



Lingua Botanica

The National Newsletter for FS Botanists & Plant Ecologists



When we were very young, we were shamelessly proud to be singled out for praise. Whether it was a gold star on an important paper, a ribbon for horse riding, or hugs from your mom; the glow of a well-praised child is brilliant and unmistakable. I'm sure each of you has at least one precious memory of approval from your childhood. For me it was the time my father praised me for being patient when I was five or six. It wasn't a big deal, but it was nonetheless indelible. By the time you got to college, your grades come anonymously and you weren't praised for doing your best, but were judged against a 100 percent standard. Now praise seems random. Some people get awards just for coming to work and the people that are busting their hump for passion's-sake are either unnoticed or, worse yet, ignored. I think this sucks, but I'm here to tell you that it is within your grasp to make a change. It's my great pleasure to serve on several national award committees and I'm always surprised at the small number of nominations we see. I was helping to put together a briefing for the Chief on weed control success stories recently and our group actually had to stop and go looking for examples. We were recently updating a list of conservation agreements and strategies for rare plants. The more we dug the more we found, but I was astonished that we had to work so hard to find these documents. Sometimes we don't get a pat on the back because the people around you don't value the work we're doing. Sometimes we don't get praised because we don't do a very good job of telling others about the great things we are doing. Maybe you're busy, or you think no one cares, but maybe it's because you don't understand how important it is to share the pride you feel in your accomplishments and the successes of your colleagues. If you want to revisit that brilliant and unmistakable glow, involve others in your successes and share your joy. You are doing excellent work and getting important things done. **Make sure the world knows about it, and make praise happen.**

- the editor.

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Useful URLs

Celebrating Wildflowers!: Watch the Forest Service CW website for wildflower news and events throughout the wildflower season!

<http://www.fs.fed.us/outdoors/naturewatch/wildflowers/flower.html>

<http://www.nps.gov/plants/cw/events.htm>.

NPCC Makes a Difference: Hit this link to see what some of our conservation partners are saying about land management policy issues.

<http://cnps.org/NPCC/MakeADifference.htm>

Federal Regulation: Your one-stop site to comment on federal regulations

<http://www.regulations.gov/>

Government Science: Visit the gateway to authoritative selected science information provided by U.S. Government agencies, including research and development results.

<http://www.science.gov/>

The Bee Conservation Course: A ten-day course on native bee biology and conservation is being held 19-29 August in Portal, Arizona. A rare opportunity...

<http://research.amnh.org/invertzoo/beecourse/>

Ways to Use Geospatial Imagery at the District Level: Need some GIS training? You can get it online! Visit the link below, click on the FS Online Tutorials button and feed your head.

<http://fsweb.geotraining.fs.fed.us/>

Fun with (ex)Pollinators: Irreverent fun from Click and Clack! Its five minutes of educational entertainment that you'll be sure to share with all your friends. Thanks to Don Crank (Arkansas Native Plant Society) for sending this.

<http://cartalk.cars.com/About/Gunk/>

The Plant Press: Read current and back issues of the Smithsonian Department of Systematic Biology and the U.S. National Herbarium.

<http://www.nmnh.si.edu/botany/plantpress/plantpress.html>

Theo: Theo is the premier herbarium label maker database. It was developed by the New York Natural Heritage Program and is available for free download.

<http://www.nyflora.org/theo/theo.htm>

Botanical Illustration Bibliography: Art for art's sake...

<http://www.library.wvu.edu/ref/subjguides/BOTILL.htm#Past%20and%20Modern>

The Race for DNA: Utilizing over 800 scanned documents, photographs, audio clips and video excerpts, this website details the pursuit of the structure of DNA.

<http://osulibrary.orst.edu/specialcollections/coll/pauling/dna/>

The BIG BIG Botany Story Issue

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

Kimberly Pierson – Sawtooth National Forest - 2003 Karl Urban Celebrating Wildflowers Award Winner

Text abbreviated from the original nomination letter for Kim from her Regional Office

Kim is an outstanding and creative botanist. She oversees a strong and well-integrated botany program for her forest. Her responsibilities include plant conservation programs, RNA monitoring, fire restoration projects, and volunteer programs. During the past years she has also served as the planning botanist for the Southwest Idaho EIS, developing Management Direction for Botanical Resources affecting three National Forest Plans currently under revision.



Despite commitment to the EIS and Forest Plan Revisions Kim has managed to develop a [website](#) for the Sawtooth Forest Botany Program that provides botanical information for the general public, schoolchildren, Forest Service employees, our partners and other agencies.

One of Kim's outstanding accomplishments in 2002 was the planning of a very successful Flower Fair. Over 300 children attended this event that was jointly sponsored by the FS, BLM, local businesses, nurseries, and schools. The children learned how to identify wildflowers and weeds, how to protect rare plant species, about pollination, where fruits and vegetables come from, how to fire-proof around your home with native plants, how to identify poisonous plants and avoid them, and why plants are important to fish, wildlife, and humans

Kim's dedication, enthusiasm, motivation, and accomplishments truly reflect the remarkable spirit of Karl Urban and make her our nominee as the outstanding candidate for this award.

A Taste of Wildflower Celebrations in 2003

National Celebrating Wildflowers Week is May 18-14 2003. There will be literally hundreds of large and small celebrations around the country throughout the spring and summer. Go to your local festivals and take your kids, your nephews and nieces, your parents and grandparents. If you are planning an event – good for you! You can let the entire nation know about it via the Plant Conservation Alliance’s Celebrating Wildflowers page <http://www.nps.gov/plants/cw/events.htm>. Below is a short sampling of events around the country.

Petit Jean State Park – In the Arkansas River Valley, 5-6 April 2003
<http://www.arvtripeaks.com/calendar>

Tohono Chul Wildflower Festival – 6 April in Tucson for Sonoran Desert beauty.
<http://www.tohonochulpark.org/>

Pacific Grove Wildflower Festival – It’s their 42nd annual celebration and it happens 18-20 April 2003
http://www.pacificgrove.org/calendar_of_events.htm

Glide Wildflower Show – It’s the 37th Annual celebration and its 26-27 April 2003
<http://www.wmni.net/magyan/GWS.htm>

Wheaton, Maryland Wildflower Celebration – 26 April 2003 in the DC area.
<http://calendar.gardenweb.com/display/200304261000026302.html?w=Wild-Flowers>

Boise Foothills Wildflower Walks – 1 and 15 May at 6:30 p.m. at the old Penitentiary.

London Arkansas – Poke Sallet Festival on the first weekend in May 2003
<http://www.arvtripeaks.com/calendar>

California Native Plant Society – Milo Baker Chapter Spring Wildflower Festival - Its in Sonoma Count, California all day on May 10th 2003.
<http://www.sustainablesonoma.org/calendar/eventdetails.php?eventId=178>

Mother’s Day Wildflower Celebration – In Leavenworth, Washington on 11 May!
<http://www.leavenworthspringbirdfest.com/>

Asheville North Carolina – Several events throughout May 2003
<http://www.exploreasheville.com/calendar5.htm>

Crested Butte Wildflower Festival – 7-13 July 2003
<http://www.crestedbuttwildflowerfestival.com/>



GCA Casey Trees Endowment Fund Names New Executive Director

Garden Club of American, 5 February 2003

Washington, D.C. -- The Garden Club of America (GCA) Casey Trees Endowment Fund has named **Jim Lyons** as its new Executive Director. Lyons currently teaches environmental leadership and natural resources policy at the Yale School of Forestry and Environmental Studies in New Haven, Connecticut. Prior to joining the Yale faculty, he was U.S. Department of Agriculture (USDA) Under Secretary for Natural Resources and Environment for eight years.

At USDA, Lyons led major reforms in the policies and programs of both the Forest Service and the Natural Resources Conservation Service. He is a strong advocate for urban forests and open space and created the Urban Resources Partnership (URP) to encourage conservation and natural resource restoration in cities across the nation. URP was recognized by the Ford Foundation/Kennedy School *Innovations in Government* program and was awarded the New York Environmental Action Coalition's Green Star Award. In 1997, Lyons was recognized for his national leadership in urban forestry by American Forests which awarded him its Global Relief Award for Public Service in Support of Urban Forestry.

"We are very pleased to welcome Jim to GCA Casey Trees to serve as our Executive Director. Jim has a wealth of experience in urban forestry and has distinguished himself as a national leader in the forestry community and in the urban conservation movement. We look forward to building upon the foundation that GCA Casey Trees has established through our street tree inventory to expand our efforts to regreen our Nation's capital," said Barbara Shea, President of the GCA Casey Trees Endowment Fund.

The GCA Casey Trees Endowment Fund was established in 2001 to restore the tree canopy of Washington, DC. The Fund was the inspiration of Washington, D.C. philanthropist Mrs. Eugene B. Casey who gave \$50 million to the Garden Club of America for the creation of a permanent endowment to address the alarming rate of decline in tree cover in the Nation's capital. As reported in the Washington Post in November 1999, Washington, D.C. lost over 64 percent of its forest canopy between 1973 and 1997.

Last August, GCA Casey Trees completed an unprecedented citizen-based inventory of all street trees in Washington, D.C. Over 500 people including DC high school students, partner organizations, and local volunteers participated in the inventory. In addition, GCA Casey Trees has initiated efforts to train volunteers to assist in planting, pruning and protecting the District's trees through the establishment of a Citizen Forester Program.

In accepting the Executive Director position, Lyons said, "I am excited about the opportunity to return to Washington, D.C. to work with the District government, our partners, and the citizens of this great city to help protect and restore the city's tree canopy. Like many major metropolitan areas, the green infrastructure of the Nation's capital has declined substantially. As a result of the commitment made by Mayor Williams to regreen the city and the generous gift of Mrs. Eugene B. Casey, we can reverse this loss of trees and restore our parks, waterfronts, and street trees. I appreciate

the opportunity to lead the GCA Casey Trees Endowment Fund and look forward to working to make the Nation's capital the "City of Trees" once again."

Although Lyons will begin his tenure as Executive Director of GCA Casey Trees in February, he will remain a member of the faculty of the Yale School of Forestry and Environmental Studies through June, 2003.

California Cultures Nuts and Honey

Louis Freedburg, San Francisco Chronicle, 17 February 2003

Chowchilla -- Lyle Johnson, beekeeper, and Russell Harris, almond farmer, are dependent on each other for their livelihoods. Harris needs Johnson's bees to pollinate the pinkish white blossoms that are about to bloom in his thousands of acres of almond orchards.

The men also represent the two faces of California's imbalanced trade relationship with China. Harris, 39, is one of the few California farmers to actually benefit from trade with China. California accounts for 81 percent of the world's almond production, and exports to China have zoomed from 5.6 million pounds in 1996 to nearly 25 million pounds over the past year. At one time, Harris' crop accounted for nearly 20 percent of all almonds imported into China.

By contrast, Johnson, 46, has been fighting to resist the Chinese trade juggernaut. For years, China "dumped" honey into the U.S. market. Dumping is the legal term for selling imported products at below their cost of production.

That practice helped depress the price of U.S. honey to the point that the entire domestic honey industry was threatened.

The American Honey Producers Association, of which Johnson is president, then filed a complaint with the U.S. International Trade Commission. In response, the United States imposed tariffs against Chinese honey producers ranging from 34 percent to 184 percent of the market price. Since then, the domestic price of honey has rebounded, from 55 cents a pound two years ago to about \$1.50 today.

It was an expensive fight. The beekeepers had to spend more than a \$1 million in legal and other fees. Johnson expects they'll have to spend \$800,000 a year indefinitely to keep Chinese producers at bay. "We've beaten them back, but they'll find a way back in," he said.

The U.S. Customs Service has already uncovered numerous shiploads of Chinese honey that have been illegally routed through other countries, including Thailand, Australia and Malaysia.

They may be on opposite sides of trade wars with China, but they're forced to work together in the bee business. Harris pays Johnson to truck in thousands of hives to pollinate his trees. There aren't nearly enough bees in California to pollinate the half million acres of almond orchards stretching from Bakersfield to Chico. In a massive migration beginning in October, more than 800,000 hives have been trucked in on semi-trailers from all across the United States, so that half of all commercial beehives in the United States are ensconced in California orchards for the next month.

This week the bees and the almonds appeared to be in perfect equilibrium. Johnson's bees were buzzing around their hives in Harris' orchards, waiting for the sun to emerge before flying into action.

Behind the tranquil scene is a larger -- but one-sided -- battle. Last year, the United States imported \$103 billion in goods from China, and only exported \$18 billion in goods there. Agricultural exports to China actually declined by 1 percent, while ag imports from China grew by 11 percent.

The equation is simple: Fewer bees equals fewer almonds. If Harris and other almond farmers want to maintain their world dominance of the almond trade, they'll need Johnson to prevail in his fight against Chinese honey. But with 800 million of China's 1.2 billion population living on farms, Johnson and his bees can hardly count on being permanently protected from unfair Chinese competition.

5th Annual Southeast Exotic Pest Plant Symposium



On May 15-17, 2003, the Kentucky Exotic Pest Plant Council will host the 5th annual meeting of the Southeast Exotic Pest Plant Council. The meeting will be held at the Campbell House Inn in Lexington, Kentucky. In addition to seeing old acquaintances, rub shoulders and compare notes with land managers and weed warriors from states outside of the SE region as we reach beyond our borders to invite our neighbors to attend. Presentations on weeds known to the southeast as well as new ones poised to invade will be featured on May 15th and 16th. Topics include: research on *Microstegium* and Chinese yam; predicting invasion in forests; converting exotic grasses to native warm season grasses; controlling mile-a-minute weed, Japanese knotweed, and other problem species. Get updates on herbicide products from company representatives. Learn how the St. Louis Declaration is being implemented and received. Copies of the US Forest Service's new guidebook on exotics will be available. Hear some great bluegrass/folk music and bid on silent auction items at the social on the evening of May 15th. A workshop for private landowners on controlling exotic plants will be held in the morning on May 17th. Field trips highlighting the diversity of Kentucky's Inner Bluegrass Region are also planned for May 17th. Learn more about the efforts land managers are making to control the spread of invasive exotics at two local sites: McConnell Springs in Lexington and Floracliff State Nature Preserve in Fayette County. For a longer trip, view the ancient Kentucky River Palisades at Tom Dorman State Nature Preserve in Garrard County or visit Harrison County at a recently acquired bluegrass savanna woodland, a globally imperiled natural community that will require a tremendous amount of invasive species management.

For registration materials and further information, contact Augusta at kmazyck@tnc.org (please put "Registration" in the subject line) or phone (859) 259-9655 ext. 52.

Knapweed may hold key to creating effective, natural herbicide

Katherine Vogt, Associated Press, 4 March 2003

DENVER — An invasive weed that has taken over vast swaths of grazing land in the West may hold the key to creating an effective, natural herbicide.

A Colorado State University study found that a chemical compound secreted from the roots of spotted knapweed is toxic to surrounding plants and has potential to wipe out other unwanted weeds.

"This is a herbicide that is as potent as a commercial chemical but it comes from a natural plant," said study author Jorge Vivanco, an assistant professor of horticulture biotechnology at CSU. "It's considered an environmentally friendly herbicide."

Vivanco's research — and a separate study at the University of Colorado in which bugs stopped the spread of diffuse knapweed — are among the latest efforts to find natural ways of controlling invasive plants that have bedeviled farmers and ranchers for centuries.

Eric Lane, who carries the unlikely title of "state weed coordinator," says there is a growing emphasis on nonchemical ways to fend off weeds. He called the knapweed study exciting because it would encourage others to try similar efforts.

At least three knapweed species are found in Colorado, and forms of the invasive weed have taken over millions of acres in the West. The plant is capable of wiping out all other surrounding plants, effectively ruining grazing lands.

Because they are not native to Colorado, they have few predators. Originally from eastern Europe and western Asia, the most common knapweed species in the West are believed to have arrived in the late 1800s in contaminated crop seed or possibly discarded soil from ships. Common forms feature tiny white or purple flowers on spindly, leafed green stalks.

Two years ago, Vivanco read about a knapweed species that invades and colonizes by secreting a toxic compound into the soil through its roots. His team tried to become the first to isolate the chemical from spotted knapweed — a feat complicated by the complex jumble of contaminants, microbes, and chemicals found in soil. The team grew spotted knapweed plants in flasks in the lab. The roots were submerged in a water-based solution while the plant floated on top. The plants secreted the toxic chemical compound into the liquid, making it easier for the researchers to isolate each compound in it.

They found nearly 30 compounds, including two forms of catechin. One type had antibacterial properties, and the other had a toxic effect on other plants. The researchers found that spraying toxic catechin on plants or adding it to soil was as effective against some weeds as common synthetic herbicides, typically killing the plants within a week.

Vivanco said no one previously knew about catechin's toxic effect on plants. His findings were published last year in the journal *Plant Physiology*. Because there is no evidence that catechin is toxic to humans or animals, Vivanco hopes it will eventually be fast-tracked for approval by the Environmental Protection Agency.

CSU has licensed the catechin technology patent to a company, and Vivanco hopes to see it on the market in two or three years.

Ragan Callaway, an associate professor of biology at the University of Montana and a plant ecologist who specializes in invasive weeds, said Vivanco's research is

exciting but should be carefully studied. "Just because it's produced organically doesn't mean it won't kill you. On the other hand, I think that because Jorge is trying to use natural processes to control how plants interact with each other is fantastic," Callaway said.

Vivanco said the discovery has several potential applications as a herbicide. In reduced concentrations the chemical only kills select plants while sparing others. That could allow farmers to protect a crop while killing a weed. Or it could be used as a preventive agent by mixing it with soil before weeds emerge.

Exotic Worms Killing Off North American Plants

John Pickrell, National Geographic News, 2 January 2003



While most earthworms are credited for their beneficial effects on soil, recent research suggests that several invasive European earthworm species could be causing a decline in some North American plants.

A new study suggests that one European invader may be responsible for extirpating close to 30 percent of a highly endangered and unusual goblin fern growing in Minnesota's Chippewa National Forest.

"There is growing concern about invasions of exotic earthworms, especially in [formerly] glaciated regions of North America, where there are few, if any, native species," said Peter M. Groffman of the Institute of Ecosystem Studies in Millbrook, New York.

Few native earthworms exist in the northern-most reaches of the continental United States. Most species were forced south in the last major glaciation, which ended 10,000 years ago.

While American earthworm species have been slow to recolonize the northern-most reaches of the U.S., European earthworm species, first introduced by colonial settlers, have made themselves at home in the country's northern climes for several centuries.

European worms likely arrived in the mud-packed root-balls of transported plants or the discarded soil used as ballast in ships, said forest ecologist and study author, Michael Gundale, formerly of Michigan Technical University in Houghton. Gundale said invasive earthworm species continue to arrive in the U.S. as fishing bait or as part of composting kits used by gardeners.

Tiny and Unusual

Gundale first became interested in how earthworms might affect rare plants when he was working as a botany technician in Minnesota's Chippewa National Forest.

One of the plants he studied was the rare goblin fern (*Botrychium mormo*), which is found only in the surrounding Great Lakes region. These tiny and unusual plants spend the majority of their lives submerged in the forest floor, sending a few stunted leaves up

briefly during the summer months. Goblin ferns are thought to gain most of their energy from fungi growing underground, instead of from sunlight.

Gundale began to wonder if the invasive earthworms might be a factor in the fern's decline when he noticed that otherwise suitable areas lacking the fern seemed to have thinner forest floors of decomposing plant litter at the surface of the soil. Other scientists working nearby, had determined that earthworms could reduce the thickness of this layer.

In order to test whether or not worms might be linked to fern declines, Gundale—now at the school of forestry at the University of Montana in Missoula—examined 28 woodland spots where the fern had previously been located. He surveyed each site for earthworms and ferns and measured the thickness of the forest floor.

Astounded

To his surprise, Gundale said he found that the fern had disappeared from 9 of the 28 sites he studied. Those sites that lacked ferns also harbored large populations of the European earthworm *Lumbricus rubellus*. They also had a surface layer of just 1.5 inches (3.8 centimeters), as opposed to the three-inch-thick (7.6-centimeter-thick) layer common at worm-free sites. A thick fungi-rich forest floor is probably a requirement for the goblin fern.

"I was somewhat astounded at how consistently *L. rubellus* had shown up at the extirpated locations," said Gundale.

In order to back up this finding, Gundale completed laboratory experiments with *L. rubellus*, which proved that the worm was able to decimate the forest floor thickness of experimental containers by 50 percent in just 60 days.

Gundale said his study is the first "to show that exotic earthworms are harmful to rare native vegetation." His findings were reported in the December 2002 issue of the journal *Conservation Biology*.

Plants such as ferns "are rooted in the forest floor, [therefore] if the forest floor is disturbed or destroyed, it makes sense that some of the plants would decline," said Groffman, of the Institute of Ecosystem Studies. Declines in other plants, such as the northeastern trout lily (*Erythronium*), have also been anecdotally linked with exotic earthworm invasions, he said.

Earthworms cause basic changes in the structure, biology, and chemistry of soil, said Patrick J. Bohlen, a soil biologist at the MacArthur Agro-Ecology Research Center in Lake Placid, Florida. "Whether that is beneficial or not, depends on the location," he said.

Some exotic earthworms, such as *L. rubellus*, are examples of species that take advantage of human disturbance of the environment, said Paul F. Hendrix of the University of Georgia's Department of Crop and Soils Sciences, in Athens.

Like many of the world's most widespread species—such as pigeons, rats and cockroaches—these worms thrive under human dominated conditions, and are found wherever European settlers spread, he noted.

For some reason, European earthworms seem more adaptable to a wide range of environmental conditions, than native North American species—which are less cold and dehydration resistant, Gundale said. This may account for their relative success at colonizing northern regions, he said.

Return of the Pumice Grapefern

Patricia Joslin, Botanist, Bend-Fort Rock Ranger District, Deschutes National Forest

Almost fifty years to the day after an enthusiastic student extirpated the rare pumice grape-fern (*Botrychium pumicola*) from the top of 7,775-foot Tumalo Mountain in the Central Oregon Cascades, the diminutive Ophioglossaceae relative of the ferns has returned to that windswept site.



That student, one Roy L. Rogers, wrote of his September 1951 search for this plant through its then-known range from Crater Lake northward to the rim of the Newberry Caldera. Attracted by the summits of the Cascades and hoping to extend the plant's known range, he wandered northwest to check out "the first locality of promise" that proved to be "the rounded top of Tumalo Mountain on which perches a Forest Service fire-lookout..." as he put it in a 1951 issue of *Nature Notes*. Although he thought the search "futile" and success "improbable," all of a sudden: "There it was: a single specimen growing scarcely an inch above the ground 80 feet due north of the lookout..." And, after "piercing search and dogged persistence," he found another plant "scarcely twenty feet away from the first specimen." Rogers promptly collected both specimens and disappeared from the mountain. Pumice grape-fern disappeared from the mountain, too, and ever since Roger's act has served as an example of how not to collect plant specimens.

Then, on August 31, 2001, as Forest Service ecologist Charmane Levack and I surveyed a proposed trail re-route, I was thrilled to find six pumice grape-ferns atop Tumalo Mountain. The little plant had returned after an apparent fifty-year absence! Most specimens were very small, but some did have fertile fronds and were producing spores. During an August 2002 revisit, I located five specimens. Since the pumice grape-fern does not always appear every year, the lower number of plants didn't concern me.



The question, of course, is how they got back to this site. The answer could be that spores from the original population had remained viable for fifty years. A more likely answer, however, might be found in the geography of the area. The summit of Mt. Bachelor, which also supports a pumice grape-fern population, is about two miles southwest of the top of Tumalo Mountain, and the prevailing southwesterly winds could have blown spores from that population to give birth to the new Tumalo Mountain population.

Just exactly how nature restored Tumalo Mountain's pumice grape-fern population after half a century may never be known for sure. However it happened, the restoration certainly made two Forest Service women extremely happy.

Green-tinged Paintbrush and Fires

Robert L. Wooley, Botanist/Ecologist, Fremont National Forest 1989-2002

For over a decade I was the overseer of the world's core population of a little known paintbrush that exists on a vacant piece of real estate on the top of Winter Rim, a basalt ridge above a Great Basin playa known as Summer Lake in South Central Oregon. Lt. John C. Fremont named Winter Rim and Summer Lake when his exploration party crossed the area in 1843. When the party reached the top of the rim from the west at about 7000 feet it was covered with deep snow but, looking from the formation known today as Fremont Point, a green valley with a lake below beckoned suggesting to the explorers the names for the formation.



I was interested in the area because it was the home of the largest known population of Green-tinged paintbrush *Castilleja chlorotica* Piper where an estimated 500,000 clumps occur on approximately a ten square mile area on top of Winter Rim. The open ponderosa pine forest is dominated in the understory openings by mountain big sagebrush *Artemisia tridentata vaseyana*, the hemiparasitic host of the paintbrush. Studies indicated that the paintbrush has a parasitic relationship with big sagebrush and several other shrubs. It has also been demonstrated that mountain big sagebrush is susceptible to killing by fire and when the host shrub is killed the paintbrush succumbs with it. The area has been grazed historically by sheep and cattle and because of the late snowmelt and early arrival of winter fires were infrequent. Preliminary studies indicate a fire frequency in the area is in the 120 to 200 year range. The combination of long fire intervals and continued grazing by cattle seems to have promoted a mature mountain big sagebrush community with the majority of the shrubs being greater than 40 years old. This seems to have suited the green-tinged paintbrush and produced the largest population of the species that, so far, is limited to four Oregon Counties with only one other large population of about 20,000 clumps and about 10 smaller disjunct populations of 1000-2000 clumps.

When I said I was the overseer of this population I suppose that has more to do with ego and professional hubris that sometimes pervades even the realm of humble field botanists like myself who think we are in charge of something. I work for the U.S. Forest Service and assisted with authoring the conservation strategy for this local endemic and for the most part conducted the annual monitoring required by this strategy. I had several occasions to battle with folks who wanted to prescribe burn the area, and performed a long somewhat arduous study of cattle and found that they didn't like to eat this viscid plant and for the most part would not even step on it deliberately. In fact I believe the cows may have helped maintain the brush as the dominant plant life and suppressed competitive grasses to boot thus also favoring the paintbrush. I designed a number of studies to keep track of what the paintbrush population was doing, wrestled with sampling design, statistics, and on more than one occasion while performing field surveys gave pints of blood to the hordes of vampires (mosquitoes) that also do very well in the dry forests of the Great Basin.

What I was trying to say was I put a lot of blood, sweat, and toil, into the conservation of this plant over more than a decade. I also am a compulsive journal keeper and what follows are some scribblings from my field notebook that most likely have more to do with how botanists work than the ecology of plants but it may also say something about how nature works.

July 12, 2002: The mercury rose to 105 degrees F the last three days. Drove the 2916 road where the heat and pumice dust made for a deplorable workplace. Checked Wickiup Springs enclosure. The cows, the elk, and all of nature teamed up to take down the entire fence that was put up at great expense three years ago. Found a dalmation toadflax plant along the 27 road, first time for sighting that weed on the district, did not destroy it as I want to use it for a weed identification course to be taught next week about 2000 hours a dry thunderstorm moved into the area. I sat on the back porch of my house in Silver Lake watching the flashing sky fire strike the forested mountains. By 2100 hours 9 fires were reported by the Hagar and Bald Mountain lookouts. I suspect the blazes of summer may commence this evening.

July 13, 2002: The blazes commenced in earnest today. Three escaped initial attack one near Toolbox Spring, one on the face of Winter Rim, one up Silver Creek. I was sent to evacuate the campground at Silver Creek Marsh. Did not have too much trouble as a smart column of smoke not over half a mile away cast an eerie light over the place. I watched the Silver fire advance with spotting of a quarter mile at a time in the dry white fir. I looked to the east where I could see the summit of Hagar Mountain site of one of the green-tinged paintbrush populations. A column of smoke rose violently to the south. A slight worry nudged me. Don't get upset, Bob. The tankers will be on the fires soon and they are a long way from my fire sensitive plants.

July 14, 2002: The fires spread rapidly. A Type-Two team was called in to manage the fires.

July 15, 2002: The type two team arrived but resources are scarce. No tankers are available as suddenly the State of Oregon enters conflagration conditions. The Winter fire advances along the eastern face of Winter rim. The Toolbox fire runs over Foster Butte heading east, right towards the core green-tinged paintbrush. Not to worry, Bonneville Power high-tension lines that serve California are in its path forming a wide firebreak. Air support will be here soon as the country that runs on electrical power will defend the power lines. In the evening I volunteer to take a 5-gallon jerry can of gas to the lookout on Hagar Mountain. The gas runs a small generator that operates the radio. There are plenty of others who could do this but I need to have a look at my paintbrush on the Hagar summit and see what the threat is to the Winter Rim core population. It is about 12 miles to the summit from where I begin. I don nomex and mount my trusty half-ton S-10 and make way in the waning light. At the summit it is quiet, immensely peaceful. The fires are laying down for the night but the widespread glow of the Toolbox fire to the east is larger than I imagined. It is heading straight for the core paintbrush habitat. The Silver fire has hooked to the southward. A good run and it will climb Hagar and threaten the small paintbrush community on the summit, the one I have installed an interpretive sign along a recreation trail that cost substantial money and effort. I go to several clumps of the paintbrush that are in full bloom, albeit stunted this year from the intense drought. Alone with the plants I wish them well but I do not believe I shall see them again. That fire to the west wants to climb Hagar. I climb to

the lookout deliver the gas, and visit the lookout. The experienced lookout believes he will be evacuated soon.

July 16, 2002: Toolbox fire explodes sending great smoke columns capped with cumulus clouds into the blue sky. The Winter fire makes major runs on the face of Winter rim. The two fires want to join. Columns of smoke rise as far as the eye can see along the rim. I field triangulate a couple of columns. It is clear the core paintbrush population is gone. I feel dejected. I send a message to the botanist on the Deschutes National Forest saying they may now have the world's largest population of green-tinged paintbrush and should consider it accordingly.

July 17, 2002: The fires run towards Indian Mountain site of major electronics installations for the area. Tankers are released from other fires and saturate the summit trying to prevent loss of the communications facilities.

July 18, 2002: I continue work with the type two team structural protection unit that I was assigned to several days ago. People are scared and worried about their property and homes. I have this urge to go see the paintbrush, just to make sure the fire burned the community, to know for sure the fate of my plants. In the evening I show a structural team the way to a historic cabin that is threatened. The team rakes great piles of needles from the surrounding yard and roof while the fire about a quarter mile away lies down for the night.

July 19, 2002: The Toolbox fire is estimated at 38,000 acres, the Silver at 21,000 acres, the Winter is still running in the crowns of the old growth ponderosa pines on the face of Winter Rim. In the afternoon there is a call by law enforcement to place road closure signs on the south entrance to the road running along winter rim. I along with our wildlife biologist, Amy Markus, volunteer. I really want to see the paintbrush, to know their fate. We take the signs and after placing them drive south past where we closed the road towards the core population and the smoke columns. I get to the Fremont Point road and to my great astonishment the sagebrush is still there. I proceed to Fremont Point where everything is toast, burned toast. But this area is outside the mountain big sagebrush community and the green-tinged paintbrush. I peer over the rim. The fire has killed all of the large ponderosa pines many 500 to 600 year old veterans. The only stand of Douglas firs, a disjunct population of about thirty acres in this part of the country, is gone. Oddly the Fremont Point solar powered outhouse still stands amid the blackened forest with toilet paper rolls still ready for use despite the fact that a fire-storm had rolled over this part of the rim. I note the blackened soil showing no signs of plant life but I know the place is inhabited by large stands of Carey balsamroot. I predict next spring they will emerge from their taproots and splatter the black soil with yellow in profusion. I still don't know how far the un-killed sagebrush extends. I find some healthy clumps of paintbrush, but the fire is still burning all around this area. Some wind and it will re-burn through here. I want to explore further but it is too dangerous to explore the whole area. . I go back the way I came in.

For the rest of July and into late August the Toolbox and Winter fires continued to burn. A Type-One team took over management of the fire and the area I was interested in was sealed from entry. I watched several columns rise from the vicinity knowing that the fire had returned to cleanup the work left undone by the initial runs. I did not expect to see the paintbrush again. By late August the fires had burned over 108,000 acres and

along with others such as the 500,000 acre Biscuit fire in the Siskiyou Mountains constituted the largest fires in Oregon in recent history.

August 27, 2002: The fires have largely run their course. Most of the fuel was so dry it just burned up and went out. Finally it was safe to enter the fire perimeter and examine the damage done to the core population of green-tinged paintbrush. I along with two of my colleagues went to a place we could view the formation on Winter Rim known as the punchbowl. Everywhere the forest was black with tangled down pines attesting to the violence of the firestorms that raged here. A smart wind blew ash and red cinder dust into our faces. For a moment we were speechless at the awesome expanse of burned rocks before us. Perhaps our silence was a tribute to the thousands of plant deaths that occurred here a few weeks ago. We left the rim and went to the core population area expecting to see more charred earth. To my great surprise from the northern limit of the core population to the southern boundary the entire mountain big sagebrush with its green-tinged paintbrush community was unburned. It was like the fire burned almost a circle around it leaving the 10,000 acres as a doughnut hole of occupied unburned habitat. Further examination revealed that of the ten thousand acres of core habitat about 1600 acres did burn in a mosaic of about 40% burned and 60% unburned. The green-tinged paintbrush core population was spared.

I don't know if the fires missed the core population of green-tinged paintbrush by sheer chance or whether there is some other reason. Perhaps the paintbrush lives here in abundance because fires do not burn here, even during periods such as 2002 when intense drought and high temperatures along with fuel loadings in these man created forest tinder boxes burn with intensities outside the historic patterns. I do know the green-tinged paintbrush have provided this botanist a professional challenge to see to it that man is not the cause of their demise. This year nature seems to agree that for now the green-tinged paintbrush should continue to make the top of Winter rim a special place for a rare plant as well.

State Scientists Propagate Rare Venturan *Astragalus*

Raul Hernandez, Inside Ventura County, February 24, 2003

Researchers are trying to find ways to help the rare Ventura marsh milk vetch plant -- once thought to be extinct -- thrive in the wild as it struggles to survive on state lands in Ventura and Santa Barbara counties (*Astragalus pycnostachyus* var. *lanosissimus*).

"They are hanging on, but they don't produce many flowers and very much seed," said Mary Meyer, plant ecologist with the State Department of Fish and Game.

She said the goal is to produce self-sustaining plants that yield good seed and seedlings.

"We are nowhere near knowing whether that is going to be possible," said Meyer.

"It's not a good idea to disclose their location because they are very vulnerable. So, we want to protect them as much as we can."

Milk vetch plants growing at the University of California in Santa Barbara's Coal Oil Point Reserve seem to be doing well.

Cristine Sandoval, director of Coal Oil Point Reserve, said the university has 185 milk vetch plants growing from a batch of 30 plants that were transported there from the Sunburst Plant Disease Clinic in Turlock in March 2000.

Although half of the 30 Sunburst plants died shortly after their arrival, Sandoval said, university researchers were able to collect healthy seeds from the remainder to grow the 185 plants.

"They are in the protective area we put them in and are where there is no public access," Sandoval said.

She said people should care about the survival of this plant because like any endangered plant species it can hold medical secrets that might be able to help in prolonging human lives.

"There could be hidden opportunities," she said. "There could be something that could be good for us."

Also, Sandoval said plants and animals enrich our lives and are there for us to study and enjoy.

"I don't think we have a right to bring any species to extinction. Once it's gone, it's gone forever," she said.

Meyer said the plant does well in years when there is a lot of rainfall and the snail population is low. Snails like to nibble on the rare plant. She said state officials have contracted to grow more experimental plants and to do research on them.

The endangered plant, which once grew in dune habitats, coastal meadows and near coastal salt marshes from Ventura to Orange counties, was considered extinct.

In June 1997, two colonies of about 200 of the rare plants were found thriving on a now-closed oil and chemical dump site, near the northeast corner of Harbor Boulevard and West Fifth Street in Oxnard.

Plans are under way to spend millions of dollars to clean up the 91-acre site and build 289 houses there at a cost of \$110 million, said North Shore at Mandalay Bay developer Ron Smith.

Smith said the plants at this site seem to be thriving.

"They're doing great," he said.

Environmental groups say it took a lawsuit against Smith to protect the endangered plant and establish a 10-acre preserve on the 91-acre site.

Smith said he's always been concerned about the survival of this plant.

"I raise roses," he said.

Smith said he's spent more than \$100,000 of his own money to protect the plant and pay for research on it. He said he put a fence around the plant colonies, which, he said, he didn't have to do.

In 2000, Smith hired plant pathologist Tom Yamashita to do research on the plant at the Sunburst Plant Disease Clinic. Yamashita was able to grow 180 plants, which were distributed to Coal Oil Point Reserve and to Carpinteria.

All the milk vetch plants at Carpinteria that came from the disease clinic have since died, said Meyer.

Sandoval and others, including Fish and Game, credit Smith for his help in saving and protecting the plant.

"The developer, North Shore, has undertaken a commendable effort to incorporate numerous revisions to their original plans in order to better protect the Ventura marsh

milk-vetch and has been working closely with the department and the (Regional Water Quality Control Board) to incorporate protection measures into the project and ensure continued existence of the species." a 2000 state report says in part.

Sandoval said many developers would have thought nothing of just getting rid of the milk vetch.

"He's a wonderful person," she said. "When he found it, he was really concerned that it be protected."

Sandoval said Smith donated \$8,000 so the university's milk vetch research could continue.

One of the things university researchers discovered is that hot water makes the milk vetch seed come out of its dormancy stage and sprout, she said.

Research shows the milk vetch produces two type of seeds with distinct structures: One is a larger black seed that sprouts right away, and the other is a small green seed.

"It (the green seed) doesn't produce any plants right away," Sandoval said.

She said the university doesn't have a goal to grow a certain number of plants.

"We will if we have a research project that requires that," Sandoval said.

Astragalus pycnostachyus var. *lanosissimus* was listed as endangered 21 March 2001. It was originally proposed for endangered status in 1976.

The Endangered Bark

Bikash Rath, Non-Wood Forest Products News, March 2003

Agarbattis (incense sticks) made in India have been one of the major products of Indian identity in the world. This appeared to be a flourishing industry a few years ago when it was discovered that the supply of the raw materials was quickly decreasing. The Agarbattis are manufactured using Sal resin, Guggul (gum resin of *Commiphora mukul*), bamboo sticks, etc.

Among the raw materials, the supply of the binding material has concerned the Agarbatti manufacturers mostly because the criteria that select this binding material are hardly met with in any single item like the glutinous bark of *Persea macarantha*. Hence, this bark (called *jigat* in powder form) was the most preferred binder. However, overexploitation caused the rapid depletion of this resource and thus, other alternatives were searched for. The bark of *Litsea glutinosa/monopetala* emerged as the most preferred substitute causing extensive debarking of these two species.

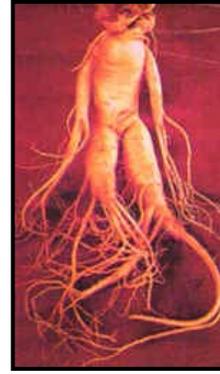
Although not recognized by IUCN, all these species are now facing grave danger of extinction in many parts of India (for ex, Orissa). A lot needs to be done to ensure the conservation of these species. A step in this direction is development of a biopolymer that is to replace the glutinous bark of above species.

Scientific data on these species needs to be updated & revised. *Pojo* (*L. monopetala*) is one of three types as per the apprehension of the primary collectors whereas reference books mention only a single species against that. Study by a local scholar indicates that *Pojo* may belong to an altogether different genus of *Phoebe* (Lauraceae). Also, current status of *Persea macarantha*, declared 'rare' in Orissa 75 years ago, is yet to be identified in Orissa.

Conservation of Species by Protective Marking

James Edward Corbin, *Native Plants Journal*, Fall 2002

In a 10 day period in 1993, John Garrison, a supervisory Ranger with the Great Smoky Mountains National Park, saw 6 kg (13 lb) of ginseng (*Panax quinquefolius* L [Araliaceae]), approximately 8000 plants, seized from 2 different groups of poachers. This sent a wake-up call throughout the country that certain plants in the wild are in need of protection. Garrison teamed up with me to address the problem



The help protect ginseng, I originally designed a marking system that used tiny stainless steel ribbon inserts, coded in the Navajo language. The code revealed the location and date plants were marked. These plants could be seized at the dealer level if found, however, expensive instruments were needed to find the marked roots. An immediate, easy to see identification was needed as a deterrent and as a means to assist the dealer in finding illegally collected material.

After studying soil, physiology, and nutrient needs of native herbaceous perennials, a nutrient dye was developed to facilitate instant recognition. The dye contains small quantities of nutrients with proper rations to allow the root to absorb the dye and mark the plant permanently (within an hour of application). Because collection is illegal in national parks, the permanent dye was a perfect solution. In private stands, a type of non-permanent dye was developed so that plants could be marketed.

To make it more difficult for poachers, silicon marking chips the size of flour grains are used in association with dyes, which allows the plants to be electronically tracked. The Blue Ridge Parkway uses Microtaggent™, the same product used by the explosives industry to track their product.

Naturally, the violators will be able eventually to counter actions of enforcement. Our protection systems must continually evolve if we are to sufficiently protect our natural resources. In 2001, protection efforts took a new twist with the addition of a K-9 unit to detect the marker at the dealer level. The dog, only 8 weeks old when training started, has an extremely bright future. His sensitive nose found a single, illegally collected root in a pile of 189 kg (417 lb) of ginseng roots. During his first 2 weeks of service, the dog assisted with 9 seizures of illegally collected ginseng that were returned to the Great Smoky Mountains National park for replanting.

Since its inception, the protective marking program has expanded to include many other ornamental and medicinal plants that are being illegally exploited, including bloodroot (*Sanguinaria canadensis* L [Papaveraceae]), blue cohosh (*Caulophyllum thalictroides* (L.) Michx. [Berberidaceae]), trillium (*Trillium* L. spp. [Trilliaceae]), and pitcher plants (*Sarracenia* L. spp. [Sarraceniaceae]).

Deterrents are applied during the growing season by groups of dedicated Plant Protection Specialists from North Carolina Department of Agriculture and Consumer Resources (NCDA & CS), park technicians, and rangers who have become adept at identification and application. Experts are training botanists and law enforcement personnel in the marking methods. Leading the effort to mark plants have been John Scott of NCDA & CS, John Garrison and Ken Johnson of the Blue Ridge Parkway, Janet Rock of the Great Smoky Mountains National Park, and Gary Kauffman of the USDA

Forest Service. A combined effort of personnel from NCDA & CS, US Fish and Wildlife Service, North Carolina Wildlife Commission, Blue Ridge Parkway, and North Carolina State University has yielded outstanding results (nearly 80 convictions in 1996; convictions continue on a yearly basis) in the war against decimation and exploitation of native plant species. Currently 14 states and 1 Canadian province have used some form of the system.

Continued protection work will allow the next generation to enjoy the pristine beauty of the native medicinal plants.

Riches Uprooted From Mexican Desert

Black Market for Rare Cactuses Gives Rise to Sophisticated Smuggling Network
Mary Jordan and Kevin Sullivan, Washington Post Foreign Service, 13 February 2003

MEXICO CITY -- When German smugglers landed in Amsterdam hauling suitcases of contraband destined for their underworld contacts, Dutch customs officials were one step ahead of them. The police busted the traffickers, confiscating their maps and shovels and nearly 1,000 extremely rare cactus plants they had uprooted from the Mexican desert.

The cactus, a plant that Mexicans have long regarded as a useless weed, the dandelion of the desert, has turned into a hot item on the global black market for exotica. Collectors in the United States, Europe and Asia are paying thousands of dollars for a single rare cactus from Mexico, the world's richest cactus breeding ground, in an increasingly sophisticated smuggling network.

Mexico has 850 species of cactuses, many of them extremely valuable. Collectors establish value for the plants based on their size -- tiny cactuses are considered desirable -- rarity and age. Some cactuses are hundreds of years old and no larger than a thumbnail, while others can grow 60 feet high and weigh several tons. It is illegal to take endangered cactus species out of Mexico. But shadowy collectors around the world display Mexican cactuses in private greenhouses and homes, treating them as if they were precious jewels or works of art. Black-market demand has created an underworld trafficking operation that stretches from shovel-wielding poachers who carve the plants from the Mexican desert to the finest European gardens.

"In order to make money on cacti you really have to know the black market," said Jeronimo Reyes Santiago, a biologist and president of the Mexican Cactus Society. "It's like narco-traffickers -- it's one thing to grow the marijuana, but you have to know who is willing to buy it. You have to have the connections. This is really a big problem. And the Europeans are setting the prices."

Victor Lichtinger, Mexico's environment minister, said the country was "trying to get better intelligence on who is buying, creating the black market." He said stripping the desert harms "the traditional richness" of Mexico. "The first thing we need to do is capture these smugglers and put them in jail," he said. "And we need to educate our own people that cactuses have value."

President Vicente Fox met Monday with officials from the World Wildlife Fund who handed him their new report, "Prickly Trade," which concludes that illegal cactus trafficking is devastating the fragile environment of the Chihuahuan Desert, a 250,000-square-mile paradise of biodiversity that spreads from Mexico into Texas, New Mexico and Arizona.

The report said that "commercial exploitation" was leading to a loss of tens of thousands of cactuses from the desert every year. The report estimated that from 1998 to mid-2001, about 100,000 plants, worth about \$3 million, were uprooted in Texas or illegally imported from Mexico, destined for American consumers.

The demand for legal cactuses is growing as well. As water becomes increasingly scarce, especially in places like the American Southwest, cactuses are becoming more popular for landscaping and decoration. They are also being used more in herbal remedies and skin lotions, and scientists are now studying them for a variety of medical treatments, from diabetes to schizophrenia.

One species of cactus has even found a niche in the world of computers: The *Cereus peruvianus*, called the "computer cactus," is being touted on the Internet as helping to absorb static from computer screens, thus reducing eyestrain and headaches.

Many kinds of common cactuses can be sold legally, including the tall saguaros -- the famous three-armed variety seen on Mexican restaurant logos throughout the United States. But Mexico has 270 species that are considered threatened or endangered, and it is illegal to remove them without a permit.

The cactus has long been associated with poverty here, because cactuses tend to grow in the most arid and marginalized regions of the country. Farmers and construction crews have hacked them away by the hundreds of thousands to make way for homes, roads and dams. But as appreciation for the cactus has risen, people are guarding them more. The townspeople in Galeana, in the northern state of Nuevo Leon, not long ago smashed a van carrying Japanese tourists because they were poaching cactuses.

Diana Ponce Nava, a lawyer with the environment ministry's enforcement division, said that two years ago the penalties for illegally exporting rare cactuses were increased to a maximum of nine years in prison. Before that, it was largely a risk-free business, with Europeans even running "cactus trips" to the Mexican desert, where they openly dug up the plants.

"It used to be just people with shovels and suitcases, but the trafficking is getting much more sophisticated," said Ponce, whose agency recently raided the famous Xochimilco flower market just south of Mexico City and a private greenhouse in Monterrey, where they recovered thousands of rare cactuses.

U.S. border agents are finding them, too. In one celebrated cactus bust, U.S. Customs agents, working with U.S. Fish and Wildlife Service investigators, arrested two Americans in 1999 for smuggling 21,000 Mexican ocotillo cactus plants into Texas. Their black-market value was estimated at more than \$500,000. Months after the March 2000 bust at the Amsterdam airport, Czech officials confiscated two suitcases containing 72 rare Mexican cactuses, which had been abandoned by smugglers. Before that, a dozen Czechs were nabbed here trying to smuggle \$200,000 worth of cactuses dug out of the desert.

Reyes, curator of Mexico's most prized cactus garden, estimated that tens of thousands of cactus plants were smuggled out of Mexico in the 1990s. His giant cactus garden, located at the National Autonomous University of Mexico, includes cactuses that look like huge asparagus spears and others so subtle they are almost impossible to see amid the rocks. His garden is also home to the 72 repatriated cactuses found in the abandoned suitcases in Prague, prized plants worth thousands of dollars.

"I love their capacity to survive," said Reyes, explaining devotees' admiration for cactuses. "Some can live without care for a year or water for a year. They are patient plants. They wait 10 years to sprout a single flower."

Germans and Czechs have repeatedly turned up as illegal collectors and many of the biggest busts of rare cactuses have been at the Frankfurt and Prague airports. Reyes said officials from the Czech Embassy came recently to check on the well-being of the cactuses from the Prague airport bust.

Recent and Continuing Studies in Trilliaceae

Susan Farmer, reprinted from BEN 301, 5 February 2003

Trilliaceae is a family of petaloid, lilioid monocots. To paraphrase what Steven Elliott wrote of the genus *Trillium* in 1817, "this family is an interesting one. A whorl of leaves at the summit of a stem, supporting a single flower, it contains and conceals many species." In its most recent treatment (Farmer and Schilling 2002) the family, which exhibits an arcto-tertiary distribution, is comprised of 6 genera. Three genera have a wide distribution: *Paris* from Iceland to Japan, *Daiswa* from eastern Asia, and *Trillium* from North America and eastern Asia. Three remaining genera are endemic and each of them has only one species: *Trillidium govanianum* Kunth, with a tepaloid inflorescence, from the Himalayan Mountains; *Kinugasa japonica* (Franch. & Sav.) Tatew. & Suto, with petaloid sepals, from Japan; and the newly described genus *Pseudotrillium* with one species, *Pseudotrillium rivale* (S. Wats.) S. Farmer that has spotted petals, from the Pacific Northwest.

Pseudotrillium rivale, formerly *Trillium rivale*, was first recognized as distinct based on DNA sequence data, being neither a *Trillium* nor a member of the genus *Paris* but separate from both. Morphological characters that supported the distinct and basal position of *Pseudotrillium rivale* are: (1) spotted petals, (2) glossy, heart-shaped, *Philodendron* like leaf, and (3) elongating pedicel.



Pollen was examined to see if it was *Trillium*-like (spherical and omniaperturate) or *Paris*-like (ellipsoidal, and monosulcate); it was *Trillium*-like. Other characters were contributed by members of *Trillium* L, an internet mailing list devoted to *Trillium* and other woodland plants. These characters included a leaf-like cotyledon rather than the normal strap-like cotyledon of *Trillium*. It was also reported that once a plant reached the 3-leaf stage, there was always a flower unless the plant had been damaged by predation.

Molecular evidence also supported the recognition of the segregate genera within *Paris*. Surprisingly, *Kinugasa* is more closely related to *Daiswa* than it is to *Paris*. The placement of *Trillidium* is still problematic. It is very closely related to the eastern *Trillium undulatum*, but morphologically it is more closely related to *Paris*, *Daiswa*, and *Kinugasa* than to *Trillium*. Recent work published by Dr. Fukuda indicated that *Trillium*

undulatum, or its progenitor, may be the *Trillium* parent of the polyploid *Trillidium* (Fukuda 2001a, 2001b). Work is ongoing to investigate the relationships between these taxa.

Current studies concern the *Delostylis* group of *pedicellate* *Trillium*. The name was applied by Rafinesque (1819) to refer to species with a common style and three slender stigmas. In all other species of *Trillium*, the stigmas are sessile upon the ovary. As defined by Rafinesque, this group is comprised of four species: *Trillium persistens*, *T. catesbaei*, *T. nivale*, and *Trillium pusillum*. Other than northern US *T. nivale*, all of these are species of the southern Appalachians and southeastern United States.

The new genus *Pseudotrillium* S.B. Farmer, a monotypic genus, with the type species *Pseudotrillium rivale* (S.Wats.) S.B. Farmer based on *Trillium rivale* S.Wats. was published in *Systematic Botany* 27(4): 687.

Key to the genera of Trilliaceae

1. Inflorescence composed of tepals (if outer perianth segments are green, shape and size of inner and outer segments similar); phyllotaxy trimerous ***Trillidium*** (1 sp.)
1. Inflorescence composed of sepals and petals (shape and size of inner and outer segments dissimilar); phyllotaxy trimerous to numerous.
 2. Sepals showy, white; petals filiform (to 1[2] mm wide) or absent ***Kinugasa*** (1 sp.)
 2. Sepals green or purplish; petals filiform to broad (0.1-6 cm wide), or absent.
 3. Phyllotaxy mostly 4- to 11-merous; leaves (0.8-) 2-5 (7) cm wide (rarely to 60 cm with fewer leaves and height to 1m or more); petals filiform 1-2 (3) mm wide (rarely 5-6 mm).
 4. Placentation axile; seeds with partial green aril or aril absent ***Paris*** (14 sp.)
 4. Placentation parietal; seeds with enclosing red or orange sarcotesta ***Daiswa*** (10 sp.)
 3. Phyllotaxy mostly trimerous with leaves (0.8-) 5-15 (25) cm wide; petals (2) 7-15 (60) cm wide (if narrower, petals either white or pink, or plants sessile-flowered).
 5. Petals generally spotted, ovate, frequently appearing clawed; leaves cordate to rounded, coriaceous ***Pseudotrillium*** (1 sp.)
 5. Petals not spotted, from ovate to obovate; leaves ovate to obovate, herbaceous, or not coriaceous ***Trillium*** (41 sp.)

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Plant Biologist Receives First Scientific American Award

Plant Science Bulletin, Spring 2003 (v49, no. 1)

<http://www.botany.org/bsa/psb/2003/psb49-1.html>

Allison Snow, a professor of evolution, ecology and organismal biology at Ohio State, and member of the Botanical Society of America, received *Scientific American's* first annual Research Leader in Agriculture award.

She is part of the *Scientific American 50*, the noted magazine's first list recognizing contributions from the past year to science and technology. One leader is chosen from each of 12 categories, which range from agriculture to computing to transportation.

Snow received the award for her work on genetically modified crops, especially on how genetic traits in crops could be unintentionally transferred to related weedy species.

To see the entire SA list, link to <http://www.sciam.com>

Champions of the West

Sunset Magazine, March 2003

Sunset Magazine annual Champions of the West honors for 2003 include two winners of particular interest to botanists, including Margaret Malm of Zion National Park, and former Forest Supervisor Gloria Flora.

Margaret Malm: Zion's secret weapon

Margaret Malm is hard to stop. The retired chemist has volunteered at Utah's Zion National Park for 28 years, and she just keeps going.

Malm was a Southern Californian who first discovered Zion on a visit. She began working as a seasonal volunteer, leading nature walks and slide shows for 12 years, then was hired as a paid ranger-naturalist. When cutbacks eliminated the position, Malm returned to volunteering. "I fell in love with Zion," she explains.

Over the last few years, her work has taken a particular focus: botany. Zion is a botanical treasure chest, with more than 900 plant species. "Most of these plants are pretty tough," Malm says, "but they often get squeezed out by exotic species."

That's why Malm now spends much of her time on native-plant restoration. One of her first big projects was reducing an exotic species called mullein (*Verbascum thapsus*) from Zion's beautiful Kolob Terrace. Armed with a shovel, gloves, and clippers, she fought this pest for two summers, digging up tenacious taproots and lugging out bags full of the plant — an astonishing 50,000 mulleins in the end.

Since then, Malm has regularly collected seeds of native species, germinated them in the park nursery, and planted them. In her spare time, she leads plant walks and has authored a guide to Zion's plants.

"I feel that I've at least slowed the progress of some of these really bad, invasive exotics," says Malm. "I'm just balancing the scales for native plants."

by Lora J. Finnegan

Gloria Flora: Mission accomplished

"I was one of the problem children of the forest service," Gloria Flora laughs. "I had to learn, early on, the art of diplomacy." Diplomatic or not, Flora made waves during a 23-year U.S. Forest Service career. In 1997, as supervisor of Montana's Lewis and Clark National Forest, she banned oil and gas leasing in the pristine 356,000-acre Rocky Mountain Front.

It was a controversial decision — one that the oil industry has appealed all the way to the Supreme Court, thus far without having it overturned. But Flora became a hero to many Montanans. "There ought to be a monument for Gloria Flora," lauded the *Missoulian* newspaper. "Come to think of it, there is — sort of. Montana's incomparable Rocky Mountain Front will endure as a monument to this forest service official's strength and vision."

Flora left the forest service two years later. Today she lectures and speaks on environmental issues, and she has started a new group, Sustainable Obtainable Solutions, whose goal is to ensure the sustainability of public lands.

Former U.S. Forest Service Chief Mike Dombeck says of Flora, "She was not willing to compromise her principles even for her career. She never forgot the mission of the agency to care for the land."

"I took my responsibility very conscientiously," Flora says. "Was I going to wake up every morning a sellout? Or wake up knowing that I'd tried as hard as I could?"

by *Caroline Patterson*

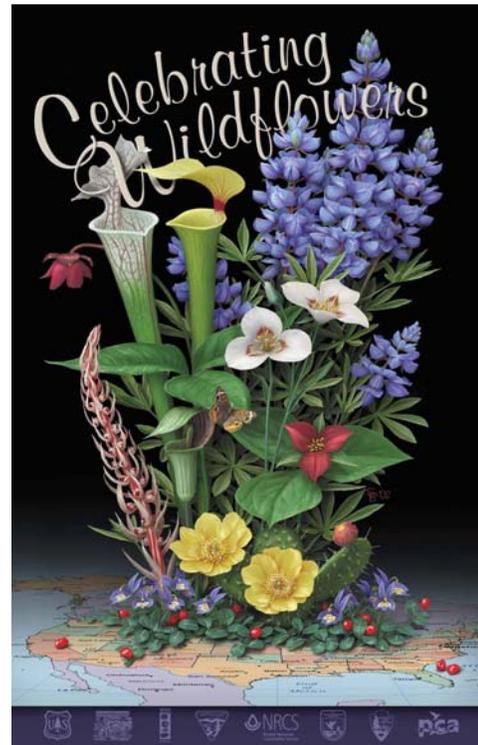
To read more about Sunset Magazine's Champions of the West, go to:

<http://www.sunset.com/sunset/Premium/Travel/2003/03-Mar/Heroes0303/Heroes0303.html>

National Botany Program Highlights

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

- ☀️ Chris Frisbee spent two weeks in the Washington Office on an appeals detail.
- ☀️ Robin Roecker of the Francis Marion – Sumter National Forest was in the Washington Office for one week on an appeals detail.
- ☀️ I attended the Native Seed Trade Association conference in Washington, DC.
- ☀️ Have you seen the new Celebrating Wildflowers posters? Pretty sweet, eh? Thanks to artist Steve Buchanan, outgoing NatureWatch coordinator Kimberly Anderson, and the many National Forest botanists that suggested flowers for the poster. The Forest Service paid for the artwork, and the FS and BLM shared the printing costs. Detach this image and open it with Microsoft PhotoEditor to see it large!



☀ The National Botany Cadre annual meeting was held in Tucson, Arizona during the week of March 17th. Highlights of that meeting will be presented in the Summer 2003 edition of *Lingua Botanica*.

☀ I attended the national Diversity Workshop, an effort on the part of the administration to get focused input on the proposed Planning Rule from affected members of the public.

☀ Representatives from the Native Plant Conservation Campaign, Center for Plant Conservation, and the Lady Bird Johnson Wildflower Center visited with Deputy Chief Tom Thompson to talk about the Forest Service Botany Program.

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 March 2003, there are eight open Forest Service line officer positions

<u>BOTANIST</u>	\$38,588 - 50,165	GS-0430-09/09	Apr 7, 2003
FOREST SERVICE			AR-057-03G
Open to Federal employees	Full Time,Permanent		
Ft. Collins, CO			

<u>BOTANIST</u>	\$39,700 - 51,610	GS-0430-09/09	Apr 7, 2003
FOREST SERVICE			R605-090-03G
Open to Federal employees	Full Time,Permanent		
Skykomish, WA			

<u>BOTANIST</u>	\$26,171 - 39,653	GS-0430-05/09	Apr 7, 2003
FOREST SERVICE			PN-370-03D
Open to Everyone	Full Time,Permanent		
PORTLAND, OR			

<u>BOTANIST</u>	\$26,171 - 39,653	GS-0430-05/09	Apr 8, 2003
FOREST SERVICE			PN-370-03G
Open to Federal employees	Full Time,Permanent		
PORTLAND, OR			

<u>BOTANIST</u>	\$23,442 - 35,519	GS-0430-05/09	Apr 8, 2003
FOREST SERVICE			PN-326-03D
Open to Everyone	Full Time,Permanent		
ANCHORAGE, AK			

<u>BOTANIST</u>	\$23,442 - 35,519	GS-0430-05/09	Apr 8, 2003
FOREST SERVICE			PN-326-03G
Open to Federal employees	Full Time,Permanent		

ANCHORAGE, AK

BOTANIST \$38,589 GS-0430-09/ Apr 7, 2003
 BUREAU OF LAND MANAGEMENT BLM/OA-03-17TL
 Open to Everyone Full Time, Temporary
 LAKEVIEW, OR; KLAMATH FALLS, OR

BOTANIST \$38,588 GS-0430-09/ Apr 2, 2003
 FOREST SERVICE PN-416-03D
 Open to Everyone Full Time, Term appt NTE 13 mos
 WENATCHEE, WA

BOTANIST (INTERDISCIPLINARY) \$42,976 GS-0430-11/ Apr 14, 2003
 Forest Service R607-0989-03
 Open to Federal employees Full Time, Permanent
 PRINEVILLE, OR

INTERDISCIPLINARY BOTANIST \$35,521 - 35,521 GS-0430-09/09 Apr 9, 2003
 FOREST SERVICE T516-054-03
 Open to Everyone Full Time, Temporary
 TUOLUMNE COUNTY, CA

SUPERVISORY BOTANIST \$66,543 - 86,509 GS-0430-13/ Apr 7, 2003
 AGRICULTURAL MARKETING SERVICE 24-57-435
 Open to Everyone Full Time, Permanent
 GASTONIA, NC

VEGETATION RESOURCE SPECIALIST \$46,689 - 60,700 GS-0430-11/12 Apr 9, 2003
 FOREST SERVICE R616-0457-03G
 Open to Federal employees Full Time, Permanent
 BAKER, OR

BOTANY \$16,528 - 120,245 GS-0430-01/15 Dec 31, 2003
 Field Operating Ofc of Ofc of Secretary of Army WTEJ03000400OC
 Open to Everyone Full Time, Permanent
 Throughout the U.S., US

BOTANIST \$39,700 - 39,700 GS-0430-09/09 Mar 28, 2003
 FOREST SERVICE R605-091-03D
 Open to Everyone Full Time, Permanent
 Skykomish, WA

Banner Plant: *Eschscholzia californica*

Each month, a different plant graces the banner of *Lingua Botanica*.
This month's image courtesy of Lorraine Elrod, California Academy of Sciences.

The California Poppy is native to California, Oregon, and the Southwestern United States, and has become naturalized in almost every state and in many other places around the world (although it is nowhere invasive). California Poppy was selected as the State Flower of California in 1890.

California Poppy was “discovered” and described by French-born Prussian naturalist and poet Adelbert von Chamisso. Chamisso was a naturalist on the Russian ship *Rurick*, a part of the Kotzebue expedition to Alaska and western North America in 1815-1818. He first saw the plants in present-day San Francisco in October of 1816 and named them for his friend Johann Friedrich Eschscholtz who was the expedition's physician and entomologist.

California Poppy pollen was used as a cosmetic by some Native American tribes in California. The leaves and roots have long been used for medicinal purposes, especially as a sedative.



Portrait of Adelbert von Chamisso (from Flora Malesiana, Ser. 1, Vol. 1, 1950)



Johann Friedrich Eschscholtz



Captain Otto von Kotzebue

After Image: Protect the Wild Flowers

This month's After Image comes from the Library of Congress' "American Environmental Photographs" collection (image number AEP-MIN73) and is © by the University of Chicago Library

The children of George Elwood Nichols (Professor of Botany at Yale University and noted Bryologist) and spouse Grace Elizabeth were photographed in the early 20th century by their father standing in a patch of *Cypripedium reginae* (showy lady slippers) at Douglas Lake, near the University of Michigan Biological Station in Cheboygan County, Michigan. George Nichols was a tireless promoter of plant conservation and an avid photographer. More of his outstanding imagery can be seen at the American Environmental Photographs (1891-1936) collection of the University of Chicago <http://memory.loc.gov/ammem/award97/icuhtml/aephome.html>



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.

Peace of mind requires eternal vigilance – Lisa Croft

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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>.

