee experts say that could be about to change. The number of honeybee colonies in the United States is down by almost two-thirds over a 50-year period. Two species of bloodsucking mites are chewing their way through honeybee colonies nationwide, wreaking havoc on the way. Chinese competition is driving down the price of honey.

Because of these problems, beekeeping no longer earns much. Some operators are hanging up their veils and putting away their smokers.

This means the cost of pollination is rising and occasionally there are honeybee shortages. With 1 out of every 3 bites of food the result of pollination, bee specialists are looking for alternative ways to do the job.

Princeton University researcher Claire Kremen is a champion of native bees - the wild, distant cousins of the honeybee. Dr. Kremen says farmers have been relying too heavily on honeybees, and that other species of bee such as bumblebees, mason bees, carpenter bees, and sweat bees can do a much better job of pollination.

"I kind of think of wild bees as being our insurance policy," Kremen says, adding that there are 1,500 species in California alone.

Working on farms near Davis (including Rominger's), Kremen's team has found one bee species that is 10 times as good at pollinating sunflowers as the honeybee, a European import. But, she says, the numbers of native bees are kept low by typical commercial farming practices. Many farmers scrape their farms clean of weeds, in the process removing the kind of habitat the bees need to nest and forage.

Kremen wants Rominger and other farmers to plant hedgerows of native plants and take more care in their use of pesticides. She says if they do that, they could have all the pollinators they need on the farm without paying a penny to rent honeybees.

At Full Belly Farm in the Capay Valley, about 20 miles from Rominger's, there are plenty of native bees. Right now, it's harvest season in the tomato fields. The shoulder-high cherry-tomato plants are laden with red, green, and yellow fruit. Several thousand bumblebees buzz the flowers in the four-acre field.

They are not there by accident. Full Belly farmer Paul Muller says it's part of his organic farm's plan to grow insects as well as plants. During 20 years of experimentation, Mr. Muller and his partners have planted swaths of native flowers to provide pollen and nectar sources year round. They leave a lot of weeds around the edges of fields. This attracts native bees as well as other beneficial insects.

"We're just dancing in the dark here with something that we think is enhancing insect ecology," says Muller. But Kremen's research shows that Muller's experiments are working. She says Muller doesn't need to bring honeybees onto the farm to pollinate the crops.

Persuading other farmers to change will be an uphill battle, Muller says. "It's an aesthetic thing. Farmers think the ideal is to have all their rows neat and straight and not a weed in sight. But if you want insects it doesn't work that way."

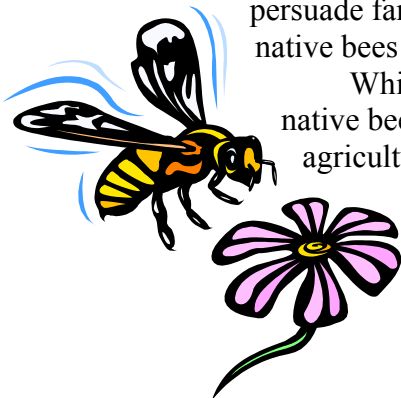
It's not aesthetics that worries Rick Rominger, but reliability. "You like to think in the long term. But in our business if we trip this year, we won't be here next year."

Rominger wants to know precise details of the native bees' nesting habits before trying to create habitat for them. He's concerned about the investment. Native plants cost money at the nursery and reduce the amount of available cropland.

But there are hidden benefits to switching to native bees, Kremen says. Hedgerows can harbor a range of beneficial insects that keep pest insects under control and reduce pesticide costs. They might also provide new hedgerow crops such as blackberries or rose hips, which can be sold for profit.

Underlying Kremen's arguments is the fear that native bees are in danger because they face pressure from development in their wild habitat. Two species of bumblebee have vanished from Oregon and California in the past five years alone. If Kremen can persuade farmers to make bee habitat on the farm, it's one way of making sure native bees are there for farmers should they come to really need them.

While owners of small, organic farms may warm to the idea of using native bees, Kremen admits it may prove difficult to convince big agriculture to make the change. But she says small farmers often lead the way because they have the flexibility to implement change. As more data come in about the effectiveness of the native bees as pollinators, she predicts more farmers will get on board.



Dispersing seeds is newly discovered role for deer
except the plants often are noxious weeds, Cornell ecologists report
Cornell University, 8 August 2003

SAVANNAH, GA. -- About the hoofed mammal gardeners love to hate, there's good news and the other kind from Cornell University researchers who study plant-eating habits of the white-tailed deer.

Speaking at the Ecological Society of America (ESA) annual meeting Aug. 3-8 in Savannah, Ga., Mark Vellend will report his discovery that a significant role in seed dispersal is played by deer browsing on vegetation wherever they wish and depositing seeds, in their pellet-like feces, to germinate and produce new plants up to two miles away.

"The good news is that deer might facilitate the spread of native plants to habitats recovering from disturbance, where the seeds otherwise wouldn't be able to reach," says Vellend, a Cornell graduate student of ecology and evolutionary biology. Along with Cornell undergraduate Jonathan Myers, the graduate ecologist spent countless hours dissecting deer pellets.

The bad news, says Vellend: "Unfortunately, many of the seeds we're finding in deer feces are from noxious weeds, including four of the top 20 invasive plants of greatest concern in New York state. The multiflora rose, for example," he says of a pretty plant that creates impenetrable brambles.

Ecologists have long known about the myriad ways seeds are dispersed from plants in eastern North America: Ants carry some seeds and so does the wind, while birds and other vertebrates drop indigestible seeds in their feces. And certain plants with ballistic capabilities can shoot seeds several feet or even yards away.

Many of those methods, however, fail to account for the relatively rapid spread of some plant species when unused farmland returns to woodlands. Or the resurgence of woodlands when Ice Age glaciers scoured landscapes of all vegetation millennia ago and then receded, leaving barren soil in their wake.

The study by Vellend and his colleagues was the first comprehensive test of seed dispersal by white-tailed deer, which are known to researchers by their scientific name, *Odocoileus virginianus*, and to long-suffering gardeners by unprintable epithets. Once a rare sight in suburban neighborhoods, deer populations have reached unprecedented levels in many parts of eastern North America. Wildlife biologists credit a variety of factors (the return of abandoned agricultural fields to woodland, suburban sprawl and a shortage of predators, both human and wild) for the deer explosion.

A typical cluster of deer pellets examined by Vellend and colleagues contained more than 30 germinable seeds. They found that seeds are dispersed by deer throughout the year. The majority of seeds found had no obvious adaptations for dispersal -- that is, if the deer hadn't carried them to new locations, they probably wouldn't be there. Some seeds were from trillium, the three-petaled woodland flower that is a protected species in some areas. Other seeds came from plants that need no protection and threaten to overwhelm native plants.

At the ESA meeting, Vellend will report: "White-tailed deer represent a significant and previously unappreciated vector of seed dispersal across the landscape, likely contributing an important long-distance component to the seed shadows of

hundreds of plant species and providing a mechanism to help explain rapid rates of plant migration."

As for the rapid rate of plant disappearance, the Cornell ecologist offers a ray of hope to gardeners: "If eaten at the right time, plants may reappear next season, thanks to seed dispersal, though not likely in your own yard. Maybe your neighbor's yard." Vellend also was assisted in his deer study by research associate Sana Gardescu and Professor Peter L. Marks in Cornell's Department of Ecology and Evolutionary Biology. The study was supported, in part, by the A.W. Mellon Foundation, the McIntire-Stennis program, the Cornell University Biological Sciences Honors Program and a STAR Fellowship from the U.S. Environmental Protection Agency.

Fungi Find May Alter View of Global Warming

Rick Weiss, Washington Post, 8 September 2003

Scientists probing the frozen soil beneath Colorado's Rocky Mountain snowpack have found a world of microbes no one knew existed -- a world dominated by microscopic fungi unlike any others previously found on Earth.

So numerous and diverse are these newly discovered organisms that scientists are having to rewrite the book on the ecological importance of fungi -- life forms that are neither animals nor plants but which, as nature's premier recyclers, do a big share of the work of keeping Earth in biological and chemical balance.

Indeed, scientists said, if other regions of the world have similar fungal communities thriving under their winter snows, as now seems likely, climatologists will have to revise their models of global warming to accommodate fungi's surprisingly massive role in the winter production of greenhouse gases, such as carbon dioxide.

Industrial chemists are eyeing the peculiar tundra fungi, too. They want to take advantage of the organisms' ability to perform biochemical reactions at temperatures that would put most microbes to sleep.

"The dogma was that not much biology goes on under the snow," said study leader Steven Schmidt, a microbiologist at the University of Colorado in Boulder. "But obviously, there's quite a bit going on."

Suspicious that something was cooking beneath the world's snowfields arose in recent years when scientists detected carbon dioxide and methane escaping into the winter air over Siberia and other arctic regions. The gases were exactly those that scientists would expect if bacteria and fungi in the soil were going about their usual summertime business of breaking down decaying plant matter -- a process that scientists thought came to a near-standstill under snow.

To see what was going on, Schmidt and his co-workers took a series of core soil samples at their 21/2-mile-high study site. Common methods of spotting microbes in soil, including using microscopes and trying to grow them in laboratory dishes, turned up little. But when the team used molecular tools to detect microbial DNA in the soil, they hit, well, pay dirt.

Analysis of those DNA samples indicated the presence of countless species of fungi, invisible to the eye and too finicky to grow in standard laboratory preparations. Some are genetically similar to known fungal species, indicating they are simply new

species, the team reported Sept. 5 in the journal *Science*. Many others, however, have enough similarities to identify them as fungi but are otherwise completely novel, indicating they constitute entirely new groupings and probably perform unique biological functions.

Equally surprising, tests showed that the density of these organisms per gram of soil climbed dramatically in midwinter, when the researchers had predicted they would be at their minimum.

"At first I thought I wasn't reading the [researchers'] paper right," said Jo Handelsman, a plant pathologist and Howard Hughes Medical Institute microbiologist at the University of Wisconsin at Madison. "It shows a vast increase in fungal biomass in winter, with more than twice as much under the snow as in summer soil. That's really surprising."

If Handelsman is surprised, that's saying something, because she has made a habit of finding similarly unexpected troves of biology -- in her case, bacteria -- in environs that no one knew were so full of life.

Both she and Schmidt are part of a unique, decentralized effort known as the Microbial Observatory, funded by the National Science Foundation. The goal is to find new life forms on Earth, especially in extreme environments, in many cases by trolling for traces of their DNA.

"What we know about the microbial world comes from the tiniest chip off the microbial iceberg, the little bit we've been able to see and grow," Handelsman said. "Most of what's out there is still unknown and will offer us a tremendous amount of information about how the world works."

Fungi are of particular interest to scientists studying biogeochemical cycles -- the big natural cycles through which organic (or carbon-containing) compounds are broken down and rebuilt, which keep the planet in biological and chemical equilibrium.

Although some fungi are visible -- bread mold, lichens and mushrooms among them -- most are microscopic. They sport delicate and tangled hairlike hyphae that exude digestive chemicals that allow them to penetrate and dissolve even the toughest components of plant cells, including cellulose and lignin.

Fungi can convert those compounds into stable molecules that effectively lock up carbon atoms in the soil for years, slowing their conversion into methane and carbon dioxide (CO₂) -- major contributors to global warming. But fungi also release carbon dioxide themselves, just as people do when they exhale.

It remains to be seen whether these newly discovered communities of fungi -- not to mention all the other kinds of microbes yet to be found -- will dampen or strengthen predictions about rising temperatures on Earth. But global warming models can no longer ignore fungi in snowy regions and seasons as they have, scientists said -- especially because about 40 percent of Earth's landmass is covered with snow for at least part of the year.

"We're living in a world where global warming is a constant threat, but in fact we have relatively little knowledge of what the inputs and outputs are for CO₂," said Steven Miller, a mycologist, or fungus specialist, at the University of Wyoming.

Although the ecological impact of these cold-hardy fungi remains uncertain, Miller said, their industrial potential is clear. Chemists are ever on the lookout for microbes that thrive in the cold, because these organisms are sure to harbor enzymes that

have evolved to work best at low temperatures. Researchers want to put these enzymes to work driving chemical reactions that normally require big inputs of heat or caustic chemicals.

Some envision using the microbes or their enzymes to make paper pulp from wood in ways that are cooler and less polluting than current techniques. Others hope to use them to clean up toxic waste in places too cold for standard biological detoxification processes to work.

To take fullest advantage of these strange life forms, though, scientists will have to figure out how to grow them, so they can study them in the flesh. That will require a special kind of experimentalist -- part scientist, part chef -- to come up with the customized recipes that will appeal to each of these specialized species.

Schmidt's team has taken a few stabs. It has placed bits of Rocky Mountain soil in lab dishes filled with nutrients and tasty tundra plant extracts, then incubated them in refrigerators, in the hope of hitting on a recipe that the fungi find palatable.

So far, no luck, Schmidt said, sounding a bit like a parent with a fussy child. So for now, at least, most of the world's microbial menagerie will continue to work in anonymity.

Volunteers gather seeds to be used in rehabilitation project

Andrea Domaskin (Staff Writer), Minot Daily News, 28 July 2003

WATFORD CITY, ND - Hidden among the sweet brome crested wheatgrass that so often dominates North Dakota's landscape lies a treasure for nature lovers. Grasses and flowers native to North Dakota, such as wild blue flax, little bluestem, yellow coneflowers, and needle-and-thread, might not be easy to spot, but for some people, the search for these treasures is worthwhile.

Early Saturday morning, about 20 nature-loving volunteers gathered at Little Missouri National Grassland 15 miles south of Watford City to learn more about these hidden treasures while they collected seeds from the plants.

The seed gathering event was a part of the Forest Service's Explorer Series, in which specialists take the public on tours, hikes and explorations of the Little Missouri, Grand River and Sheyenne National Grasslands.

Later this fall, the seeds the volunteers collected will be used in a rehabilitation project, said Cara Gildar, a botanist with Dakota Prairie Grasslands, who led the hike.

Gildar will clean and plant the native seeds to study how they grow and which species do the best, she said. Collecting these seeds is important, she said, because of a push to plant native seeds that come from local plants. Using seeds that are not only native to the area but that actually come from the area, promote genetic diversity, she said.

The excursion took place just north of the CCC campground on a high spot Gildar referred to as the "horse pasture." It was a goldmine for native seed gathering - in a 1/10 acre spot, Gildar had counted about 60 species of plants.

Armed with paper bags and a pre-seed gathering information session, as well as a hands-on plant identification quiz, the seed gatherers spent the morning gently taking the

mature seeds from the plants. As they gathered, they paused to ask questions and learn the name and properties of unfamiliar plants.

Most had a particular interest in wild seeds. Some want to plant native seeds in their yards. Others were science teachers, biology students, grasshopper researchers and amphibian experts.

About six came as a part of a Sierra Club excursion. Some said they enjoyed nature and learning about it more than a particular interest in wild seeds.

"They all share a common goal," said Leroy Schmitt, recreation technician, Dakota Prairie Grasslands. "They all have the desire to learn more about what's on the national grasslands."

Erin Hassler, a biology student at Valley City State University, said she could identify a few of the plants before the event, but that she learned a lot about in what particular areas the plants grow and what they look like in different stages.

"I found a lot of junegrass on the dry patches," she said.

She can't pick up that knowledge from wildflower and native grass guidebooks, she said, because they usually only show the flower, and not the leaves, which can be important clues to identifying some tricky flowers.

"I'm always dragging my kids to these places," said Hassler's mother, Jean Legge of Valley City. Legge, a high school science teacher at Litchville-Marion High School, she thought it was important to study not just the plants, but how they grow and where they grow.

"The kids need to come to these places," she said.

The Explorer Series is designed to give people the opportunity to have that kind of experience. Every month from April through September, U.S. Forest Service specialists lead sessions highlighting a variety of aspects of the national grasslands, from early-morning observations of mating rituals of grouse to mountain biking clinics.

Schmitt said the series provides interested folks with the opportunity to learn and ask questions on-site, but it also gives Dakota Prairie Grasslands staff with a chance to interact with the public.

Do Birds Feed on Mosses?

I thought I'd share with *LB* readers a summary of a discussion from earlier this summer on *Bryonet* regarding the question of whether birds eat moss capsules.

The original question - I recently spent a 4 days bryologising on Kapiti Island, a forest covered nature reserve off the coast of the North Island of New Zealand. Ornithologists working there have observed birds, specifically the kokako, or blue-wattled crow, which is an endangered species, feeding on capsules of moss. We have not yet confirmed the identity of the moss, but I think it is likely to be *Leptostomum macrocarpon* in the Bryaceae, otherwise known as "pin-cushion moss" - the pin heads being the large, conspicuous thecae, often produced in abundance. I can not recall any other records of birds feeding on mosses (though plenty use them for nest material). Does anyone know of any information - published or unpublished - on this subject? Also, can anyone help me get into the literature about the nutritive value of moss capsules, or have data of their own?

Answers -

About ten years ago Utah Fish and Wildlife Service recovered a tagged Canada goose (*Branta canadensis*) in central Utah, and found its gizzard full of moss. They sent the moss to Larry St. Clair, lichenologist at BYU; he forwarded it on to me. The moss was only slightly degraded, but still identifiable as *Homalothecium nevadensis*, which is fairly common in the central Rockies. As I recall, however, it was mostly vegetative material, certainly not selectively sporophytic.

I have a bird's nest from about 4000 ft. on Moloka`i here in Hawaii that is almost entirely made of the sporophytes (setae and capsules) of *Rhizogonium spiniforme* (which is now *Phyrobryum spiniforme*, I believe). Someone knowledgeable about Hawai`i's birds said that it was probably not from a native bird because it was too small, so it might be from a Japanese white-eye or something of that size.

I have no idea whether the birds eat the sporophytes, but they certainly could disperse the moss by carrying it around for nesting material.

Prior to this wonderful discussion, here are the things I had found on birds eating mosses: Richardson (1981) reported moss-feeding by mammals and birds in northern areas. Capsules of *Bryum* and *Polytrichum* are eaten by the Norwegian grouse chicks, apparently as the main food, whereas other kinds of capsules are eaten by Scottish red grouse (Lid & Meidell 1933). The Wyoming sage grouse eats small amounts of moss, snow buntings eat *Bryum pendulum* capsules, and the moorhen, blackbird, song thrush, and fieldfare all eat mosses (Richardson 1981). In Britain, the blue tits and marsh tits feed on capsules of *Dicranoweisia cirrata* (Betts 1955). Barnacle geese arrive in Spitzbergen, Scandinavia, after a long migration but before flowering plants are available (Gardarsson et al. 1972). Thus mosses are eaten heavily during prelaying and laying periods. The young goslings also consume the mosses, and sampling revealed that 27 out of 28 samples of adult and gosling droppings contained mosses. Snow geese and pink-footed geese consume mosses to a lesser extent than the barnacle geese.

Competition may force some geese to eat mosses. Madsen and Mortensen (1987) found that when pink-footed and barnacle geese live separately, their diets are comprised of sedges and grasses. However, where the species co-exist the amount of mosses in the diet increases, especially in barnacle geese. Mosses are suboptimal for both nutrients and fiber content compared to sedges and grasses.

Betts, M. M. 1955. The food of titmice in an oak woodland. *J. Animal Ecology* 24: 282-323.

Gardarsson, A., and Sigurdsson, J. B. 1972. Research on the pink-footed goose. unpubl report, Icelandic National Energy Authority, Reykjavik.

Lid, J., and Meidell, O. 1933. The food of Norwegian grouse chicks. *Nytt. Mag. Naturvidensk* 73: 75-114.

Madsen, J., and Mortensen, C. E. 1987. Habitat exploitation and interspecific competition of moulting geese in East Greenland. *Ibis* 129:25-44.

Richardson, D. H. S. 1981. *The biology of mosses*. xii + 220 Pp. Oxford.

Summary of unpublished data of kokako (blue-wattled crow) feeding on moss capsules in New Zealand from Ian Flux and Nic Gorman, Dept of Conservation (for Bryonet, with permission): Ornithologists records of diet of kokako on Kapiti Island include observations of these birds feeding on moss capsules (Nic Gorman pers. comm. April 2003). Of 912 total observations of kokako feeding, 26 were consumption of moss

capsules. In the 2001/2002 season, in which there was good fruiting of (vascular plant) species preferred by kokako, 3/217 feeding observations were of moss capsules. In the following season, in which there was poor fruiting of preferred species, and poorer breeding of kokako, a greater proportion of feeding observations were of moss capsules, namely 6/178.

Ian Flux (Dept. of Conservation) (pers. comm. April 2003) provides further data from Mapara in the central North island on kokako feeding on moss capsules. “It [moss capsules] is a food we see kokako taking from time to time. They forage along branches for them, snipping off the capsules with beak edge.” “Kokako do feed on invertebrates from bark and moss areas on branches, however this action (directed pecking) differs from the side-of-the-bill cutting action used when clipping of capsules/moss etc.” “The greatest use of bryophytes was during spring/summer (when capsules were present), but there was some feeding on bryophytes during winter months (=moss). March to November bryophytes =0.75% of feeding observations (n=150). November to March = 3% (n=298). However, obvious food such as large, bright-coloured fruits/insects are over-represented in this data due to the greater ease of recognition. Moss-capsule observations obviously require a very good view! (unknown vegetation records make up about 16% of observations)” “Kokako also use moss capsules in nest lining sometimes. They use lichens, mosses and liverworts, together with rotten wood and even some mud in a central layer of the nest.”

In response to my query as to the colour of the capsules taken Ian replies: “Many feeding observations are in silhouette, so colour is hard to determine. However birds appear very able to select what they need in the way of nutrition. I’d be very surprised if they spent time ingesting empty capsule walls”

Career Development - Ten Ways to Be Influential **Harv Forsgren – R3 Regional Forester**



1. **Decide to make a “big” difference** and invest in what’s important. A shotgun approach seldom yields significant results. Laser focus on one or two *significant* things.
2. **Be good leaders** and good managers.
3. **Link your agenda to the Agency’s or your unit’s priorities.** Connect-the-dots for decision makers and “piggy-back” on initiatives going in the right direction.
4. **If you need time with decision makers—ask for it!**
5. **Don’t be reluctant to ask for what you need** and articulate it clearly.
6. **It’s important to be concise.** Link your message to the values and priorities of the decision maker to provide context.
7. If you bring problems forward then you need to **bring alternative solutions forward** too.
8. **Don’t “triangulate.”** Decision makers expect differences of views, but all players should be at the table if you need to elevate an issue.
9. **Keep commitments and deliver results.**
10. **Share recognition** for accomplishments.

Greed for green
Quest for profit threatens once plentiful plants
Jim Casada, Knoxville News-Sentinel, 14 April 2003

Three plants long a part of Southern Appalachian folkways - ginseng, ramps and galax - are in danger of being loved to death.

The threats to these plants, all of which hold a special place in the hearts of those who call the highcountry home, revolve around overuse and overharvesting.

The roots of ginseng, commonly known as "sang," have long been gathered as a money crop.

Used in China for at least 5,000 years, ginseng has a rich history as a medicinal plant. It is used as an antidepressant, immune-system booster and aphrodisiac. Its true degree of effectiveness is debatable, but there has always been strong demand for the dried roots of the plant in East Asia.

"Sangin'" - the word given to the act of gathering the plant - can be quite lucrative. Old-timers sometimes call the plant "green gold." Dried wild ginseng, which is far more valuable than the cultivated plant, presently brings as much as \$350 a pound, and the rare root that is shaped like a human fetches even higher prices.

Problem is, ginseng takes three years of growth to produce seed and is not ready to harvest until at least five years of age. In days of yesteryear, most mountain folks practiced selective harvesting and returned the plant's bright red seeds to the soil each fall. Gradually though, greed replaced sensible sangin', poaching became commonplace and overharvesting ran rampant.

As a result, legal sangin' has been sharply curtailed or halted in national forests, and it has always been illegal in national parks. Even so, it will take years of vigilant protection and the healing hands of nature for ginseng to return to anything approaching its former abundance.

In some senses, the story of ramps sounds a similar note, although most of the money connected with this edible resident of high coves and remote hollows centers on festivals celebrating its unique culinary properties.

Consumption of these wild leeks gives an entirely new meaning to halitosis. Although it has a relatively mild taste, the aftereffect is such that when, years ago, anyone who came to school after eating a "bait" of ramps was sent home for three days. Its penetrating scent makes garlic seem like fragrant honeysuckle by comparison.

Mountain folks have always celebrated returning spring by dining on ramps - eating them raw, with hot bacon grease poured over the little bulbs, chopped and scrambled with eggs or in myriad other ways.

Ramps reputedly keep rattlesnakes at bay, lend themselves to longevity and serve as a blood-thinning spring tonic.

In the last decade or two, with the sort of gumption and sometimes-perverse sense of humor typical of highlanders, ramp festivals have become commonplace from North Georgia to West Virginia. Also, in a delicious bit of irony, the pungent vegetable traditionally enjoyed by simple mountain folks has become fashionable among gourmet chefs.

As a result, ramps are being harvested in such quantities that officials in the Great Smoky Mountains National Park have made them off-limits, and national forest officials

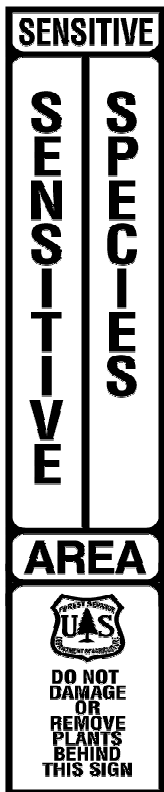
have expressed growing concern. The acres of ramps that once graced buckeye flats have largely vanished.

Then there's galax, which revered North Carolina scribe and folklorist John Parris once described as "one of the most stable markets in the whole wide world." In a story entitled "Always Money in Galaxin'," he explained how the lovely little plant of the hardwood forest understory in Georgia, North Carolina and Virginia brought "cash money" to a hardscrabble way of life. It even gave its name to a town in Southwest Virginia.

The plant's shiny, heart-shaped leaves, which turn lovely hues of maroon, magenta and deep rose in autumn, are used by florists to fashion wreaths and as table decorations or nosegays. In their spring and summer color of vivid green, they have also been used for funeral memorials and weddings.

Gallackers (those who gather galax) are a vanishing breed, and the reason is simple. The days when a hard-working person could gather a thousand pounds of leaves a week are gone, for the plant, though still fairly common, no longer exists in its formerly incredible abundance.

Already old-timers look back with nostalgia on the good old days when sang, ramps and galax were, as some put it, "common as pig tracks." Like many other aspects of the Appalachian way of life, the plants and their uses threaten to become a part of a world we have lost, victims of too many people and too little thought of their future.



New Marker for Sensitive Plants

You will soon be able to purchase this sanctioned marker from the good folks at Unicorn, (<http://fsweb.wo.fs.fed.us/eng/unicorn/cover.htm>). The sign will not show up on the Unicorn site for a couple months, but you can order copies directly by calling 805.735.6211

Suggested uses:

- ❖ Mark off Sensitive Species Locations within timber sale areas (or any places where there are ongoing activities).
- ❖ Additional signage at the entrance to RNAs or Special Interest Botanical Areas.
- ❖ To identify protected sites for operators of bulldozers and other fire-fighting equipment.
- ❖ As a temporary marker during special events.
- ❖ As a seasonal marker in special use areas (such as ski resorts).
- ❖ To identify your desk while you are bogged down in some interminable planning exercise.
- ❖ As a going-away present...

Use this sign carefully. You don't want to highlight desirable poachables for the less-than-ethical collector crowd!

National Botany Program Highlights

What's going on with botany in the Washington Office?

- ☀ More Planning Rule and now its associated directives too.
- ☀ I am spending a lot of time with the National Fish and Wildlife Foundation.
- ☀ The NRIS rare plants protocol is nearly a reality.
- ☀ Met with Dr. Kay Havens, Director of Conservation Science at the Chicago Botanic Garden to talk about conservation and research partnerships.
- ☀ Working on the very earliest stages of drafting a National Native Plant policy.
- ☀ Working on the Medicinal and Aromatic Plants Symposium.
- ☀ Working on new NatureWatch poster. It's at the printer!
- ☀ Working on Celebrating Wildflowers products for 2004.
- ☀ The Watershed, Fisheries, Wildlife, Air, and Rare Plants staff here in the WO welcomes new Assistant Director **Deanna Stouder** (formerly of PNW).

Federal Botany Jobs

Check for these and other jobs of interest to botanists at <http://usajobs.opm.gov/>.

Remember, botanists make excellent leaders!

As of 19 September 2003, there are 14 open Forest Service line officer positions

| | | | |
|--------------|---|---------------------------|-----------------|
| Sep 16, 2003 | BOTANIST | Bureau of Land Management | US-MT-Billings |
| | Who May Apply: Public Pay Plan: GS-0430-07/09/11 Appointment Term: Permanent Job Status: Full Time Closing Date: 10/16/2003 Salary: From 31,830.00 to 61,248.00 USD per year | | |
| Sep 16, 2003 | BOTANIST | Bureau of Land Management | US-MT-Billings |
| | Who May Apply: Status / Federal Civil Service Employees Pay Plan: GS-0430-07/09/11 Appointment Term: Permanent Job Status: Full Time Closing Date: 10/16/2003 Salary: From 31,830.00 to 61,248.00 USD per year | | |
| Sep 9, 2003 | Botanist | Bureau of Land Management | US-UT-Richfield |
| | Who May Apply: Status / Federal Civil Service Employees Pay Plan: GS-0430-11/12 Appointment Term: Permanent Job Status: Full Time Closing Date: 9/26/2003 Salary: From 47,110.00 to 73,403.00 USD per year | | |
| Sep 4, 2003 | Botanist | USDA, Forest Service | US-AK-Ketchikan |
| | Who May Apply: Status / Federal Civil Service Employees | | |

| | | | |
|--------------|---|-----------------------|--|
| | Pay Plan: GS-0430-09/09 Appointment Term: Seasonal Job Status: Full Time Closing Date: 10/2/2003 Salary: From 35,519.00 to 46,175.00 USD per year | | |
| Sep 4, 2003 | Botanist Who May Apply: Public Pay Plan: GS-0430-09/09 Appointment Term: Seasonal Job Status: Full Time Closing Date: 10/2/2003 Salary: From 35,519.00 to 46,175.00 USD per year | USDA, Forest Service | US-AK-Ketchikan |
| Aug 27, 2003 | BOTANIST Who May Apply: Public Pay Plan: GS-0430-09 Appointment Term: Permanent Job Status: Full Time Closing Date: 9/24/2003 Salary: From 38,936.00 to 50,617.00 USD per year | National Park Service | US-ND-THROUGHOUT NORTH DAK |
| Aug 27, 2003 | Botanist Who May Apply: Status / Federal Civil Service Employees Pay Plan: GS-0430-09/11 Appointment Term: Permanent Job Status: Full Time Closing Date: 9/24/2003 Salary: From 38,936.00 to 61,248.00 USD per year | National Park Service | US-ND-Theodore Roosevelt National Park |
| Apr 28, 2003 | BOTANIST Who May Apply: Public Pay Plan: GS-0430-09 Appointment Term: Temporary Job Status: Full Time Closing Date: 12/31/2003 Salary: 18.49 USD per hour | USDA, Forest Service | US-CA-Siskiyou County |
| Mar 26, 2003 | BOTANIST Who May Apply: Public Pay Plan: GS-0430-09 Appointment Term: Temporary Job Status: Full Time Closing Date: 12/31/2003 Salary: 18.49 USD per hour | USDA, Forest Service | US-CA-Humboldt County |
| Feb 24, 2003 | ID PLANNER Who May Apply: Status / Federal Civil Service | USDA, Forest Service | US-Site to be determined after selection is made |

| | | | |
|-------------|---|---|------------------------------|
| | Salary: 46,689.00 USD per year | | |
| Jan 1, 2003 | BOTANY Who May Apply: Status / Federal Civil Service Employees, Public Pay Plan: GS-0430-00/15 Appointment Term: Permanent Job Status: Full Time Closing Date: 9/30/2003 Salary: From 16,678.00 to 121,330.00 USD per year | Field Operating Office of Office of Secretary of the Army | US |
| Oct 1, 2002 | BOTANIST Who May Apply: Public Pay Plan: GS-0430-05/07 Appointment Term: Permanent Job Status: Full Time Closing Date: 9/30/2003 Salary: From 23,442.00 to 45,706.00 USD per year | Army Corps of Engineers | US-LA-New Orleans Metro area |
| Oct 1, 2002 | BOTANIST Who May Apply: Public Pay Plan: GS-0430-05/07 Appointment Term: Permanent Job Status: Full Time Closing Date: 9/30/2003 Salary: From 23,442.00 to 45,706.00 USD per year | Army Corps of Engineers | US-LA-New Orleans Metro area |

Banner Plant: *Proboscidea louisianica*

Each month, a different plant graces the banner of *Lingua Botanica*.

This month's image courtesy of Mike Haddock, Kansas State University

See his other images at: <http://www.lib.ksu.edu/wildflower/>

The text below appears on the reverse of the soon to be printed NatureWatch poster!

Devil's clay (*Proboscidea louisianica*), also known as Unicorn plant, or Ram's horn, is a very interesting and unusual plant that produces lovely flowers. It was originally native to the southwestern United States and northern Mexico, but has recently expanded its range throughout the Midwestern and Eastern U.S. This unique plant gets its common names from its strange seed pods that have two long, curved and hooked claws, or horns. These fruits can be as large as fifteen inches long. Mature Unicorn Plant fruits can attach themselves to the feet of large animals to spread their seeds over large areas. Unicorn Plants thrive in disturbed areas, such as the edges of farm fields and are very tolerant of dry conditions. It makes a handsome garden plant that typically grows to two feet tall, has large and somewhat sticky leaves, and looks rather like a squash or gourd plant. The immature fruits of the Unicorn Plant have been used to make pickles and can be eaten as a steamed vegetable. Its seeds, which are rich in oils and protein, are also sometimes eaten either raw or cooked and can be ground to make nutritious flour. Traditional

basket-makers use the mature pods of the Unicorn Plant to make a distinctive black dye. Hopi Indian tradition tells us that Unicorn Plants attract lightning and rain.

After-Image: Leave the Kids...

Image courtesy of Carson City, NV Recreation Division

Kids love the fall, just as much as grown-up botanists do. I hope you're sharing the wonders of the season with someone young (or feeling young while enjoying the season).



The opinions expressed in *Lingua Botanica* are not necessarily those of the USDA Forest Service or the editor. The USDA prohibits discrimination in all its programs and activities. Pass your copy of *Lingua Botanica* around to all your friends. Contributing submissions are always welcome.

There are no limits. There is no choice. Nothing but victory... Joe Frank

Lingua Botanica is archived at <http://www.fs.fed.us/biology/resources/pubs/plants/index.html>

The Forest Service National Botany Program is at <http://www.fs.fed.us/biology/plants/index.html>

To subscribe to the *Lingua Botanica*, just send an email to Wayne Owen at <wowen@fs.fed.us>.

