On The Fringe

Journal of the Native Plant Society of Northeastern Ohio

On The Fringe Turns Over a New Leaf

This issue of *On The Fringe* is the last one for which Ann Malmquist and I, Jane McCullam, will be editors. After nearly ten years we are handing the Journal over to the capable hands of Diane Christensen and Bill Oberdick, and we wish them the best of luck. Ann and I will be here to cheer them on and help in any way we can to smooth the path for them. Please continue to send in articles and suggestions for subjects.

Ann and I have had a good time working on the Journal, and we will miss the opportunity to read all the newsletters of other native plant societies. There is a strong interest in native plants in this country, and the revival of enthusiasm for unprocessed foods and the awareness of the interaction of global warming and habitat disruption is carrying us all forward. Fifty years ago we worried that urban sprawl and the exploitation of natural resources were the major threat to our native plants. Now we have climate change to add to our concerns. It is more important than ever that we all work to educate those around us about how to preserve and promote our local habitats and to do something concrete ourselves to help. For a start, most of our local park systems have programs to remove invasive species, and they are always looking for more volunteers

2009 Annual Grant Recipients

This year at the annual meeting we awarded three separate grants totaling $1000. Roger H. Laushman, Ph.D, of the Oberlin College Biology Department was awarded $400 for his work restoring *Rosa blanda* populations. A $300 grant was given to Katie Martin, Graduate Fellow at the School of Environment and Natural Resources, Ohio Agricultural Research and Development Center at The Ohio State University, for a portable greenhouse and supplies to help with her program to teach K-12 students about native plants and to start a native plant garden at their school. The Mentor Marsh was awarded $300 to create a Rain Garden planted with native species.

Membership Renewal Time

Early in January we will send you next year's schedule of programs and field trips along with the annual membership renewal form. **Please return your renewal promptly** and renew at the highest level you can manage. We would like to sponsor more events and projects promoting and preserving native plants.

Don't forget to visit our new website at
www.nativeplantsocietyneohio.org

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Ohio Invasive Plants Council Conference

February 18, 2010 - Ohio Invasive Plants Council will present its third Invasive Plant Research Conference, entitled "Connecting Research and Land Management" on Thursday, February 18, 2010, at the Indoor Adventure Center in downtown Columbus, OH. The cost of the conference is $25 before January 15 and $35 after that. For more information about the conference visit the OIPC website, http://www.oipc.info or call Don Cipilloni at 937-775-3805

Program Schedule Spring 2010

Saturday March 13, 2010, 2:00 - 3:30 PM – Chagrin Falls Library. Habitat for Wildlife and the use of Native plants. Joint presentation with the National Wildlife Federation. Bobby Katzman of National Wildlife Federation and Kathryn Hanratty of Enviroscapes Landscape Design will discuss the habitat needs of local wildlife and the native plants that will help you create a diverse oasis for wildlife in your own yard. Find out how to certify your yard as a Backyard Habitat.

Ohio Botanical Symposium

Friday, March 26, 2010 - Villa Milano, 1630 Schrock Road, Columbus, Ohio, 43229. Sponsored by: Ohio Division of Natural Areas & Preserves, the Cleveland Museum of Natural History, The Nature Conservancy and The Ohio State University Herbarium.

Keynote speaker will be Doug Tallamy, Professor and Chair of the Department of Entomology and Wildlife Ecology at the University of Delaware in Newark, Delaware, where he has authored 69 research articles and has taught Insect Taxonomy, Behavioral Ecology, and other courses for 28 years. Chief among his research goals is to better understand the many ways insects interact with plants and how such interactions determine the diversity of animal communities. His book *Bringing Nature Home: How Native Plants Sustain Wildlife in Our Gardens* was published by Timber Press in 2007 and was awarded the 2008 silver medal by the Garden Writer's Association.

The Ohio Botanical Symposium was first held in 2001 by the Ohio Division of Natural Areas and Preserves to bring botanists, naturalists, and nature enthusiasts together to network, provide professional enrichment, and view posters and displays on Ohio's native flora, natural areas, and rare plants. The Nature Conservancy joined as a co-sponsor of the symposium in 2003, the Ohio State University Herbarium in 2006, and the Cleveland Museum of Natural History in 2009.

In addition to at least six presentations, attendees have a chance to visit with exhibitors and vendors. Exhibitors include non-profit environmental and conservation groups, park districts, federal and state agencies, and universities. In the past, vendors have included book sellers, nature craftsmen, and nature education/lodging. See the ODNR website for information on registration.

A Brief Review of This Summer's Native Plant Society Programs

Stracola Plant Survey

On Saturday, June 13, 2009, the Native Plant Society participated in our annual plant survey for the Western Reserve Land Conservancy (previously known as the Chagrin River Land Conservancy). As the conservancy works to preserve the scenic beauty, rural character, and natural resources of Northeast Ohio, a species list for the property aids preservation decisions and provides support for grant requests needed to procure funding for public land acquisitions and conservation easement purchases. This year's survey was held at the Stracola property in Ashtabula County, north of Orwell. This 130-acre property includes 30 acres of high quality beaver marsh and 80 acres of river-bottom oak forest. A future purchase will result in a total of 170 acres with 2/3 mile frontage on the Grand River.

Having donned our boots, hats, and bug repellant, we headed off. Our first stop was to check out the area around an old barn where a snake survey was being conducted. Large sheets of corrugated metal were placed on the ground for snakes to bask under. The area is known for the rare massasauga rattlesnake but it was too early in the day for snakes to be basking. We traversed the forested areas inventorying the species of trees, shrubs, and herbs encountered along the way, often sharing folklore and anecdotes about the plants we found. The area around the beaver pond revealed recent beaver work where drag paths were clearly visible leading to the open water, the beaver having manipulated the trees through the forest to use as food or construction material.

Together with an earlier spring visit, a total of 180 plant species were recorded, including a rich diversity of spring wildflowers, 10 species of ferns, and 52 species of woody plants. One of the more unusual plants was the Hairy Honeysuckle, *Lonicera hirsuta*, a vine with the two upper most leaves fused to form a cup-like disk that the flower emerges out of.

The chance to see this pristine property with a rich diversity of habitats and few invasives, along with the camaraderie of those with a similar interest in botany, made for an enjoyable morning.

The Aliens Have Landed: Invasive Plant Workshop

On Saturday, June 26, Jennifer Hillmer shared her expertise on invasive species at The West Woods Nature Center as a joint program with Geauga Park District. Having worked as a land steward for The Nature Conservancy, The Holden Arboretum, and Cleveland Metroparks, Jennifer has extensive experience in recognizing and controlling invasive plant species.

She began with an overview of the difference between native, non-native, and invasive species. Non-native plants are not the same as invasive plants. Invasives are characterized as becoming established, reproducing, persisting, and spreading outside of cultivation; they cause harm to the environment and are expensive or difficult to control. Species covered included lesser celandine, Japanese knotweed, reed canary grass, the different bush honeysuckle varieties, autumn olive, and the black swallowwort, among others. Jennifer also shared various means for controlling these species. Many samples of both upland and wetland species were on display for close examination. The group then reconvened outdoors for a hike to observe how invasives affect the native landscape by out-competing native species with no natural control.

Insect Pollinators

Saturday, August 30, was cool and drizzly for a summer afternoon, but that didn't stop 21 people from coming out to North Chagrin Reservation to hear Judy Semroc of the Cleveland Museum of Natural History share her knowledge on the variety of insects that pollinate our flowers. Covering everything from bees and beetles to butterflies and flies, Judy began with a power point presentation on their different pollination strategies, including flower color preference, flower type and shape, and how these strategies are adapted to the specific flower type, such as tongue length. The group then went outside to observe insects in action on the vegetation around the nature center. The cool temperatures reduced the total of number of species we saw, but kept them immobile for close observation and photo opportunities. This program was held jointly with the local Wild Ones chapter, and we hope to do more joint programs in the future.

Rittman Salt Marsh

Another cool, rainy day dawned for the trip to Rittman salt marsh in Wayne County on September 26, with Rick Gardner, botanist with ODNR Division of Natural Areas and Preserves. The group met Rick at a local restaurant off the highway, and then carpooled to

the Morton Salt Plant to gain access to their property. Rick had made advance arrangements for the group to go in, and we were looking forward to seeing some unusual plants. Then began our eventful day. The guard opened the gate for us at the site, and we proceeded to drive back to the area with several settling ponds for water used to pump the salt from the ground below. As we emerged from the vehicles, we were greeted by gunfire close to where Rick was planning to take us. Being concerned that someone was target shooting illegally on the property, we made a call to the security office, which sent out a supervisor to investigate. The supervisor was not aware of any authorized shooting and called the local police. Meanwhile, we passed the time looking at shorebirds congregating on the flats of the settling ponds and weedy plants growing along the edges of the service drive. An officer finally arrived and informed everyone that the shooting was being conducted by a SWAT team doing weapons training and were beyond the point where we would be in danger. With our safety assured, we headed along the edge of a marsh to a channel approximately 4 feet wide and 25 feet long that was blanketed with a succulent plant known as glasswort, *Salicornia europaea*. This halophyte, or salt loving plant, is fleshy with scale-like leaves and was once used for glass-making. Other salt-loving species growing with the glasswort were the small annual salt marsh aster, *Aster subulatus*; spear saltbush, *Atriples patula*; and salt marsh sand spurry, *Spergularia salina*. These unusual plants, not normally found in Ohio, were a treat to see after our adventure getting to them. We greatly appreciate Rick Gardner taking the time to share these unique natural areas with us. – *Judy Barnhart*

Annual Meeting

Our Annual meeting was held on September 25th at the Cleveland Museum of Natural History. About 50 members attended the business meeting where the recipients of this year's grants were introduced. Please see page 1 for details. The meeting was followed by a talk by Jim McCormac, the first lecture in this year's Explorer Series. Jim based his presentation on material from his new book *Wild Ohio*, illustrated with beautiful pictures by Gary Mezaros.

Historic Poster Is Available

Summer housekeeping has unearthed a small supply of the first poster created by the Native Plant Society. It is 20x24" and shows the original eight chapters of the Ohio Native Plant Society with a large color rendering of the Chapter Native Plant for each. The art work was done by Jim Glover, who illustrated most of the publications for the Ohio Division of Natural Preserves. These posters are free to members plus $3.00 per order to cover postage. Write, call or email Judy Barnhart, 10761, Pekin Rd., Newbury, OH 44065, 440-564-9151, bunchberry1@windstream.net.

The Winter-Flowering Shrub

Robert L. Tener

One of my favorite flowering shrub-trees is the Witch Hazel. I look forward every year to its blossoming in early or late winter when it becomes a multitude of yellow small wavy flowers enlivening the dreary scene. I planted several along our east balcony here at High Hawk and now this March I see their tendril-like flowers adorning the length of each stem, expressing in a small way the empty expanse outlined by their tall branching brown stems.

The Witch Hazel is also called Wych-Hazel, Snapping Hazel, Striped Alder, Spotted Alder, Winter Bloom, Common Witch Hazel, Southern Witch Hazel, and Tobacco Wood. There are six species of Witch Hazel in eastern North America and eastern Asia. Botanists call it *Hamamelis virginiana* Linnaeus. *Hamamelis* is the old Latin name derived from two Greek words meaning "at the same time" and "apple tree." The name was applied to a Medlar or similar tree and refers to the tree blooming when the fruits of the preceding season's flowers are ripe. *Virginiana* means "of Virginia". Hazel is an old Teutonic term for witch derived from Old English *wick* from *wicken* meaning "quick," suggesting how a stick of Witch Hazel acts when held over water underground by a diviner trying to find or predict a source of water. The early American settlers named it Witch Hazel because its leaves and fruits resembled those of the Hazel tree and its autumnal blooming suggested that it had mysterious powers.

This is a small, deciduous tree rarely more than 25 feet high. In northern Ohio it may be a stout shrub, but on the slopes of the Alleghenies it can reach 40 feet with a trunk diameter of one foot. It has a broad open head and slender flexible branches. The leaves are alternate, simple, as broad as they are long, dark green with wavy margins and straight veins depressed above and conspicuous beneath. They tend to be asymmetrical.

The flower buds are tiny round yellow buttons appearing in August. Their flowers are dainty, pale yellow to bright yellow ribbon-like petals, four to a flower, with a faint delicate fragrance. The tree blooms in late September, October, or November during Indian Summer, and can bloom in January or February here in Ohio.

The fruits occur in round two-celled brown pods which contain two smooth shiny black seeds. These are surrounded by an inner and outer layer of hard woody tissue. The pods remain closed for an entire year; when

the current year's blossoms start, last year's pods, now dry and ripe, split open to scatter the seeds with a sharp report. The contraction of the inner, horn-hard woody layer exerts force behind the seed to expel it to a distance or five to thirty feet.

In February or early March we cut a few small branches and place them in a vase of water on our kitchen table. Soon the entire area is suffused with a fragile sweet aromatic perfume as though a beautiful Victorian woman had passed through our kitchen and left her memory.

The Witch Hazel grows in low rich soil on the edges of woodlands, deep ravines, rocky banks by streams, often in dry sites, being largest in the North and South Carolina Alleghenies. Because each plant usually has several stems, like a shrub, but often attaining tree height, it makes a fine ornamental plant. It ranges from Maine south to Florida and west to Wisconsin thence south to Texas. It grows in most of Ohio's counties except for the western border from Hancock to Van Wert and south to Butler and Brown.

The wood is heavy, close grained, a light brown with touches of red, thick white sapwood, and hard. The early settlers took its autumnal blooming as a sign that the tree had special powers and used it, therefore, for their divining rods to find coal and water. They used a Y shaped branch held loosely by the Y end in both hands. When the long loose end pointed down, there was the place to dig for water. The process was called "water witching." Some people also used its wood to counter a witch's spell.

The leaves, bark, and roots have an astringent value. An extract or infusion is made from them by boiling for 24 hours in water and alcohol. Indians used this for inflammation, sprains, and bruises. Witch Hazel extract is distilled from this and sold under the name Witch Hazel (to be used on bruises, sprains, and burns) or under the name Aqua Hamamelis. It also is used as an after-shave lotion. The drug hamamelis comes from the dried leaves. The active agent is a tannin extracted with water and steam and then distilled. To 850 cc. of distillate is then added 150 cc. of alcohol to produce an astringent that helps stop bleeding. A distillation of the bark in alcohol is called Pond's Extract.

Sources:

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Shipley, Joseph T. *Dictionary of Word Origins*. 1961.
Vannorsdall, Harry H. *Trees of Ohio*. 1958.

Robert L. Tener is a member of the Native Plant Society of Northeastern Ohio. He lives at High Hawk in Rootstown, Ohio

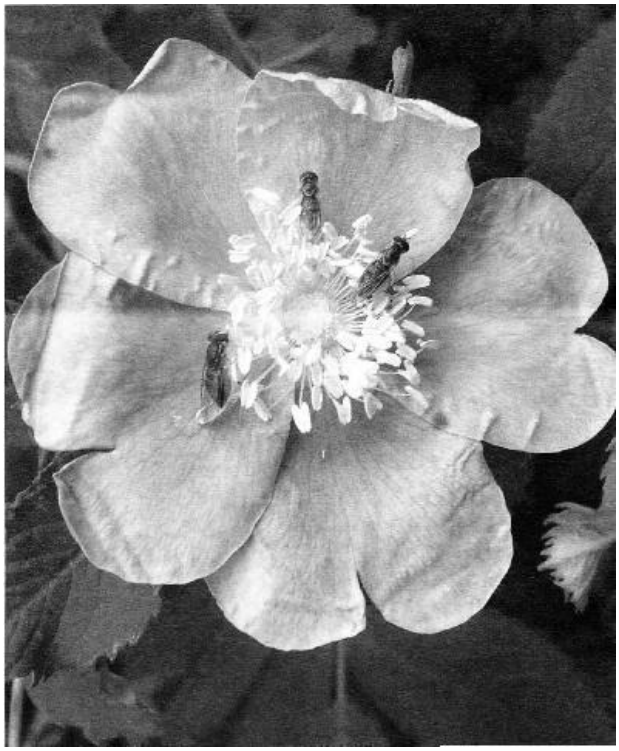
The Wild Rose and its Pollinators

Jim Dyer and Victoria MacPhail

Wild roses (*Rosa* spp.) are being studied as a potential commercial source of rose hips, the fruit that develops from rose flowers. A close relative of strawberries and apples, rose hips are little, berry-like, red fruit with a high vitamin C content, as well as several other vitamins, antioxidants, and nutrients. Commercial production of rose hips for pharmaceutical and preserve companies, as well as wineries, could provide a new source of income for farmers, particularly in the Maritimes. The Atlantic Canada Network on Bioactive Compounds is the organization responsible for developing this concept, with help from the Atlantic Innovation Fund. An important part of this investigation is being carried out in the Department of Environmental Biology at the University of Guelph in Guelph, Ontario, where research into the pollination biology of wild roses is currently underway. A large part of the field component for this project is taking place at Rock Chapel, a nature reserve operated by the Royal Botanical Gardens near Dundas, Ontario.

Wild roses are preferable to ornamental roses for the purposes of cultivation for human consumption. This may seem surprising given the size of most domestic roses compared to the delicate and modest wild roses. However, garden roses need special care and expensive inputs whereas wild roses are well-adapted to Canadian environmental conditions. As well, people consuming parts of these flowers are likely to be interested in how they are grown. A product grown without pesticides will probably enjoy better market value.

One of the production questions involves how roses achieve pollination, which is needed in order for the hips to form. With wild roses, it isn't presently known whether they are capable of self-pollination (ovules can be fertilized with pollen from the same flower) or if they are self-sterile (pollen must be transported to other flowers to form fruit). In rare cases fruit can form without pollination, and this unlikely possibility will also be checked in the study. If the work at Rock Chapel indicates that wild roses



Along with assorted native bees, Syrphid, or flower, flies are also effective pollinators of many wild flowers, largely because of their great numbers.

need cross-pollination, insect pollinators become critical. In fact this issue is so important that part of the study requires depriving the flowers of natural cross-pollination. This involves bagging selected flowers to keep insect pollinators away.

Recent experience has revealed that the introduction of honeybees is not always the best solution for crop pollination. There are many specific cases where local native bees are better suited. Decreased reliance on honeybees as pollinators is not a new concept, as illustrated by the blueberry (*Vaccinium* spp.) industry in eastern Canada. The transition from a wild harvest to a systematic cultivation of blueberries has been going on since the late 1800's. The crucial role played by several dozen species of wild bees is now generally recognized. In fact, it is becoming more evident that relying on honeybees for pollination services has a number of problems. First, their hives are vulnerable to infections by two types of mites, and moving them around to pollinate various farmers' crops tends to spread these infections. Wild or native bees are not affected by these mites. Second, since the honeybee is an introduced species, any regional increase in their numbers puts extra competitive pressure on native bees. Since it is important to know what the local pollinator agents are, a big part of this wild rose study is to observe the insects that frequent wild rose patches.


A sweat bee

Following the example of blueberry cultivation in eastern Canada, a beneficial side effect of commercial production of wild rose hips might well be the incentive to thoroughly catalogue the native bees and other pollinating insects that are associated with wild roses. The wild rose flower is easily recognized by its five pink (or, more rarely, white) petals and its flat, open shape. Flowers having a radial or bowl shape allow insect visitors easy access to their anthers. This accessibility means that wild roses are generalists compared to more specialized flowers which allow only insects of the right shape and size to penetrate the narrow, tubular or closed corollas in order to retrieve pollen. Wild roses attract a variety of pollinators, including many small-to-medium bees and a variety of beetles and syrphid flies. The domestication of roses has produced a very differently shaped flower. A hybrid rose is more tubular and has more than five petals.

The prominence and accessibility of the anthers of wild roses to foragers is an adaptation likely driven by necessity since the lifespan of any given flower is short (often only a few days). The wild rose does not offer its visitors any nectar. Instead, the insects must forage for pollen. This may limit the number of insect species that forage this plant to those that rely primarily on pollen. It may also mean that many insects that take pollen from wild roses would need access to other floral sources to obtain nectar, a factor that must be considered before large monocultures of roses are planted.

The wild rose hips initiative comes at a time when there is a growing concern that many pollinating insects are under threat and not well enough understood. In Canada the link between the scientists who have been researching pollinating insects for decades and the emerging need for more public awareness and involvement is being filled by the Environmental Monitoring and Assessment Network Coordinating Office (EMAN-CO), a part of Environment Canada.

To facilitate this link, EMAN-CO is developing a nation-wide pollinator watch program (based upon last year's pilot project in Waterloo) whereby volunteer observers will receive guidance on how to observe and report on pollinating insects that they would encounter in their backyards or local parks and trails, sites where the wild rose might be present.

While the wild rose project, like the blueberry industry, provides motivation for more scientific study of wild insect pollinators, the potential for commercial rose hip production demonstrates that these insects are not just another component of nature that needs our protection. They contribute significantly to our economic prosperity. Our dependence on insect pollinators extends to most crop types and is shared by virtually all natural ecosystems.

Web Links:
http://www.upei.ca/acnbc/
http://www.springvalleyroses.com/inthegarden/rosereci pes.html
http://www.eman-rese.ca

Photos by Jim Dyer.
Jim Dyer is an environmental consultant on climate change and biodiversity issues in agriculture who lives in Cambridge, Ontario. Victoria MacPhail is a graduate student in Environmental Biology at the University of Guelph who is conducting field research on wild rose reproduction factors and insect visitors.
Reprinted from *The Blazing Star*, newsletter of the North American Native Plant Society, Summer 2005.

Guessing the Age of Trees

Bill Einsig

Counting rings is not the only way to age a tree. Here are some techniques that can be used on live trees, ones that will also help teach mathematics, conservation and history.

Just how old is that large tree in your backyard or on the school campus? How can you tell? Tree rings on cut stumps are reliable indicators of a tree's age but, obviously, can be used only after the tree is cut down. Fortunately, there are several other methods that do not harm the tree and are easy for school students to handle on their own.

Teachers will find these methods useful in getting students outside to solve real problems and to reinforce other instruction.

We often overlook the fact that new construction usually involves some landscape improvements. It is possible that some trees on the property were planted at the time the building was constructed. Depending on the age of the school or home, old plans, maps and other records might give clues about which trees were planted as part of the original construction. Check with neighbors and other residents who might remember some local history of your school and neighborhood.

Foresters use a tool known as an "increment borer" to determine tree age. This tool bores a hole into the tree's trunk and removes a thin plug of wood. The sequence of tree rings is easily seen in this plug and the age of the tree can be determined. Many schools do not use increment borers because of their high cost, limited use, and risk of loss if they are used improperly. But local foresters might welcome the chance to visit your class to demonstrate the tool's use and help you estimate the age of a particular tree.

Coniferous trees grow by developing sets, or whorls, of branches each year. You can estimate tree age by counting the sets of branches from the ground up. The distance between sets of limbs represents the annual growth of the main trunk for that growing season. With that in mind, it is possible to compare the amount of growth during various years.

M.W. Staples has suggested a formula he believes gives approximate ages for most trees growing under average conditions. His formula uses the tree diameter at 4.5 feet above the ground, times a multiplier for each species: Tree diameter (in inches) multiplied by species multiplier factor (see accompanying chart) equals tree's approximate age.

Multiplier Chart

Species	Multiplier
White Ash	5
Black Oak	4
Beech	6*
Scarlet Oak	4
Birch	4
Red Oak	3.5
Elm	2.5
White Oak	5
Hickory	7
Sycamore	3.5
Norway Maple	4.5
Sweet Gum	4
Silver Maple	2
Tulip Tree	2.5
Walnut	3

**Richard Pardo, former Director of the American Forestry Association suggests that a multiplier of 12 would be more accurate for Beech.*

Here's how it works: First measure the diameter of your tree 4.5 feet above the ground. (Foresters call this value the Diameter at Breast Height or DBH.) Next find the Species Multiplier for your tree species in the chart above. Finally multiply the diameter of your tree times the multiplier. Your answer is the tree's approximate age.

To measure diameter you may use string or flexible steel tape to measure circumference, then divide by 3.14 to find the diameter. Diameter tapes are available which are calibrated in 3.14 inch units so that you can measure circumference and read out the diameter. A Biltmore stick is a straight, calibrated stick held against the tree trunk at arm's length and read to give the tree's diameter. Check with a local forester [ed: or Google] for information on diameter tapes and Biltmore sticks.

Reprinted from Notes of the Pennsylvania Native Plant Society, Oct.-Dec., 2005

The Apple Doesn't Fall Far From the Tree

Mike E. Ecker

Apples don't fall far from the tree, as the saying goes, so it's a good thing plants have developed methods to ensure seed dispersal, helping them survive as a species. Seed dispersal simply refers to the act of a seed being moved from its point of origin to another location. Plants use various mechanisms to accomplish this: wind, animals, water and, in rare instances, insects. Sometimes the plant itself plays an active role in dispersing its own seeds. One can easily have the impression that seed dispersal is only a means for a plant to increase its geographical range; however, the story is much more complex.

Fruit is produced by a plant for the sole benefit of making more of its own kind. As beautiful or tasty as we think a plant's fruit may be, even if it could, the plant wouldn't care about its effect on us. Reproduction (fruits and seeds) allows plants to increase their genetic diversity and then to spread their offspring as widely as possible. Ideally, seeds will sprout, grow and, eventually, produce seeds themselves. Many seeds, weeds in many cases, lie nestled in soil for years, waiting for conditions that allow them to sprout. This "seed bank" as it's called is a relatively safe way for plants to avoid having to adjust too quickly to a new environment without a way to "return" to the old environment should that become necessary.

Wind is a common agent of dispersal in modern plants; I'll discuss three of them here: seeds with a plume, winged seeds, and tumbleweeds. In some cases, these mechanisms allow a seed to travel great distances.

When discussing wind dispersal, one of the first plants to come to mind is the dandelion. Many watch with annoyance as the dandelion's finely plumed seed-like fruits loft into the air from mature seed heads held above lawns on long stalks. This is especially true of homeowners, carefully treating their lawns and watching as their neighbor's crop of dandelion seeds blows freely into their lawn.

And who hasn't at one time or another succumbed to the attraction of maple "helicopters," correctly called samaras (you just knew there was another name), throwing them into the air and watching as they slowly twirl back to earth? When this occurs naturally from high up in a tree, these seeds can whirl themselves quite a distance.

Seeds of some plants are not released by themselves but with structures attached to the seed that are used for dispersal, such as in the case of tumbleweeds. Russian-thistle (*Salsola*) for example, rolls in the wind, dispersing seeds along the way. Some grass fruits are enveloped by structures that have water-sensitive, coiled bristles (awns) attached; these twist when dry and straighten when wet, "pulling" the seed into contact with soil, planting itself so to speak.

Seed dispersal by animals is accomplished by various methods. Some are subtle and sneaky. Others are quite "in your face" or, perhaps more accurately, "in the mouth." Animal dispersal is subdivided into dissemination by birds and by mammals.

Some plants produce fruits and seeds low to the ground so that dispersal on the outside of animals is augmented. Such seeds and seed-like fruits possess hooks, spines, or barbs, or have sticky glands that tangle them in an animal's fur, allowing them to travel right along with the animal, dropping as they go. Burdock (*Arctium)* and beggar-ticks (*Bidens*) possess hooks and barbs on their fruits, and anyone who has a long-haired dog that has run through a thicket is more than familiar with this method of dispersal. Heck, if you've gone through a thicket you may have come out with black, two-pronged fruits of beggar-ticks stuck all over your pants. (Surely, if wading through thickets you are wearing long pants?)

A fruit whose seeds are dispersed via the inside of animals possess brightly colored or odiferous flesh, or both these attractants, to entice an animal to eat it. Red and black colors are attractive mostly to birds. Larger, fleshy fruits are eaten by mammals like deer, raccoon, or as one of my mother's favorite sayings states, "You're grinning like a `possum eating persimmons," which I always assumed referred to the extreme astringency of an unripe persimmon causing a rather pinched grin.

Osage-orange (syn. hedge-apple) (*Maclura pomifera*) has large, round, hard, bright green fruits laced with sticky, latex-like sap. It's been suggested that now-extinct large mammals such as the Wooly Mammoth ate this fruit, perhaps spreading the many seeds inside its droppings. Now that Wooly Mammoths are gone, nothing seems to move this fruit around unless, perhaps, the tree grows on a steep hillside.

Some larger nuts like hickory, beech, and oak are "planted" by animals. Acorns are eaten by squirrels and, hence, many are destroyed in the process. An oak tree has to produce sufficient acorns to satisfy a squirrel

population's appetite with enough remaining so that some get cached and others are not recovered. So, most acorns are sacrificed in order to ensure that at least some of those moved and buried will produce new oak trees.

Even a few birds, such as jays, pigeons, and some woodpeckers, plant acorns by caching. Birds transport seeds in several different ways: held in their beaks, in their gut, stuck to feathers, or, in the case of wading birds, on their feet. In this last case seeds can be stuck in mud on birds' feet from one pool and then washed off in another. Seeds being transported in a bird's stomach can either pass through its digestive system (ending up on your windshield) or regurgitated in some cases.

Fruits attractive to birds often have similar characteristics such as (1) an attractive edible part that is brightly colored and goes through a color change signaling its maturity, (2) a mechanism either protecting the seed against digestion or causing regurgitation, (3) having no closed, hard rind (i.e., soft or fleshy) and (4) possessing exposed or dangling seeds. The fruits of serviceberry (*Amelanchier*) and some viburnums (*Viburnum*) are only two examples of plants whose fruits go through a dramatic color change, in this case from bright red to blue-black when mature. Some plants have parts other than the outer fruit acting as the initial attractant. Euonymus (*Euonymus*) is attractive to birds by its colorful red aril (fleshy outgrowth on the seed) surrounding a dangling seed that is bright reddish orange. This is unfortunately the case with European spindletree (*Euonymus europaeus*), and this non-native large shrub has spread into our woodlands in this manner.

All larger fruits are transported more widely by mammals than by birds; however, as noted earlier, jays can carry small acorns quite a distance. In the case of crab apples, birds prefer the smaller diameter ones to the larger because they can fly away with the fruits and consume them in seclusion. Deer, however, eat the larger crab apples eagerly, passing the seeds through their digestive systems.

Water can even act as an agent of dispersal. Some plants growing in or near water may drop fruits that can float for quite some time, their seeds germinating in mud if good fortune directs them there. Not all plants growing in wet areas have seed dispersed by water. Also, many plants in wet areas reproduce asexually (i.e., without producing seeds at all).

In rare instances, insects can become the dispersal mechanism. Fruits of wild ginger (*Asarum canadense*) are tucked among the leaves, close to the ground. Ants collect seeds of wild ginger, attracted to oils in appendages on the seeds. Carrying the seeds to their colony to utilize this high protein oil, they inadvertently plant them in the process.

Ballistic dispersal includes both active and passive methods of seed dissemination. An example of active dispersal is touch-me-not or jewel-weed (*Impatiens*). The fruit's living seed coat is under tension, and when touched by an animal it explodes, sending the seed several feet from the mother plant. Another example is witch-hazel (*Hamamelis*) whose hard, woody capsule dries and then, if things are quiet enough, can be heard to open with a crack, shooting seeds close to 20' (6m) in the process.

Passive ballistic dispersal happens when a fruit sheds seeds through movement by wind, rain or animals. Sweetgum (*Liquidambar*) has woody, ball-shaped fruits that have openings. Many capsules develop pores or split open along a seam when dry, allowing the small seeds inside to fall out. When moved by the wind, these fruits distribute seeds much like a salt shaker. Additional dispersal methods may be used after the seed has been ejected in either active or passive ballistic dispersal.

Not any one mechanism can be credited for a seed's dispersal. Some use the elements, while others rely on animals in a variety of innovative ways to transport their seeds. Still other plants have colorful fruits that act as an attractant and indeed, besides attracting many birds and animals, they disperse humans to various nurseries and garden centers, proving their effectiveness.

Some text from *Dispersal Mechanisms of Common Northeast American Flora*, Michael Ecker, December, 1980, Akron University.

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Reprinted with permission from *Daweswood,* a biannual publication of the Dawes Arboretum, Newark, Ohio, Fall/Winter 2008

Planting a Cornucopia of Native Plants

Casey Tucker

When we think of feeding birds we often think about putting out bird feeders full of sunflower seeds, corn, millet, or suet. We also typically think of feeding birds as being strictly limited to winter. Feeding, however, can be a year-round activity, one that allows you to observe birds and their behavior in the unique and intimate setting of your own back yard.

It's easy to feed birds throughout the year by planting plants that provide a variety of food sources at different seasons. You might try planting some nut-bearing trees, seed-producing flowers, or even some berry-producing bushes. The great thing about doing this is that it allows you to landscape your yard in a veritable cornucopia of bird food, and some of it is good for us too!

There are a few things to consider before you begin planting. First, assess what kind of soil you have in your yard. Is it well-drained, fertile soil or is it poorly drained, clay-like soil? Is your soil well-drained because the land has a slope to it? Some plants can grow in any type of soil, but other plants will only thrive in specific soil types. Just understanding the type of soil in your yard will save you a lot of time and money in the long run.

Another thing to take into consideration is in what seasons do you want to offer food? Do you want to make food available all year round, or only in spring or winter?

Lastly, what kind of foods do you want to offer? This will determine the kinds of birds that are attracted to your yard. Birds like American robin, eastern bluebird, brown thrasher, northern mockingbird, and cedar waxwing will be attracted to berries, whereas many of the finches and sparrows, chickadees and titmice will be attracted to seed-producing plants like sunflowers and purple coneflowers.

One of the best things you can do is utilize native plant species whenever possible. Native plants tend to require less additional water and fertilizer to survive because they are adapted to conditions in Ohio, and they will be more resistant to weather conditions and pests.

Here are some native plants to consider based on the type of food they produce.

Berries

Eastern Redcedar *(Juniperus virginiana).* An evergreen tree that produces small, blue berry-like cones during the early fall, eastern redcedar attracts cedar waxwings, northern mockingbirds, brown thrashers, gray catbirds, and a variety of other species. It grows in a range of sites and soils, but prefers poor, eroded soils and at least partial sun. Redcedars are dioecious, meaning in effect that some plants are male, and some are female. Only female redcedars produce berries, but they need pollen from male redcedars before they can bear berries. So plant three or four plants to ensure you have both sexes present.

Northern Spicebush *(Lindera benzoin).* A deciduous bushy shrub that produces small, red berries from mid-summer through mid-fall, spicebush attracts northern bobwhite and northern flicker, as well as a number of migrant and breeding species. A woodland plant, spicebush prefers moist, fertile soil, and shade or partial shade. Its leaves produce a wonderful fragrance, and, as an added benefit, it is generally deer-resistant. As with eastern redcedar, spicebush are dioecious, so plant several.

Staghorn Sumac *(Rhus typhina).* A deciduous woody shrub that produces clusters of small, red berries from late fall and throughout the winter, staghorn sumac attracts American robins and occasionally red-eyed vireos, as well as a number of other species. It prefers well-drained soils and full sun, and it is dioecious.

Nuts:

American Beech *(Fagus grandifolia).* The beech is a moderately large, deciduous tree that can grow up to 70 feet in height. The unusually shaped nuts it produces in the early fall are a favorite food item of northern bobwhite and cedar waxwings. Beeches prefer growing in moist loam, meaning rich soil that contains roughly equal proportions of clay, sand, and organic matter.

Butternut *(Juglans cinerea).* Also known as white walnut, this is a fast-growing deciduous tree that can reach heights of up to 40 to 60 feet. The nuts that it produces during the late fall to early winter attract nuthatches, chickadees, Carolina wrens, and red-bellied woodpeckers. It prefers moist but well-drained loamy soil.

Black Oak *(Quercus velutina).* A large deciduous tree that can reach heights of up to 150 feet, the Black Oak can live for 200 years or more. The acorn crop that it produces every three years in early to late fall attracts a wide variety of species, including eastern towhees, blue jays, and wild turkeys. Black oak prefers moist, well-drained loamy soil.

Seeds

Common Sunflower *(Helianthus annuus).* This is the wild "cousin" to the cultivated giant sunflower we are typically familiar with. The seeds this plant produces midsummer to early fall attract a variety of different bird species. There is some dispute about whether the common sunflower is a true native plant or a long-naturalized weed; however, Native Americans reportedly used this plant to make flour for breads. It requires full sun and prefers moderately drained soils.

Eastern Purple Coneflower *(Echinacea purpurea).* Coneflowers are typically associated with prairie habitats. The seeds of this plant attract American goldfinches and some sparrow species. Its purple flower, which blooms mid-summer to mid-fall, also appeals to numerous butterfly species. Coneflower prefers dry, well-drained soils and full sun.

Eastern Purple Coneflower

Cones:

Tamarack *(Larix laricina).* An attractive deciduous needle-leafed tree that is more typically found in the boreal forests of the arctic, Tamarack is still found in northern Ohio as a remnant of the last ice age, when cooler temperatures prevailed. It produces cones in late summer and early fall that attract cross-bills and purple finches. Tamarack prefers moist, acid soil.

Tamarack

Eastern Hemlock *(Tsuga canadensis*). This native evergreen can be used to form hedgerows through careful pruning, which in turn provides great nesting sites for birds like American robins and wood thrush. Under ideal conditions (and untrimmed) hemlocks can reach a height of up to 80 feet. The cones this species produces in early fall are especially attractive to chickadees. Eastern hemlock prefers moist, but drained soils, and is particularly shade tolerant.

Reprinted from Audubon Ohio, March 2004

Botanical Excursions:

Hunkering Down in Winter

George Ellison

It's mid-December 2008 as I write this. This past weekend my wife, Elizabeth, and I spent most of our time in our cabin on the North Carolina side of the Smokies, feeding wood into the two woodstoves in our living and kitchen areas. Out the back windows, we could see birds foraging around the feeders. Through the front windows, across the little creek that flows through our property, rhododendrons drooped their leaves like forlorn sheep, indicating beyond all doubt that the first really cold snap of the winter was upon us.

Animals make it through the cold by generating warmth from food, movement, shelter, or contrived means like fire. Plants, on the other hand, have devised a series of ingenious devices that allow them to survive in potentially lethal conditions.

All plants in upland or northern environments face the double-edged dilemma of low temperature stress and lack of moisture in winter. Most opt to lay low: annuals survive as over-wintering seeds; biennials produce low-growing, first-year plants protected by leaf litter or a blanket of snow; herbaceous perennials die back completely and overwinter as dormant corms or regenerative root stock; and broadleaved deciduous trees, shrubs, and various vines shed their leaves and assume other protective measures. Come spring, these

plants really have to hustle to do their thing and produce seed or fruit during the growing season.

Evergreens have "chosen" the other fork in the evolutionary path. They tough winter out with their foliage intact so as to obtain a head start when the growing season arrives. For this group of plants, photosynthesis can continue longer in the fall and begin earlier in the coming year; indeed, keeping their leaves (or needles) actually helps these plants survive since they can use them in photosynthesis on mild winter days. Come spring, energy that would otherwise be channeled into producing leaves is saved for direct reproductive efforts.

Additional strategies allow evergreens to weather the drying winds and freezing temperatures of winter. Conifers have needlelike leaves that expose less surface to cold drying winds than broader leaves. Their needles, stems, and roots are filled with "botanical antifreeze" in the form of resinous chemicals. Conical shapes minimize buildups of snow or ice.

Other evergreens have developed thick leaves with waxy coats to cut down on evaporation. These tend to be shrubby or ground hugging. In order to avoid having their leaf cells ruptured by frost, water is channeled to spaces between the cells where expansion does less damage. And finally, the sugar content of the cells is increased to lower their freezing points

Individual evergreen species often have their own distinctive overwintering devices. Everyone has observed how rhododendron leaves curl and droop in extreme cold. Drooping (a dormant posture also assumed during periods of drought) lessens exposure to wind, while curling temporarily shields and closes off air-circulation pores (stomata) on the undersides of the leaves.

In *Life in the Cold: An Introduction to Winter Ecology* (Hanover NH,: University Press of New England, 1987), Peter J. Marchand provides interesting information on this topic. I was especially interested in the tables Marchand presents that provide the freezing ("killing temperature") for various tree species. He makes the point that most species have adapted to the cold by adjusting their freezing tolerance so that it closely matches the minimum temperature at their northern range limit.

For instance, live oak, a southern tree of the Gulf Coast and lower Atlantic coastal plain will tolerate temperatures down to 15 or so degrees Fahrenheit. Eastern redbud, a tree that ranges northward from the southern states to the Great Lakes, dies when subjected to temperatures approaching minus 31 degrees.

Other deciduous trees that range into the higher elevations here in the Smokies, like northern red oak and yellow birch, withstand temperatures in the minus 35-49 degree range. Red spruce and Fraser fir, trees that grow in our highest elevations, above 6,000 feet, could make it in temperatures below minus 80 degrees.

Some tree species have adapted especially for the regions in which they find themselves. For instance, sycamores in Mississippi will die in the event of temperatures below minus 4 degrees, while sycamores in Minnesota will tolerate minus 40 degrees. White pine shows a similar range of adaptability.

The lesson in this for Elizabeth and me has been to prepare for the harshest winter weather situation we might reasonably expect to encounter here in the Smokies by cutting our wood early, keeping it good and dry, and hunkering down as quietly as possible by the wood-stove while it burns.

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Reprinted from *Chinquapin*, the newsletter of the Southern Appalachian Botanical Society, Winter 2008.

Rhododendron in the cold

Hueston Woods State Nature Preserve

Tim Snyder, ODNR, DNAP

Examples of Ohio's original forest cover are extremely rare. Hueston Woods State Nature Preserve is one of the finest such stands left in the state. As such, it is invaluable for scientific research and education. It is located in the southwestern corner of the state on Acton Lake. Hueston Woods is a tiny souvenir of the beech-maple forest that once stretched in a broad band from southwestern Ohio to its northeastern corner. This forest type is dominated by the ghostly grey trunks of beech trees along with varying proportions of sugar maple, red and white oaks, and white ash. The quantity and variety of species vary according to the wetness and slope of the ground and other environmental factors. In Hueston Woods, beech trees form nearly 44 percent of the canopy, sugar maples make up 28 percent and white ashes form 19 percent.

Because the woods is mature and fairly undisturbed, the layered effect common to such forests is well-developed. These levels–ground, shrub, sapling and canopy—each provide a distinct habitat with varying amounts of heat, light, wind and water. The resulting stratification of the forest is echoed by a similar stratification of animal populations as each species seeks the environment that suits it best.

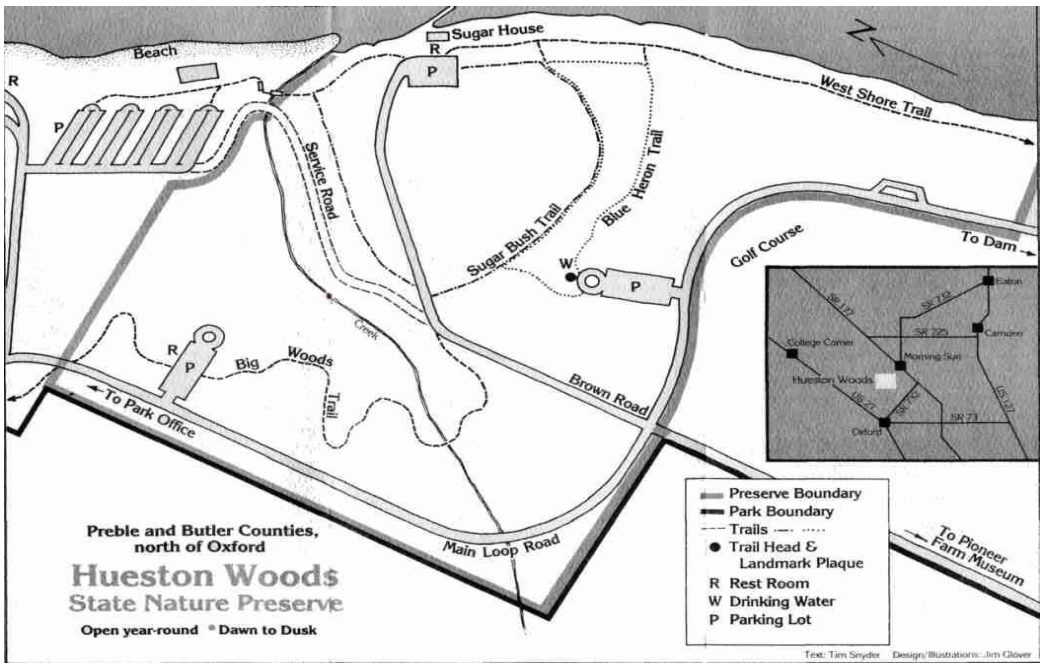
One animal to watch for is the pileated woodpecker, a crow-sized, red-crested bird once feared to be nearing extinction due to a lack of large tracts of old forest speckled with dying trees. Hueston Woods provides this type of habitat, which the pileated needs to survive.

In 1797, Matthew Hueston returned to the fertile ground in southwestern Ohio that he had seen as a soldier while marching with General "Mad" Anthony Wayne toward the Battle of Fallen Timbers. Eventually he owned several thousand acres in Butler and Preble counties, most of which was soon converted from forest to farmland.

This 200-acre plot, however, escaped cutting. Perhaps this land along Four Mile Creek was too steep and broken for farming, or maybe the ancient sugar maples were too valuable as syrup producers to be lost. Whatever the reason, this tiny remnant of virgin forest was carefully preserved by successive generations of Huestons until 1935 when the last member of the family died.

Fortunately, the "Big Woods," as it was called by the family, was sold to Morris Taylor, a local banker who recognized its educational and scientific value. He protected the woods until 1941 when the state of Ohio purchased it as a forest park. Land around the "Big Woods" was gradually acquired and Hueston Woods State Park developed. In 1967, the original virgin forest was declared a National Natural Landmark by the National Park Service, and in 1973 it was dedicated as an Ohio State Nature Preserve.

Reprinted from a publication of the Ohio Department of Natural Resources, Division of Natural Areas and Preserves. Map by Jim Glover.



Wild Black Cherry

Gordon Mitchell

When we were children, we all heard the story about young George Washington chopping down the cherry tree. Unfortunately, that story never gave the species name of that cherry tree. Perhaps that was because the story itself was fiction.

If he did chop down that tree, it probably would not have been our most common native cherry tree species. That native species would have been the Wild Black Cherry (*Prunus serotina* Ehrhart), which is America's largest and most valuable native cherry tree.

The Wild Black Cherry is a member of the Rose Family (*Rosaceae*) and of the *Amygdaloideae* or the *Prunoideae* Subfamily. The generic name, *Prunus*, is from the Latin words *pruna* or *prunum* or from the Greek word *proumnon*, all of which mean "plum". The specific epithet, *serotina*, is from the Latin word *serotinus*, which is "late development", referring to their late flowering and fruiting seasons.

Other scientific names for this tree were *Cerasus serotina* De Candolle, *Cerasus virginiana* Michaux, *Padus virginiana* (L.) Millspaugh, *Prunus capuli* Cavanilles, *Prunus salicifolia* Kunth, and *Prunus virginiana* Miller. Other common names for this tree are American Sweet Black Cherry, Bird Cherry, Bitter Black Cherry, Black Cherry, Black Choke, Cabinet Cherry, Capuli, Cherry, Chokeberry, Choke Cherry, Cornflake Tree, Mountain Black Cherry, Rum Cherry, Sweet Black Cherry, Virginian Prune Bark, Whiskey Cherry, and Wild Cherry.

The Wild Black Cherry is a long-lived tree in the wild. It may live up to 150-200 years. This tree is fast growing when young. As the tree ages, its growth rate slows. The younger trees are more shade-tolerant than the older trees.

Description of the Wild Black Cherry

Height: 40-100 feet. It is the largest native cherry tree.
Diameter: 1-3, sometimes up to 5 feet.
Trunk: The trunk is tall, straight, and clear.
Crown: The crown is narrow, columnar, oblong, oval, or round. Its spread may reach 40-50 feet.
Leaves: The leaves are simple, alternate, and deciduous. Each leaf is firm, thick, leathery, smooth and shiny green above, pale below. It is about 2-6 inches long and about 1-2 inches wide, elliptical, lanceolate, oblong, narrow, has a tapered base and a pointed tip. The prominent midrib on the underside has tufts of white, red-brown, or orange hairs. Its margins have small finely blunt or sharp incurved teeth. The petioles are short and have 1-3 dark red nectar-secreting glands. In the fall these leaves may turn yellow or red.
Flowers: The flowers are arranged in a narrow, drooping, loose racemose cluster. Each cluster is about 2-6 inches long. The clusters are located at the top of the leaf branches. Each flower is white or pink, fragrant, is about ¼-½ inches wide, and is radially symmetrical. It has a corolla of five 1/8-inch-long spreading petals, a cup-shaped calyx of 5 sepals, 15 or more stamens, and one pistil with club-shaped stigma and a single-celled ovary. This flower is insect-pollinated. Flowering season is usually April to June.
Fruits: The fruits are also arranged in a drooping, elongated, slender, racemose cluster. Each cluster has about 6-20 fruits. Each fruit is about ⅓-½-inch in diameter and is a globose, glossy, and fleshy drupe. It is a red when young, but becomes dark purple or black when ripe. The skin of the fruit is thin. The calyx lobes are still present at the base of the fruit. Numerous species of birds and mammals eat the fruits. Fruiting season is usually June to October. Trees growing in the open areas produce both more fruit and better fruit than trees growing in the woods. A good fruit crop is usually produced about every 3-4 years. Each fruit has only one seed. The seed, or pit or stone, is encased in a hard elliptical or ovate shell. The seeds are animal-borne and have a better chance of

germination if they are first passed through an animal's digestive system. These seeds may lie dormant on the ground for 1-3 years before germination.

Roots: A long, deep taproot is set during the tree's first year. During subsequent years, the roots become shallow and wide spreading. The older trees are susceptible to windthrow.

Twigs: The twigs are slender and smooth. The young twigs are pale green or bronzed and the older twigs are gray- or red-brown with a tinge of red. There are many lenticels present the first year. The pith is both white and continuous.

Buds: The lateral buds are yellow-green or red-brown, smooth, shiny, and diverge from the twig. These buds are not clustered at the tips of the twigs. Each lateral bud is less than 3/16-inch long and has about 10 pointed and keeled scales. Each scale is brown with a green base and dark tips. This tree species also has true end buds. The end buds are larger and more pointed than the lateral buds.

Branches: The branches are irregularly spreading and are pendulous with drooping tips. There are no spur branches.

Bark: The young bark is smooth, thin, glossy, dark red- or olive-brown with a grayish bloom, and has many small white or gray raised horizontal lenticels. The older bark is a dark purple-gray to black, thick, rough, platy and scaly, has braided fissures, and still has lenticels. The edges of these irregular scaly plates usually curve outward. The inner bark is red-brown and is aromatic.

Wood: The wood is hard, heavy, close-, smooth-, and straight-grained, diffuse-porous, lustrous, and moderately strong. The heartwood is light to dark red-brown and the sapwood is yellow. The heartwood usually darkens with age. This wood is able to withstand pressure and shock. Despite the temperature or the humidity, this wood doesn't shrink, split, or warp during seasoning.

Habitat: Dry woods, thickets, fencerows, pastures, woods' edges, old fields, roadsides, and waste areas. This tree grows better in mixed stands than in pure stands. It can tolerate mesic or xeric soils. This tree can also tolerate frost pockets.

Range: The Wild Black Cherry is found in the eastern U.S., except Florida, and in southeastern Canada.

Toxicity of the Wild Black Cherry:

The Wild Black Cherry is the most toxic of all of the cherry tree species. The parts of this tree that are most toxic are the bark, the leaves, the seeds, and the twigs. The Wild Black Cherry contains the glycoside cyanogens, prunasin or amygdalin, which are inactive sugar-cyanides. When in contact with water and with the digestive system's enzymes, the cyanogen is hydrolyzed into hydrocyanic acid (HCN), which is also prussic acid or cyanide, and benzaldehyde.

Cyanide is considered to be cytotoxic. Cytotoxins block the activities of the enzyme cytochrome oxidase which is active during respiration. This will paralyze the cardiac and the respiratory systems and will cause asphyxia and cyanosis in the red blood cells. Symptoms of cyanide poisoning may include anxiety, breathing difficulties, confusion, convulsions, dizziness, excitement, gasping, headaches, high or low blood pressure, paralysis, seizures, spasms, staggering, twitching, vomiting, coma, and even death. Cyanide acts quickly and can cause death within one hour.

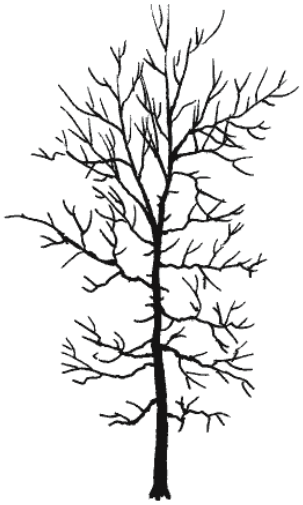
The bark is most toxic in the fall, when it is usually harvested. Goats may die after peeling off the bark and eating it. This bark contains other chemicals, such as gallic acid, tannic acid, resins, and a volatile oil.

The fruit seeds are toxic but the fruit pulp is not. The pulp contains certain chemicals that neutralize the toxins that are emitted from the seeds. Unfortunately,

these toxic seeds have poisoned children who have eaten the fruits.

The leaves have varying levels of toxicity. They are most toxic when they have wilted to about 75% of their original weight. However, dried leaves are less toxic than the wilted leaves. A cup of tea made from the leaves can be fatal to the consumer. One pound of these wilted leaves can kill cattle. The leaves of the young shoots are more toxic than the leaves of the mature trees.

The toxic twigs smell and taste like bitter almonds. Children who have chewed upon the twigs have been poisoned from them.



Uses of the Wild Black Cherry:

Despite this tree's toxicity, both the Native Americans and the European settlers had many uses for the Wild Black Cherry. The parts that were especially used were the bark, the roots, the fruit, and the wood.

The inner bark of the younger trees was usually harvested for medicine. The bark was removed in vertical strips to prevent girdling the tree. The green inner bark was removed from the outer bark and was dried in a spot away from the Sun. This dried inner bark was then stored for future uses. To prevent deterioration of the bark, it was best not to store it for longer than a year. Some harvesters sold the inner bark to pharmaceutical companies.

The inner bark or the dried roots were steeped in water at just below 212 degrees F. to make a tea or syrup. This tea or syrup was used internally as an antispasmodic, an antitussive, a decongestant, an expectorant, a sedative, and a tonic. It was mainly used for treating respiratory ailments, such as asthma, bronchitis, coughs, colds, consumption, laryngitis, and pneumonia. Because cyanide, increases respiration and sedates the sensory nerves of the cough reflex, it made the perfect cough medicine.

The Wild Black Cherry syrup or tea was also used internally for treating other ailments as well. Such ailments consisted of bladder ailments, childbirth discomforts, chest pains, chills, fevers, hysteria, jaundice, sore throats, inflamed gums, heart palpitation, poor circulation, thrush, and intestinal and stomach ailments.

The toxin prunasin or amygdalin, which is marketed as laetrile, was once used for treating patients with terminal cancer. But because of laetrile's ineffectiveness in fighting cancer and because of the risks of cyanide poisoning, the Food and Drug Administration and the American Medical Association had lobbied to ban laetrile in the United States. However, it is still used in other countries.

This tree also contains other chemicals that have been used in medicines. Some of them are eudesmic acid, coumaric acid, prunase (an enzyme), seratin, and scopoletin.

The bark and the roots were used externally as an astringent and as a disinfectant. They were used as a poultice or a wash for burns, cuts, hemorrhoids, sores, ulcers, and other wounds.

The Wild Black Cherry was mentioned in the some of America's early writings. The Wild Black Cherry was listed in the *U.S. Pharmacopeia* from 1820 to 1975 and in the *National Formulary* since 1888. (These two publications merged in 1975.)

The fruit is edible but bitter before it is ripe. It is high in vitamin A. The Native Americans ate this fruit either fresh or dried. The European settlers used the fruit for making jam, jelly, syrup, and pie fillings. Cooking this fruit destroys the cyanide in the seeds.

This fruit was mashed into cherry juice. This juice is bitter and should not be consumed straight. It was sometimes placed in a container for about a year to ferment. This fermented juice was then used as a treatment for dysentery or was made into brandy, whiskey, or wine. The juice was sometimes steeped in other alcoholic beverages, such as brandy, rum, or whiskey, to make a drink called "cherry bounce". This juice was also used as hair rinse.

The wood is highly prized as lumber. It is the only cherry tree of any commercial value. After the Black Walnut (*Juglans nigra* L.), it is probably the second most popular hardwood lumber tree in the United States. It is used for furniture, cabinetry, coffins, doors, interior finish, paneling, musical and scientific instruments, gunstocks, tool handles, typesetting blocks, woodenware, and veneer. However, the wood is not strong enough for structural framing. This wood does take a fine polish.

The Europeans also favored this tree species. In 1629, this tree was first exported to England. For many years, the Europeans grew this tree for its lumber. Unfortunately, this tree has since become a nuisance plant in many parts of Europe.

Pests of the Wild Black Cherry:

Despite the toxins present in this tree, the Wild Black Cherry is plagued by several species of insects, especially their larva. Some, such the Red-Spotted Purple (*Limenitis arthemis*), the Coral Hairstreak (*Strymon titus*), the Eastern Tiger Swallowtail (*Papilio glaucus*), the Cherry Casebearer (*Coleophora pruniella*), the Gypsy Moth (*Lymantria dispar*), the Fall Webworm (*Hyphantria cunea*) the Eastern Tent Caterpillar (*Malacosoma americanum*), the Ugly Nest Caterpillar (*Archip cerasivoranus*), and the Cherry Leaf Beetle (*Pyrrhalta cavicollis*), eat the leaves and defoliate the tree.

Other insects build their nests or cocoons in this tree. The Eastern Tent Caterpillar larvae build their webbed nests in the forks and in the crotches of this tree. The Eastern Tiger Swallowtail larvae make their cocoons in the silk-spun folded leaves. The Cecropia Moth (*Hyalophora cecropia*) larvae place their brown-bagged cocoons upon the twigs.

Still other insects make galls in the tree. One species of mites (*Eriophyes padi*) makes long, green or red pouched galls upon the leaves. The Cherry Bud Gall Gnat (*Cecidomyia serotinae*) makes galls upon the twig tips.

A few diseases also attack the Wild Black Cherry. One of them is the Black Knot Disease (*Dibotryon morbosum*), a black parasitic wart fungus that attacks the twigs, branches and small stems. Another disease is the Cherry Leaf Spot (*Coccomyces hiemalis*), a sac fungus that leaves holes in the leaves. The Wild Black Cherry is also subject to the fungal wood rots *Polyporeus spraguei* and *Polyporeus berkeleyi*, the trunk rots *Poria prunicola, Poria mutans, Fomes pinicola*, and *Polyporeus sulphureus*, and the butt rot *Caniosphora cerebella*.

Aside from insects and diseases, other things can harm the Wild Black Cherry. Because of the tree's thin bark, fire can damage this tree. The Whitetail Deer (*Odocoileus virginianus* [Boddaert]) and the Eastern Cottontail (*Sylvilagus virginianus* [Allen]) may browse upon the seedlings and the sprouts.

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

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Kentucky Plants With Unusual "Lifestyles" Part II, Carnivorous Plants

Ron Jones

The vast majority of vascular plants in Kentucky exhibit a "typical" life history, that is, they are rooted in the soil, and have green above-ground parts that carry on photosynthesis. Thus, the typical plant is composed of roots, stems, and leaves, and it obtains all the necessities of life from sunlight, air, water, and soil nutrients. Some Kentucky plants, however, exhibit atypical forms or life histories.

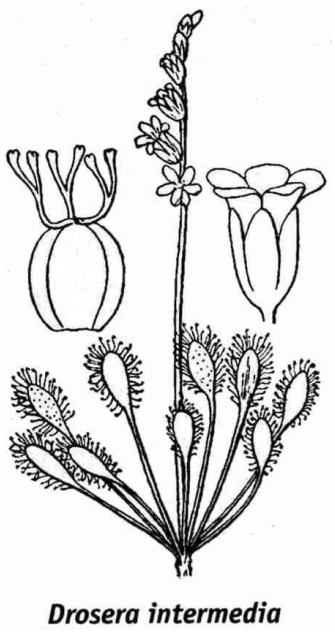
Having discussed parasites in the first part of this series (see *On The Fringe*, September 2007), the subject turns to: **carnivorous plants**

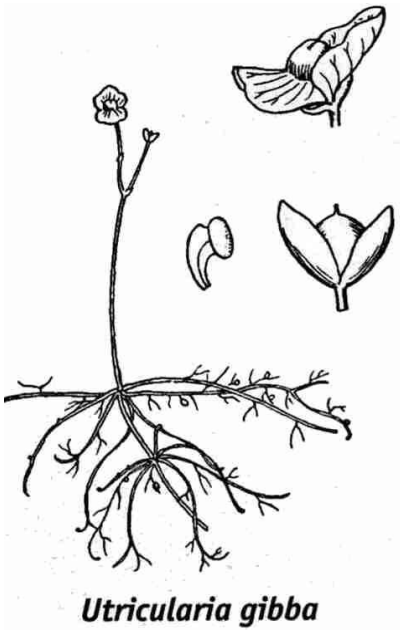
Carnivorous plants obtain their sugar-based nutrients from photosynthesis, but they derive at least a portion of their minerals, especially nitrogen, from animal sources. These plants grow in nitrogen-poor habitats (acidic soils or water) and have evolved structures that enable them to trap small animals. In Kentucky there are two groups of carnivorous plants, sundews (*Drosera* spp.) and bladderworts (*Utricularia* spp.).

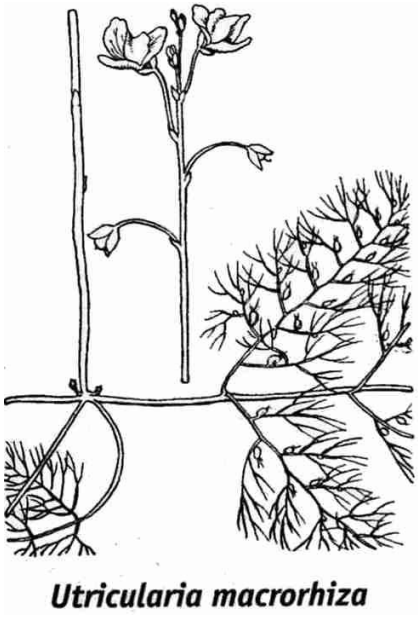
Sundews

In sundews the leaves consist of a narrow petiole and an expanded blade that acts as an insect trap. The trapping mechanism consists of sticky, reddish trichomes (hairlike appendages) that coat the leaf surface. The longer trichomes, which secrete a sticky mucilage, occur along the edges of the leaf. The shorter ones, located toward the center of the leaf, secrete digestive enzymes. Small insects, probably attracted by the plant colors or glandular secretions, crawl across the leaf and become mired. The longer trichomes then bend over the insect, further trapping it, and often the entire leaf will curl around its struggling prey. After the digestive process has occurred, and the needed nutrients absorbed, the leaf dies and is replaced by another leaf.

Sundews have been nearly extirpated from Kentucky. *Drosera brevifolia* is Endangered, *D. intermedia* was previously listed as Historical and *D. rotundifolia* is currently unknown in Kentucky but has been credited to the state in some publications.


Drosera intermedia


Utricularia gibba


Utricularia macrorhiza

Bladderworts

Bladderworts are aquatic plants, typically found floating on or near the surface in bodies of water, or occasionally in damp or muddy soil. They are rootless, with the plant body consisting of a slender stem, sometimes elongating to 9 m or more, with whorls of branches bearing tiny bladders. The bladders are bulbous, 0.5-3 mm long. Kentucky bladderworts produce yellow, 2-lipped flowers on stalks arising from the main axis.

The bladderwort bladders have a tiny opening with a trap door mechanism surrounded by branched trigger hairs. When the door is closed, a negative pressure builds up inside the bladder. The trap is sprung when a passing aquatic animal disturbs one of the trigger hairs, causing the door to snap inward, resulting in an inrush of water that draws in the animal. The speed of the trap has been estimated at 1/460 second. Because of the small size of the traps, only very small animals are caught, such as water insects, protozoans, tiny crustaceans, and rotifers. Larger animals, such as mosquito larvae and even tadpoles and small fishes are sometimes caught by species with larger bladders.

Two species of *Utricularia* are known to occur in Kentucky— *U. gibba*, which is widespread across the state; and *U. macrorhiza*, which is rare in western Kentucky. Probably other species await discovery in the state.

Pitcher Plants

Pitcher plants (*Sarracenia* spp.) are well-known carnivorous plants of the southern U.S., but there are no documented occurrences of pitcher plants in Kentucky. Since the green pitcher plant, *Sarracenia oreophila*, was known to occur in Fentress Co., Tennessee, in the mid-20th century, there is a remote possibility that pitcher plants could still be discovered in Kentucky, most likely at seepage sites in remote regions of the Cumberland Mountains.

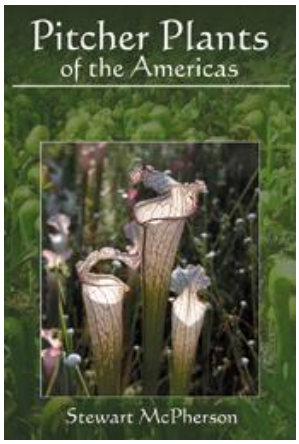
Reprinted from *The Lady Slipper*, newsletter of the Kentucky Native Plant Society, Spring 2004.

Book Review

Stewart McPherson

Pitcher Plants of the Americas

Pitcher Plants of the Americas. 2006. 6x9, viii+320 pages, 245 color figures, glossary, bibliography, index; softcover (0-939923-74-2) $39.95; hardcover (0-939923-75-0) $49.95. Submit orders to: McDonald & Woodward Publishing Company, 431-B East College Street, Granville, OH 43023. 1-800-233-8787 *www.mwpubco.com*



Pitcher plants are the largest and most beautiful of the world's carnivorous plants and are viewed with fascination as objects of natural history and natural beauty by people of all ages, nationalities, and vocational callings. *Pitcher Plants of the Americas* provides a detailed overview of the systematics, biology, ecology, biogeography, conservation, and horticulture of the five genera of American pitcher plants, including three genera of true pitcher plants *(Darlingtonia, Heliamphora,* and *Sarracenia)* and two genera of tank bromeliads *(Brocchinia* and *Catopsis).*

The introductory chapters outline the taxonomic content and groupings (by trapping methods) of carnivorous plants and briefly review the taxonomy, biology, evolutionary history, and biogeography of the American pitcher plants. The following five chapters are devoted to individual genera and examine the anatomy, habitat, ecology, trapping process, and distribution of each genus and each member species as well as many naturally occurring hybrids and selected cultivars. The concluding chapters summarize the current conservational status of the group and reviews various successful conservation initiatives which are helping to secure the future for these rare plants.

The strengths of this book include (1) its uniquely detailed systematic coverage of the five genera and their member species, hybrids, and cultivars; (2) the first and only comprehensive, systematic coverage of the genus *Heliamphora;* (3) the full-color format and 200+ spectacular photographs used to document each taxon and cultivar covered; (4) the very first published images of several species and varieties in their natural habitat; and (5) descriptions and photographs of thirty currently unnamed and largely undocumented variants *of Sarracenia.*

Pitcher Plants of the Americas is up-to-date, comprehensive, focused, well-illustrated, and visually beautiful. It is technically written yet accessible to non-specialist audiences and will be valued as a source of information, reference book, and spectacular overview of the group that will appeal to botanists, naturalists, ecologists, biogeographers, resource managers, conservationists, horticulturists, and gardeners—among others!

Stewart McPherson is a British geographer who has studied at the University of Durham in England, with additional years abroad at the University of Tuebingen in Germany and Yale University in the United States. He has traveled the world while participating in international conservation programs and while researching this and other books on carnivorous plants and the lands that they inhabit.

Reprinted from the publisher's promotional literature.

Invasive Initiatives

States Are Beginning to Take Action Against Horticultural Pest Plants

Colleen Fitzpatrick

Any gardener not enamored of burning bush (*Euonymus alatus*) is a hard-hearted gardener indeed. The elliptical green leaves of this northeast Asian shrub turn a brilliant red in autumn, outshining the competition even in New England's color-packed fall landscape. Yet burning bush is "planta non grata" in many states because of its propensity to crash the ecological party and trounce its native hosts. (Burning bush is displacing native shrubs in woodland habitats throughout the eastern U.S.)

Massachusetts is one state that lists burning bush as invasive and is on the offensive against it. After January 1, 2009, nurseries in the Bay State will no longer be permitted to grow, sell, or distribute the offending plant. This regulation follows on the heels of an earlier one, from July 2005, banning growers and nurseries from bringing new burning bush plants into Massachusetts. The grace period between the importation and sale bans is to give folks in the trade time to sell their stock and find alternatives. (Brooklyn Botanic Garden's handbook *Native Alternatives to Invasive Plants* recommends fragrant sumac, *Rhus aromatica,* as one worthy substitute.)

Burning bush has plenty of company on the state's "bad plant" list. Autumn olive (*Elaeagnus umbellata*) and purple loosestrife (*Lythrum salicaria*) were banned from Massachusetts nursery yards as of January 1, 2006. Starting this year, yellow iris (*Iris pseudacorus*) and plume grass (*Miscanthus sacchariflorus*) will be off-limits for sale. Come 2009, Norway maple (*Acer*

platanoides), Japanese barberry (*Berberis thunbergii*), and five kinds of honeysuckle (*Lonicera* species and cultivars) will be unavailable.

All in all, about 140 other plants have been targeted for bans by the Massachusetts Invasive Plant Advisory Group. The Massachusetts Department of Agricultural Resources, which licenses and inspects nurseries, enforces the regulations. In addition, on land with nasty invasions of banned plants, regulators can order property owners to weed out the culprits. If the owners refuse, the state may do the job and send them a bill.

Massachusetts is just one of a number of states that have begun to tackle the problem of invasive horticultural plants head on in the absence of any meaningful action at the federal level. Neighboring Connecticut, for instance, has enacted several laws that involve identifying and banning invasive plants. The laws call for fines of up to $100 per plant for anyone caught importing, selling, or buying any of the 81 plants on the state's invasive plant list. However, officials concede they haven't adequately addressed the matter of enforcement.

Who's in Charge Here?

Federal regulations that address "noxious weeds," defined as plants that pose a threat to agriculture, have been on the books for decades. But only in the last 15 years or so has the general discussion expanded to include the problem of nonnative plants that invade and disrupt aquatic environments and terrestrial wildlands (such as forests, prairies, and conservation areas).

Concern about invasive species got a small boost in 1999, when former President Clinton signed Executive Order 13112, requiring federal agencies to coordinate with each other and devise an invasive species management plan. Then, in late 2001, a landmark gathering at the Missouri Botanical Garden, in St. Louis, resulted in the publication of voluntary codes of conduct for botanic gardens and arboreta, nursery professionals, landscape architects, government agencies, and ordinary gardeners.

But responsibility and authority for addressing the problem is fragmented, cutting across regions and myriad agencies within all levels of government. The issue is also fraught with complex (or at least contentious) scientific and economic questions: How do you define an invasive plant, especially when plants behave differently in different climates? If a plant species is deemed invasive, are all cultivars of the species invasive too? What do you do with a plant that is invasive but is also an economic mainstay?

As academic researchers, government officials, the horticultural industry, and environmental groups struggle to come to a consensus, the plant bullies march on. Kudzu (*Pueraria montana*) claims a conservation area in Marblehead, Massachusetts. Giant hogweed (*Heracleum mantegazzianum*) establishes residency in all but one of Connecticut's counties. And horticultural beauties such as Oriental bittersweet (*Celastrus orbiculatus*), porcelainberry (*Ampelopsis brevipedunculata*), and English ivy (*Hedera helix*) run rampant in many parts of the country.

A Three-Pronged Assault

Concerned states seem to be adopting one or more of three approaches to the invasive plant problem: 1) blacklisting known pest species, 2) investing in public education campaigns that encourage the use of benign alternatives, and 3) developing early-detection programs, which attempt to identify potential exotic invasives before they become a problem.

Clearly Massachusetts and Connecticut, with their outright bans, are among the more legislatively active states.

"We need the plans in place to keep the invasives from getting here and to stop other invasives once they are here. And they are here," Gina McCarthy, commissioner of the Connecticut Department of Environmental Protection, said last fall at an invasive-species conference in Wallingford, Connecticut. "We are in a battle with an insidious enemy, and it is a common enemy. We need to do more, and we need to do it faster."

Delaware is taking a different tack, relying not on rules and regulations but on raising public awareness. In some nurseries, for example, plants on the state's invasive list carry a warning tag, and horticultural displays offer information on alternatives that are ecologically wiser. In addition, the state's invasive plant council has published three booklets as part of the "Plants for a Livable Delaware" campaign, encouraging people to think of landscaping not simply as ornamental but as functional, in terms of preserving native ecosystems and providing habitat and food for birds and other wildlife.

While invasion biologists welcome these efforts to combat pest plants, some say they're not enough. With limited resources for enforcement, control, eradication, and habitat restoration, they argue, it may be as—or even more—important and efficient for states to focus attention on detecting the presence of would-be pest plants and taking swift action.

This is what's happening in Wisconsin, where the U.S. Environmental Protection Agency is helping fund a program to identify and map the location of plants in the state as part of an early-detection system. "Volunteers do most of the groundwork," says Kelly Kearns, plant conservation program manager with the Wisconsin Department of Natural Resources. The volunteers collect and photograph specimens and post their findings on the Wisconsin State Herbarium website. Money is also available from the U.S. Department of Agriculture's Forest Service for weed-suppression work, says Kearns.

In a few states, including Hawaii, California, Florida, and Iowa, academic researchers and experts are pushing the early-detection envelope even further by trying to understand the causes of invasion—what will make a plant misbehave in an environment—and develop policies that aim to minimize the risk.

In doing so, they are taking their cue from Australia and New Zealand, both of which use precautionary tools called weed risk assessments to predict the potential invasiveness of exotic plants that have not yet reached their shores. A plant is assessed using a set list of criteria, such as reproductive biology and history of invasion, to determine how it might act in the landscape. If the plant is deemed a potential pest, it can't be imported or cultivated; if it passes the test, it's put on a "white list" of acceptable low-risk species.

There are no flawless predictors yet in the U.S., according to Peter White, a biology professor and director of the North Carolina Botanical Garden, in Chapel Hill. But researchers are making strides in some states. In Florida, for example, scientists have been testing a protocol adapted from Australia's weed risk assessment tool, running 124 plant species through a set of 49 questions. They were still analyzing the results as of press time but expressed optimism that the tool is reliable and nationally applicable.

"I personally feel quite confident it could be adapted to the entire United States," says Alison Fox, associate professor with the University of Florida's Agronomy Department and chair of the Florida Exotic Pest Plant Council. Whether the tool is used as a basis for new laws or for voluntary initiatives—or gets shunted aside—only time will tell, she says.

Think Global, Weed Local

Experts and officials continue to argue about the best way to solve the invasive plant problem, but in the end, most of them agree that there is room on deck for all hands and approaches. Most also say that success will ultimately come down to attitudes and action taken at the level of individuals, and that public education therefore is key.

"No gardener wakes up and says, 'Now, how can I cause harm to the world?'" says Terri Kempton, project manager of the California Horticultural Invasives Prevention partnership.

Yet some gardeners, landscapers, and growers are doing just that by failing to recognize that horticulture is an important pathway for disseminating harmful plants and that their plant-growing decisions can affect the environment for years to come.

In that sense, Kempton says, and as corny as it sounds, combating invasive plant species truly is a global problem with local solutions.

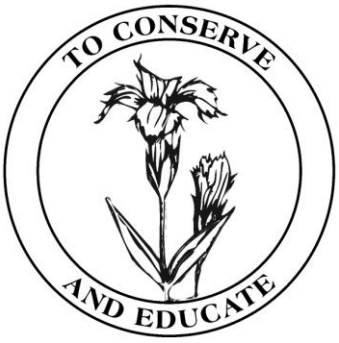
More Information

To learn about laws or polices in your state, check with your state's exotic pest plant or invasive species council (see http://dnr.state.oh.us/tabid/2005/Default.aspx), or with state agencies overseeing the environment, agriculture, or natural resources.

The nonprofit environmental group NatureServe publishes state-by-state information about invasives on its website (see www.natureserve.org/getData/plantData.jsp).

For general information on invasive plants, visit the U.S. Department of Agriculture's online National Invasive Species Information Center: www.invasivespeciesinfo.gov/plants/main.shtml.

Reprinted from *Plants & Gardens News*, Spring 2007, Brooklyn Botanic Garden. Colleen Fitzpatrick is a freelance journalist based in Simsbury, Connecticut.



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