On The Fringe

Journal of the Native Plant Society of Northeastern Ohio

ANNUAL DINNER

Friday, October 28 2005

At the Cleveland Museum of Natural History

Socializing and dinner: 5:30

Lecture by Dr. Mariano Ospina at 7:30

"Andean Jewels: The Colombian Oncidiinae Orchids"

This speaker is co-sponsored by the Cleveland Museum of Natural History Explorer Series.

Tickets: Dinner and lecture: $20.00.

Send checks to Ann Malmquist, 6 Louise Drive., Chagrin Falls, OH 44022; 440-338-6622

Tickets for the lecture only: $8.00, purchased through the Museum

TICKETS ARE LIMITED, SO MAKE YOUR RESERVATIONS EARLY

Annual Dinner Speaker

Dr. Mariano Ospina-Hernandez has had a varied career in Colombian politics, finance and preservation. He was elected a Colombian Senator and after12 years in that position he was named Colombian Ambassador to West Germany. There he actively promoted Colombian coffee commerce and the conservation of South America's natural resources. Upon returning to Colombia he was appointed president of the nation's largest financial institution, the main source of financing for coffee growers and farmers. He now heads the Mariano Ospina Perez Foundation, to further his father's vision of social justice, labor protection and for the assistance of Colombian farmers. He has been elected to the Constitutional Assembly and now heads the South American Riverway System, a socioeconomic and scientific research center, specifically for the preparation of projects in areas such as engineering, environmental protection and economic development and utilization of South America's rivers, jungles and rain forest.

He is currently a Visiting Research Scholar at the Oakes Ames Orchid Herbarium at Harvard University. Colombia is well known worldwide for its extremely high indexes of biodiversity of both plants and animals. Such a biodiversity is closely related to the enormous variety of topographic and climatic features of the country which, in turn, result in a great variety of local ecosystems, plant formations and microclimates.

One of the most attractive manifestations of such a biodiversity is to be found in the Orchid family, probably the largest family of flowering plants in the world in terms of known species. In Colombia there are already registers of over 3,000 orchid species and the list is being increased with every new area that becomes explored by the taxonomists.

Unfortunately, the growing processes of natural ecosystems destruction and wanton extraction of orchid plants from the wild is taking a heavy toll on these orchid species, many of which have been practically exterminated in the wild and survive only in foreign plantations. Dr. Ospina's goal is to save as many of the orchid species as possible while being aware of the over-all preservation of the rich natural resource of South America and Colombia in particular. He has degrees from Bogota University, MIT and Harvard.

Grant Announcement

The Native Plant Society of Northeastern Ohio hereby announces that it will consider applications and nominations for an Annual Grant to be awarded to an Ohio botanist that demonstrates excellence in research, conservation or education, to include land trusts, organizations and causes that clearly support the Mission of the Ohio Native Plant Society. The mission includes:

- Conservation of all native plants and natural plant communities through habitat protection and other means
- Public education and appreciation of native plants
- Proper ethics and methods of natural landscaping
- Surveys and research on native plants and publication of the information
- Cooperation with other programs and organizations concerned with the conservation of natural resources.

The amount of the grant will be $500.00. Deadline for submissions is **September 30**.

Please submit 3 copies of your request to:

Judy Barnhart, President, Native Plant Society of Northeast Ohio, 10761 Pekin Road, Newbury, Ohio 44065

or via e-mail to bunchberry1@netzero.net

The Journal of the Native Plant Society of Northeastern Ohio is published 4 times a year at Novelty, Ohio. Questions or comments are welcome and may be addressed to Jane McCullam, 9880 Fairmount Road, Newbury, Ohio 44065, 440-338-3253; npsohio@hotmail.com; or to Ann Malmquist, 6 Louise Drive, Chagrin Falls, Ohio 44022; 440-338-6622, inky5@juno.com

Fall Program Schedule

SEP 10, Sat: Plant ID Series: Goldenrods/Asters 9:00 AM *(Part of our ongoing Plant Identification Series-families welcome)* From the rich yellows of the goldenrods to the purples, blues, and whites of the asters, these members of the Composite family abound in the meadows and fields of late summer and fall. Discover how to tell them apart by leaf, flower, and habitat. **West Woods Nature Center** in Geauga County. Directions: Take St. Rt 87 east from Rt 306 approx. 2 miles to the park entrance on south side of the road. **Call Judy to register: 440-564-9151 (H) or 440-286-9516 (W).**

OCT TBD: Fungus Foray: Meeting time and date to be determined. Tom Masser, professor emeritus at Kent State University, will lead this field trip. The site and date will be chosen according to weather conditions. **Call Judy or Diane after Sept. 15 for information and site announcement.**

OCT 28, Fri: Annual Meeting and CMNH Explorer Series evening: Dr. Mariano Ospina, 5:30 PM *Andean Jewels: The Colombian Oncidiinae Orchids.* Enjoy beautiful photographs as Dr. Ospina discusses protection of orchids, floral treasures, and the understanding of Colombian forest ecology. See page 1 for more information. **Cleveland Museum of Natural History.**

NOV 12, Sat: Wildlife Habitat Council 10:00 AM. Marcia Maslonek will be presenting the work of the Wildlife Habitat Council; a nonprofit group of corporations, conservation organizations, and individuals dedicated to protecting and enhancing wildlife habitat.. Locally, they are involved in the Cuyahoga River Remediation Action Plan, partnering with the Ohio EPA. Their objective is to plan and promote the restoration of the environmental quality of the Cuyahoga River, its tributaries and watershed. **Meet at Orange Library. Call Diane to register**: **216-691-1929 (H) 440-603-7195 (W).**

Out in the Field

By Judy Barnhart

Native Plant Society members spent two enjoyable days in the field botanizing during the month of June.

The first event took place June 12 when 13 participants explored the newly protected Forest Ridge Preserve in Moreland Hills conducting a plant survey for the Chagrin River Land Conservancy. This is the second year Native Plant Society assisted the conservancy in surveying one of their properties. This valuable information not only gives the Chagrin River Land Conservancy a better understanding of the property's resources but also helps in acquiring funding for the preserve. A total of 149 species, including 37 trees and shrubs, 8 ferns and 84 herbaceous plants, were identifies on this 50 acre parcel of forested uplands and ravines.

The following weekend Native Plant Society members joined Cincinnati Wildflower Preservation Society members in a joint trip to several bogs in northeastern Ohio. Approximately 15 members from Cincinnati made the trip north to explore the rich diversity of glacial wetlands found in this area. Rick Gardner, ODNR Division of Natural Areas & Preserves botanist, was our guide.

First on the agenda was a visit to White Pine Bog Forest in Burton Township in Geauga County owned by The Nature Conservancy. Rick led us along numerous wetlands to the heart of this unique plant community where we discovered many boreal

species. Next stop was Burton Wetlands State Nature Preserve owned by Geauga Park District. Judy Barnhart shared the glacial history of Lake Kelso and pointed out the diversity of bog species growing around the lake.

Next, we headed south to Portage County to Kent Bog State Nature Preserve. The boardwalk trail allowed for close-up viewing of this remarkable tamarack filled wetland.

After the Cincinnati folks spent the night in the Kent area, we reconvened on Sunday at Triangle Lake Bog in Ravenna. The boardwalk trail took us through the various concentric plant zones of this kettle hole bog to the open water in the center. The group then finished up at Jackson Bog/Fen in Stark County before heading their separate ways. Thanks to Rick Gardner for making all the arrangements, including restroom stops on the agenda. A great time was had by all.

All the pretty flowers

Emily Green, staff writer for the *Los Angeles Times*

Ask a philosopher why we name things, and the reply will be: human nature. It's how we distinguish a chair from a couch, a pond from an ocean, them from us. First among the things we learned to name were plants. Our long evolution would have been a very short one had we not found ways to, say, differentiate hemlock from basil.

Yet while all people in all places name plants that they use, it took the discovery of the New World to inspire the idea that one could or should classify *all* plants. For 233 years, generation after generation of botanist has been trying to know North America root and branch. What began as an epic quest for knowledge's sake is now seen as an urgent bid to record our "biological heritage."

As scientists, they are assaulting the mystery of mysteries—the search to understand the origins of life. As environmentalists, they are in a race against the boundless forces that built this country: bulldozer and plough. To those taking part, it could not be more important: These plants provide the air we breathe, food, shelter—life itself. Recording their ranges means that if they retreat to higher altitudes and ever more northerly parallels, it will be the clincher to demonstrate to a disbelieving government the reality of global warming.

Since 1983, a vast modern effort has gathered up more than 850 botanists now working on the "Flora of North America" project. To critics, the scientists have eyes bigger than their walking shoes. The study takes in the U.S., Canada, Greenland, St. Pierre and Miquelon. To cover it, each botanist is assigned a plant group. From recorded sightings going back centuries, they establish a range where this plant is known to occur. Cascades and the Sierra for pines, the Appalachian Trail for hickory, the Great Plains for buffalo grass, and so on, thousands and thousands of times.

Then they add their lifetimes to the trawl. There are organized collecting trips in the wilderness, but life becomes an expedition, says Helen Jeude, technical editor of the project. "Botanists are terrible drivers because you'll be going along an interstate at 70 and they'll spot something and—screech—they're off to the side to photograph it. They're always in search of *one more plant. Just to be sure. One more."* Having determined a territory, the botanist must then look close, closer and closest at a single specimen, characterizing it past the outward appearance, past the thickness of the hairs on the leaf, right down to its chromosomes. The DNA will be used to plumb its ancestry right back to primordial sludge. It will be measured and drawn so painstakingly that the artist must wear magnifying glasses.

Learned studies will be written, maps rendered, and everything will be reviewed and reviewed again. The slowly accumulating load of detail is then sent to the Missouri Botanical Garden where, say the project's organizers, it will constitute an environmental check-up for America.

The continent is not proving easy to doctor. The project is four years overdue and less than half-finished, and government funding has all but dried up. Discovering rare plants isn't good for housing starts, agriculture or oil exploration. Moreover, only essential publishing costs are paid, with botanists working for free. The country that spent $260 million on the "Genesis" probe for solar dust, whose capsule crashed in the Utah Salt Flats last September, has in the last decade put less than $1 million of government funds into the Flora of North America project.

As the odds of success worsen, the sense of urgency has redoubled. A wilderness once too vast to comprehend is being eroded at a furious pace. The visionaries are not just aging, but dying. The people with the money are losing faith. Two years ago, in a last-ditch effort to save the project, the organizers brought in Peter Stevens, a former star of the Harvard University botany department. James Reveal, botany

professor emeritus from the University of Maryland, whose stock in trade is using exact scientific terms, calls this disheveled Englishman "an out-and-out genius."

Nobody has a better grasp than Stevens of how the language of botany was forged, and how it is now being re-forged. If botanists working today studied the subject, they read Stevens. If they're part of a rebel group out to revolutionize their field, they admire Stevens. Yet as he answered a plea to lend his name to the project, it wasn't at all clear which it needed: genius or heart?

Another man in his place would have played the conservation card. Stevens will listen politely enough to environmental pleas, then say in his precise English accent, "We do this kind of thing in general because we like it."

American plants brought back to Europe by tall-ship botanists inspired the golden age of botany, but the man who set the tone was a Swede and, by all accounts, an egomaniac: the 18th century physician Carolus Linnaeus. Toward the end of his life, he dubbed himself the "prince of botany."

He began as a boy entranced with meadows, birds and bees. Biographer Wilfrid Blunt offers an account of how a 4-year-old Linnaeus listened raptly as his father, a Lutheran rector, once delivered the homily, "Every flower had its name," but when the child forgot one, the cleric rebuked him.

Linnaeus grew into a compulsive organizer and gifted naturalist, who saw it as his calling to put God's house in order. Plants collected by apostles and independent explorers from around the world were pressed, dried and shipped to him, where they were examined and named in his herbarium. By the time he died in 1778, he had named 7,700 species of plants—in a world that was supposed to contain only 10,000.

All flowers may have had their names, but Linnaeus brought method and his own notions of music to the christenings. Names were limited to two words, a noun-adjective combination that gives botanical Latin its clip-clopping phonetics. If you Google Linnaeus, the binomial system is most often cited as his abiding contribution. Reveal disagrees. Linnaeus' crowning accomplishment, he argues, was introducing a "species concept." Many plants have distinct characteristics, such as oaks with their acorns. Until Linnaeus, no one had devised a system of grouping to reflect those qualities. He organized plants according to the architecture of their genitalia, what became known as "the sexual system."

A kinky system was better than no system. However, laboring in the shadow of the French Revolution, the botanist Antoine-Laurent de Jussieu was refining a "natural system." It was a better fit for plants, which were described according to the structure and appearance of their roots, stems, leaves, buds and berries, then put in distinct groups according to similarities of the sum of their parts.

As explorers pushed west in the 19th century, the New World developed its own seats of botany. At Harvard, one of the first acts of the father of American botany was to jettison the sex stuff. Asa Gray integrated the natural system into the hierarchical structure of Linnaeus. In 1873, Gray retired to undertake an attempt at a sweeping continental plant survey. When he died 15 years later, it was nowhere near complete, but the dream now pervaded American botany.

Wars and a Depression got in the way, but by the 1960s it was again a perennial topic at botanical meet-ups. In 1973, a Smithsonian-backed venture came so close to actually happening that the country's authority on the sunflower family, Ted Barkley, sold his house in Kansas and moved to Washington, D.C., to start work. When he got there, all bets were off. "They had all of a sudden decided everything was going to be computer-based," Jeude says. "Nobody at that time even had computers."

Chastening as it was, this defeat inspired a blockbuster version in 1983 out of the Missouri Botanical Garden in St. Louis. Carnegie Mellon and Harvard pledged help. Eight Canadian research institutions were in, as were 33 universities, botanical gardens and herbaria across North America. By the late 1980s, the U.S. Fish and Wildlife Service had signed on, as had the National Science Foundation, the Pew Charitable Trust and a number of other foundations.

When the Mexican government announced that it wanted to do its flora separately, it was a case of bad news and good news. It amputated the fecund southern tip of the continent, but it also cut the species load by half. The project now called "The Flora of North America (North of Mexico)" had 20,100 species of plants to cover and a decade to do it.

It is hard to think of a more unlikely savior than Peter Stevens. At Harvard, he is known as the professor who wore shorts in February. "He's very difficult to talk to," says Reveal, a project contributor, "but if you can get him to slow down momentarily, he has an incredible mind and very deep understanding of the intellectual development of nomenclature. The problem with Peter is he can't speak fast enough to keep up with what he's thinking."

Extreme problems required extreme measures. No sooner had a newly funded, newly organized, third-

time-lucky Flora of North America received funding in the late 1980s then it was hit by the mother of all paradigm shifts. Modern genetics. Focus shifted from the way plants looked to how their molecules functioned. A rival arm of botany was emerging called "phylogenetics" that could trace the flow of a plant's genes back to continental drift. By 1998, it had a new language, the "PhyloCode." Young scientists followed the grant money out of the fields into the labs. Old scientists were having to become bilingual.

By 2000, America had gone to the moon and headed to Mars. But the Flora of North America project had produced only four volumes—an introduction; one on ferns and conifers; another on magnolias and wind-pollinated plants; and water plants. Patience wore so thin at the National Science Foundation that middle-aged grant committee members were remarking how it was the new thing when they had been graduate students. Project managing editor James Zarucchi enlisted Stevens, his professor at Harvard and curator of the Arnold Arboretum and Gray Herbarium. What Stevens lacked in suitability for a committee he made up for in repute and, frankly, accessibility. The Oxford and Edinburgh-educated Englishman was already in St. Louis. He had decamped to Missouri after Harvard denied his wife tenure. Short of summoning Asa Gray from the dead, if anyone could get this project back on track, it was Stevens.

Not just anyone could get hundreds of already underpaid botanists to work for free. Even dissenting phylo-ists would surely react to his tap on their shoulder, just as any budding computer programmer would wish to impress Bill Gates. If anyone could retrieve the Internet rights—naively sold to Oxford University Press— it was Stevens. However, when the editorial board of the Flora of North America project agreed to an interview one sleeting St. Louis day in the Missouri Botanical Garden, it never occurred to them that his particular brilliance might embarrass them.

Stevens waited for the group next to a library containing a rare collection of pre-Linnaean floras. He wasn't in shorts, but cargo pants, a rumpled, untucked shirt and jumper. He was reading as he waited, standing up, like a scholarly stork, his moth-eaten red scarf puddling on the book's edge.

He had asked both Zarucchi and Luc Brouillet, a professor at the University of Montreal and French Canadian coordinator for the project, to join the interview. Zarucchi was the picture of reasonableness and grooming, gray and tweed. Brouillet was shorter, rounder, more dapper and far more voluble—the product of a place with better food and higher passions.

After a seemly round of deference—Stevens insisting he wasn't important, Zarucchi calling him "our white knight"—it broke down into an axis of attitudes: Brouillet's French passion in one corner, Zarucchi's Midwestern stoicism in another and the prickly English genius in a third.

The most obvious points were dispatched quickly—the early bungling, persistent lateness, funding ("sad"), competing molecular data ("cross referencing"). It was all very civilized until the question came up: Why do it?

"You want to identify the plants," said Stevens.

"It is an issue that mandates individuals to go out and preserve what is rare," declared Brouillet. "How do we know what we have is rare if we don't have it somewhere in a book?"

"If organisms have any right to exist, then that's going to happen," Stevens objected.

"I would put it outside that!" Brouillet cried. "I would say why do developers need to wreck another piece of land? Why can we not control our own development? It's just greed!"

"Because of sprawl," said Zarucchi in his measured voice, "the city of St. Louis has lost half of its population in 30 years. It's all moved out and all kinds of areas have been developed."

This was too much for Stevens to bear. He made his name teaching botanists how belief in God had skewed 18th and 19th century perceptions of the natural world. Now money colored our ability to take nature by its own terms, not ours.

"I find this a very confusing conversation to have," he exclaimed, gulping. "You can't social engineer through a flora. If you put dollar signs on plants, then conservation, etcetera, etcetera, depends on the size of the dollar sign, and then it's a question of balancing one dollar sign against another dollar sign. And the problem here is that neither the dollar sign that's fixed to your plant, nor the dollar sign that's attached to some other thing that your plant is being balanced against, is fixed. So basically I don't think that is a stable proposition."

Silence.

"To me, to try and preserve things simply based on economic value is basically buying into the system that's causing all the problems."

More silence.

Stevens continued. "If what you mean to say is that you need to know the organisms in your environment if it is to keep on functioning, as it has to do for you to survive, then that is a perfectly reasonable argument."

The group relaxed and small talk resumed as they set out across black ice to tour the garden. A wet, not quite freezing late winter wind blew away the fatigue

and bruised feelings. Zarucchi began recounting how the botanical garden had to be moved some time back because of pollution from soft coal. Stevens remarked on how our gardens are too clean, and bent to muss newly raked leaves around a tree. Brouillet was sulky. Somehow his message wasn't resonating. Earlier, he had tried to drive it home by using as an example the feral palms of Los Angeles, displaced from the desert to urban shopping malls and now a common weed across the city. "We destroy their native habitats. I find it sweet when some of them take revenge."

How strange, these accountants of nature.

Money. Linnaeus' great patron was George Clifford, a director of the Dutch East India Company. Almost 300 years later, industry still holds some purse strings. The handsome red brick building at the Missouri Botanical Garden housing the Flora of North America Project was donated by Monsanto.

But as a rule, funding for studies of wild flora doesn't come from biotech companies and agribusiness, but from nonprofits or the government, more specifically, from the National Science Foundation.

When discussing how money is given out, James Rodman, program director in the foundation's division of environmental biology, takes pains to emphasize a single point: Scientists don't control how the federal government funds science. Politicians do. "I'm sure my colleagues out in the community are amazed and appalled at what they would consider the incredible disparity," he says.

If we are bothered by this, says Rodman, then it's in our hands. We should write our congressperson. All the project needs to survive, says Stevens, is about half a million a year, or "the cost of one military Humvee."

As far as things are set up now, grants for the flora project, when they are made, come from a government biodiversity fund of about $11 million a year. This not only covers flora, but fauna, not only the U.S., but the world. Rodman estimates that $3 million to $4 million goes to "the plant side of things," and of that, much goes to the tropics. They cannot afford to make North America a high priority, he says. Too much of the tropics remains unexplored and under threat.

Frustration among U.S. botanists is so high that if one cracks the lid of their box of woes, a storm blows out. The most common misconception that Barbara Ertter, collections manager at UC Berkeley's Jepson Herbarium, runs into is the conviction that the study has already been done, that it was part of the U.S. Geological mapping surveys.

Then there is the "only" problem. The U.S. and Canada are regarded as so well picked over that, based on a rate of 50 new discoveries a year, a going estimate for the number of undiscovered species in North America is "only" 5% of the flora, or 8,000 new species.

For plant collectors, there's nothing "only" about it, but meet them and it's also clear why grant committees gamble that they will do the job for free. Stevens was not being facetious when he said they do it because they like it, only guilty of understatement. They love it. As outwardly different as they might seem—as a Brouillet, a Zarucchi or a Stevens—in one fundamental way they are the same. Show them a weed pushing up through cracks in the sidewalk and they see the history of the world. Even on the meanest streets of the meanest city, they'd likely abandon the car and go over to photograph it, says Jeude, the technical editor. "It goes beyond interest. It's an obsession,"

So much rests on their interested squint, their quirk of regard. Where most of us in 2001 in San Luis Potosí would only have seen a tough little plug of a weed in a Mexican ravine, Travis Columbus saw *Schaffnerella gracilis*, a grass that hadn't been recorded since the 19th century, and thought to have been grazed and flooded out of existence.

Columbus works on grass genetics at Rancho Santa Ana Botanic Garden in Claremont. Focusing on this rarest of plugs, he photographed it, charted its position with GPS technology, measured it, plucked a sample and brought that back to Claremont. Here he managed to match it to the last recorded sample—from 1877. He preserved it, propagated seed for more, extracted DNA. Why?

"I'm a miner," he says. By recording everything he can about a plant, he puts it on file for scientists studying drought resistance, grassland restoration, forage—anything involving grass. To these plant-finders, every plant holds a story, of a place and of the workings of nature.

As such, Claremont botanists are working hard to survey Riverside before developers pave it over. It was the redness of a rock outcropping that told Columbus' colleague, Steve Boyd, that the ceanothus growing near Vail Lake might be an undiscovered breed. It was, an extremely rare one, and now a number of stands in the area are protected.

To find out if a plant is new or not, and then to get their claims on record, collectors must check it against known species. To show how it's done, Columbus leads a tour at the Rancho Santa Ana herbarium, where six women stand at large tables pressing, drying and tagging plant specimens. The best ones have a flower and a bud, says one of the women. Where there is only one sample of a plant, it will stay there, says another.

Where there are more, copies will be sent around the country.

These women work for free, too. They are housewives and yet more of the anonymous faces of the Flora of North America project.

The Jepson Herbarium in Berkeley also runs on volunteerism, says Ertter, and not just pressing and drying, but also plant collecting. A semi-retired construction worker, David Gowen, recently surprised her with a new species of woolly star flower that he found hiking on Lime Ridge, at an old cement quarry in the East Bay.

When she tells him that a reporter wants to hear about it, he thinks she's joking. It was only six inches tall with "minute" white flowers, he says, but it made him question the way we build. "There's this perception that if you lose one little plant, who cares?" he says. "But until you're one of those people who saves one of those little plants, it doesn't hit you. If we're losing little things, we might be losing bigger things."

Ertter is worried about the bigger things, the 95% of discovered plants. In a recent study of Mt. Diablo, she witnessed a steep decline in Western clover. These once "abundant" species, manna to grizzly bears, were "still present," she says, "but I don't call them common anymore." She doesn't know where decline will become extinction. "When you fall off a cliff, everything seems to be fine until you hit the bottom."

Back at the National Science Foundation offices in Arlington, Va., Rodman is aware of these botanists' dedication, their loves, their fears. Foundation support did dry up for the project, he says. The delays, the conversion to computers, the shift to molecular work, the disappearance of Mexico from the survey, pressure to work in the tropics all took their toll. But he objects to the inference that they withdrew completely. For example, in 2002, $300,000 went to what they view as the make-or-break phase of the project.

This coincided with a $3 million grant from the Chanticleer Foundation in Pennsylvania. There was only one condition: the Flora of North America project had to deliver two volumes a year.

The man who could set the pace was Ted Barkley. After losing his house in a bid to get the project going in 1973, Barkley returned to the Midwest. There, in a massive effort, he helped bring together botanists from Kansas, Nebraska, the Dakotas, Montana, Wyoming, Colorado, New Mexico, Oklahoma, Missouri, Iowa and Minnesota to produce the Flora of the Great Plains.

On that basis, the foundation chose Barkley to jump-start the stalled national project. He would do it with the sunflower family. Botanists like to say that the only place they don't grow is underwater. It would require three volumes. Pulling them off would be the single greatest feat of the Flora of North America Project.

Equipped with just over half a million dollars, Barkley moved a team to the Botanical Research Institute of Texas in Ft. Worth. Jeude joined him from the Missouri office to complete the staff of five. They had their work cut out for them. The sunflower family has 2,438 species. It would take 80 botanists, 30 regional reviewers, 4,000 plant specimens and three years.

"We set up the project this time so it could survive anything," Jeude says. Time was called on collecting. In every state with sunflowers, botanists who had spent their lives combing hillsides, forests, highway verges, who had given up holidays, left their spouses and bored children sitting in cars while they photographed and measured weeds had to get to their desks with what they had, what they knew. "Everybody wants to find *one more* specimen to be sure," says Jeude. "The one on the other side of the hill."

Now it was time to write the treatments, pulling together all the data, traditional and molecular. Young botanists would get the easiest assignments. A botanist would be hired to fill in for contributors who promised treatments but flaked. Jeude would send their articles to reviewers to be checked for accuracy. Each plant would be depicted in an immaculate line-drawing (it "focuses the eye in a way that color doesn't," Stevens says).

Entries would be edited to ensure consistent terms and style. They were then sent to Harvard for a name check. In what might seem a conundrum, North America has four times more scientific names for plants than plants themselves. Plants have a way of being discovered repeatedly. The job of nomenclature editor Kanchi Gandhi is to decide which name is legitimate, and to demote the others to synonyms.

That's not his day job, which is working as index manager at Harvard's Gray Herbarium. Gandhi estimated that he worked 10 to 13 hours a day, plus more on weekends. The overtime was not paid. The other 130 scientists on the sunflowers also worked for free.

"It's a labor of love," Jeude says.

Barkley had the ability to meet people in a lunch-line and have converted them to botany by checkout, she says. Part of it she attributes to an uncanny gift for languages. "Not just foreign languages," she adds, "but *really* foreign ones, like Hungarian." She can't remember how many times he astonished staff by greeting a foreign visitor in his native tongue. When staff went out to a Cypriot restaurant, he gave career advice to the waitress—in Greek. Once a job was

assigned, he would phone the author in whatever language worked to woo results.

Last July, already suffering from cancer, Barkley was in the lab examining specimens two days before the heart attack that killed him. The shock in Ft. Worth is still tangible. But since then, says Zarucchi, Jeude and the team have completed one of the three volumes, which will go to press in December. The other two are on target for publication next year.

That will take the project to 12 volumes and, they hope, restore their credibility with the National Science Foundation. They plan to have the series of 30 finished by 2011.

Since lending his name to the stalled project, Stevens has resumed his own research, says Zarucchi. The new figurehead is Luc Brouillet. Barkley's widow, Mary, remembers Brouillet well. When he was on sabbatical in Texas, she says, "We had Luc in our home about every Sunday for supper."

And so he will be there on Thanksgiving weekend, to deliver an address at Ted Barkley's memorial service. After a celebration at St. Paul Presbyterian Church in North Richmond Hills, the ashes of a man who loved sunflowers will be scattered on Konza Prairie.

Joan DeFato, retired librarian of the Los Angeles County Arboretum and Botanic Garden, and Tiana Franklin of the Botanical Research Institute of Texas assisted with research for this report.

Reprinted with the author's permission from the November 28, 2004, Los Angeles Times.

Book Review:

Requiem For a Lawnmower - Gardening In a Warmer, Drier World, 2nd edition, by Sally Wasowski & Andy Wasowski, 2004. Taylor Trade Publishing. Paper, 211 pages, $16.95.

Review by Jane Dorn

It is not easy to promote the use of native plants for landscapes without sounding dogmatic, but the Wasowskis have written a book that does just that. Each chapter of this easy-to-read book combines humor, anecdotes and sound advice to gardeners to advance the concepts and practices of landscaping with native plants. The Wasowskis have deliberately written this book with a minimum of technical terms, scientific names and professional jargon which tend to scare readers away from some books on this topic. While the Wasowskis have lived in and frequently written about Texas gardening, this book presents sound landscaping principals that can be applied to any part of the country, including Wyoming and the Rocky Mountains.

For anyone who has ever had to speak before an audience about landscaping with native plants, this book should be required reading. The major anti-native plants arguments and misconceptions are addressed, so that, after reading Wasowskis' book, you too can easily refute these cherished notions without starting a riot. For example, if you find a gardener who really loves non-native plants like roses or petunias, the Wasowskis point out that local natives will mix well into the more traditional landscape, and that using natives doesn't necessarily mean "100 percent native." Or, when you hear someone equate xeriscaping with expanses of gravel and cactus, you would be able to point out it really means balancing plant selection with available natural moisture and that native plants have already figured out that trick without human help. Even the 'weed laws' issue is addressed with good advice on how to approach the touchy issue of neighbors who view your naturalistic plantings as a weed patch.

The title chapter, "Requiem for a Lawnmower," is obviously a plea to stop scheduling summer weekends around municipal watering restrictions, mowing, weeding, and fertilizing the non-native, monoculture called a lawn and create a landscape that might include native grasses and is adapted to local conditions. As Sally points out, "because we weren't spending inordinate amounts of time doing [lawn] maintenance, we were free to simply enjoy our garden."

It is easy to talk about use of native plants for landscaping, but as this reviewer can personally testify, much harder to put into practice if one depends on the offerings of the traditional nurseries. The Wasowskis point out in their chapter, "Our unsung horticultural heroes," there may be tougher ways to make a living than growing native plants for nursery stock, but not many. This is one area where native plant supporters can make a difference. Encourage local nurseries to stock natives, then buy those natives. Ask for other natives. Encourage your gardening friends to purchase and use native plants from local nurseries. Encourage nursery owners to participate in native plant activities. Be generous with your knowledge of native plant culture.

This book is set up in seven sections with a total of 48 chapters. Each chapter is a short, stand-alone essay which creates easy pick-and-choose reading. It would be a good addition to any public library. If you are already a convert to the landscaping-with-natives philosophy, you might want to add this non-technical book to your own library as an excellent first book to loan to doubters and possible converts, and a good refresher when you need to communicate with native-plants-won't-work gardeners.

Reprinted from the Newsletter of the Nevada Native Plant Society, February 2005

Botany 101-19: Common Plant Families in Indiana

Composite Family

by Dr. Rebecca Dolan

In the hierarchy of botanical nomenclature, similar species are grouped together into genera; related genera are grouped into families. Members of common families can often be identified based on a few distinctive morphological characteristics. There are about 150 plant families represented in the native Indiana flora. I'll review the 10 most common in the coming columns, starting with one with a lot of late-fall blooming species.

The 10 families we'll cover include almost half of the estimated 2,600 species in the state.

Composite family =
Sunflower or Daisy family =
Asteraceae
Perhaps the largest family world wide, with 20,000 to 25,000 species.
346 North American genera, 72 in Indiana,
2,687 North American species, 255 in Indiana.

Composite Flower:

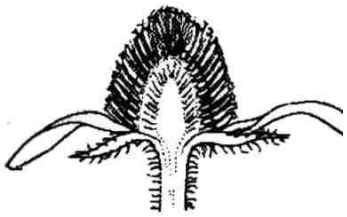
floret:
individual flower of member of composite family, usually numerous and tiny, arranged in compact inflorescence (flowering stem) that resembles a single flower.

ray florets:
flowers around the outside of the inflorescence, often have large straplike petals.

disk florets:
flowers on the inside of the inflorescence, usually very small petals.

Some species lack disk or ray flowers; sometimes the relative number of each is characteristic for a species.


Disk floret


Ray Floret

Economically important members of the family:
lettuce, endive, chicory, Jerusalem artichoke, dahlia, chrysanthemum, marigold, sunflower, daisy and thistle.

Plant Products:
tarragon, pyrethrum, yarrow, sunflower.

Common fall-blooming composites in Indiana:
(aka damn-yellow-composites, as many of them are difficult to tell apart at first glance)

goldenrods: (Solidago spp.)

asters: (Aster spp.)

sunflowers: (Helianthus spp.)

coneflowers and black-eyed Susans: (Rudbeckia spp.)

beggar's-ticks: (Bidens spp.)

ragweed: (Ambrosia spp.)

white snake root and Joe-Pye weed:
(Eupatorium spp.)


Joe Pye Weed
(Eupatorium purpureum)

Recent great book on composites:
The Sunflower Family in the Upper Midwest by Antonio and Masi, published by the Indiana Academy of Science, 2001. ISBN 1-883362-11-3. $48 from www.indianaacademyofscience.org

Becky Dolan Director of the Friesner Herbarium at Butler University.

"OPEN SESAME": GENTIANS & BUMBLEBEES

By George Ellison

"Thou waitest late and com'st alone
When woods are bare and birds have flown,
And frosts and shortening days portend
The aged year is near his end.
Then doth thy sweet and quiet eye
Look through its fringes to the sky,
Blue blue as if the sky let fall
A flower from its cerulean wall.
-William Cullen Bryant

Aside from witch-hazel, which unfurls its yellow tassels from September on into December or even January, gentians are perhaps the latest-blooming, showy wildflowers here in the southern mountains. In pockets protected from hard frost, they can often be found in full flower throughout November.

Because of their tardy nature and breathtaking beauty, gentians have been justly celebrated in American letters. In the lines quoted above, Bryant was writing about the fringed gentian, which some consider to be the most beautiful wildflower in North America. The poet also referred to fringed gentian's hue as "Heaven's own blue," while Thoreau described the color as "such a dark blue, surpassing that of the male bluebird's back! It is a transcendent blue!"

Unlike the fringed gentian, which opens fully in sunlight, the seven other gentian species found in the southern mountains have five petals that are closed or almost closed at the top so that the blossom has a bottle-like shape.

Two of the most common of these are stiff gentian *(Gentiana quinquefolia),* which displays narrow, dark purple flower heads, and closed or bottle gentian *(G. clausa),* which has the flowers completely closed at the top.

Happening upon these flowers in the woods for the first time, one immediately wonders how they ever accomplish pollination since the sexual parts are encapsulated in a container of petals. Hang around long enough and the answer will come buzzing along. Bumblebees, for reasons known only to themselves, are incurably attracted to purples and blues. That being the case, they cannot resist gentians, the ultimate blue. And they know, of course, the secret of gaining access to the sweets inside the gentian containers.

Bumblebees are stronger than most other nectar-gathering insects. By pressing at the apex of the gentian blossom, they cause it to "Open sesame!" If the bumblebee is careful he pushes only the front end of his body into the bottle. If he gets too greedy or excited and enters completely, the "door" closes behind and getting out can prove impossible.

A closed or bottle gentian (*Gentiana* spp.) includes several eastern species regionally (e.g., *G. austromontana, clausa, decora, saponaria)*, some deep gentian blue or violet, others pale blue

Stiff gentian is also widely known as agueweed. Ague ("a-gyoo") is the common name for violent and recurrent attacks of chills and fevers of a malarial nature, a malady that was prevalent in the American South during the 19th century. The common name of the plant refers to its reputed efficacy in treating ague. It has also been widely used as a bitter tonic to stimulate digestion or a weak appetite, as well as for headaches, hepatitis, jaundice, constipation and a host of other complaints.

In J.K. Crellin and Jane Philpott's *Herbal Medicine Past and Present* (Duke Univ. Press, 1989), Appalachian herbalist Tommie Bass observes that, "Most all fine stomach compounds contain gentian.... Use a handful of roots or tops boiled in a quart of water ... Gosh, it's one of the best things in the world for the stomach. Of course I generally recommend yellowroot. But a lot of the time it is just handy to take a little shot of this."

Crellin and Philpott in their summary of the medical literature on gentian note that the gentian species that have been studied contain "bitter glycosides, alkaloids, fixed oil, and flavonoids. The glycosides chemistry and pharmacology merit further study."

I have no intention of disturbing gentians for medicinal purposes. I just like to look at them, as did Emily Dickinson - yet another of those 19th century nature-loving writers! - who described it as "a creature [for whom] frost is her condition [that appears] just before the snows [and] ravishes the hills."

Illustrations by Elizabeth Ellison

Reprinted from *Chinquapin*, Autumn 2000, newsletter of the Southern Appalachian Botanical Society

Killing Them Not So Softly

Controlling Invasive Species

by Ellen Jacquart

You know you've got them. They're all over, bullying their way into your backyard, woodlot and wetland. Well, what are you going to DO about it?

Controlling invasive plant species like garlic mustard, Asian bush honeysuckle, and Oriental bittersweet is tough. Honestly, it can be very time-consuming and labor intensive. But if you want to provide habitat for a diverse mix of species on your land, and you think it's worth fighting for, read on to find out how to do it.

1. The first thing to do is to be sure of WHAT you have. Use a good field guide or a knowledgeable botanist friend to double-check that you've identified a real problem, rather than an innocent took-a-like.

2. The second thing to do is to estimate HOW MUCH you have. The method you use to control 50 plants of garlic mustard will likely be very different from how you control 5 acres.

3. The third thing to do is to figure out WHY you have this invasive problem. Where are they coming from?

Neighbors:
If there's a 15-foot tall autumn olive shrub in your neighbor's fence row, you'll never get rid of the autumn olive seedlings in your woods until the 'mama plant' is taken out.

Disturbance:
Recognize that you could inadvertently be providing an invitation to invasives. Most any kind of disturbance helps invasive plants get a foothold, from soil disturbance of any kind to clearing brush away and increasing the available sunlight.

Soil alkalinity versus acidity:
Many invasive species like alkaline pHs, so the addition of limestone gravel to an area (for trails, driveways, or roads) can tip the balance and give invasive species an edge as the soil's pH starts to climb.

Deer:
Finally, there is increasing evidence that we can blame at least some of our invasive plant problems on Bambi. For example, garlic mustard is a species not palatable to deer, which has allowed it to expand as our native flora has been munched away by the overpopulation of deer. Until the deer overpopulation in your area is under control, unpalatable invasives will probably rule.

Prevention is the best method
Now you're ready to choose how to control your infestation. But before I start discussing methods of control, I have to mention the BEST method of all: prevention. We should all work to make sure invasive plants are not introduced into the landscape in the first place, which would save us all the work involved in killing them once they arrive. But until that day arrives...

There are many, many different methods of invasive plant control, which generally fall into these categories:

- Biocontrol
- Manual removal
- Mechanical removal
- Herbicide methods

Biocontrol,
or the control of invasive species through a biological agent such as beetles or moths, is a fascinating topic but not one that has much application for private landowners dealing with most of the invasive plant species in Indiana.

Manual methods
of control involve pulling or digging the offending plant out of the ground. Manual control is a common method used for garlic mustard by pulling it before it sets seed each spring. The advantages of this method are that it is simple, straightforward, and doesn't involve special equipment. One disadvantage is that it requires a great deal of labor to cover even a small area, though with willing volunteers many acres of garlic mustard have been cleared in Indiana's natural areas. A more significant disadvantage is that the very act of pulling the plant *disturbs the soil* and makes it more likely that invasive plants, which by their nature thrive on disturbance, will be back next year.

Still, manual pulling can be a very effective control for scattered, small infestations of herbaceous plants like garlic mustard or small individuals (less than two feet tall) of invasive shrubs like Asian bush honeysuckle, privet, or burning bush.

It's important that the majority of the root system be pulled up without breaking to avoid having the plant resprout from the remaining roots. Waiting until the ground softens after a rain increases your chances of

pulling the plants without breaking the roots. For annuals or biennials (like garlic mustard) be sure to pull the plants ***before*** they set seed. Remember that in some cases, plants can continue to develop seed even after being pulled from the ground so removal of the plant from the area may be necessary. And always wear gloves when pulling invasives – some plants can cause skin irritation, especially when the plant's stems and leaves are crushed.

Here's the unfortunate part; once is not enough. Invasive species are usually quite good at producing seed, and all that seed is still sitting in the ground waiting to germinate. So you'll need to continue pulling *until that seed bank is depleted,* which can be 5-10 years for some species. And that assumes you will *not let a single individual* come to fruit and release more seed during that 5-10 years.

Mechanical methods
involve using cutting tools – mowers, brushcutters, chainsaws, pruners, loppers – to cut down invading species. In practice, this method is almost always used in conjunction with an herbicide application when used against perennial plants. In the case of annual or biennial plants, purely mechanical control can be effective.

One example is to cut garlic mustard rosettes close to the ground after they start to flower using a brushcutter or weed whacker. Properly done, this does not disturb the soil (removing one big disadvantage of the manual method) and infested areas can be covered fairly quickly. A disadvantage is that there is some damage to native wildflowers that are up and blooming at this time of year, but since they are perennials they stand a reasonable chance of resprouting the next year.

Sweet clover is another biennial invasive sometimes controlled using a strictly mechanical method. Areas of sweet clover are mowed as it starts to flower in the summer. Again, the nontarget species in the area will take a hit from the mowing, but the expectation is that the perennials will come back next year.

These mechanical methods, like the manual methods, are rarely 100% effective after one year; *multiple years of cutting or mowing will be necessary until the seed bank is exhausted.* Proper timing is essential; cut the plant too early and it will still have time to bloom during the growing season; cut too late and it may be able to set seed on the cut stems.

Herbicide methods
include a wide variety of chemicals and techniques. Using herbicides is a decision not to be made lightly. You need to understand the overall impacts of the herbicide on the environment, the health and safety risks involved in using particular herbicides, and your responsibilities when using herbicides under federal, state, and local regulations. A great deal of information on using herbicides can be found in The Nature Conservancy's on-line *Weed Control Methods Handbook* (Mandy Tu, Callie Hurd, and John M. Randall, version date April 2001) at http://tncweeds.ucdavis.edu/handbook.html

glyphosate and triclopyr
The two types of herbicide most commonly used in natural areas are glyphosate (trade names include Roundup, Rodeo, Accord, and Glypro) and triclopyr (trade names include Garton and Pathfinder II). These are popular herbicides for natural areas because they are relatively short-lived in the environment and relatively non-toxic. Note the term "relatively" – both of these herbicides can have adverse effects on the environment and on human health, so it is important to use them properly. Again, much more information on these herbicides can be found in the on-line *Weed Control Methods Handbook* mentioned above. Above all else, when using an herbicide follow the label directions. This is not just a good idea, it's the law!

Difference between glyphosate and triclopyr:
One of the key differences between glyphosate and triclopyr herbicides is that **glyphosate is non-selective**, killing all plants it contacts, while **triclopyr is selective**, killing only broadleaved plants and not grasses and sedges.

Glyphosate can be sprayed on leaves (foliar application) or painted on cut stems, but will not penetrate through woody bark. There are two varieties of triclopyr herbicide; a salt or amine formulation (sold as **Garlon 3A**) and an ester formulation (sold as **Garlon 4, Crossbow**, or **Pathfinder II**).
Garlon 3A is used for foliar application, while Garlon 4 and other ester formulations are used for cut stem treatments and basal bark treatments, where the herbicide is sprayed or painted directly on bark and penetrates into the stem to kill the plant.

Timing is Important
The choice of an appropriate herbicide is important, but without the proper application at the right time of year,

it's a waste of your time and money. When choosing the time and application method, use the plant's physiology against it. The most effective time to treat invasive plants is usually late summer and fall, when the plant is moving stored food to its roots and will carry herbicide along with it, resulting in killing the whole plant. Treating invasives during springtime, especially shrubs or trees, is usually much less effective because the plant's resources are moving up the stem instead of down.

Foliar applications
can be made by spraying (using a hand-held spray bottle, a pressurized hand-held spray container, or a pressurized backpack sprayer, depending on the size of the job you are taking on) or wicking (using a sponge or the infamous 'glove of death'-a cotton glove wetted with herbicide which is worn over a thick rubber glove to avoid any skin contact).

Cut stem treatments
can be made with a hand-held squirt bottle, which is used to drip a bit of herbicide on the cut stem. Basal bark treatments, which wet the bottom 6 to 12 inches around the circumference of the woody plant) are made using a sprayer (with low pressure, so the herbicide drips onto the bark, rather than sprays all over) or a wick of some kind.

If desired, you can purchase herbicides that are ready-to-use for particular types of applications, already diluted to the appropriate concentration and with surfactants (additives that allow herbicide to cling to and penetrate the plant cuticle for foliar applications) or carriers (additives like oil that help penetrate woody tissue for basal bark or cut stem treatments) already added.

Given all this, here are a few specific herbicide treatments for particular types of invasive plant species. In each case, the appropriate concentration of herbicide to use is specified on the label depending on the application method.

Garlic mustard *(Alliatia Petiolata)*
(and many other herbaceous invasive species):
Application method: foliar spray
Herbicide: glyphosate or triclopyr amine with a surfactant added
Timing: fall, after the first frost and when most other vegetation is dormant

Asian bush honeysuckle *(Lonicera sp.)*
(and many other woody invasive species):
Application method: basal bark treatment
Herbicide,, triclopyr ester in an oil carrier
Timing: year-round, but more effective in the fall

Careful application
is necessary to avoid killing nontarget plant species. The best time to apply herbicides is generally on warm, sunny days with little wind and no rain forecasted for several hours after application. While herbicide treatments can be very effective, retreatment is usually necessary to control any resprouts or any new plants springing up from the seed bank.

In general, any invasive control project requires persistence and vigilance but when you are successful the rewards are great. Now, get out there and kill some invasives!

Ellen Jacquart is Director of Stewardship for the Indiana Chapter of The Nature Conservancy, coordinating management of TNC preserves in Indiana, with a particular focus on invasive plant control. She led the effort to develop the Invasive Plants of Indiana *brochure.*

Reprinted from the Indiana Native Plant and Wildflower Society *News,* Summer 2003.

Meadow Grows In the Suburbs

by Deanne M. Eversmeyer

When I purchased my little house in the suburbs of Northern Virginia, Dad thought he'd found a home for a lawn mower that he no longer needed. He seemed a bit perplexed when I declined his offer and explained that instead of a front lawn, I would have a meadow of grasses and wildflowers. And when I told the neighbors that I was replacing the lawn, they were a bit dismayed that the horticulturist for an established country club was not planting a putting green. But four years later, I think that the neighbors and Dad have come to accept my meadow, and even appreciate it for its year-round beauty and low maintenance.

I live in a rather free-thinking neighborhood just inside the Capitol Beltway. The houses, built 50 years ago, are far from fancy, but the lots are roomy – about a quarter acre in size. The transformation began with the removal of a 40-year-old red maple *(Acer rubrum*) and the

killing of the lawn with Roundup. A small mountain of wood chips, the remains of the maple, was spread over the dead lawn. By not disturbing the turf layer, dormant seeds were not given a chance to see light and sprout, and the organic matter in that top layer was left to enhance the soil. Unfortunately, I did this site preparation in the fall of the year and did not know until spring that the lawn was home to healthy populations of then-dormant buttercups and violets. Applying another round of herbicide in April would have eliminated these.

Since the meadow area is not very large, about 1,000 square feet, I decided to plant it with plugs instead of seeding it. Deep plugs performed best; planted through the mulch layer, their longer roots ensured good contact with the clay beneath. Once planted, regular watering for the first summer was all that was needed. The meadow has never been fertilized or raked out. In late winter the dried remains are cut down with hedge shears and a weed-eater. A light surface-raking removes the bigger remnants to the compost pile. The smaller bits filter down to mulch and feed the soil.

The meadow starts off slowly with early summer's purple coneflower *(Echinacea purpurea),* sunny false sunflower *(Heliopsis helianthoides*) and true-orange butterfly weed *(Asclepias tuberosa)* amongst tufts of new green grasses. Mexican feather grass *(Stipa tenuissima),* a Southwest native, adds to the opening act with soft, sunbleached, ponytail plumes. By mid-July the meadow is at its riotous peak when black-eyed Susans *(Rudbeckia* 'Goldsturm', *R. subtomentosa* and *R. triloba)* and blazing star *(Liatris spicata)* join in the eruption of color. To allow access into the meadow, I laid out a loop path carpeted with pine needles. Between the far edge of the yard and the loop, taller grasses and wildflowers create a screen from summer through late winter. A gang of seven-foot-tall cup plants *(Silphium perfoliatum)* crown themselves with bouquets of sunny yellow daisies. These prairie natives collect rain in cups formed by the bases of their paired leaves; days after a shower, small birds will quench their thirst at these giants. Later, shattered seedheads attest to the plant's popularity with hungry finches. Hovering just below the cup plant are the royal purple ironweeds *(Vernonia* spp.) and the mauve-pink Joe-Pye weed *(Eupatorium maculatum),* always alive with swallowtail and monarch butterflies. The button-heads of black-eyed Susans and purple coneflowers, as well as the gaudy purple wands of blazing star, are also butterfly and finch magnets. By summer's end the horizontal sprays of goldenrod *(Solidago rugosa* 'Fireworks') are turning yellow, just in time to provide a backdrop for purple New England aster *(Aster novae-angliae)* and self-sown, white heath aster *(Aster ericoides*).

Although the matrix of grasses takes a back seat to the wildflowers during summer's show, it plays the vital role of tying the various components together. Our native little bluestem *(Schizachyrium scoparium)* at two to three feet and the taller Indian grass *(Sorghastrum nutans),* along with the summer-blooming, non-native dwarf fountain grass *(Pennisetum alopecuroides* 'Hameln'), make up most of the meadow. The fountain grass is especially useful as a neat, tight border at the sidewalk. Switch grass *(Panicum virgatum),* purple top *(Tridens flavus)* and side oats grama *(Bouteloua curtipendula)* are sprinkled throughout. Once the floral fireworks die down, the grasses claim the spotlight. The Indian grass sends its feathery seedheads up on wands of five feet or so, while the foliage goes from a lovely, light blue-green to the color of pale parchment. The fountain grass morphs into straw-yellow mops of hair which contrast wonderfully all winter with the rich russet sheaths of the little bluestem. The meadow is left through the short days of winter, taking on a quieter beauty. The stark spikes left by the blazing stars contrast with the soft fog of the goldenrod thickets. The thousands of black eyes, all that remain of the Susans, form reverse constellations against a background of bleached grasses. The empty pods of the butterfly weed, bent backwards from the effort of dispersing silky parachuted seeds, wave in the cold wind. And wintry precipitation becomes a treat when ice and snow transform the meadow into a crystalline wonderland. In four years of its existence I have had only one person complain about my meadow; he was told by the lady across the street to go home and leave “us" alone! Butterfly weed, goldenrod and little bluestem are popping up in neighboring gardens as visitors to the meadow are sent home with the excess. And while the rest of the neighbors spend their weekends making noise and polluting the air with their lawn mowers, I enjoy the play of butterflies jockeying for position on the Joe-Pye weed and the full-throated call of the song sparrow who has claimed my meadow as his and the bright flash of the goldfinches alighting on the pink-purple wands of blazing star. Who needs a lawn when you can have all that?

Reprinted from the Bulletin of the Virginia Native Plant Society, February 2002

Doellingeria umbellata

Eurybia macrophylla

Ionactis linariifolius

The Curious Case of the Disappearing Asters

by Alan Weakley

Would an aster by any other name look as showy?

One dark and stormy night in 1994 I was awakened from a deep sleep by a loud thump. Creeping carefully down the stairs, I discovered to my astonishment that a large bouquet of *Aster* on the dining table had disappeared! In its place was a cornucopia of composites, including *Symphyotrichum, Ionactis, Eurybia, Sericocarpus, Doellingeria, Ampelaster,* and *Odemena!* Once again, a plant taxonomist had struck in dark of night, taken a simple two-syllable genus with the same English common name, and replaced it with a handful of four-and five-syllable Latin tongue-twisters. Whatever can we do about such things?

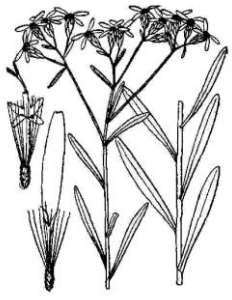
The classification of living things is based on the principle that each taxonomic unit (for instance the Composite or Aster Family, the genus *Aster,* or a species) groups together things that are most closely related to one another, and that the group should not also contain things which are disparate, unrelated, or more closely related to another group.

The concept of the genus *Aster* has had a long history of controversy and confusion. Asa Gray, the most influential nineteenth-century North American botanist, struggled with *Aster*—at all levels, from its circumscription (what to include in it), to the taxonomy of the component species. Late in his life, he wrote: "I am half dead with *Aster*. I got on very fairly until I got to the thick of the genus, around what I call the *Dumosi* and *Salicifolia.* Here I work and work, but make no headway at all. I can't tell what are species and [sic] how to define any of them ... I was never so boggled ... If you hear of my breaking down utterly, and being sent to an asylum, you may lay it to *Aster,* which is a slow and fatal poison."

Ultimately, Gray took a broad view of *Aster,* and with some uncertainty included in it many of the "segregate genera" named in the 1820s and 1830s. His view proved influential, and has generally prevailed until very recently— although Edward L. Greene, John K. Small, and others recognized many of the segregates. In the 1940s and onward, renowned composite expert Arthur Cronquist returned to Gray's broad view and even added an additional segregate, *Sericocarpus,* to *Aster.*

In the last decade, studies of the genus *Aster* have resulted in major changes in the understanding of the genus and its relatives. In 1994 Guy Nesom (currently at the Botanical Research Institute of Texas) used traditional taxonomic tools (morphology and chromosomes) to suggest two things: that Gray's broadly conceived *Aster* included disparate components that should not be grouped together, and, even more radically, that none of the American "asters" was

Oclemena acuminata



Sericocarpus linifolius

Symphyotrichum cordifolium

closely related to Eurasian asters. Many experts were skeptical, and they set about to prove Nesom wrong, using molecular and other taxonomic methodologies. All methods concluded, however, that Nesom was right: the smaller genera should be used, and North American asters are not closely related to the European genus *Aster.* Since the "type species" of *Aster* is European, the name must remain associated with Eurasia and all our species have been transferred to other genera, a taxonomic system that will be used in the upcoming aster volume of the Flora of North America and in my *Flora of the Carolinas, Virginia, and Georgia.*.

So, here is a bouquet of the new asters: climbing aster *(Ampelaster carolinianus),* stiff-leaved aster *(Ionactis linariifolius),* tall flat-topped aster *(Doellingeria umbellata),* whorled aster *(Oclemena acuminata),* common blue aster *(Symphyotrichum cordifolium),* big-leaved wood-aster *(Eurybia macrophylla),* and white-topped aster *(Sericocarpus linifolius).* Fortunately, we can appreciate our new understanding of the diversity of asters, and in common names at least, they are still "asters"!

Alan Weakley is Curator of the University of North Carolina Herbarium, a component of the North Carolina Botanical Garden. He has been researching the flora of the Southeastern United States for the last 25 years. The Garden, part of the University of North Carolina at Chapel Hill, is a center for research, conservation, and interpretation of plants, with special emphasis on plants native to the southeastern United States and horticultural plants having traditional uses or special botanical interest. For information on NCBG or the Newsletter, please see www.ncbg.unc.edu or call 919-962-0522.

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Prairie restoration

The Loess Prairie

by David Zahrt

I live on a century farm in Iowa in a house built by my great grandfather. The farm is on the west slope of a string of wind-blown hills that stretch for 140 miles along the Missouri River. To the west is the river delta; to the east the Loess Hills rise from the floodplain. A photograph of the house taken in 1895 shows the tree-less hills covered in a mixed-grass prairie, the original Loess (*wind-blown* in German) Prairie.

Some 30,000 years ago the center of the North American continent was covered with a glacier. As it moved south, the glacier ground rock to flour. Twenty thousand years ago it began to melt and recede along what we now call the Missouri River, leaving a rockpile (moraine) in my front yard! Over the next 10,000 years heavy winds lifted the rock flour and deposited it in a dirt drift over the moraine, leaving behind a thin layer of Grade A topsoil.

The vegetation that took root in these hills had to withstand harsh conditions: strong winds, minimal rainfall and blazing sun on the south and west slopes. Fire played a role in managing the prairie, keeping woody plants at bay. The native grasses and forbs have developed deep root systems from five feet to 15 feet. Not only do these roots hold water in the soil, they allow rainfall and snow melt to percolate slowly into the hills. Legumes, which contribute nitrogen to the soil, number among the plants that make up this community of diversity.

Over the past half-century intensive grazing of cattle has damaged this fragile ecosystem. When cows or sheep over-graze the prairie, the grasses no longer have enough leaf area for photosynthesis to occur, preventing them from adequately replenishing their root systems. Exotics with shallow roots such as bluegrass *(Poa pratensis),* cockleburs (*Xanthium strumarium*), bull thistles *(Cirsium vulgare),* jimsonweed *(Datura stramonium)* and hemp *(Cannabis* sp.), to name a few, quickly take hold. Many of them regenerate from seed.

Before European settlement the buffalo grazed the prairie but in a controlled fashion: they kept moving. The decimation of the gigantic buffalo herds and the suppression of the fires that had historically maintained the prairie ecology radically changed the landscape. Woody species began moving in. In the 1950s, when I left home for university, there were oak savannah, dogwood and sumac thickets with scattered walnut trees on the north slopes. I was gone for over 30 years, returning to the old homestead in 1989. By then the hills were 75% covered in trees with eastern red cedars (which confusedly bear the botanical name of *juniperus virginiana* and are more commonly known as junipers) blanketing the south and west slopes. Nothing grew under the juniper groves. On the other slopes black walnut *(juglans nigra),* burr oak *(Quercus macrocarpa),* red oak *(Quercus rubra),* elm *(Ulmus*

rubra), hackberry *(Celtis occidentalis),* ash *(Fraxinus pensylvanica),*white mulberry *(Morus alba),* ironwood *(Ostrya virginiana)* and a dense understory succeeded the prairie flora.

I launched a managed grazing program. I cut 3½ miles of electric fence line through the juniper infestation. Then I laid 2,500 feet of water line through the pasture. I pumped the water from an existing cistern 140 feet of rise to a 1,500-gallon tank that gravity-fed the water to the far end of the pasture. Then I began rotating the cattle through the pastures. After three years the paddocks, which had been dominated by thistles *(Cirsium vulgare* classified as noxious weeds in Iowa), were covered in native grasses.

Since I was out on the pasture daily from early April to late September I had the opportunity to observe the prairie in all its growth stages: vegetative, flowering, seeding and final disappearance. I began to identify the native species as coming in a procession. First comes the pasque flower *(Anemone patens)* around Easter, before anything green is up. Next come the ground plum *(Astragalus crassicarpus),* prairie dandelion *(Agoseris cuspidata),* prairie violet *(Viola perdatitifida),* prairie ragwort *(Senecio plattensis)* and both puccoons: hoary *(Lithospermum canescens)* and fringed *(L. incisum).* Throughout May I see dainty blue-eyed grass *(Sisyrinchium campestre)* and locoweed *(Oxytropis lambertii)* which causes neurological damage in animals who eat it. A host of other prairie forbs emerge at this time. In early June prairie willow (*Salix humilis*) and New Jersey tea *(Ceanothus americanus)* are blooming and some of the early grasses such as porcupine grass *(Tipa spartea)* have begun to emerge.

I was surprised to discover that many native species had survived. I decided to liquidate the cattle herd and begin the process of reconstructing tired pasture into prairie.

I scheduled Vernal and Autumnal Equinox celebrations. I invited all who would join me to help clearcut the junipers with weed-whips, snippers, chainsaws, and handsaws. Then we would stir up the bed of needles and overseed with locally collected seed. We would always conclude the day with a potluck and reflective conversation.

When I had the funds I would hire a skid loader with hydraulic shears to cut and stack the junipers. There is a limit to the extent he can climb the hillside and the remainder would have to be cleared by hand. An alternative would be to bring the bulldozer in when the ground is frozen but then the job becomes very costly in a hurry.

I have been fortunate to enlist the help of college students hired by The Nature Conservancy each summer to recover prairie. The two days of work I obtain from 10 to 12 students saves a month of work for me.

I see myself involved in three different types of prairie nurture.

1. **Protection**: designed to preserve that which has survived. This work covers about 15 acres of ridges where species of concern such as Missouri milkvetch *(Astragalus missouriensis)* and prairie moonwort *(Botrychium campestre)* grow.

2. **Restoration**: coaxing remnants back into full standing. This is done by collecting seed from the native prairie and overseeding areas that are in danger of being crowded out. Prescribed burns and mowing the unwanted annuals before they can drop seeds are part of the strategy.

3. **Reconstruction**: an attempt to convert juniper thickets or over-grazed, weed-infested cool-season grass (bluegrass) pastures by seeding them down and waiting for the prairie to succeed against the annual weeds that invariably ensue.

This last strategy can be frustrating. I am attempting to reconstruct what I label "tired pasture," land that has been managed for cool-season grasses. The result of agricultural management is that the soil is compacted so there is no soil tilth – and was likely over-fertilized both with chemical fertilizers and manure. Anecdotal evidence points to the presence of a seed bank of annuals that are not native to this region. Once the ground is disturbed, or laid fallow, and the use of herbicides is suspended, the seeds germinate.

I like to point out to visitors that Cole Porter wrote a song about the Loess Hills: "Don't Fence Me In". A line in the chorus goes: "I want to ride the ridge where the West commences" and the Loess Hills are the ridge where the West commences! The evidence? Soapweed yucca or *Yucca glauca* (whose common name derives from the fact that its roots and palm-like leaves were used as soapmaking materials by natives of the Southwest), the purple-flowered skeleton weed *(Lygodesmia juncea)* and nine-anther dalea *(Dalea enneandra*) are among the species that grow on the west slope of our hills. They are also at home in western Nebraska, Oklahoma, Arizona and New Mexico but not in central Iowa.

This leads me to conclude that even though I am frustrated by how long it is taking me to reconstruct my prairie (it took 45 years to degrade it but I want it to recover in two to three years), it is well worth the effort.

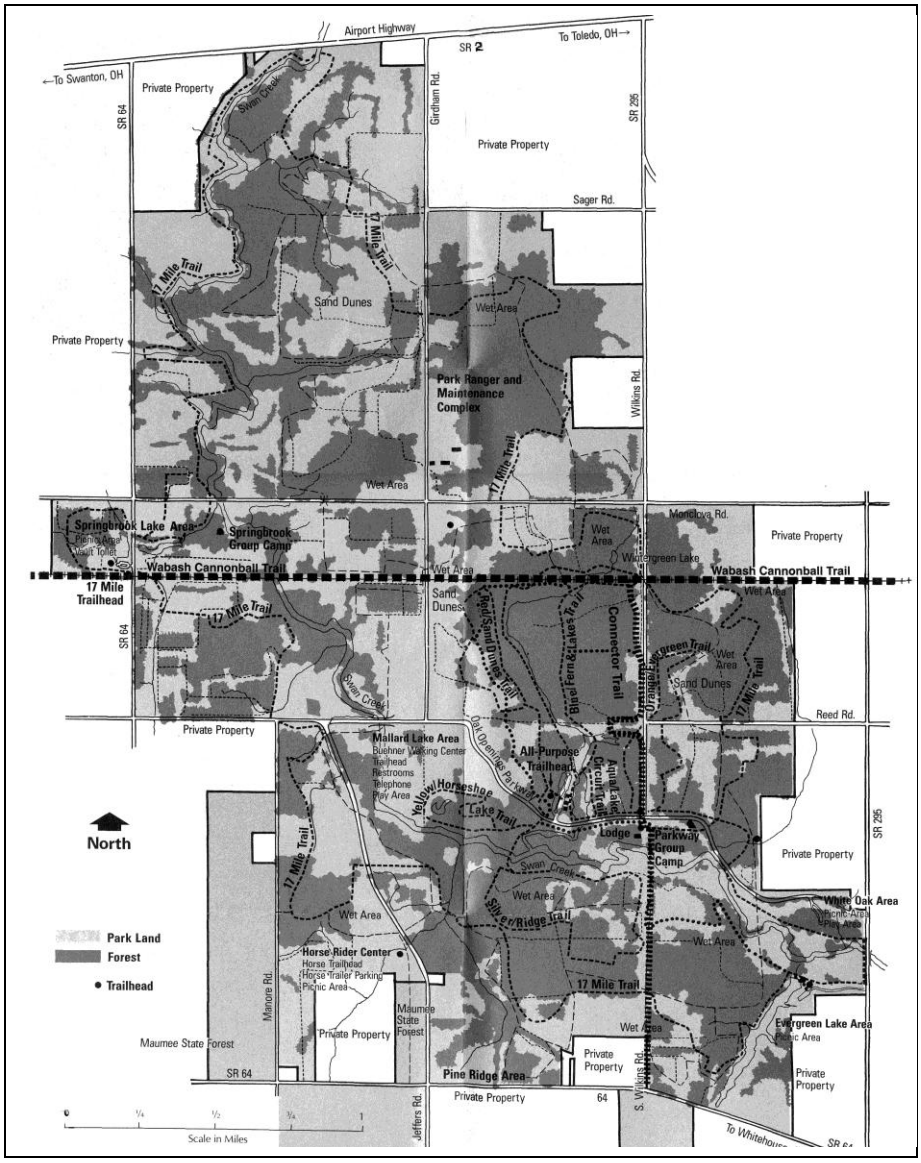
David Zahrt maintains stewardship over his fragment of the Loess Hills.
Reprinted from *The Blazing Star,* Newsletter of the North American Native Plant Society, Winter 2004

Oak Openings Preserve Metropark

At 3,693 acres, Oak Openings Preserve is larger than the eight other Toledo Metroparks combined. The nine natural area parks total more than 6,800 acres and are operated by the Metropolitan Park District of the Toledo Area, a separate political subdivision of the State of Ohio. Oak Openings offers nature enthusiasts trails of all types, a wide variety of plant and animal life, and a unique habitat for many of Ohio's threatened and endangered species.

The Oak Openings, from which the preserve takes its name, is in western Lucas County with thick, sandy soil left by ancient glacial lakes. It proved to be hospitable ground for a forest of white and black oak trees. Recent documented studies list over 1,000 different species of plants. Some are more plentiful here than elsewhere in Ohio and some are found nowhere else in the state.

The preserve is a birdwatcher's paradise: the nesting place of bluebirds, indigo buntings, whip-poor-wills and many others. Its large, roaming deer population is estimated in the hundreds. And, the varied habitats are safe haven for fox, raccoon, weasel, mink, skunk and many small animals, including the endangered spotted turtle.



In the fall, Oak Openings offers one of the area's most spectacular foliage displays. Evergreen and Springbrook Lakes are open to fishermen of all ages, while Mallard Lake may be fished by children 14 and under. There is skating on Mallard Lake when ice conditions permit.

For the walker, there are 11.5 miles of short and medium length trails and a 17-mile hiking trail. The park also has 5.5 miles of all purpose trails, 23 miles of horse trails, a 4-mile cross country ski trail and approximately 50 miles of unmarked fire lanes. The Buehner Walking Center at Mallard Lake is the origination point for most trail

The Trails

The Ferns and Lakes Trail begins at Mallard Lake, then follows Gale Run north to Beaver Lake and beyond. It offers opportunities for wildlife sighting and passes through large patches of ferns, a stand of wild black cherry trees, spicebush and many other plants which thrive in rich, moist soil.

The Ridge Trail circles south from the Walking Center. It takes walkers across and along Swan Creek's banks, then up to higher elevations and finally along a ridge overlooking the creek's floodplain. This trail passes through native growth and an area where vegetation planted by early homesteaders still grows.

The Sand Dunes Trail to some extent parallels the Ferns Trail, but traverses higher ground. It passes through the largest of the open sand dunes and allows visitors to see how the sand is spilling over the east and southeast, smothering vegetation, thereby proving sand dunes actually move. Some of the park's rarest plant species can be found along this trail near the dunes.

The Evergreen Trail begins at Oak Openings Lodge and goes through large stands of non-native red and scotch pines, spruce and fir, as well as open areas and small sand dunes. Some red pines have died from disease and insect infestation caused by overcrowding. Most of the scotch pines are dying of old age at 55-60 years. Since they are not native trees, seedlings won't be planted and the area will return to its natural state. The evergreens offer good opportunities for sighting owls and red squirrels, while deer can be spotted on occasion in open areas. Some of the park's most beautiful colonies of lichens and moss can be seen here as well.

The Horseshoe Lake Trail goes west from the Walking Center through a mixed hardwood forest and circles Horseshoe Lake. This is an excellent trail for viewing animals and birds, including deer, and hooded and Kentucky warblers.

The Lake Circuit Trail around Mallard Lake is handicapped accessible. An observation deck on the west shore provides close-up views of the ducks which frequent the lake.

Other Trails

The 17-mile yellow-blazed hiking trail encircles the entire park and gives hikers access to virtually all the features of the other trails. Access to the trail can be made from the Mallard Lake area, as well as the Springbrook, Evergreen Lake, and White Oak picnic areas. Many hikers find it enjoyable to explore the 17-mile trail in a leisurely 2 days. There are 5.8 miles of stone-surfaced multi-purpose trails, the longest in the Metropark system. One connects Mallard and Evergreen Lakes, while the 3-mile loop passes the sand dunes.

Twenty-three miles of horse trails allow riders to traverse all sections of the preserve, except the Mallard Lake Trail system and formal picnic areas where horses are prohibited. The new Horse Rider's Center located on Jeffers Road, just north of Route 64, offers a large trailer parking area, picnic area and shelter with water, grills and vault rest rooms. A hitching post and watering tank are available.

A special four mile ski trail, groomed for cross-country skiers only, originates at Evergreen Lake. A shelter at the half-way point has rest rooms and, most times, a warming fire. For daily skiing conditions, call the Metroparks SNOWIine at 382-7669.

Special Projects

Oak Openings Preserve supports a substantial number of species considered endangered or threatened by the Ohio Department of Natural Resources and in some cases, the federal government. The Metroparks naturalist staff conducts rare species monitoring, particularly in the oak savannah and prairie areas. Recently, several endangered plants and insects have been discovered: Skinner's foxglove; Sundews, a tiny, carnivorous plant; Unexpected cycnia, a small moth; and Frosted elfin and Persius dusky-wing, both rarely-seen butterflies. Naturalists are also monitoring several animals in the preserve — lark sparrows, salamanders and rare turtles.

Oak Openings Preserve Metropark 4139 Girdham Rd., Swanton, Ohio 43558 Telephone (419) 826-6463
Metroparks Administrative Offices, 5100 West Central Ave., Toledo, Ohio 43615; Telephone (419) 535-3050

Reprinted from *Oak Openings Preserve*, a brochure published by the Toledo Area Metroparks, 2001.

William C. McCoy Honored

William C. McCoy, Cleveland Museum of Natural History Trustee and patron donor of the NPS, was recently honored by the Museum with the re-naming of Pymatuning Fen in Ashtabula County. The Fen is now called William C. McCoy State Nature Preserve. This a fitting honor for a gentleman who has devoted much of his life to preserving Ohio's natural wealth. McCoy began his relationship with the Museum early in life when he developed a bee exhibit for them. He still has an extensive apiary which he tends.

McCoy and Sterling Newell teamed up to loan money to the Museum to buy the Fen until Jim Bissell could raise the funds to purchase it outright. The Fen is home to 13 rare plant species including five that are endangered. In addition, a rare dragonfly, a federally endangered clubshell and a number of threatened and endangered birds are resident in the Fen. This area is accessible only by permit and is closely watched by the adjacent neighbor.

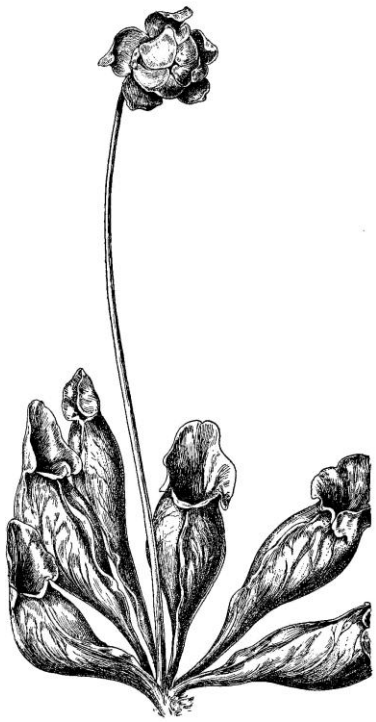
Mr. McCoy's son is vice-president of the California Native Plant Society so the apple didn't fall far from the tree. The Native Plant Society salutes William C. McCoy and is proud to have him as a member. *A.M*

NORTHERN PITCHER PLANT

Gordon Mitchell

All plant species have leaves that are of unique sizes and shapes, specific to that species. Those leaf sizes and shapes are usually present upon that plant for a specific purpose.

Those leaves are usually present on any plant species for the purposes of absorbing sunlight for photosynthesis and of producing sugars for that plant. However, some plant species have leaves that are adapted for other purposes as well, such as catching and digesting insects. These insects provide supplemental nutrients for the plant in a nutrient-poor environment. Such plants are called carnivorous or insectivorous plants. One such plant species is the Northern Pitcher Plant (*Sarracenia purpurea* L.)



The Northern Pitcher Plant is a member of the Pitcher Plant Family (*Sarraceniaceae*). The generic name, *Sarracenia*, is named for Dr. Michel S. Sarrazin (or Sarrasin), the 17th and 18th Century French physician and botanist and the Father of Canadian science. Dr. Sarrazin, who was living in Quebec, sent some samples of this plant to French botanist Joseph Pitton de Tournefort in France in 1701. Tournefort subsequently named the plant after Sarrazin. The specific epithet, *purpurea*, is either Greek or Latin for "purple". Previous scientific names for this plant have been *Sarazina gibbosa* Rafinesque, *Sarracenia gibbosa* Rafinesque, *Sarracenia heterophylla* Eaton, and *Sarracenia terrae-novae* (Bachelot de la Pylaie) C. R. Bell.

At different times and places, other common names for this plant have been Adam's Cup, Adam's Pitcher, Bog Bugle, Devil's Boot, Dumb, Dumb Watches, Eve's Cup, Fever Cup, Flytrap, Forefather's Cup, Forefather's Pitcher, Foxglove, Frog Bonnet, Frog's Britches, Hollow Leaved Lavender, Hooded Pitcher Plant, Huntsman's Cup, Indian Cup, Indian Jug, Indian Pipe, Indian Pitcher, Indian Teakettle, Meadow Cup, Pitcher Plant, Purple Pitcher Plant, St. Jacob's Dipper, Sidesaddle Flower, Skunk Cabbage, Smallpox Plant, Soldier's Drinking Cup, Sweet Pitcher Plant, Trumpet Pitcher, Watches, Water Cup, Whippoorwill's Boots, and Whippoorwill's Shoes.

How the Northern Pitcher Plant Catches an Insect

The insect is caught in the modified leaf of the Northern Pitcher Plant. The interior of this leaf is actually composed of many levels or zones, numbered from the top to the bottom. Both the 19th Century British botanist, Sir Joseph Hooker, and 19th Century American botanist, Francis Ernest Lloyd, made extensive studies of each of these zones.

Zone 1: Zone 1 is on the underside of the leaf's erect, flap-like lid or hood. This hood, which does not cover the leaf's tubular opening, has red venation and is lined with recurved (downward-pointing) hairs that surround the nectar glands. It is the nectar and the red color that initially attract the insect to the leaf. An insect will land upon the hood to drink the nectar. Because of the recurved hairs, the insect can only move downward, not upward. The insect may step upon the recurved hairs, which exude numbing secretions, and then fall into the water within the tubular leaf and drown.

Zone 2: Zone 2 is the shortest zone. It has many nectar glands and downward cell protrusions. This zone has a rolled leaf margin or lip with a smooth surface.

Zone 3: Zone 3 is the longest zone. Its inside walls are smooth and waxy. This zone also has digestive glands that secrete the acids and enzymes needed to break down the insect's soft tissue. The water in the tube contains the anaerobic and nitrogen-fixing bacteria, *Rhodopseudomonos palustris*, and the various enzymes. The initial enzymes present are invertase and protease. Later enzymes, which are needed for breaking down the carbohydrates, fats, and proteins, are mylase and lipase.

Zone 4: Zone 4 is the digestion and absorption zone. This zone has the absorption glands. Its inside surface also has recurved hairs to prevent the insect from escaping. Specialized cells, located at the bottom of this modified leaf, absorb the nitrogen from the digested insect.

Zone 5: Zone 5 has smooth and glossy inner walls. This is the only *Sarracenia* species that has a fifth zone. This zone seems to have no known function. The bottom of this zone is a narrow stalk containing a black mass of the undigested chitinous exoskeletons of the insects.

There are some insect species that remain in the leaf tube's water their entire lives. These species do not drown and they are immune to the plant's acids and enzymes. These insects are there to prey upon other insects that have fallen into the leaf tube. This sort of biological relationship between the swimming insect (1st species) and the plant (2nd species) is called commensalism. This is where the first species benefits from a second species while that second species is neither benefited nor is harmed by the first species.

Other Uses Of the Northern Pitcher Plant

Although the Northern Pitcher Plant does digest insects, it did have some medicinal value for both the Native Americans and the early Europeans. The plant was used as a diuretic, a febrifuge, a purgative, and as a tonic.

A leaf tea was used for treating chills, fevers, and shakiness. A root tea was used for treating childbirth problems, liver ailments, memory loss, respiratory ailments, stomach ailments, and smallpox. Some people even considered the teas to be a narcotic.

Many Native Americans and a few settlers believed that this plant would prevent, cure, or even lessen the effects of smallpox. Dr. Michel Sarrazin had tried to treat smallpox with this plant. In 1861, Dr. W. Morris, a British physician, had tried unsuccessfully to promote that belief. After several years of debate, medical science finally disproved that belief.

Some tribes drank the water from the leaf. These tribes believed that the water from the leaf was safer to drink than the water from the bog or fen.

The Northern Pitcher Plant contains other chemicals, some of which are harmful to humans. Such chemicals are acrylic acid, sarracenic acid, the alkaloid sarracenin, and the glucoside meliatoside.

Description Of the Northern Pitcher Plant

Perennial. This plant reaches full maturity within 5-8 years.
Height: 8-24 inches.
Stem: Leafless.
Leaves: Basal rosette. Each plant may have up to 8 leaves at one time. Each leaf is decumbent (reclining), is about 4-17 inches long, is keeled or winged, has red-green or bronzed veins, and is cup- or pitcher-shaped, curved, hollow, inflated, or tubular. About ½ of the leaf is filled with rainwater. These leaves turn red in the fall and then back to green in the spring. During the winter, the water within the leaf may freeze but that it won't harm the leaf.

When a leaf ages, its nectar glands lose their ability to produce nectar. The younger leaves will usually attract more insects than the older leaves.

When a leaf finally dies it falls off the plant and a new leaf usually appears directly opposite the dead leaf in a radiating leaf cluster. The petiole base of a new leaf may surround both the stem and the bases of the older leaf petioles. In the spring, a leaf may be replaced upon a single plant once every 10-14 days
Flowers: Purple-red or maroon. Solitary. Located at the top of the stem. About 2-4 inches wide. Radially symmetrical. Nodding. Globular. Each flower has 3 bracts, 5 folded papery petals with each petal being about 2 inches long, 4-5 red-green sepals with each sepal being about 1½ inch long, 12 or more yellow-anthered stamens with short filaments, and a flattened pistil with a 5-sided umbraculated (umbrella-shaped) style that is about 3 inches wide. The sepals and the style may remain on the flower throughout the winter. However, the petals do not stay on the flower for very long.

This flower is fragrant, but may change its fragrance throughout a single day. The flower is also insect-pollinated. Flowering season is usually May to August.
Fruit: Capsule. Each capsule is brown or tan, has a granular surface, and has about 5 chambers. These capsules may persist on the plant throughout winter.
Seeds: The seeds are small, brown, and are oval with a narrow ridge or wing along one of the margins. The winged ridge facilitates wind dispersal of the seeds. These seeds require a deep freeze to break their dormancy.
Rootstock: Horizontal. Stout. This plant can reproduce vegetatively.
Habitat: Acidic bogs or alkaline fens, usually with a pH of 5-9.
Range: New England, Great Lakes area, Atlantic coast, and eastern Canada. It is the most widespread of all of the *Sarracenia* species. It is also the provincial wildflower of Labrador and Newfoundland.

Gordon Mitchell works for the Columbus, Ohio, Metroparks and is a member of the Columbus Native Plant Society

.Cuyahoga Valley National Park – Invasive Plant Removal

The Exotic Plant Management Volunteer Program is an opportunity for people of all ages to assist the staff of Cuyahoga Valley National Park in removing exotic, invasive plant infestations. Invasive plant and animal species are the second leading cause for species being listed under the federal Endangered Species Act (habitat loss is #1). Help the Science and Resource Management Division inventory, monitor, and remove exotic plant infestations that threaten native plant & animal habitat.

Here are the Invasive Plant removal work session dates for Cuyahoga Valley National Park. All of these work sessions are open to the public - no pre-registration required. Volunteer Agreements and Parental Approval Forms (for participants under 18) are available for new volunteers to sign at the beginning of the work session. We provide tools and gloves and teach invasive plant identification. Please join us at one (or more) of the following work sessions:

September

6 Salt Run, 9 a.m. to noon
8 Ledges, 9 a.m. to 11 a.m.
15 Salt Run, 9 a.m. to noon
17 Ledges, 9 a.m. to 11 a.m.
21 Stumpy Basin (Lock 29), 9 a.m. to 11 a.m.
24 (National Public Lands Day) Happy Days Visitor Center, 10 a.m. to 1 p.m.
27 Salt Run, 9 a.m. to noon
30 Stumpy Basin (Lock 29), 9 a.m. to 11 a.m.

Meeting Locations:

Happy Days Visitor Center, 500 W. Streetsboro Road (SR303), 1 mile west of SR8 in Peninsula.
Ledges Invasive Crew meets at the Ledges Parking Lot off of Truxell Road. For more information call Christine Freitag at (330) 864-2209.
Salt Run Invasive Crew meets at the Pine Hollow parking lot off of Quick Road. For more information call Bob Wunderlich at (330) 689-1178.
Stumpy Basin Invasive Crew meets at the Lock 29 parking lot off of Mill Street (in Peninsula). For more information call Christine Freitag at (330) 864-2209.

Volunteers are also needed to lead invasive plant management crews. Contact Science and Resource Management Staff at (330) 342-0764 ext. 5 for more information.

Laura K. Elze, Biological Science Technician
Cuyahoga Valley National Park
Science & Resource Management
15610 Vaughn Road, Brecksville, Ohio 44141-3018
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New England Aster *(Aster novae-angliae)*

by Tom Swinford

A Sunday drive through the Indiana countryside offers rich vistas of blazing red-yellow maples, wine-colored oaks, and burnished gold tulip trees. Old fields filled with New England asters and Canada goldenrod glow in the late afternoon sun as buzzy nectar- and pollen-greedy insects careen from flower to flower. It is a time of universal unease, a certainty in uncertainty. Cool nights and shortened days trigger a period of intense activity as organisms convene the season's business and urgently prepare for the long, dark months ahead. Humans are not immune, as the state parks and nature preserves fill up with cars and visitors hurrying to celebrate, and remember, the passing of yet another summer in our lives. Things may never again be the same. Change is sweeping our world.

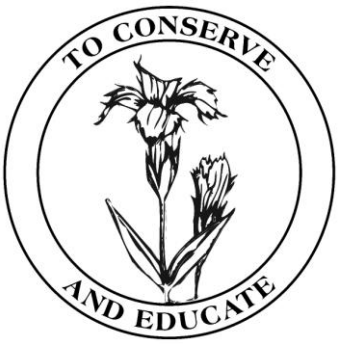
Perhaps as a gift of comfort and appreciation, a plant of unmatched beauty, yet familiar form, accompanies us nearly everywhere our out-door activities may take us. This plant is the New England aster, common in sunny, open habitats throughout much of Indiana.

True to its name, the New England aster belongs to the aster family of plants, that mega-family which includes many of our most familiar plants including sunflowers, asters, goldenrods, daisies, thistles, dandelions, and joe-pye weeds.

A horticulturist could not have created a more showy plant than the New England aster, a large robust plant of graceful form and abundant large flowers of a gorgeous deep purple hue arranged in a spray as if presented as nature's own bouquet.

Preparing this article I reviewed several old wildflower guides. There were the typical, vague accounts of use of the New England aster for "food, medicine" by the pioneers and Native Americans. In one battered old hardcover I found a more satisfying account of the use of the New England aster by the Native Americans as a "charm." I have known the attraction and delight of this aster and the magic of a golden fall day.

Thomas 0. Swinford is Regional Ecologist for the Division of Nature Preserves, Indiana Department of Natural Resources.,
Reprinted from the *Indiana Native Plant and Wild/lower Society News,* Autumn 20



Chapters of the Ohio Native Plant Society

Cincinnati Wildflower Preservation Society
Dr. Vic Soukup
338 Compton Road
Wyoming OH 45215
513-761-2568

Central Ohio Native Plant Society
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Native Plant Society of the Miami Valley
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- Encourage surveys and research on natural plants and publication of the information
- Promote cooperation with other programs and organizations concerned with the conservation of natural resources

On The Fringe

In this issue:

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