



On The Fringe

Journal of the Native Plant Society of Northeastern Ohio

ANNUAL DINNER

Friday, November 7, 2003

At the Cleveland Museum of Natural History

Socializing and dinner: 5:30

Lecture by Ann Haymond Zwinger at 7:30

“Land Beyond the Trees: The American Alpine Tundra”

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

LAND ABOVE THE TREES: THE AMERICAN ALPINE TUNDRA

Ann Haymond Zwinger, the Museum’s Explorer speaker and our Annual Dinner guest on November 7th, is a woman of many talents, but her greatest achievement may well be her cogent defense of the natural world. She is an intrepid explorer who knows no fear of animal, insect, weather or terrain (“I attempt to roll up my bedroll without too many scorpions trapped in it”). She spends days and weeks alone in inhospitable lands with a complete sense of self-assurance. When Zwinger speaks, one listens intently, for her sentences convey a sense of being there with her, in that exact place and time, of seeing every detail down to the smallest living thing. She is an artist whose drawings illustrate many of her books, but they run a faint second to the literary artistry of her words. Whether she is in the alpine tundra, in a canoe on the Green River, alone in the Sonoran Desert, or simply at home at Constant Friendship, she sees the minutiae of the world around her and conveys it to the reader.

Ann Zwinger was born in Muncie, Indiana, her father a lawyer who instilled in his daughter an ecological awareness, her mother an artist who encouraged Ann’s artistic bent. She graduated from Wellesley College with a degree in art history and continued with a master of art degree from Indiana University. In 1952 Ann married Herman Zwinger, an air force pilot, and raised three daughters, one of whom has followed in her footsteps. Upon Herman’s retirement the family settled in Colorado Springs and eventually bought Constant Friendship in the foothills of the Front Range. In a recent communication with her, she writes “It is such a joy to have been up here long enough, 40 years, to recognize the patterns and patters and tatters of the seasons”. This is her life: seeking, searching, seeing, and capturing it all in her words and in her drawings. The following bibliography contains a winter’s pleasurable reading.

Thus was born the seed for the first book, *Beyond the Aspen Grove* (1970). “Forty acres of land [Constant Friendship] in the Colorado Rockies are Ann Zwinger’s subject in prose and drawing. There, 8300 feet above sea level, summer is short and winter long and often harsh; it is a place where much of life exists on the margin. In good years the grasses are lush; in bad years, even the mice starve. But it is a land the Zwingers have lovingly explored and recorded, careful not to disrupt the balance of the land, the relationship of plant to animal and of each to its environment”.*

Her second book is *Land Above the Trees*, A Guide to the American Alpine Tundra (1972). “This beautifully illustrated volume...is the first comprehensive book on the ecology of the alpine tundra of the United States, the area above the tree limit which occurs on many western ranges and on the Presidential

peaks of New Hampshire's White Mountains. Mrs. Zwinger's vivid descriptions of geological and soil formations, the sudden and terrifying onslaught of a June snowstorm accompanied by thunder and lightning, the breathtaking beauty of a Muir primrose, and the relatively few animals and birds which have adapted themselves to survive in the harsh environment are based on many hours of personal observation and extensive research".*

The next book was *Run River Run: A Naturalist's Journey Down One of the Great Rivers of the West* (1975). "The Green River runs more than 730 miles from its source in Wyoming's Wind River range to its confluence with the Colorado River in Utah's Canyon Lands National Park. Ann Zwinger has covered every mile of the river – on foot, by canoe or river raft, or from the air – and she has made exquisite use of her extraordinary descriptive powers to immerse the reader in the sights, smells and sensations of a beautiful region. Transported by her narrative and evocative drawings, we ride the rapids over dangerous rocks, observe the wildflowers, animal life and geological formations along the river's shore and relive the history of Indians, fur trappers and homesteaders of the past".*

The fourth book in Zwinger's exploration of the West's natural heritage was *Wind in the Rock* (1978). In *Wind in the Rock* naturalist Ann Zwinger explores, mostly on foot, the five canyons of the Grand Gulch Plateau which empties into the San Juan River in southeastern Utah, not far above its confluence with the Colorado. Illustrated with dozens of the author's enchanting drawings the book recounts the area's history, evokes the dramatic moon-like landscape, describes the plants, animals and insects that survive in the arid climate, and captures moments of terror and euphoria one experiences in this inhospitable land with its silence, its aura of timelessness...its beauty and blessed solitude".*

Writing with Edwin Way Teale, *A Conscious Stillness: Two Naturalists on Thoreau's Rivers* (1982) Zwinger journeys to the East for her next book. "Over a period of several years, together and separately, they visited Concord, canoed and walked beside its rivers in all seasons [the Sudbury and Assabet] noting, photographing, and sketching the flora and fauna, and sharing their thoughts and concerns. The stimulating result is a mingling of two eloquent voices about a historically and ecologically fascinating area".*

The next adventure was to *A Desert Country Near the Sea: A Natural History of the Cape Region of Baja California* (1983). "For fifteen years Ann Zwinger has been visiting the southern tip of Baja California. Captivated by the area's harsh beauty, its dramatic contrast of arid desert and tropical sea, she has climbed its rocky, 5,000 foot mountains, explored its great variety of beaches and tidepools, trekked through miles of its cactus-covered low country, and come to know the people who live there and their turbulent history".*

Continuing her exploration of the West, Zwinger wrote *The Mysterious Lands: A Naturalist Explores the Four Great Deserts of the Southwest* (1989). "The American West is composed of many mountain ranges, endless prairies, and four great desert regions – vast magic lands that time forgot. All four are living deserts and support extraordinary varieties of strange, highly adapted creatures and plants. Zwinger takes the reader far inside each desert – The Chihuahuan, the Sonoran, the Mojave, and Nevada's Great Basin – and observes everything: from the giant saguaro cactus in one desert to the strange lives of pack rats in another".*

Downcanyon: A Naturalist Explores the Colorado River through the Grand Canyon (1995) is a trip that many of us would dream about taking. "Teamed with scientists and other naturalists, Zwinger was part of an ongoing study of change along the Colorado. In all seasons and all weathers, in almost every kind of craft that goes down the waves, she returned again and again to explore, look, listen. Zwinger's book begins with a bald eagle count at Nankoweap Creek in January and ends with a subzero, snowy walk out of the canyon at winter solstice. Her eye for detail catches the enchantment of small things played against the immensity of the river: the Gatling-gun love song of tree frogs; the fragile beauty of an evening primrose; ravens 'always in close attendance, like lugubrious, sharp-eyed, nineteenth-century undertakers'; and a golden eagle chasing a trout 'with wings akimbo like a cleaning lady after a cockroach'".*

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Last in this particular series of books, *The Nearsighted Naturalist* (1988), is a series of essays spanning Zwinger's career. "From the Indiana landscape of her youth to her Colorado mountain retreat, from Arizona's Aravaipa Canyon to New Zealand's Kapiti Island, Zwinger leads an ever-widening armchair tour of natural places both ordinary and astonishing. Whether anticipating the first day of spring or seeing the elegance of the subtle gray-brown hues of a moth's papery wings, Zwinger's trademark eye for detail brings the landscape alive".*

*Indicates text was taken from the books' dust wrappers.

In 1986 Zwinger became interested in John Xantus and unearthed archives at the Smithsonian that allowed her to document Xantus' trials and tribulations in the field while exploring flora and fauna of the Southwest. She was also able to describe his somewhat questionable character and outlines the apparent contradictions between Xantus' personal and professional lives. The two titles *John Xantus, The Fort Tejon Letters 1857-1859* and *Xantus, The letters of John Xantus to Spencer Fullerton Baird 1859-1861* make fascinating reading about a time and place long gone.

In 2000, Ann Zwinger was asked to spend a week at Hedgebrook, a writer's retreat on Whidbey Island in Puget Sound. Here she wrote *Shaped by Wind and Water: Reflections of a Naturalist* (2000), part of the Credo Series. In it she expresses her philosophy regarding her writing career and as a naturalist. It closes with a fine biography of her by Scott Slovic. Anyone wishing to learn more about her life is directed to this book.

Further reading may be found in the following books in which she supplied the text for various photographers:

- Colorado II* with world-famous photographer David Muench (1987)
- Aspen: Blazon of the High Country* with Barbara Sparks (1991)
- Women in Wilderness* with Susan Zwinger (1995)
- Yosemite: Valley of Thunder* with Kathleen Norris Cook (1996)
- Portrait of Utah* with David Muench (1999)
- Fall Colors Across North America* with Anthony Cook (2001)
- Colorado* with Marc Muench (2001)

She has also written many forewords, essays within anthologies, magazine articles and introductions for acclaimed writers.

Her honors are numerous but it is worth mentioning that she received the John Burroughs medal for *Run River Run*; a National Book Award nomination for *Land Above the Trees*; the Sara Francis Chapman award from the Garden Club of America; and three Doctor of Humane Letters degrees.

Ann Malmquist

Fall Program Schedule

Sept. 21, Sun., LATE SUMMER BOTANIZING THE BEACHES OF ASHTABULA COUNTY Bob Bartolotta of the Cleveland Museum of Natural History will lead this trip being done in conjunction with the Ohio Lake Erie Commission "Coastweeks." Sea-rocket, Seaside-spurge, Beach-grass, Beach-pea and Cocklebur are just a few of the unusual plants growing on the beaches of Ashtabula County. Stops will include Conneaut Park Bathing Beach in Conneaut, Walnut Beach in Ashtabula and Geneva State Park in Geneva-on-the-Lake. Bring lunch, beverages and snacks, and plan on spending the entire day along the shoreline of Lake Erie in Ashtabula County. Call Jean Roche to register and receive a map to meeting spot. **Ashtabula, Conneaut 9:00 am – ? pm**

DRIVING DIRECTIONS: We encourage people to carpool. Meet at McDonald's, 312 State Street (between Sandusky Street and Buffalo Street), Conneaut, Ohio 44030. For most participants the directions will be to follow I-90 East to the State Route 7 exit in Conneaut (this is the easternmost exit in Ohio on I-90). Turn left at the top of the exit ramp and follow SR 7 North (becomes Mill Street in town) for two miles crossing Liberty, Main, Monroe, and State (may be one way westbound) Streets to Madison Street, turn right onto Madison and travel two blocks to the side entrance of McDonald's. From here we will drive toward the lakeshore at either Conneaut Harbor or Lakeview Park (they are next to each other), then follow State Route 531 west to Ashtabula to

visit Walnut Beach at Lake and Walnut Streets (Hubbard House Underground Railroad Museum is at this corner and just down Walnut Street to the east is the Maritime Museum). From here we will work our way back to SR 531 and travel west to the Geneva State Park area. This should make for a full day. Maps of the three beach areas will be provided to participants.

Oct 11, Sat.: FALL FOLIAGE IN THE WEST WOODS

Join Judy Barnhart, Native Plant Society Board member and Geauga Park District naturalist for an exploration of this more remote section of the 900 acre West Woods. Sandstone outcroppings, a waterfall and forests full of sweet smelling cherry birch are just a few highlights of this rich natural area. Directions: Take St. Rt. 306 south of Rt. 87 approximately 1/2 mile to a narrow drive on the east side at 15139 Chillicothe Rd. Follow drive past power line opening until reaching house. Call Judy to register: 440-564-9151 (H) or 440-286-9504 (W). **The West Woods 9:00 am**

Nov. 7, Fri.: ANNUAL DINNER with speaker Ann Haymond Zwinger -The American Alpine Tundra. See page 1 for details

Jennings Woods Field Trip

On July 19 Jason Hopkins led a tour of the property he has been studying as a botany graduate student at Kent State. Jason is the 2002 recipient of the NPS annual grant. We were fortunate to have a bright, cool morning with a north breeze which tempered the enthusiasm of the mosquitoes a bit. We met in Kent and carpoled to the Ravenna site, since parking was limited. The trail along the gas pipe line was wet from recent rains and lush with plants from a seedbank recently released from the forest. There was a nice patch of dodder weed near the road, noticeable by its orange viney stems. Wood frogs were just emerging, and in places we had to walk with care to avoid stepping on them. There were many kinds of sedges. Jason pointed out one with viviparous offspring, that is, with little plants at the top like a spider plant. At the back of the property we saw the buttonbush swamp, too full of water to inspect the plants closely.

We walked back through the woods, seeing the remnants of a healthy population of spring ephemerals. From the trillium leaves present one could deduce that the deer population is not yet wholly out of control here. There were large tracts of foam flower leaves, some mayapples (a few with fruit), and solomon's seal.

The woods was memorable as an example of good woodland husbandry, something we don't see much in a land of developers and clear-cutting. The property had belonged to a man with a sawmill who made his living harvesting hardwoods sustainably. Here, 35 years after his death was a population of well-spaced, mixed lumber-grade trees, rising branchless for 40 feet and topped with a dense leaf canopy discouraging under story growth. At this time of year the forest floor was clear and open, with little dead wood to obstruct passage. There were many hickories (shagbark and pignut), oaks, and various "whitewoods": tulip, cucumber, basswood.

The most interesting tree was not a lumber candidate. It was a huge sycamore growing on the bank of the West Branch of the Mahoning which runs along the east side of the property. The tree grows out over the creek at about a 50-degree angle, counterbalanced by several large branches springing from its trunk that have grown back toward the forest. The tree is at least four feet in diameter and is probably very old, though no data are available on its exact age.

RARE PLANTS ON OHIO'S WILDLIFE AREAS

by Jennifer L. Windus

Jennifer Windus is a Program Administrator in the ODNR Division of Wildlife, Wildlife Management & Research Group in Columbus. Since she joined the Division in February 2002, one of her job duties has been to evaluate the status of Federal and state-listed plants on wildlife areas.

Rare plants on wildlife areas? State wildlife areas have populations of rare plants? Aren't wildlife areas just for hunting and fishing in Ohio? Many people do not realize that the Ohio Department of Natural Resources, Division of Wildlife manages approximately 100 wildlife areas in 78 counties in Ohio. The Division owns almost 175,000 acres and leases another 58,832 acres for management. Therefore, over 233,000 acres are managed as wildlife areas in Ohio. In addition, the Division has hunting agreements on more than 81,000 acres. The mission of the Division is to *conserve and improve fish and wildlife resources and their habitats, and promote their use and appreciation by the people so that these resources continue to enhance the quality of life for all Ohioans.*

Ohio's wildlife areas contain a diversity of plants and animals. While wildlife areas range in size from 40 to 20,000 acres, they are scattered throughout the state in a wide range of habitats. Therefore, it should not be too surprising that there are more than 300 records of Federal and state-listed rare plants on wildlife areas. More than 200 of these records are more than 10 years old, meaning that few recent plant surveys have been conducted on wildlife areas. In addition, many of the records are from the 1960-1970s with poor locational information, making relocation challenging. The 300 known plant records are from 47 wildlife areas, so many wildlife areas either have not been surveyed or they do not have appropriate habitat for rare plants. Many changes (e.g. natural succession, facility development, wetland and grassland establishment) have occurred on wildlife areas as well, so some of the rare plants may no longer exist on the sites.

When I joined the Division of Wildlife in February 2002, one of my job duties in the Wildlife Management and Research Group is to attempt to relocate records of Federal and state-listed plants on wildlife areas, particularly the endangered and threatened species which have legal status in Ohio.

These records were obtained from the Division of Natural Areas and Preserves' Natural Heritage Database. The Division of Wildlife also contracts with interested, qualified botanists to relocate the rare plants, as 300 records is a lot for one person to manage. The hope is to relocate as many of the endangered and threatened plants as possible and evaluate necessary habitat management to maintain as many as possible, depending on the goals for their locations within the wildlife areas.

A few plant surveys were conducted on wildlife areas funded by the Division during 1994-2000. These included Killdeer Wildlife Area by Barbara Andreas and John Furlow in 1994-97, Grand River Wildlife Area by Jim Bissell in 1998-99, and Killbuck Marsh Wildlife Area by Barbara Andreas in 1998-2000. In 2002-03, the Division contracted with four more botanists to survey nine wildlife areas: Indian Creek and Rush Run Wildlife Areas by Marjorie Becus, Cooper Hollow and Liberty Wildlife Areas by Allison Cusick, Spring Valley Wildlife Area by David Dister, and Acadia Cliffs, Brush Creek, Tycoon Lake, and Waterloo Wildlife Areas by Marilyn Ortt. The primary focus of these surveys was to relocate records of state-listed plants, take GPS readings of their locations, and make comments regarding necessary management. In many cases, ongoing grassland and wetland management on the wildlife areas, such as prescribed burning, mowing, control of invasive plants, and herbicide application has maintained excellent populations of rare plants.

My plant surveys in 2002 focused on those wildlife areas with the most number of state-listed plant species including Resthaven (35 species), Magee Marsh (14 species), Green Island (7 species), Tranquility (5 species), Aquilla Lake (5 species), Hambden Orchard (5 species), and Kuehnle on Middle Bass Island (5 species). I also continued long-term survey and monitoring projects for the Eastern prairie fringed orchid at Killbuck Marsh, Pickerel Creek, and Mallard Club Wildlife Areas.

Resthaven Wildlife Area, now over 2,200 acres, is part of what was originally a wet marl prairie or fen known by the early settlers as the "Castalia Prairie". Although much of the area was disturbed by mining for marl before purchase by the Division of Wildlife in 1942, it still maintains a high diversity of plants and animals including 113 records of state-listed plants dating from 1966 to 1998. I was able to relocate 9 sites for the state endangered small white lady's-slipper (*Cypripedium candidum*) and estimate over 3,500 flowering plants at Resthaven, including several hybrid plants (between the small white and small yellow lady's-slipper). I also relocated twig-rush (*Cladium mariscoides*), the threatened Kalm's St. John's-wort (*Hypericum kalmianum*), the potentially threatened prairie rattlesnake-root (*Prenanthes racemosa*), the state threatened hoary willow (*Salix candida*), narrow-leaved bluets (*Hedyotis nigricans*), and the potentially threatened rock sandwort (*Arenaria stricta*). I plan to do more detailed monitoring of the small white lady's-slipper populations and survey for records of other endangered and threatened plants this year.

Green Island and Middle Bass Island were two of the more exciting trips I made to wildlife areas last summer, both accompanied by Allison Cusick who was a big help. Green Island had records for 7 state-listed plants dating from 1966 to 1998. We were able to relocate the state endangered harebell (*Campanula rotundifolia*), a few plants of the state threatened tufted fescue sedge (*Carex brevior*, a 1967 record), a number of non-flowering plants of the state threatened Sprengel's sedge (*Carex sprengelii*, a 1966 record), about 30 state threatened rock elm trees (*Ulmus thomasii*), numerous state endangered northern bog violets (*Viola nephrophylla*), as well as a new record for the elegant sunburst lichen (*Xanthoria elegans*, status undetermined). We did not find snowberry (*Symphoricarpos albus* var. *albus*, a 1966 record) or rock sandwort (a 1968 record). Unfortunately much of the island is impacted by invasive plants such as tree-of-heaven, garlic mustard, Amur bush honeysuckle, common buckthorn, and periwinkle. We also found Lake Erie water snakes

(Federally threatened and state endangered) that day which were thought to no longer occur on the island, so it was a rewarding trip. Kuehnle Wildlife Area on Middle Bass Island (also known as Haunck's Pond) was less rewarding as the pond, the main feature of the small 20-acre area, has changed dramatically since the 5 rare plant species were reported (1959-1994). The lake level has changed, significant road construction occurred, and invasive plants, such as Phragmites, reed canary grass, purple loosestrife, and Eurasian water-milfoil, have increased. We did not relocate any of the old records, but we did find the state threatened Oakes' evening-primrose (*Oenothera oakesiana*) growing on the north bank of the pond.

My favorite project was to continue a long-term monitoring project of the Federally and state threatened Eastern prairie fringed orchid (*Platanthera leucophaea*) sites which I have been involved in since 1985 (when I worked for the Division of Natural Areas & Preserves). Most of the Ohio populations occur on wildlife areas: Killbuck Marsh, Mallard Club, and Pickerel Creek. 2002 was a low flowering year for most prairie fringed orchid populations: 62 at Killbuck Marsh (367 in 1982), 34 at Mallard Club (10 in 1998 when discovered), and 1 at Pickerel Creek (5,600 in 1996). I also visited the populations at Yondota Road (6 flowering plants), Maumee Bay State Park (18 flowering plants), Metzger's (no flowering plants), and Wightmans Grove (no flowering plants) as they are very near these wildlife areas. In the past, I have conducted demographic monitoring (following the fate of individual, tagged plants) at some of these sites, but we only censused the number of flowering plants in 2002.

This is just a small sampling of the exciting state-listed plants which can be found on the Division of Wildlife's wildlife areas in Ohio. There is still much work to be done to relocate old records and discover new locations of rare plants. Find out what wildlife areas are in your region of the state and plan to visit a wildlife area soon. Feel free to contact me at the Division of Wildlife in Columbus if you are interested in looking for rare plants on these special and diverse areas.

Cattail: A Multi-Purpose Plant

By Gordon Mitchell

What is the first plant that comes into your mind when someone mentions wetland plants? The chances are that your answer would be the Cattail. Most people will equate the Cattail with wetlands.

The Cattail is a member of the Cattail Family (*Typhaceae*). There is only one genus in the Cattail Family: the genus *Typha*. Within this genus are two main Cattail species that are common in this area: the Broadleaf Cattail (*Typha latifolia* L.) and the Narrowleaf Cattail (*Typha angustifolia* L.). The generic name, *Typha*, is Latin for *Typhē* (or *Typhē*), which is Greek for “cattail”. The name *Typhē* may have come from the term, *Typhēin*, which is “to smoke” or “to emit smoke”. (Possibly in reference to the smoke from the burning leaves of this plant or from the smoky-colored flower heads.) The specific epithet, *latifolia*, is Latin for “broadleaf” (*lati* is “broad” and *folia* is “leaves”) and the specific epithet, *angustifolia*, is Latin for “narrowleaf” (*angusti* is “narrow” and *folia* is “leaves”).

The Broadleaf Cattail is the more common of the two species. Its range covers most of North America, Eurasia, and North Africa. It is more tolerant of acidic wetlands but can only thrive in water of about 6 to 24 inches deep. Other common names for this plant are Blackcap, Bull Segg, Bulrush, Candlewick, Cat-O’ Nine Tails, Cattail Flag, Common Cattail, Cooper’s Reed, Cossack Asparagus, Deer Marsh Grass, Ducktails, Flag, Flag Grass, Flag Tule, Flatgrass, Flat Rush, Foxtail, Great Reed Mace, Indian Leek, Indian Onion, Marsh Beetle, Marsh Pestle, Neck Rod, Reed Mace, Rush, Soft Flag, Swamp Bulrush, and Water Torch.

The Narrowleaf Cattail is less common and has a smaller range than the Broadleaf. Some botanists believe them to be non-native and had initially established themselves along our coastal areas. When the 19th Century canals and railroads, with their accompanying ditches, were constructed, The Narrowleaf Cattail spread inland. The Narrowleaf is also more tolerant of alkaline, brackish, and polluted wetlands and can thrive in water of up to 3 feet deep.

Other common names for this plant are Bulrush, Lesser Bulrush, Nail Rod, and Small Reed Mace.

Sometimes the two species may hybridize to form a sterile third Cattail: the Blue, the Glaucus, or the Hybrid Cattail (*Typha x glauca* Godron). Although this hybrid has traits from both parents, it has longer female spikes and taller leaves than either parent species. While it is sterile, it can reproduce and spread vegetatively.

Cattails reproduce either by seed or by rhizome, and are able to colonize an area very quickly. Usually, a colony starts near the shore and spreads outward and into the wetland. After a large, dense colony is established, the Cattails may secrete an allelopathic toxin to prevent any other plant species from invading the colony.

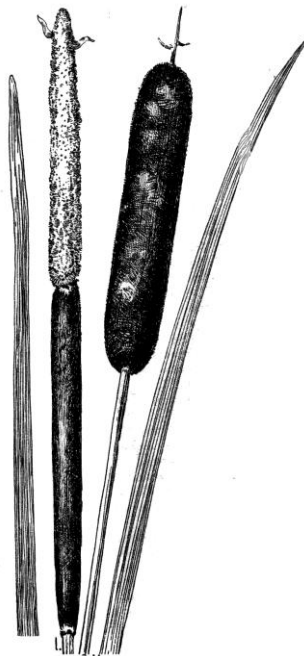
Cattails are very efficient in improving the soil and water quality. They can neutralize organic pollution and have been used in some secondary waste treatment programs. They can also tolerate high levels of heavy metals in the soil. Cattails are also capable of fixing atmospheric nitrogen and converting it for use in the soil. However, Cattails can only tolerate very short dry spells.

Cattails are also effective in preventing erosion of the shorelines by blocking or slowing the water’s wave actions. Because of that, Cattails may be used in pond management.

Cattail colonies make perfect nesting habitat for water bird species like American Bitterns (*Botaurus lentiginosus* Racket), Least Bitterns (*Ixobrychus exilis* Gmelin) American Coots (*Fulica americana* Gmelin), Blue Winged Teal (*Anas discors* L.), Pied-Billed Grebes (*Podilymbus podiceps* L.), and Red-Winged Blackbirds (*Agelaius phoeniceus* L.)

The Cattail is one of our most versatile plant species. The Native Americans and the European settlers had so many different uses for this plant. Because of its many uses, the late naturalist, Euell Gibbons, had often referred to this plant as “The Supermarket of the Swamp”.

Height: Broadleaf varies from 3 to 10 feet and Narrowleaf varies from 2 to 6 feet.



Broadleaf Cattail
(*Typha latifolia* L.)

Stem: The stem is usually shorter than the leaves. It is erect, single, round, and jointless. Its diameter is about 3/8-3/4 inch in the middle but narrows down to 1/8-1/4 inch near the top. It also has both the male and female flower spikes upon it. On both species the male flowers are always above the female flowers. On the Narrowleaf stem, there is a small 1-3 inch gap of bare stem between both flowers. On the Broadleaf stem the flowers either touch or may have a very small gap between them.

Both the Native Americans and the early settlers had uses for the stems. The Native Americans used these stems for their arrow shafts and for their hand drills. The early settlers sometimes tied their candlewicks to these stems when dipping their candles.

Leaves and Shoots: All leaves are basal, erect, linear, sword-like, seamless, two-ranked and are located on opposite sides of the stem. The leaves are both spongy and strong, due to a network of fibers and horizontal partitions. The Broadleaf leaves are about 1/3-3/4 inch wide, flat, have a fan-shaped leaf base, and have tapered sheaths at their junction with the blade. The Narrowleaf leaves are about 1/4-1/2 inch wide, are rounded on one side, have a round or cylindrical leaf base, and have small auricles at the junction of the sheath and the blade. All leaf veins are parallel.

These leaves contain large air ducts or vessels inside of them. This allows air to be transported from the surface down to the submerged parts of the plant.

The young leaf shoots are edible. It is best to hand-pull them from the late spring to August. The lower 1-3 feet of the shoot are the best parts. After they are pulled, the outer leaves should be peeled to reveal the 1/2 inch wide, 4-18 inch long, succulent inner core. The fresh core is very crispy. It can either be eaten raw as in salads or it can be cooked like asparagus or used as a potato substitute. If the cores have a bitter taste, then boil them in several changes of water. These cores are very nutritious and contain beta carotene, niacin, phosphorus, potassium, riboflavin, thiamin, and vitamin C.

The shoots are also a favored food of both the Muskrats (*Ondatra zibethicus* L.) and the Canada Geese (*Branta canadensis* L.). Although the shoots

are edible to some animals and to humans, they may be toxic to grazing animals.

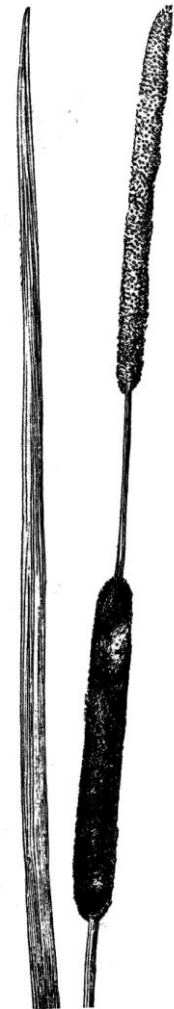
The sticky, gelatinous substance present between the young leaves can be used for thickening soups and other food products. This substance is also used as an anesthetic, an antiseptic, and as a coagulant. It can be applied to boils, carbuncles, inflammations, sores, wounds, and toothaches.

The older leaves of this plant have many uses for both humans and animals as well. Muskrats build their homes from the leaves. Boiled leaves make a good skin wash. The ashes left from burning these leaves were used both as an antiseptic and as a styptic for wounds. The Native Americans and some early settlers wove the leaves into baskets, rugs, mats, plates, backs and seats of chairs, thatching wigwams, and wall partitions. The leaves were also used for caulking barrels, canoes, and log cabins, or used as cordage. The leaf pulp can be used for making paper or rayon. Children sometimes made toy dolls or toy animals from the leaves, too. To prevent the leaves from becoming brittle during use, they should be collected, dried in the shade, and then dampened before and during use.

Flowers: Both the male and the female flowers are arranged in cylindrical spikes and are both borne upon the same stem, with the male flowers located above the female flowers. The Broadleaf Cattail's flowering spikes are about 1 inch in diameter and are dark brown. The Narrowleaf Cattail's flowering spikes are about 1/2 inch in diameter and are light brown. These flower heads are about 1 foot long. Flowering season is usually May to July.

Male Flowers: The individual male flowers are green-yellow, arranged in a club-like spike, about 3/16-1/2 inch long, usually have 3 stamens, and may have bristles instead of petals and sepals. In their early season, especially while still green and in their sheaths, the flowers are quite edible. The flowers should be cut off and boiled or simmered for about 5-15 minutes. Afterwards, they may be salted and buttered, and then eaten off the stem like corn-on-the-cob.

The pollen is also edible and is rich in protein, beta carotene, vitamins A, B, C, E, minerals like sulfur and phosphorus, oils, unsaturated fat, and carbohydrates. Although some people may eat it as health food, those who are allergic to other pollens



Narrowleaf Cattail
(*Typha angustifolia* L.)

should not consume cattail pollen. The pollen should only be collected during pollination. While collecting the pollen, the male flowers should be bent over to have their pollen shaken into a bag or any other container. The collected pollen should first be dried and then sifted to remove any unwanted debris from it. Afterwards, the yellow pollen can be mixed with flour to make yellow bread and pastries. The pollen may also be added to other foods for coloring, for flavor, or for thickening. To avoid molding, any unused pollen should be refrigerated.

Any non-food uses of the pollen could be for dusting powder or as a hair conditioner. The pollen can also be used as an astringent, a diuretic, and as a hemostatic.

Although much of the pollen may fall down to the female flowers below, the success rate of self-pollination is about 50%. This pollen is windborne to facilitate cross-pollination. After pollination, the male flowers will fall off the stem.

Female Flowers: The individual female flowers are brown, about 3/8-5/8 inches long, and are arranged in cigar-shaped spike, that resembles a hotdog-on-a-stick. Each flower has only 1 bristly-based pistil. The Broadleaf has broad and flattened stigmas and the Narrowleaf has long and narrow stigmas. Instead of petals and sepals, there are many small white hairs, which become fluff when the seeds mature. A typical female flower stalk may have up to 2,000,000 individual flowers. Six weeks after pollination, the seeds mature, the flowers explode, and the hairs fluff out to scatter the windborne seeds.

Any female flower heads left intact upon the stem may be dipped into animal fat, coal oil, cooking oil, grease, kerosene, or wax, and used as torches. Aside from providing light, these torches also make excellent insect repellants.

The fluff (or down) from the seeds has many good uses. After the down is collected and dried, it can be used for stuffing mattresses, pillows, and quilts. The fluff can also be spun into thread. Because the fluff is also buoyant and water-repellant, it can be used to stuff life preservers. (This was quite useful during World War II.) The fluff can also be pressed and used for sound or heat insulation. It can even be used as punk or tinder for starting fires.

The fluff was also used externally for treating boils, burns, carbuncles, chaffings, or wounds. One Native American tribe used to throw it into the eyes of their enemies to temporarily blind them.

However, before using any of the down, always be sure that no one is allergic to it.

Seed: A typical seed head may produce over 250,000 seeds per head. The individual seed is a 1/2 inch long, linear, yellow-brown achene or nutlet, which is borne upon a small stalk. These seeds should be harvested in the fall.

About 20% of the seed's content is an organic drying, but edible, oil. Pressing the seeds will yield the oil. The seeds can also be mashed to make protein-rich flour.

Each seed has small, packed down hairs attached to it. These hairs will fluff when the seed matures.

If the fluff is removed, the seeds are edible and may be used as cereal or as mush. The fluff can be easily removed by charring the seeds with glowing embers. Anyway, the seeds are best eaten if roasted first.

Some animals like these seeds, too. They are a favorite food of the Semipalmated Sandpiper (*Calidris pusilla* L.) and the Green Winged Teal (*Anas crecca* L.). If the drying oils are removed, the seeds can be used as a feed for chickens or for cattle.

Root system: The Cattail's rootstocks (or rhizomes) have a spongy cortex surrounding its core. This allows for the transfer of air from the leaves to the roots. The rhizomes may extend as far as 27 inches and are about 1/4-1 1/2 inch in diameter.

The rhizomes are a favored food of both Muskrats and Canada Geese. The root system in the water also makes excellent spawning habitat for fish.

The rootstocks, especially the younger ones, are edible to humans. They contain calcium, as much protein and less fat as corn or rice, and may contain over 30% starch and sugar, more than in potatoes. Although the rootstocks can be picked any time of the year, they contain more carbohydrates if picked in the winter, when the upper parts of the plant are dead.

These roots can be eaten whole but should not be eaten raw. If eaten whole, they can be fried in animal fats, roasted, or pit-cooked.

The roots can also be chopped and ground into a flour substitute. After the roots are picked, they should be washed, peeled, ground, and sifted. The mashed roots should then be soaked, or even boiled, in several changes of water. These soaking periods allow the spongy coarse fibers to float to the top, which can then be removed. (The removed coarse fibers can be used for making burlap and for caulking.) After drying and sifting, these pulverized roots make a good substitute for flour, cornstarch, or potatoes. This was a common food substance of the impoverished settlers of early Virginia.

The pulverized roots can also be boiled down into sugary syrup. Like maple syrup, it can be used to flavor other foods.

The chopped roots also have medicinal uses, too. Externally, they can be used as a poultice for treating boils, burns, sores, or wounds, or they can be used as toothpaste. Internally, they can be used as an infusion for treating intestinal ailments, intestinal worm, kidney stones, and for easing women and animals in labor.

The root flour can even be fermented into ethyl alcohol. Ethyl alcohol can be used in antifreeze or in some types of industrial solvents.

Because of its many uses, Cattails are the perfect plant for use in survival situations.

Scientists are still trying to discover more uses for this plant. The Cattail Research Center of Syracuse University's Department of Plant Sciences, founded in 1947, is dedicated to finding new uses for the Cattail. Perhaps this plant may someday be cultivated for practical uses like alcohol fuels or as a cure for diseases.

With all of the past and present uses by the Cattail, it is not surprising that Euell Gibbons had compared it to a supermarket. Perhaps the Cattail should be compared to an entire shopping mall!

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Botany 101 – twelfth in a series

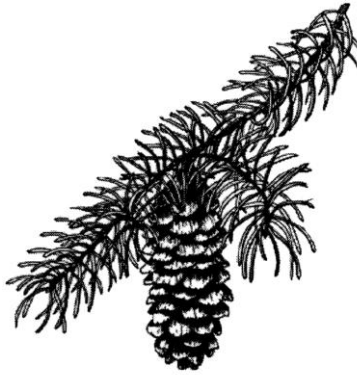
by Dr. Rebecca Dolan

We've spent the last columns looking at details of anatomy in flowering plants, that is, plants that reproduce by making seeds from fertilized ovules housed in flowers. This is the most successful group of plants, comprising an estimated 250,000 species. Flowering plants are thought to be the most recently evolved group of plants, coming into their own at about the time the dinosaurs went extinct. Their great success is likely due to a complex structure that allows flowering plants to occupy a wide range of habitats, the protection of seeds, within flowers and fruits, and coevolution with pollinators that vector pollen in a directed way from plant to plant.

Gymnosperms are plants that are one step back on the evolutionary tree. Their name means 'naked seeded.' Seeds are not protected in a flower, but are borne on highly modified branches (cones). Pollen is wind-dispersed. There are an estimated 800 species of gymnosperms today. The most familiar gymnosperms are **conifers** (cone-bearers) like pine, fir, and spruce. Most in our area are evergreen, maintaining their leaves, or needles, all year long. They are able to do this because of features of needles that prevent water loss. Deciduous trees like oaks and maples primarily lose their leaves because they cannot maintain water balance in the winter when the ground freezes.

Conifer needles, pine, for example, have a very thick, waxy cuticle and stomates sunken below the surface. They also have a layer of waterproof **suberin** inside, as roots do, to prevent free movement of water. The roundish shape of needles has a low surface-to-volume ratio, reducing the surface area for water loss. In addition, the round shape does not catch snow like flat leaf blades, reducing mechanical damage.

Gymnosperms



White Spruce
(*Picea glauca*)



Maidenhair Tree
(*Ginkgo biloba*)

Although needles last year-round, they do not last forever. Depending on the species, the needles drop after one or more years, and are replaced with fresh ones.

Wood anatomy of gymnosperms is different from that of flowering plants. Pine and other conifers do not produce many fibers (very tough support cells) in their wood, or secondary xylem, and are called softwood trees. Hardwood trees are all flowering plants. But, botany loves exceptions, and balsa wood, a seemingly classic softwood, comes from a flowering plant tree of the tropics.

Now, for more of those much-loved botanical exceptions: neither all gymnosperms nor all conifers are evergreen. Dawn redwood and bald cypress and larch are examples that are deciduous, dropping their needles every year. And, of course, some flowering plants are evergreen, like rhododendron and holly. And, guess what, not all gymnosperms have needle-shaped leaves. In an amazing twist of botany, ginkgo trees are gymnosperms, even though they have flat leaf blades.

In the next issue we will look at how to distinguish the common groups of conifers and then tackle intricacies of gymnosperm reproduction.

Becky Dolan is Director of the Friesner Herbarium at Butler University.

Illustrations by Jan Glimn Lacy, botanical illustrator, from her book Botany Illustrated.

The Best Plant Finds Of 2002

By **Jim McCormac**

The overall state list of native plants swelled again last year, with the discovery of three new species. These additions bring the Ohio native plant list to approximately 1,800 species. Also extremely significant was the rediscovery of two plants that were considered extirpated, and scores of new locations for endangered and threatened species. All in all, 2002 ranks right up there with the best botanical seasons on record.

We sometimes wonder, "What's left to find?" One would not think that a state as populous, well developed, and reasonably well-explored would continue to produce exciting new botanical discoveries every year, but Ohio does - probably more so than any nearby state. The primary reason for all of these finds is the large number of dedicated – sometimes fanatical – amateur and professional botanists who are regularly out there exploring the terrain.

And there's certainly more to find – a lot more. A perusal of the recently released Volumes 23 and 26 of the Flora North America reveal some enchanting possibilities for new Ohio discoveries. These two volumes of this excellent series cover lilies, sedges, and orchids, among others. Two interesting possibilities that are mapped right up to the Ohio border are Panicle Bulrush, *Scirpus microcarpus*, which should be sought in extreme eastern Ohio, and Smaller Spreading Pogonia, *Cleistis bifaria*. This interesting little orchid ranges to within one county of our state in both Kentucky and West Virginia, and Lawrence County would be a good place to seek it out.

Without further ado, here's what happened in 2002:

Dave Minney of The Nature Conservancy, who has an uncanny knack for locating obscure and difficult-to-recognize plants, discovered Hair Grass, *Muhlenbergia glabriflora*, at TNC's Glade Wetland Preserve in Pike County. This diminutive grass is new to the flora, and quite similar to the common and widespread Wirestem Muhly, *Muhlenbergia frondosa*, making Dave's detection of it all the more impressive.

We report another state record Dave Minney find, slightly after the fact, as we wanted to research this one a bit to feel confident it is native. In 2001, Dave found Woolly Panic Grass, *Panicum scoparium*, just a stone's throw from his Hair Grass discovery, in

Jackson County. This large and unmistakable grass shares a very similar distribution to the Hair Grass.

In a pleasant bit of serendipity, **Jim McCormac** of DNAP stumbled upon another state record while on a birding trip with the Toledo Naturalist's Association at Cedar Point National Wildlife Refuge in Lucas County. Scanning for a renegade Brown Pelican that had been seen in nearby Lake Erie, Jim collected an odd-looking sedge, which turned out to be Olneys Three-Square Bulrush, *Schoenoplectus americanus*. This typically coastal species is quite rare around the Great Lakes.

Not all the great finds were obscure, inconspicuous grasses and sedges. Adams County resident **Barb Lund's** rediscovery of Long-flowered Alumroot, *Heuchera longiflora*, was a stellar find, not only because it was considered extirpated, having been collected but once before, in 1954, but also because it is a very showy wildflower. Barb found two sites in Adams County. In an impressive display of botanical detective work, **Jason Larson** of Muskingum College relocated White Wood-sorrel, *Oxalis montana*, at a historical location in Belmont County, where it was last seen in 1915! Jason dug into the literature, ferreting out this old locale, and one can imagine his delight when a visit to the site revealed thousands of the plants! This species hadn't been seen anywhere in Ohio for 22 years and was considered extirpated.

While wading in waist-deep water in Summit County's Singer Lake, TNC botanist **Rick Gardner** and **Steve McKee** of Richland County Parks located Swaying Bulrush, *Schoenoplectus subterminalis*. This endangered plant was known only from Mud Lake Bog State Nature Preserve in William County, where it hasn't been seen since 1988. Elsewhere in Summit County, the sharp-eyed Gardner went on to discover our third known site for the bizarre saprophytic orchid, Early Coral-root, *Corallorhiza trifida*. Finding himself in the far western and much less botanically diverse reaches of Ohio – Darke County – Gardner nevertheless produced an incredible find, the endangered Gattinger's Foxglove, *Agalinis gattingeri*.

During the course of exploring a deep, dark Hocking County hemlock gorge, Denison University pteridologist **Dr. Warren Hauk** and students found one of our smallest ferns, the Triangle Grape Fern, *Botrychium lanceolatum*. This endangered species is

about the height of an average thumb, and is known from only one other Ohio site.

Columbus biological consultant **Mark Dilley** made another spectacular find of an endangered plant. While assessing a Ross County wetlands he stumbled into a staggeringly large – 10,000+ plants – population of Bur-head, *Echinodorus berteroi*, only the third known site. While inspecting those, Mark noticed a different looking sedge, that proved to be the Pale Umbrella-sedge, *Cyperus acuminatus*, also endangered. The wetland supported thousands of these plants, as well. **Mike Busam** of Butler County also found a new station for Bur-head in his home county, thus extending the range of the local Gilmore Ponds population. Although belated, as news just reached us, it's worth reporting that **Beverly Stamp** of Cleveland also found a station for Pale Umbrella-sedge, back in 1999. These plants were in a wetland in the very urban location of the Interstate 70/West Broad Street junction near downtown Columbus!

In other wetlands, Ohio EPA botanist **John Mack** located the gorgeous and threatened pink-flowered Large Marsh St. John's-wort, *Triadenum tubulosum*, in a Jackson County swamp. **Jason Hopkins** of Kent State University also found this species in a Portage County wetlands. Nearby in Portage County, Rick Gardner, TNC volunteer **Megan Wilkinson**, and **Brad Stemen** of the county park district found new colonies of the endangered Small Bur-reed, *Sparganium chlorocarpum*, one of our rarest wetland plants.

The proud owner of one of the best "back yards" in Ohio, Adams County resident **John Howard**, found the obscure parasite Pretty Dodder, *Cuscuta indecora*, growing in his prairie. We just added this rarity to the rare plant list as an "A" (status unknown), but it appears to be headed for listing as endangered. John also arranged a trip into a little known area of Adams County that included Rick Gardner, John's son **Scott Howard**, and DNAP employees **Butch Grieszmer** and Jim McCormac. We were able to find two new stations for the ignobly named but endangered Warty Panic-grass, *Panicum verrucosum*.

Also in Adams County, **Rich McCarty** of TNC located a new station for False Melic, *Melica nitens*. This beautiful little grass is endangered, and this is but the 5th extant site.

An expedition to remote wetlands along the St. Marys River in Mercer County produced the second known population for Cuspidate Dodder, *Cuscuta cuspidata*. In a strange case of the rare making the rare rarer, it was infesting – and ultimately killing – the

endangered Bottomland Aster, *Aster ontarionis*. Discoverers included **Terry Seidel** and Rick Gardner of TNC, John Mack, **Marshal Moser**, a biological consultant from Lima, **Tim Schetter** of the Black Swamp Conservancy, and **Michael Lee** and Jim McCormac of DNAP.

A book could be filled with all of Cleveland Museum of Natural History botanist **Jim Bissell's** noteworthy finds, and we'll add another chapter here. Along with City of Twinsburg naturalist **Stan Stine**, Jim found an enormous population of the threatened Marsh Spear Grass, *Poa paludigena* in Summit County. Jim put this species back on the Ohio map in 1988 when he re-discovered it – there had been only one prior record, in 1953. Jim found an even rarer grass, the endangered Sharp-glumed Manna Grass *Glyceria acutiflora*, in Stark County while botanizing with **Judy Semroc** of Uniontown, **Larry Rosche** of Kent, and **Theresa Gordon** of the Ohio EPA. Two other endangered species located by Bissell were Canada St. John's-wort, *Hypericum canadense*, in Lake County, and False Hop Sedge, *Carex lupuliformis*, in Ashtabula County. Somewhat belatedly, we report Jim's 2001 find of the endangered Smooth Rose, *Rosa blanda*, from Kelley's Island in Erie County.

It's not often that large trees get overlooked, but at least one big population of the endangered Spanish Oak, *Quercus falcata*, was, until Shawnee State Park manager **Kevin Bradbury** found them. Kevin found a small Scioto County woods where this distinctive southern species was a co-dominant. While on another trip in Shawnee State Forest, Kevin, Shawnee State Park naturalist **Jenny Richards**, and Jim McCormac located a population of the endangered Twisted Yellow-eyed-grass, *Xyris torta*. Prior to this discovery, it was known only from the Oak Openings of Lucas County, at the opposite end of the state.

New sites for any of our six Federally listed plants are always good news; therefore it was exciting to learn of the discovery of additional Hamilton County populations of the Federally threatened Running, Buffalo Clover, *Trifolium stoloniferum*, found by Cincinnati-area botanists **Dan Boone** and **Marjie Becus**. Also in the Cincinnati area, University of Cincinnati botanist **Dr. Denis Conover** located several new sites for the endangered Two-seeded Copperleaf, *Acalypha deamii*.

While the Juniper Sedge, *Carex juniperorum*, is "only" threatened, any out-of-range discovery is very significant since this sedge has one of the most limited distributions of any eastern Carex. In Ohio, it was

known primarily from the cedar glades of Adams County, until 2002, when **Tony Reznicek** of the University of Michigan found it at Buffalo Beats prairie in Athens County while participating in a Michigan Botanical Society outing.

Finally, we'll end with a plant that demonstrates how tricky some of these species can be to recognize. Last year, we reported Cleveland botanist **George Wilder's** find of Kidney-leaved Violet, *Viola renifolia*, from Cuyahoga County, which was new to Ohio's flora. These small white violets can be devilishly difficult to identify accurately, and even though George's specimens were given the stamp of

approval by a recognized *Viola* authority, George still had doubts. He exhaustively researched this species over the past year, and demonstrated that they were actually the Sweet White Violet, *Viola blanda*, a relatively common species. Thanks to George for his efforts to be painstakingly accurate.

And thanks to all who generously contribute their expertise to help the Division of Natural Areas and Preserves track Ohio's botanical diversity!

Jim McCormac is a Botanist, Division of Natural Areas and Preserves, Ohio Division of Natural Resources

Native Trees

For Gardeners in the Great Lakes Watershed

Reprinted from the Canadian Wildflower Society, 1999

There are many reasons why native trees are important. First, take a breath of air. Then, walk in the woods and stand in awe at nature's beauty. Gaze in amazement at a flowering dogwood in late May. Enjoy the dappled shade of a stately black walnut tree in the heat of mid-summer. Delight in the brightly colored leaves on the forest floor after the first sharp frost of autumn. Ponder the structure of a magnificent white oak, its elegant grey bark highlighted by a blanket of snow on the ground in coldest January. Now, thank a tree. For all of the above are the bounty of nature's woody plants, especially trees.

Let us say that you and I were somewhere in the Great Lakes watershed in the year 1700. Most of the region is inhabited, but the human denizens are few, and they are aboriginal. The region is pristine, most of it a mature, or climax, forest. The heart beats faster in exaltation at the sight of this natural cathedral.

Almost all of this magnificent panorama is either gone or threatened. We have cut down much of the original forest in the region. Yet we can do our part to redress the imbalance. Let's plant native trees in our own yards and gardens!

In general, late fall (after the leaves have dropped) and early spring are the best times to plant a tree.

Planting a Tree

1. Determine the best site for the tree. Factors to consider include: the mature size of the tree (make sure it won't interfere with over-head wires or other structures), the tree's soil preferences, the tree's sun or shade requirements, and the tree's rate of growth.

2. Dig a hole slightly larger than the root system of the tree.
3. If the tree has soil in a compact ball around the roots, plop it into the hole.
4. If the roots are bare, spread them out so that they grow out, away, and down from the trunk (to avoid interference later in life).
5. Fill the hole with the excavated soil, mixed with compost, and stamp the soil down firmly to eliminate air pockets.
6. The base of the tree should be at the same level as the soil around it.
7. Water well and regularly during the tree's first growing season.
8. Talk to, caress, love your tree!

Sources: *Most nurseries sell trees and many will deliver and plant them for you. As well, you can propagate your own by collecting seeds from existing trees or taking cuttings.*

Trees to Plant in Moist Areas.- pin oak, eastern hemlock; red maple; silver maple; white ash; white oak; eastern white-cedar

Trees to Attract Birds for Food and/or Shelter- eastern white pine; white, burr, and red oak; white spruce; paper birch; American mountain ash; redbud; pin cherry; shagbark hickory; eastern hemlock

A windbreak of evergreen trees planted on the north side of a house will buffer against winter north winds and protect against some heat loss – up to 22% according to Landscape Ontario. Deciduous trees planted on the southeast or southwest sides of the house can reduce air-conditioning needs up to 75%.

A Selection of Native Trees for Gardens in the Great Lakes Watershed

Name	Size	Zone	Soil, Site Requirements	Growth Rate	Strong Points
Alternate-leaf dogwood <i>Cornus alternifolia</i>	Very small	4	Most any soil, sun or shade	Fast	White flowers, fall colour, fruit, attracts birds
American beech <i>Fagus grandifolia</i>	Medium	4	Most any soil, sun or shade	Slow	Bluish-grey bark, edible nuts
Bitternut hickory <i>Carya cordiformis</i>	Medium	5	Most any soil, sun or shade	Medium	Stately outline
Black walnut <i>Juglans nigra</i>	Medium	5	Most any soil, sun	Fast	Walnuts, shade, stately outline, timber
Burr oak <i>Quercus macrocarpa</i>	Medium	(2) 3	Most any soil, sun	Slow	Stately outline, acorns, corky wings on branches
Eastern hemlock <i>Tsuga canadensis</i>	Medium	4	Cool, moist soil, sun or shade	Medium	Conical shape, cones
Eastern white-cedar <i>Thuja occidentalis</i>	Small	3	Most any soil, sun	Medium	Columnar shape, nesting and food for birds
Red maple <i>Acer rubrum</i>	Medium	4	Most any soil, shade tolerant but prefers sun	Slow	Spring and fall colour
Red oak <i>Quercus rubra</i>	Medium	4	Most any soil, shade tolerant but prefers sun	Fast	Fall colour, stately outline, acorns
Sugar maple <i>Acer saccharum</i>	Large	4	Most any soil, shade tolerant but prefers sun	Medium	Stately tree, maple sugar, fall colour
White oak <i>Quercus alba</i>	Large	5	Slightly acid soil, sun	Slow	Fall colour, ridged bark, acorns
White pine <i>Pinus strobus</i>	Large	4	Slightly acid soil, prefers sun	Medium	Stately outline, Ontario provincial tree
Black-gum <i>Nyssa sylvatica</i>	Small	5	Acid soil	Slow	Fall leaf color (scarlet)
Pawpaw <i>Asimina triloba</i>	Very small	(5) 6	Most any soil, shade tolerant but prefers sun	Medium	Fruit, large leaves
Redbud <i>Cercis canadensis</i>	Very small	(5) 6	Most any soil, sun	Fast	Pink flowers
Striped maple <i>Acer pensylvanicum</i>	Very small	3	Acid	Slow	Striped bark, fall colour
Tulip-tree <i>Liriodendron tulipifera</i>	Large	5	Most any soil, sun	Fast	Showy greenish-yellow flowers, attractive leaf shape, related to magnolias
White spruce <i>Picea glauca</i>	Medium	2	Slightly acid soil, shade tolerant but prefers sun	Medium	Columnar shape, cones

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Purple Loosestrife: For Vermont, Biocontrol is Best Control Available

What follows is the Vermont experience with biocontrols for Purple Loosestrife, excerpted from "The 2000 Purple Loosestrife Control Program Annual Report". Their program has existed since 1996.

Biological control works by using a plant's natural enemies against it. In 1992, five insect species that feed on purple loosestrife in Europe were approved and introduced as biological control agents in North America. Years of rigorous testing proved these insects to be host-specific to purple loosestrife and not feed on agricultural crops.

In 1996, Vermont became one of 34 States using biocontrols. They did so with the guidance of Bernd Blossey of Cornell University, and some thoughtful information-gathering.

Traditional controls comparison demonstrates a biocontrol is the better alternative than no action, or traditional controls. A comparison matrix in the Vermont study compares control methods in terms of

- 1) effectiveness (poor, moderate, or good),
- 2) risk to native plants (none, low, moderate or high risk),
- 3) and costs (inexpensive, moderate, or expensive).

Using these three criteria, biocontrol is the best tool we have at this time.

Chemical control is good in the short term, but needs reapplication over time. Herbicides are not species specific and few can be used near water. They are expensive in terms of money, time and risk to native ecosystems.

Water manipulation is mostly poor because it spreads seed and plant fragments. This method is a high risk to native plants that cannot tolerate the extent of flooding that purple loosestrife can. Water manipulation is expensive in terms of money and native species damage.

Replacement with native vegetation has a moderate effectiveness if areas are drawn down and have invasive seed in the seed bank. This method has no impact on existing native plants. It is an inexpensive method, IF native seed is available.

Cutting and mowing results in poor control after and during flowering due to the mechanical methods ability to spread the plant and seeds. If done before flowering, moderate success is possible.

Hand removal is effective in small, newly established stands; but it is difficult to remove all plant parts with certainty. In established stands, hand removal is virtually impossible.

Biological control is considered effective, although it sometimes takes years to see the results; and possibly does not eradicate the plant completely. It does offer a long term and self-sustaining solution. Biocontrols are known to reduce purple loosestrife populations to less than 5% of the original size.

USE AND RESULTS OF A BIOCONTROL

The states of New York, Illinois, Minnesota, and Michigan have had highly effective results with biocontrols. Their experiences were shared with Vermont.

The state of Vermont used a Minnesota Department of Natural Resources 1997 publication, *Biological Control of Purple Loosestrife – a Rearing Guide for Galerucella spp.* The Vermont rearing effort began in April 2000 with the collection of host purple loosestrife rearing plants and with beetles from Cornell University. To date, more than 141,000 beetles have been released in carefully selected infestations. This year 300 root-boring weevils (*Hylobius transversovittatus*) were also introduced for a double whammy to purple loosestrife control. Monitoring of the 20 sites is done through GPS recording and photographs.

Although effects of biological controls often take three to four years to produce visible results, 2001 has seen some dramatic results of flourishing beetle populations. The decrease of purple loosestrife growth rate, height, number of flower buds and inflorescences is significant. Native cattail populations have already begun to rebound, increasing in cover by 197% since 1999. Monitoring of the program is critical and has begun to yield important data. Unfortunately, site development has eliminated 4 of the original sites. However, as Vermont improves its ability to rear the beetles, successful release sites will continue to increase.

Reprinted from *Roadsides*, the Federal Highway Administration quarterly newsletter, Fall 2001



Miscanthus sinensis

By Marilyn Ortt

Ornamental grasses have become quite popular again in the past few years. As attractive as they may be, it is not easy to predict which ones may turn into the purple loosestrife of the future.

Few species seem aggressive when first planted. Individual plants are often fairly benign until a critical density of the species becomes established with sufficiently different genetic makeup to kick off another Alien Invasion.

This is apparently what happened to eulalia, fountain grass, plume grass – like terrorists in general, it has several aliases. Watch for the scientific name *Miscanthus sinensis* and then avoid.

Miscanthus is a warm season clump grass from Asia. When a single plant is planted, the clump will grow in diameter each year producing more and more flowers.

Apparently this species does not self-pollinate so even very large clumps may not produce viable seeds. Grasses are primarily wind-pollinated so if plants of different origins (that is, not a clone of the first) are located near enough to each other, it could be the beginning of trouble. For about 30 years I watched three of clumps of *Miscanthus* on a bank between a yard and a state highway near Marietta. The clumps grew larger over the years but no new clumps were formed. The plants were large enough that our children used them as an indicator of how near we were to a frequent destination for hiking.

Several years ago, this species began showing up in ornamental grass collections in local nurseries and was frequently planted around homes. At about the same time, work was done on an electrical substation across the highway from the seemingly harmless original clumps. Within a few short years, *Miscanthus* became the dominant plant in a several acre site, apparently growing from seed.

During this period individual plants were showing up in southeast Ohio mostly around developed areas at

first – by guardrails along highways, power line-right-of-ways, hayfields, - all open habitats. Within a few years *Miscanthus* had become the dominant species along about 30 miles of I-77 and U.S. 50 right-of-ways across the Ohio River in West Virginia and heading east along U.S. 50 at the rate of about two miles a year – all apparently having spread from a few plants that appeared after a section of guardrail had been replaced near the state border. The rapidity with which this has occurred is especially impressive and was no doubt aided by erosive effects of heavy rains as well as guardrail work by the Department of Highways.

This is not a southern Ohio phenomenon - about 5 years ago, I saw several plants scattered along a highway across the northern edge of eastern Iowa. I have not been back to see it since, but would be willing to bet there are now more than a few plants. Today's highway maintenance is prime *Miscanthus* habitat enhancement. Any guardrail work clearly increases the rate of spread.

The seeds apparently require some bare ground (a tiny area will do) in the open in order to germinate. The bulldozer must be its best friend wherever the seeds are available. Once established it would be a serious agricultural weed - since it is so deep-rooted, plowing would only fragment the rhizomatous roots resulting in a net increase in the number of clumps. Once established,

eradication would be extremely difficult.

There are a number of native warm season clump grasses such as big bluestem (or turkey foot), little bluestem and Indian grass. These are lovely grasses that would complement any sunny area without raising the concern of invasive, non-native species that will become a management problem in the future.

Marilyn Ortt is a field botanist for the Ohio Department of Natural Areas and Preserves
Illustration from Hitchcock, A.S. *Manual of the Grasses of the United States*. USDA, 1950



Miscanthus sinensis

Appalachian Chestnut Forests Are Memories Lost

By Michael Andrew Sawyer

On Thursday, January 3, we awoke to a steady fall of snow in Central Virginia, and with the ground already covered with a substantial blanket, most of Richmond shut down for the day. It was a welcome surprise to have this post-holiday time off just to stay at home with nothing specific to do and nowhere specific to be. My grandmother had been visiting us for the holidays and was due within the next day or so to go back to her home in Madison Heights outside of Lynchburg in Amherst County. I had wanted to talk with her about her childhood memories of growing up in Amherst at a time when chestnut trees were still to be found in the mountains of the Southern Appalachians. However, there was always something else to do, somewhere else to be, but today, as we sat watching the snow fall on this January morning, I felt the time was right.

My grandmother, Nellie Dean Martin, born on September 5, 1916 in the Forks of Buffalo region of Amherst County, was the third child of Henley Reed Martin and Florence Staton Henley, a young man of 24, worked for the government as a fire spotter, maintaining firebreaks on Cole Mountain where he additionally did some farming, growing mostly feed corn for his horses and other livestock. It was on this land that my grandmother first remembers gathering chestnuts. Her mother took the young family up Cole Mountain, across from Chestnut Ridge, to gather chestnuts in the fall of 1921. Unknown to them, it would be one of the last times they would collect them.

Chestnut gathering occurred after the first frost, usually in the second week of October. Locals would make for the mountain, particularly after a storm had come through, because the forest floor would then be covered in chestnuts. What they did not know was that a fungus, *Cryphonectria parasitica*, previously known as *Endothria parasitica*, imported on nursery stock from Asia, was also rapidly making its way to the mountains of Virginia. An arborist first discovered the fungus in 1904 on chestnut trees, *Castanea dentata*, growing in the Bronx Zoo. American chestnuts had no resistance to this Asian import, and a species that once comprised 20 percent of Appalachian forests would soon be a thing of the past.

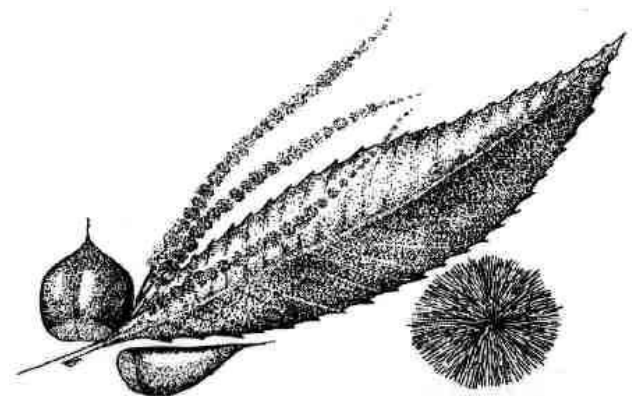
That year my grandmother said that they bought a saddle and bridle for her father for Christmas with the

money made from selling chestnuts. They were gathered by people in the region and sold by the bushel basket to the local grocer as a cash crop. In her case, my grandmother remembers taking the chestnuts to Davis' Store near Buena Vista to sell. Chestnut wood, straight and rot resistant, was also used to make Virginia splitrail fences. The bark and hulls of the chestnut were used as a leather dye. The trees supported local economies throughout the Appalachians, but this was all about to change.

Soon after 1921, the blight overtook the Amherst forests, and within two years, most of the chestnut trees were dead. My grandmother told me that soon after the trees died, the bark would peel off revealing a pale gray wood beneath. The mountain was covered in tall, ghostly, dead chestnut trees, which the government came in to try and harvest. Prevention efforts had failed; the best that could be done was to claim what timber they could from the disaster. With the loss of the chestnuts, the region's economy was permanently altered, and people began to move off of the mountains, my grandmother's family included. It is the speed at which this all happened that I find so amazing. My grandmother said that the next year she started school at Forks of Buffalo, but before the year ended, the family moved away from Cole Mountain to the Allwood section of the county because life at the mountain had changed.

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

Illustration by Nicky Staunton



American Chestnut (*Castanea dentata*)

INVASIVE PLANTS OF OHIO

Japanese Knotweed (*Polygonum cuspidatum*)**DESCRIPTION:**

Japanese knotweed is a non-native, semi-woody perennial that grows in large clumps reaching heights of 3-10 feet. The stout, hollow stems are reddish brown and the nodes are swollen giving them a bamboo-like appearance. Typical of the smartweed family, nodes are enclosed by a modified leaf-life structure. Stems die back in the winter and new ones are produced each spring. Leaves are alternate and egg-shaped (4-6 inches long and 3-4 inches wide) narrowing to a point at the tip. The tiny (1/2-inch) flowers are creamy white to greenish white and are borne in plume-like clusters in the upper leaf axils. The species is dioecious, producing male and female flowers on separate plants, however male plants are rare. Flowers bloom in August and September and female plants produce triangular, shiny black fruits, however, reproduction from seed is infrequent. This plant spreads primarily by its extensive rhizomes creating dense thickets.

HABITAT:

The species occupies a wide variety of habitats in many soil types and a range of moisture conditions. It is most common along roadsides and on stream banks, but is also found in low-lying areas, utility rights-of-way, old home sites and along woodland edges and openings. The species requires a high light environment and grows poorly under full forest canopies.

DISTRIBUTION:

Japanese knotweed was introduced from Asia as an ornamental in the late 19th century because of its unusual bamboo-like growth habit. It has been used as a landscape screening and occasionally for erosion control. It is widely distributed in the U.S., occurring in much of the Midwest and in several western states. In Ohio this species is primarily found in the eastern part of the state.

PROBLEM:

Japanese knotweed grows quickly and aggressively by extensive rhizomes and forms dense thickets that exclude native vegetation and reduce wildlife habitat. This species represents a significant threat to riparian areas where it can spread easily as small pieces of rhizome are washed downstream and deposited to create new colonies. Transfer of soil containing rhizome or seed may also cause the establishment of new colonies. Establishment can be prevented with

careful monitoring and eradication of small patches when they first develop.

CONTROL:

Mechanical: Large colonies of this species

are extremely difficult to dig up due to their high rhizome densities. Digging of large colonies is not recommended as it is very labor intensive and unlikely that all below ground material can be removed. Small patches may be dug, however care should be used in removing plant material as improper disposal can spread the species further. Repetitive cutting or mowing within a single growing season to deplete stored reserves and remove photosynthetic tissue has been effective. Eradication of the rhizome system is necessary for control of this aggressive invasive species.

Chemical: Herbicide has been generally effective at controlling this species. Repetitive cutting of stems with spot application of Roundup®, Accord® or Glypho® to the stumps, and foliar spraying in large populations has been reported to be successful.

Biological: There are currently no biological controls available for Japanese knotweed.

ADDITIONAL INFORMATION SOURCES:

Seiger, L.A. 1999. Element Stewardship Abstract for *Polygonum cuspidatum*. The Nature Conservancy.
Seiger, L.A. and H.C. Merchant. 1997. Mechanical control of Japanese knotweed (*Fallopia japonica* [Houtt.] Ronse Decraene): effects of cutting regime on rhizomatous reserves. *Natural Areas Journal*. 17(4):341-345.



Illustrations reprinted with permission from *The Illustrated Companion to Gleason and Cronquist's Manual: Illustrations of Vascular Plants of Northeastern United States and Adjacent Canada*, ©1998. The New York Botanical Garden.

Reprinted from ODNAP Fact Sheet 10, May 2000. Ohio Division of Natural Areas and Preserves, 1889 Fountain Square Dr., Bldg. F-1, Columbus, Ohio 43224 (614) 265-6453

Rockbridge State Nature Preserve

The Geologic Story

Ohio is a land of diverse geological features. Among the most unusual and striking formations are its natural rock bridges. Ohio has more than 40 such bridges, with possible new discoveries always on the horizon. Natural bridges vary in size from a tiny three-foot span along the Ohio River to the nearly 100-foot bridge that makes up the main feature of this preserve.

The Rockbridge natural bridge owes its existence in part to the bedrock that comprises it. Black Hand Sandstone, the dominant bedrock of this region, erodes easily and accounts for the spectacular geologic formations of the Hocking Hills. This Mississippian-aged sandstone, formed under a warm inland sea, experienced uplift from beneath the surface. As the waters drained away from the newly uplifted rock layers, erosional forces began to change the landscape.

Vertical fracture zones or "joints" are a common feature of the Black Hand. Such joints played an integral role in the formation of the natural bridge. Water worked its way down and through the joints over a long period of time. Freezing and thawing widened the joints. Over time, the softer midportion of the Black Hand eroded more quickly than the more firmly cemented upper portion.

A cave-like recess or rock shelter formed beneath the overhang. With the supporting mid portion removed through headward erosion, the upper "roof" collapsed between the fracture zones, leaving a large opening. Thus, the new bridge was formed.

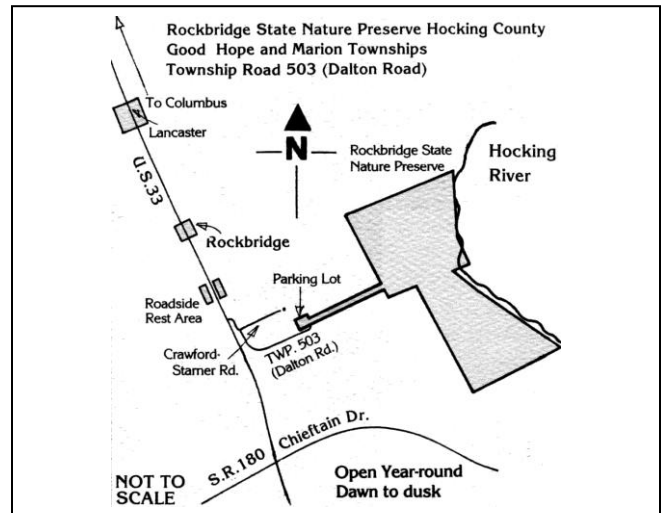
This natural arch or bridge known as Rockbridge is nearly 100 feet long, 6 to 20 feet wide. It arches gracefully up to 50 feet above the plunge pool below. It is the largest natural bridge in Ohio and has been featured in many publications. Only the Ladd Natural Bridge in Washington County approaches it in size.

Cultural History

Standing beneath the arching span of sandstone, one senses the unfolding of history. Members of the Wyandot Nation often stopped here seeking temporary shelter as they journeyed up and down the river known as the *Hock-hock-ing* ("bottle river"). As trappers and rugged frontiersmen traversed the wild countryside, they also would make use of this unusual shelter.

By the 1840s, the Hocking Canal had been constructed parallel to the river. The canal soon became a major commercial artery as the coal mines and other businesses used it to ship their products to market. For many years the bridge was a favorite picnic spot for canal travelers en route between Lancaster and Logan. The rock bridge was also a popular Sunday destination for families who would pack a lunch, rent a boat for the day and ply the canal to the bridge.

By the latter part of the 19th Century, the natural bridge was visited frequently by passengers of the Columbus, Hocking Valley and Toledo Railway, which ran between the



river and the canal bed. Visitors would disembark and walk across a swinging bridge that spanned the river. Today, several thousand people a year visit this geologic wonder.

This 100-acre nature preserve was acquired by the state in two parcels. The original parcel of 49 acres was purchased from Mr. Zora Crawford in 1978. Mr. Crawford permitted visitors for many years to park at his farm and hike over the hill to enjoy the natural bridge. The second parcel of 51 acres was obtained with Tax Checkoff funds in 1990.

Diverse Habitats

Rockbridge State Nature Preserve offers visitors a diversity of habitats to hike through and explore. Old fields, fencerows, a rich flood plain, dry ridgetops and mature forest provide homes for a variety of plant and animal species.

As the trail leaves the parking lot, it follows a narrow corridor between two fencerows for more than one-quarter mile. The trail crosses over a small, wet meadow and past an elderberry grove. Winding up the hillside one sees large oaks, hickories, and a series of paw paws, known locally as "Buck Run bananas".

Once on top of the hill, the visitors finds a scenic vista of the Hocking River valley before descending into the main body of the preserve. An old field reverting to woodland has numerous dogwood, sumac and Virginia scrub pine dotting the hillside. Once down inside the cool, mature forest, the trail parallels a winding, intermittent stream. This stream was one of the tools instrumental in the formation of the natural bridge. Once at the bridge, the water spills over the rock edge some 50 feet to the plunge pool.

Below the bridge, a narrow flood plain snakes alongside of a sometimes turbulent Hocking River. Large sycamores, scouring rush, and an assortment of colorful wildflowers make this fertile ground their home.

The trail climbs up the side of the ridge past matted trailing arbutus, pale Indian pipe, and colorful crested dwarf iris. Once on top of the ridge the soil thins and is drier. Beech, maple, and hickories provide a protective canopy for the forest inhabitants. Portions of the woods logged over

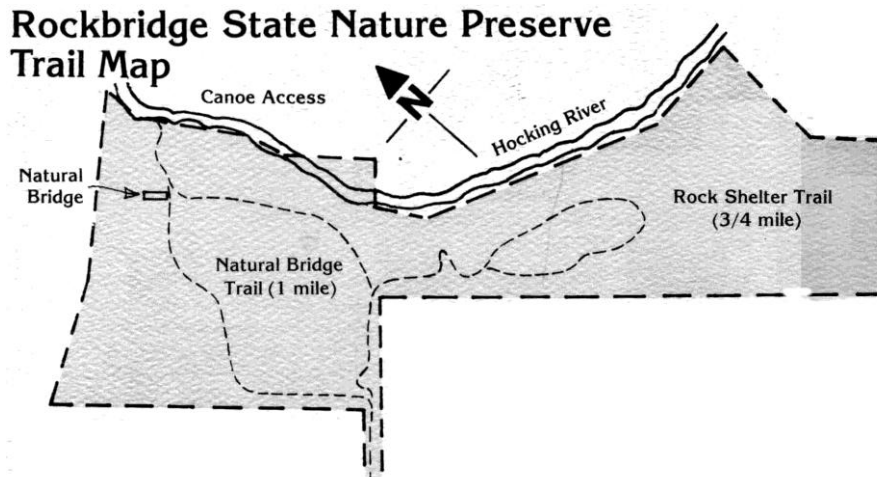
many years ago are now providing a vibrant, life-nurturing environment.

Wildlife

The Hocking Valley was once home to a variety of animals, some no longer found here. Black bears, mountain lions, and elk once roamed this rugged hill country. Today, species such as beaver, wild turkey, white-tailed deer,

grouse, fox, and an occasional bobcat supply the attentive visitor with a glimpse of Ohio's natural heritage.

In spring, migratory songbirds move into and through the preserve in preparation for nesting. Bluebirds are commonly seen along fencerows. Smaller mammals such as raccoons, opossums, skunks, squirrels, and chipmunks make Rockbridge State Nature Preserve their year-round residence.



Toronto votes against pesticide use

Luma Muhtadie, *Toronto Globe and Mail*, May 22, 2003

Representatives of the lawn-care industry stormed out of a Toronto city council meeting Thursday, after councillors voted 26-13 in favour of a by-law that restricts the use of pesticides and herbicides.

"It's been a long and process with a lot of back and forth, but I think we've reached a fair balance that ensures people won't be using pesticides if they don't need to," said Councillor Brad Duguid, a proponent of the by-law.

The use of pesticides will be permitted only to those homeowners who have a serious infestation problem. This will be determined by a committee comprised of environmentalists, lawn-care industry representatives and city employees. The ban on pesticides will be phased in over three years, beginning with a public education campaign this year and next, advising people of pesticide-free alternatives to maintain lawns. The city will begin issuing warnings for non-compliance in 2005 and by 2006 those receiving a second warning could receive a ticket for \$250.

About 45 Canadian cities have already introduced some form of restriction on the use of pesticides for lawn care. Halifax was the first major Canadian centre to ban pesticide use on lawns nearly three years ago. Following a strident debate between landscapers, who said their products could be used safely, and environmentalists and doctors, who maintained the chemicals were causing an increasing number of people to fall ill, the Halifax Regional Council voted in favour of a ban on pesticides, to be phased in over four years.

Other smaller Canadian towns, such as Dundas, Ont., and Chelsea and Hudson, Que., have by-laws banning pesticide use on private property.

Chemlawn and SprayTech, two prominent lawn-care companies, mounted a legal challenge against the Hudson by-law but the Supreme Court upheld it, continuing the restrictions on weed and bug killers.

Lawn Pesticides in Canada: A growing number of municipalities including Ottawa, Waterloo, Ont., Toronto and Calgary have also severely reduced the amount of pesticide they use on public land.

When Toronto adopted an intensive program to reduce chemical spraying on city land, their pesticide use dropped drastically, Mr. Duguid said.

More than 30 Quebec municipalities have taken action to try to reduce the use of chemicals for beautifying lawns.

Quebec approved legislation banning pesticide use on provincial and municipally owned property, and the same rules are supposed to apply to homes by 2005. The provincial regulations exempt farms.

Several studies have linked pesticide exposure to increased risks of leukemia, brain tumours and asthma in children. Researchers have also been looking at more subtle effects of low-level exposure to pesticides, such as potential learning disabilities and behavioural disorders.

In the last federal Speech from the Throne, the Chrétien government pledged to reintroduce the Pest Control Products Act, which would set new rules to address the environmental and health risks of pesticides.

Rare plants on Presque Isle

As Jim Bissell walked through the sandy plains of Presque Isle State Park in the past few years, he felt as if he had hit the wild plant bonanza. Emerging from the sand were hundreds of plants that were usually rare to find. One species had never been spotted before at the park; another hadn't been reported in decades. In 2001 alone, Bissell and his colleagues found 52 new locations with rare plants at Presque Isle.

"Last year it was the mother lode," said Bissell, a botanist with the Cleveland Museum of Natural History, who has been studying the park's plants for the Wild Resource Conservation Fund since the 1980s.

The record sightings for rare plants were directly related to Lake Erie's recent near-record low water levels, which dramatically affect the park's palustrine sand plain community — one of the rarest types of plant communities in Pennsylvania. Presque Isle is a 7-mile ridge of sand left behind as glaciers retreated 13,000 years ago. Lake Erie gradually rose around the ridge as the glaciers melted, creating a peninsula.

While the palustrine sand plain community is always present, the types of plants change with the water level. When Lake Erie is low, a number of plant species that survive through their ability to "seed bank" begin to pop up in the ponds.

These plants compete poorly with other, more aggressive species. But when the ponds begin to dry, seeds that have been dormant for decades burst forth. For a year or two, they can rule the site until other plants move in, or the pond water rises. During that time, they will germinate a new crop of seeds which will be deposited in the moist sand and will survive while those of other plants die.

The lake levels continue to rise and fall today. As this happens, the texture of the sand plains behind the ridge changes too. The shallow groundwater rises and falls with the lake level, changing the moisture of the sand. Ponds in the sand plain fill with water as the lake rises, then nearly dry up in years when the lake level is low.

"If you could somehow stabilize lake Erie, you would destroy that system," Bissell said. "It is driven by the rise and fall of the lake.

Last year, Bissell and colleagues discovered the first western Pennsylvania occurrence of the long-lobed arrowhead (*Sagittaria calycina*), an endangered plant in the state, which was discovered in a small, dry inlet on Presque Isle's west side. In recent years, the inlet had been covered by Lake Erie's high water levels. But in 2001, the bottom of the inlet was gradually exposed as the lake dropped to its lowest level in decades. As the water receded, the "seed-banked" plants sprang to life; by August, more than 1,000 long-lobed arrowhead plants covered a quarter-acre of the inlet's moist bottom. Similarly, Smith's bulrush (*Schoenoplectus smithii*), another endangered plant, abounded in the same inlet. Unlike long-lobed arrowhead,

Smith's bulrush had been seen at the inlet before, but no more than 17 plants had ever been counted.

Last year, botanists counted more than 1,000. "You could hardly walk without stepping on them," Bissell said. And — as water levels dropped at other ponds — Smith's bulrush popped up at 10 other widely scattered sites along the peninsula. "I did not know it was throughout the park," Bissell said. "I thought it was only in that one part of the park."

Other rare plants were found as well. Altogether, Bissell reported that rare plants were discovered at 52 previously unreported sites at Presque Isle, a number he called "astounding."

Presque Isle has been studied intensively for more than a century. Botanist Otto Jennings published the first analysis of its vegetation in 1909. Since then, there have been only a few periods where water levels have dipped as low as in recent years, which left great potential for new plant discoveries — but only a short window of opportunity to make them.

"These are ephemeral community species," Bissell said. "They don't compete well, so they don't last. Once those flats are exposed, if the lake continues to drop, in a few years it is taken over by more aggressive perennials."

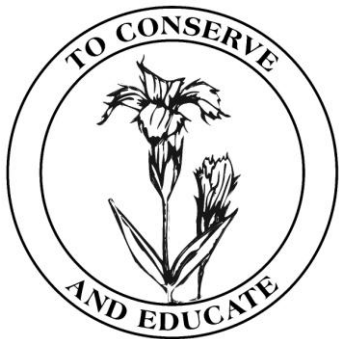
Last year was the third year that Bissell and his colleagues had taken advantage of low water levels to find new plants. Two years earlier, Bissell found dwarf spikerush (*Eleocharis parvula*) at a site which previously had been underwater for 15 years. The only other place that the state-endangered plant had previously been seen was along the Delaware River near Philadelphia.

Frank Felbaum, director of the Department of Conservation and Natural Resources' Office of Wild Resource Conservation, suggested people should take a lesson from the seed-banked Presque Isle plants. With nearly a third of the state's native plants considered to be in trouble, he said their long-term survival may hinge on people developing seed bank technologies for other rare species. Then, the plants could be returned in the future if the threats to their habitats, such as invasive species, pollution or other problems, are reduced.

"Plants indigenous to Pennsylvania should be seed-banked for development at a later date," Felbaum said. "We may not have the technology today, but 10 years, 20 years, or 50 years from now we may have the technology to create like habitat."

In the meantime, Mother Nature's own seed bank will stay in place for rare species at Presque Isle. Water levels are back on the rise this year, but Bissell plans to be ready the next time Lake Erie takes a dip. "I love these dry years," he said. It's great for us.

Reprinted from *Keystone Wild Notes*, Pennsylvania Dept of Conservation and Natural Resources, Summer/Fall 2002.



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Miscanthus sinensis – Marilyn Ort
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Rockbridge State Nature Preserve
Invasive Plants of Ohio: Japanese Knotweed

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