On The Fringe

Journal of the Native Plant Society of Northeastern Ohio

Annual Meeting of our Society

Our Annual meeting will be held **Friday, September 25** at the Cleveland Museum of Natural History in connection with the Museum's Explorer Series. Join us for the meeting and light refreshments (crudités, cheese, and crackers, and coffee) **at 6:15 p.m.,** followed by the evening's Explorer Series presentation at 7:30 p.m. (see page 3)

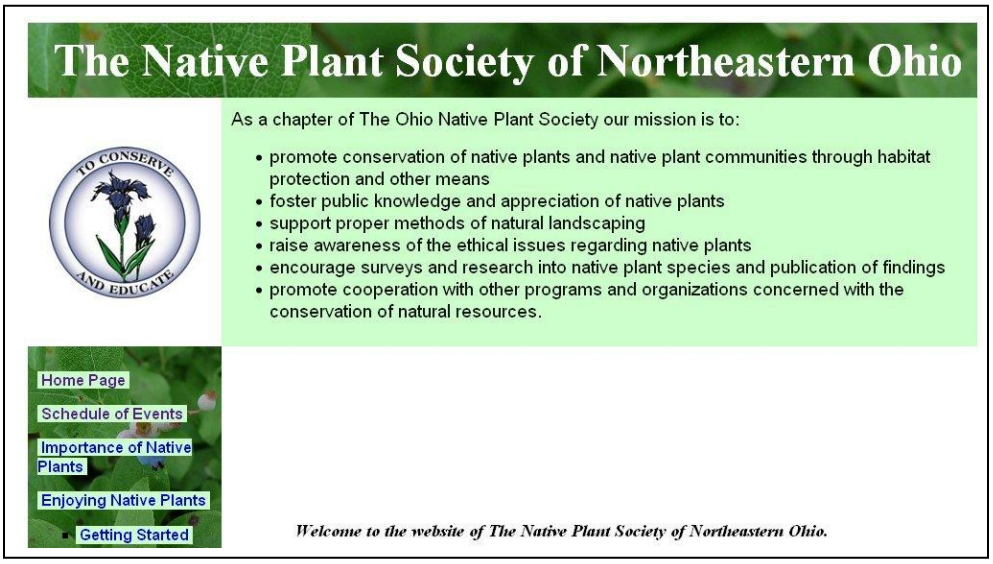
In addition you may want to come early and enjoy dinner at the Museum's Blue Planet Café. The doors to the Museum open at 5:30 pm with live music, Museum exhibitions, shopping and raffle sign-up in the Museum Store. There is always time for Q&A after each program and our speaker will be signing books. All programs in the Explorer Series are in the Museum's 500-seat Murch Auditorium.

Tickets for the annual meeting and the Explorer Series talk are $15 per person and may be purchased by sending a check to:

Kathy Hanratty
The Native Plant Society of Northeastern Ohio
P.O. Box 1064
Chardon OH 44024-5064

Deadline for registration is September 18. Tickets for just the Explorer Series are available through the Museum for $10.

Visit our new web site! (www.NativePlantSocietyNEOhio.org)



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Fall 2009 Program Schedule

Saturday, Sept. 26, 10:00 a.m. – Rittman Salt Marsh, Wayne County -– Rick Gardner, ODNR Division of Natural Areas & Preserves Botanist, leads this trip into the salt marsh owned by Morton Salt, a semi-natural wetland containing many unusual plants for Ohio. Glasswort, which is one of the oddest plants in our flora grows in good numbers here. Other unusual plants include annual salt marsh aster, black grass (a rush), and the state endangered least spike-rush. The wetland should be dry but you may want to bring knee-high boots to be sure. Directions: From I-76 take the St. Rt. 57 exit (exit 7) and head south towards Rittman (a left if you are traveling from Akron). Travel ca. 4 miles and turn right on Doylestown Rd. (Co. Rt. 70W). We will meet Crawford's Dari Delite & Eatery located at the corner of Co. Rt. 70W (Doylestown Rd. becomes Sunset Dr. in Rittman) and Co. Rt. 57A (Rittman Rd. becomes Ohio Ave. in Rittman). We will leave from there to Morton Salt. Registration limited. Call Diane to register at 216-691-1929 (H) or 216-666-4870 (Cell).

Sunday, November 8, 2:00 p.m. – Winter Wildflower Workshop, Geauga County, Lodge, Swine Creek Reservation -The colorful blossoms that once graced the fields and roadsides now stand as stately silhouettes against a winter background. Learn to identify these seed-bearing skeletons using the Winter Weed Finder pocket guide available for $3.75. Joint program with Geauga Park District. Directions: From downtown Middlefield, take Rt. 87 east 2½ miles to Hayes Road. Turn right (south) 1½ miles to park entrance on right. Bear left to Lodge, 16004 Hayes Rd, Middlefield, 44062. Call Judy to register at 440-564-9151 (H) or 440-286-9516 ext 2011(W).

Web Sites of Interest

A Database of Alien Species
NISBase is a distributed database providing information concerning non-indigenous species. Through this site, users can access information on taxonomy, life history, native and introduced ranges, photos, maps, and impacts of aquatic species introduced around the world. http://www.nisbase.org/

Invasive Plants of the Eastern United States: Identification and Control
This web site covers identification characteristics, distribution, and control options for 97 tree, shrub, vine, grass, fern, forb, and aquatic plant species that are invading the eastern United States. For each species, a menu of control options is presented, including mechanical treatments, specific herbicide prescriptions, and, for selected species, recent advances in biological control. http://www.invasive.org/eastern/

Ecology and Management of Invasive Plants Program at Cornell University
The web pages focus on work conducted by students and staff of the Ecology and Management of Invasive Plants Program, directed by Bernd Blossey, at Cornell University. The majority of the work concerns species and ecosystems in northeastern North America. http://invasiveplants.net/

Explorer Series Presentation after the Annual Meeting

Wild Ohio: The Best of Our Natural Heritage
Jim McCormac, author, and President of the Ohio Ornithological Society
Friday, September 25, 7:30 pm
Co-sponsored by the Native Plant Society of Northeastern Ohio
Jim will be signing three of his recent publications

Wild Ohio: The Best of Our Natural Heritage, authored by Jim McCormac, with imagery by Gary Mezaros, is a 208 page book released in May 2009. It is a celebration of the very best natural areas that Ohio has to offer, with descriptive narrative of the approximately forty sites that are featured. Meszaros' stunning photographs depict habitats and all manner of flora and fauna, with an emphasis on the rare and unusual.

This program is a photographic journey through the best remaining places in the Buckeye State. From southern haunts bordering the Ohio River to lakeshore habitats buffering Lake Erie, Ohio is filled with wild landscapes. We'll look at some of the creatures and plants that make these sites so special, and the global role Ohio plays in conservation.

A lifelong Ohioan, Jim McCormac began birding by the age of seven, which led to a broader interest in natural history. He spent most of his career to date as a field botanist with the Ohio Department of Natural Resources, and currently works for the Ohio Division of Wildlife specializing in birding, ornithology, and wildlife diversity issues.

Jim has published numerous scientific papers and general interest articles on animals and plants, and discovered several species of plants new to Ohio. He is author of *Birds of Ohio* (2004) and the *Great Lakes Nature Guide* (2009), as well as *Wild Ohio: The Best of Our Natural Heritage* (2009). He has written a column on nature for the Columbus Dispatch since 2005. He is co-founder and inaugural president of the Ohio Ornithological Society, and was honored with the Ludlow Griscom Award in 2009, given by the American Birding Association to individuals who have made outstanding regional contributions to ornithology. Jim leads numerous field trips and gives many lectures throughout Ohio and elsewhere in North America each year, and is passionate about engaging people with nature.

Seed Collecting Tips for Native Plants

Dawn Bauman, Chair, INPAWS Native Plant Rescue

Seed collecting can be an easy, economical way to rescue native plants, repopulate native plantings, or try growing natives in your own garden. The seeds produce many small plants and, unless disturbed, the mother or stock plant is left untouched. Just make sure you take less than one-third of the seed from any one plant to ensure that the plant can sustain itself.

Here are some tips to make this fall's seed harvest successful.

1. Know the plant's life cycle.

Collecting seed requires familiarity with the life cycle of the plant. You need to know when the plant flowers, when it forms seeds, and when the seeds mature. Observation and recording will give you the experience you need to overcome the most difficult part of seed collecting—the timing. Watch the growth cycle of each species throughout the year, and record what you see.

2. Determine whether the seeds are dry or fleshy.

When observing plants, note whether the seeds or fruits are dry or fleshy—are they more like sunflower seeds or more like apricots? Knowing the difference helps you pick the best time to harvest and know how to store the seeds appropriately. Many woodland plants have fleshy seeds, like the bright red berry-like seeds of jack-in-the-pulpit and green dragon. Many prairie plants and grasses have dry seeds, like the prickly black seed heads of purple cone-flower and the delicate grassy plumes of prairie dropseed.

3. Time your harvest to match seed development.

Timing of the harvest is all-important. If collected too early, the seeds will be immature; if collected too late, the seeds may be dried out or gone. Observing seed development is the best way to decide when to collect. The mature seed of dry seed types is usually dark, firm, and dry. Fleshy seeds turn color as they ripen and should be collected as they are turning color.

The dispersal methods of different species provide clues to the proper harvest time. Plants whose seeds ripen in pods should be collected just as the pods are beginning to open. Seeds such as twinleaf (*Jeffersonia diphylla*) and bloodroot (*Sanguinaria canadensis*), which have a fleshy appendage, need to be collected before the capsules split. Usually when one capsule begins to split the others soon follow, so watch carefully over a period of a few days—it happens fairly quickly when it happens.

Pods that break open and shoot out dry seeds can be contained by placing a paper sack over the head and closing the open end with a twist tie. Collecting the entire pod is good because the seed will continue to ripen in the pod as it dries in the paper sack.

Some seeds ripen at various times, such as the seeds of wild columbine (*Aquilegia canadensis*). Collect these by taking the entire capsule or pod or by shaking the inflorescence over a tray or sack to catch the ripe seeds. Seed can be collected over several days during August to October and dried for one or two weeks in open paper bags or open plastic bins, shaking or turning the seed heads periodically.

Dry open prairie plants and wild-flowers that have spiny seeds should be collected as entire seed heads, usually from August through October. Collect aster seeds when they are easily removed from the head. They are dark gray at maturity. Plants with seeds in a spike inflorescence can be harvested like grass. Collect grass seed by running your fingers up the flowering stems, stripping them.

4. Label the contents of collecting bags as you harvest.

Accurate labeling of the collection bags is important and should be done while collecting. Use common names unless you are sure of the scientific name, and be sure to include the collection date and location. This will help with record keeping.

Collect dry seeds in paper bags or paper envelopes so that the seeds don't retain moisture. Collect fleshy seeds in a sealed plastic container, preferably with a small amount of moist moss or vermiculite. Some people recommend a one-to-one ratio of moist sand, moss, and vermiculite or peat-perlite mix (Pro-Mix). The seeds of most woodland plants or early spring ephemerals need to be kept moist.

Be aware that the ink of permanent markers will dissolve on plastic bags. Instead, use the marker to write on freezer tape on the outside or on a small piece of paper slipped inside.

5. Clean and store seeds properly.

Fleshy seeds should be cleaned and sown as soon as possible. If they dry out, they may lose their viability or spontaneously germinate.

Dry seed should be left to fully mature and ripen after harvest by allowing air circulation in the collection bags. Storage in a brown paper sack at room temperature aids in after-ripening while helping to prevent mold.

6. Know what conditions stimulate germination.

Some seeds remain capable of germinating even after being stored for a long period of time. Such seeds have a seed coat that protects them from drying out and keeps them from germinating until conditions are right.

Some seeds have the added protection of a germination delay mechanism that can only be overcome by a specific series of conditions over time, such as drying, variations in temperature (stratification), wounding (scarification), exposure to light, and removal of germination inhibitors by washing or soaking overnight.

You'll need to research individual species to determine how to simulate the conditions they need for seeds to germinate.

Techniques to Stimulate Seed Germination

The conditions favorable to germination vary considerably from species to species. Here is a sampling of the methods used to germinate various species.

Dry storage. Storing seed dry in the refrigerator for one to three months aids in after-ripening. This technique is useful for species such as *Aster, Baptisia, Campanula, Coreopsis, Gaillardia, Helianthus, Oenothera*, and *Tiarella*.

Stratification. This technique tricks seeds into thinking it is spring when they are sown. Seeds are packed in moist vermiculite, perlite, or sand and kept cold to simulate winter. Some seeds require a period of dry storage before stratification.

Three months of moist, cold stratification (40° F) are required for *Amsonia, Anemone, Aruncus, Echinacea*, and *Aconitum*. Multiple cycles of warm and cold temperatures (40-70-40-70° F) are required for *Erythronium* and *Polygonatum*.

Three months of warm, moist stratification followed by three months of cold, then shifting to warm again are required for *Lilium, Filipendula, Dentaria, Dicentra*, and *Claytonia*.

Cleaning and washing. Removing seed from fruit and washing out germination inhibitors is required for *Arisaema, Polygonatum*, and other species with seeds imbedded in fruit. This is usually combined with other pretreatment.

Light exposure. Providing light to stimulate germination is required for common wetland species such as *Chelone*, unlike most seeds, which are covered to a depth equal to the diameter of the seed itself.

Soaking or scarifying. Seeds with thick coatings need to have them softened or nicked to enable germination. *Hibiscus* seed may be sown immediately after a warm water soak overnight. *Ipomoea* need to be scarified by clipping the pointed end of the seed with a file or nail clipper and soaking overnight.

Dawn Bauman is Chair of the Indiana Native Plant and Wildflower Society Native Plant Rescue.
Reprinted from INPAWS Journal, newsletter of the Indiana Native Plant and Wildflower Society, Autumn 2005.

The Great Sneezeweed Mystery

The Center for Plant Conservation

It was a dark and stormy night. As the rain beat down and the lightning flashed on Missouri's Ozark mountains, a shadowy form emerged from the darkness: elusive... intriguing... unexpected... it's a Virginia sneezeweed plant, long thought endemic to the state of Virginia! Looks like another case for CPC detectives - otherwise known as conservation botanists.

Perhaps that's a slight exaggeration. But plant conservation often does require quite a bit of detective work— and the case of Virginia sneezeweed (*Helenium virginicum*) is no exception.

This rare plant, called "sneezeweed" by early settlers, who used the plant as snuff by grinding up the yellow flowers, was thought to exist primarily in Virginia, growing along the edges of shallow limestone sinkhole ponds. These ponds are usually flooded half of the year, from January to July, and are filled with poorly drained, low-nutrient acidic soil.

The Virginia sneezeweed is uniquely adapted to live in this flood-prone environment: Plants can survive for long periods completely submerged underwater, and seeds remain "stored" in the soil during high-water years. Population levels then spring back when the water levels retreat.

Field workers in Virginia have identified only about 25 populations of the sneezeweed, and loss of

habitat is a major threat to the species as a whole. Virginia sneezeweed depends on the flood cycle of its habitat, and on the low-nutrient conditions that give it a competitive edge over other plants. Land uses like grazing, agriculture, industry, or development can hurt these plants by causing erosion, siltation, run-off of toxins or nutrients, permanent flooding, or draining. Little was known about the plant, and there were few resources to address the problem.

Nobody expected to find Virginia sneezeweed in Missouri, but after careful investigation, researchers identified an unusual spiky-leaved plant sprouting at the edge of an Ozarks limestone pool as belonging to the rare species. CPC botanist Kim McCue at the Missouri Botanical Garden was called in to collect seed from these Missouri plants. McCue planned to build a seed bank and enter the species in the CPC National Collection, thus preserving our options for restoration.

Seed banks like this serve as insurance against unforetold crises in the wild population, and in fact, the first year that McCue planned to collect seeds, she saw just why seed banking is so vital: the plants failed to set seed that year. Luckily, the following growing season saw better results, and seeds were collected for both a permanent seed bank and for use in propagating plants in the greenhouse.

Although the private land-owner had opened his property to researchers collecting seed, this federally listed species can not be considered safe until a wild population has been established on land which offers long-term protection and addresses or removes the conditions that threaten the plant, like drainage alterations, industrial pollution, or urban development.

Last April, half of those greenhouse-propagated plants was planted on lands owned by the Missouri Department of Conservation. The other half was planted this fall. "Nobody knows the optimum planting time, so we were hedging our bets," explains McCue.

As it turns out, April planting seems to suit the sneezeweed just fine. "So far they've done remarkably well," reports McCue. "We saw very low mortality with the April plants. They're big, robust, and stunning, with tons of flowers."

Stalking the Sneezeweed

But meanwhile, the big mystery remained: what was a Virginia endemic, doing in Missouri? Was this an isolated, chance occurrence, perhaps a transplant that had hitchhiked on an animal or human? Or was it a remnant of a much larger population that had disappeared?

"It's not that uncommon to discover populations of a plant where no one thought there were any," McCue explains. "For a species that has not been thoroughly studied, it may be the case that simply no one had ever looked before."

In the case of Virginia sneezeweed, this was especially true because the plant, with its yellow composite flowers, can easily be mistaken for any of the many other yellow composites. But when the state conservation department went out looking, the results were stunning: at least twenty-nine previously unknown populations of Virginia sneezeweed have been located in Missouri. Based on this research, the Fish and Wildlife Service has proposed downlisting the status of this rare plant from endangered to threatened. Landowner cooperation has helped make this research a real success story.

"This is very exciting for a number of reasons," says McCue. "Given the number of sites being found, maybe the Missouri populations are not as disjunct as we had thought. We need to look between here and Virginia to see if there is actually a continuous range."

Researchers are also learning more about the plant's natural history. While most of the newly located plants have been found growing in the margins of sinkholes, botanists have discovered that sinkhole habitat is not obligatory for Virginia sneezeweed. Some individual plants are able to survive in wet swales (low marshy areas) as well.

These new finds could spell a happy ending for Virginia sneezeweed. But since nearly all of the discovered populations are located on private land, crafting agreements for protection and study or reintroducing the plant to protected public land is still vital.

"For one thing, it gives us a chance to learn about this plant's life history, seed setting success, seed dispersal, and more," McCue says.

Since private land sites are not currently secured against future development, working on conservation agreements or creating secure sites on public land is vital to secure the long-term survival of this unique plant.

Until then, CPC plant detectives are on the case.

Reprinted from *Plant & Conservation*, Autumn 2003. The Center for Plant Conservation, St. Louis, MO.

Iron Weed

Robert L. Tener

Living at High Hawk has taught me to look closely at the meadows around our place and learn something about their beauty. I like trees and buy seedlings and saplings of all kinds in my efforts to create a small arboretum of Ohio and other northeastern trees here on our farm. But watching the trees grow has also involved me in seeing the meadow flowers that have moved in. The meadows surrounding our home have shown me many beautiful flowers that are native to northeastern Ohio, from the magnificent gold Sun Tics and Goldenrods to the Spring Beauties and Field-Pussytoes. But a rival to the Sun Tics and Goldenrods and Black-eyed Susans is the absolutely stunning Iron Weed.

I have watched it grow in my wife's carriage house garden and alongside the carriage house into ten-foot-tall lilac-purple flowers in late September and early October until its red Joe Pye companion was totally eclipsed. Edwin Way Teale described its color as a "madder purple." But as I started to read about this magnificent wildflower, I discovered that very little has been written about it. Yes, the standard horticultural books told me what I could see for myself. Its stem is tall and seldom branches. Its leaves are alternate and have a pleasing oval shape with gently toothed edges and a faintly hairy underside. Technically it is called *Vernonia altissima Compositae*. Nutt. But as it stands tall, brushing against the lower heavens like a fragrant wisp of guardian winds, its flowering head, almost an umbrella of lilac-purple colors, graces the area around it like a painter rearranging his subject or a good housewife decorating her kitchen. Its umbrella top is almost flat, with flowerets called a cyme. It attracts the eye and tests the imagination with its stately beauty, dominating all lesser late fall flowers.

Iron Weed is a survivor from pre-glacial times and seems to allow little competition for its forceful entrance into the wildflower gardens. The earliest written account about it was done in 1909 when H.A. Gleason analyzed all its tribal relationships and migration routes in a long technical article in the *Bulletin of the New York Botanical Garden*. Little has been written about it since, other than identifying entries in wildflower books. It seems that there are about 638 (some say 600 or 500) varieties or close relatives in a loose family tribe called Veronieae. The genus *Veronia* was named after William Vernon, an English botanist who collected in Maryland. As far as I can discover, its earliest history goes back to Linnaeus' *Species Plantarum* (1753). It is called a perennial herb, "herb" meaning a weed or wild plant. In South America its relatives may be shrubs or small trees. *Altissima* clearly refers to its height. Its closest relative is *V. noveboracensis*, the New York variety which is sometimes referred to as the type species. Iron Weed has been sometimes called *V. gigantea*, *V. maxima*, and *V. albiflora*. It has migrated through Ohio into Kentucky, west to Missouri, and south to Louisiana and Mississippi. *V. noveboracensis* is a typical species and was the first to receive a binomial name.

Iron Weed is fall's maiden servant, gracious, inviting, sexual, an adornment in the home. It is not native to Europe being largely indigenous to the Western Hemisphere. Throughout the nineteenth century there was controversy over identifying the particular species or even the genus. But Nuttall suggested that *V. altissima* and *V. gigantea* were the same species. It is truly a polymorphic species, with two migratory centers in the northwest and two in the southeast. Varieties from both centers developed south of the glacial boundary and have existed ever since. In the southeast center, the eastern Appalachian one migrated north and northeast; the coastal plain one migrated to New England and then to Nebraska and Minnesota. The entire tribe probably stemmed from South America. The origin of "iron" as in Iron Weed remains unknown. Maybe a smooth strong stem reminded someone of the smoothness and strength of iron.

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4. Louis C. Linn. *Eastern North America's Wild Flowers*. 1978.
5. Roger Tory Peterson/ Margaret McKenny. *A Field Guide to Wild Flowers*. 1968.
6. Norman Taylor, Ed. *Taylor's Encyclopedia of Gardening*. 4th ed. 1961.
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Robert L. Tener is a member of The Native Plant Society of Northeastern Ohio and a regular contributor to *On The Fringe.* He lives in Rootstown, OH.

Dead Wood Brings New Life to the Forest

David Suzuki

It may be hard to believe, but trees can actually create more habitats for various species after they die than when they are alive. Recent studies have found that dead trees are crucial to the overall health of a forest ecosystem. And amazingly, as reported in the journal *Science*(1), their influence extends beyond the edge of the forest to rivers, estuaries, and even the ocean.

For decades, scientists have recognized the importance of standing dead trees, or snags, as habitat for a variety of birds, small mammals, and insects. Fungi and bacteria first colonize these dead trees, followed by insects and other organisms like the pileated woodpecker. The woodpecker digs deep into the trees in search of carpenter ants to eat. In the process, it creates holes that serve as habitat for other creatures, such as chickadees, bluebirds, and bats, who cannot dig holes themselves.

Researchers in the United States have found up to 100 snags per hectare in old-growth forests. These trees can stand for more than 40 years, and once they fall, they decompose on the forest floor, creating new habitats for up to 300 years more. Studies of coastal temperate rainforests have found at least 80 species that depend directly on dead wood for their survival.

In an old-growth forest, rotting trees sprouting new saplings are a common sight. It is often assumed that these rotting logs, dubbed nurse logs, provide nutrients that help the seedlings grow. But studies at the University of British Columbia have found that nutrients released by rotting trees are largely unusable to seedlings. Most nutrients in the soil actually come from fallen needles and leaves. The real benefit of nurse logs is their ability to protect seedlings from pathogenic fungi in the soil, which can kill seedlings but cannot survive in the deadwood.

The more we discover about our forests, the more we find that our previously held assumptions were often wrong. Look at dead trees in rivers, for instance. It was commonly believed through much of the 20th century that these trees clogged streams and destroyed fish habitat. Now we are finding the opposite to be true. Large fallen trees can remain stuck in streams for more than a thousand years, collecting sediment, preventing erosion and gathering debris that provides nutrients for organisms. These trees also form dams and waterfalls that eventually create deep pools – perfect habitat for fish.

And if dead wood reaches the ocean, it helps spawn even more life. Marine invertebrates feast on the wood, attracting other creatures from little fish to birds to sharks. Eventually these floating piles of wood can become miniature ecosystems, some of which have been known to float for years, attracting so much sea life that fishing boat captains seek them out in their search for fish.

Unfortunately, the deadwood capable of lasting for the longest length of time and thus creating habitat for the greatest diversity of species are big old-growth trees, which are becoming more and more rare. Most of North America's virgin forests have been logged, much of it within the last 50 years. It will take centuries for very large trees to return. That means there will be less dead wood to provide habitat for birds, salmon, and other creatures and even less of it seeding the oceans with new life.

Dead wood is crucial to the health of forest ecosystems and beyond. Yet in focusing on trees for their value as timber, logs, or pulp, with rotation cycles of 70 to 80 years, we fail to see the real life cycle of a tree that extends far beyond the time of death. If we are to develop a truly sustainable model of forestry, we must recognize the interdependence of our ecosystems and change our practices accordingly.

(1) Krajick, Kevin. "Defending Deadwood," *Science*, 31 Aug 2001, pp 1579-1581.

Autumn Berries Bring Birds to Backyards

Feeding birds is a little bit like running a restaurant. You could have your standard dishes, which would be your different seed types offered at your feeders, and you would probably attract the regular customers. But if you'd like to run a restaurant like some of those celebrity chefs you see on television, you're going to have to kick it up a notch with a little bird-feeding "bam!"

One of the best things you can add to your yard to make it an attractive habitat is a fruit-producing tree or shrub. Trees and shrubs add beauty to your yard, and they provide cover for birds throughout the year. If you understand the interaction between these fruit-producing plants and birds you can make your yard a year-round sanctuary.

Color is the Cue

If we're going to talk about fruits that are eaten by birds, then we have to talk about berries. Most berries are small enough to be eaten by birds. Berries are also often brightly colored to help attract birds. Some berries use special visual cues that signal to birds when they're ready to be eaten. In contrast, a pawpaw (*Asimina triloba*) produces large greenish fruits that are typically eaten by mammals, who rely on their sense of smell to find food more than their black-and-white vision.

Berries change color, or produce color signals, to insure that the fruit is eaten once it is ripe. If the ripe fruit is not eaten, then it may rot, which would be wasted energy invested on the part of the plant. Plants may signal that berries are ripe in several ways. The color red seems to be the color that signals that the berries are either ripe, or close to being ripe. Red stands out fairly vibrantly against a green background so it would be easy to see by foraging birds, which rely on their color vision to find food.

Most summer berries start out green and then turn a pre-ripening color of pink or red, and finally blue or black when they're ripe and ready to eat (except strawberries, which stay red). These bright, pre-ripening colors serve as an indicator to summer birds that there is food on the way, and makes it easier for them to find berries before they rot.

A second type of fruit flag may involve a part of the plant other than the berry that turns red; for example, a leaf or even a stem. In berry plants that rely on leaf color change, this usually occurs in early fall, before the rest of the forest undergoes a color change. An example of this can be found in gray dogwoods (*Cornus racemosa*) that produce grayish-white berries, but rely on their red leaves to signal the ripening of these berries. Some plants, like pokeberry (*Phytolacca americana*) rely on the color of their stems to signal that the fruits are ripe or close to being ripe. Pokeberries start out green on bright pink stems before finally turning black on red stems where the red color of the stem signifies ripeness.

Why Birds Love Berries

There is a lot of investment on the part of the plant to attract birds to eat the ripe berries before they rot. There is further investment by the plant to insure that the birds return again and again for the berries in the form of nutritious rewards in the berries themselves.

Berries contain important nutritional ingredients like carbohydrates (sugars), fats (lipids), and proteins, all of which can be used as a source of energy to a greater or lesser degree. There is, however, less protein in a berry then there is in a juicy insect, so birds rely on berries more as a source of carbohydrates and fats. Carbohydrates are sources of quick or immediate energy. Think about runners who load up on carbohydrate-laden pasta and baked goods prior to a big race.

Fats or lipids are a long-term storage unit for energy. They can hold more energy that can be accessed for longer periods of time. The reason there are so many low-carb diets on the market is because an excess of carbohydrates (i.e., more than can be immediately used by the body during brief activity) will be converted into fat for storage. Reducing carbohydrate intake forces the body to rely on and use up fats as a source of energy.

The Berry Timetable

Some berries contain high amounts of carbohydrates in the form of sugar. These berries are commonly produced in abundance during the late summer when much of the nesting season is coming to an end, and there are an abundance of newly fledged birds out foraging on their own for the first time. The high sugar content allows them to stay active while they forage or avoid predators.

These sweet summer berries are the same seasonal berries that many of us look forward to in our grocery stores and at roadside farm-stands. These would include blackberries and raspberries, strawberries, blueberries, and cherries.

Some berries contain high amounts of lipids. These are produced in the late summer and early fall as birds begin loading up and storing fat for their long migration southwards. It's imperative for these berries to be eaten quickly after ripening because their higher lipid amount, in some cases as much as 37 percent, will cause them to rot quickly as well. Plants in this group include spicebush (*Lindera benzoin)*, several viburnums, and magnolias.

The last group of berries is produced in the late summer through late fall, but remain on trees and shrubs throughout the winter, often not being eaten until late winter and early spring. These berries contain low amounts of lipids and serve as a source of energy for birds throughout the winter. They may also serve as a source of food for early spring migrants. These include several viburnums, and many of the hawthorns.

How Berries Benefit From Birds

As you can see, birds benefit greatly from berries produced by all of these plants, but the plants benefit as well.

Plants benefit from these interactions by using birds to help spread their seeds. Birds ingest the seeds with the fruits. The seeds then get passed through their digestive tract and are deposited elsewhere in the birds' fecal material. Many birds have a habit of leaving droppings shortly prior to flying somewhere. In fact some seeds need to pass through a bird's digestive tract, where it is exposed to grit in the gizzard and stomach acids, before it will germinate and grow into a new plant.

Plants want to make sure their seeds survive and as a result use several strategies to insure that survival. One is to produce very small and plentiful seeds, like the seeds of a raspberry or strawberry which are ingested but get passed back out of the digestive tract of birds in whitewash. Additionally, these small, plentiful seeds are less likely to be found by a mouse. Another alternative is to be large and hard like a cherry stone that is often regurgitated by birds. A cherry stone is covered by a tough exterior coating that makes it difficult for a mouse to chew through to get at the young plant inside. A third way that plants protect their seeds is by coating the seeds in toxins, poisons, or some other chemical deterrent which typically do not affect a bird, but may affect a mammal. This insures that only birds eat the fruits and pass on seeds.

With all of the benefits that berries provide to birds, it makes sense to supplement conventional bird feeders with plants that produce berries.

Reprinted from *Audubon Ohio*, newsletter from the Ohio State Office of the National Audubon Society, Autumn 2005

Berries, Botanically Speaking

David M. Brandenburg

Although the term "fruit" has been variously applied to reproductive structures, only flowering plants bear true fruits. For example, a pine cone, the product of a non-flowering plant, is not a fruit. Likewise junipers and yews, also non-flowering plants, do not have true fruits. Their "berries" are actually modified cones.

The basic parts of a flower are illustrated in Figure 1a. The outermost whorl consists of sepals, which are commonly green and leaf-like. Inside this whorl are the petals, sometimes brightly colored and serving to attract insect pollinators. The next two floral elements are, from a reproductive standpoint, the business end of the flower. A stamen (often several in number) consists of a stalk and an anther, the latter containing the pollen. In the center of the flower is the pistil, commonly solitary, which is divided into three

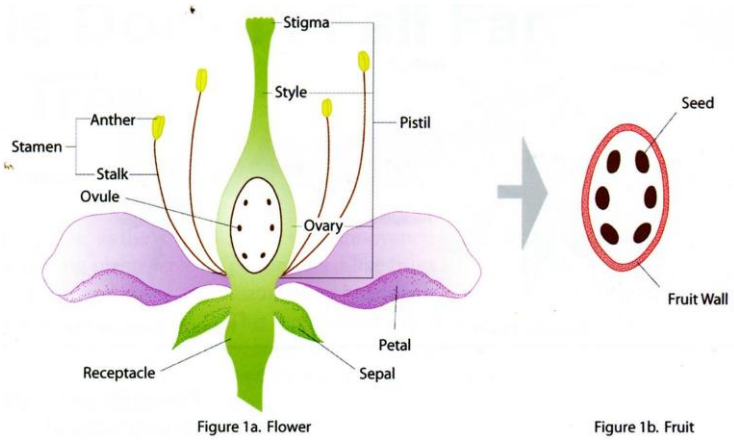

Figure 1a. Flower

Figure 1b. Fruit

regions: the stigma (uppermost), the style, and the ovary (lowermost). The ovary is a chamber that houses the ovules, or egg-containing structures. Ovules may be numerous, few or solitary (one may view ovules by

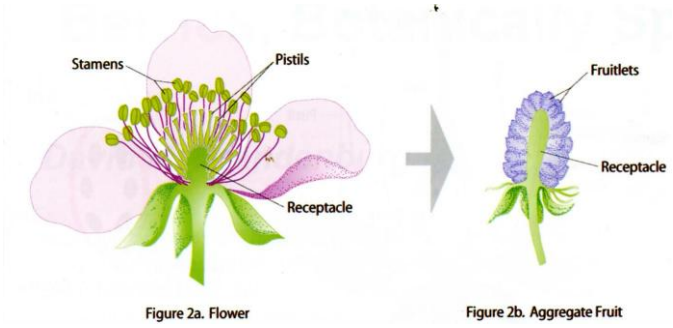

Figure 2a. Flower Figure 2b. Aggregate Fruit

opening and then squeezing the lower ("fat") part of a pistil—the tiny white globules that emerge are the ovules).

When pollen is transferred from an anther to a stigma (normally via insects or wind), pollination has occurred. These transplanted pollen grains each send forth a slender tube that grows downward through the style of the pistil until it reaches the ovary chamber. Once there, the male sex cells are released and unite with the egg(s). This is fertilization and the beginning of fruit production. The fertilized ovary develops into the fruit (the ovary wall becomes the fruit wall), and the ovules mature into seeds (Figure 1b). So, a fruit is a ripened ovary.

Several botanical fruit classifications—all imperfect—exist, with some current authors accepting many more kinds than have been recognized previously. Note that fruit in the culinary sense does not always coincide with fruit in the botanical sense. Hence a tomato, botanically and technically a fruit, is treated as a vegetable in the kitchen; likewise with zucchini, corn and peas— fruits to the botanist, veggies to the chef. "True" vegetables arise from vegetative parts of plants, such as roots, tubers, stems and leaves (e.g., carrots, potatoes, celery and lettuce). Vegetables *never* have seeds.

Fruits are generally either fleshy or dry. Those that are fleshy throughout, save for the seeds, are termed **berries**. A grape is a berry, as are eggplants and tomatoes. A **drupe** is a similar fruit whose seeds are tightly bound to a stony pit. Cherries, peaches and olives fall into this category. Apples and pears are examples of **pomes**, a type of fruit that develops from a flower whose ovary sits *beneath* the other flower parts. The result of such an arrangement is that the flesh of an apple is composed of not only the ovary wall but also of tissues in which the ovary was embedded. (The next time you eat an apple, note that the shriveled remains of the sepals and stamens are on the side opposite the fruit stalk, with the fleshy part in-between.)

Some berry-like fruits have tough skins: the **pepo** (cucumber, squash, cantaloupe, watermelon) with a thick rind; and the **hesperidium** (oranges and other citrus) with a leathery peel laden with oil glands.

Dry fruits are grouped into those that open when ripe ("dehiscent") and those that remain closed ("indehiscent"). Dehiscent fruits are further classified by the manner in which they open. The informal name "pod" is often applied to either **follicles** (e.g., milkweed, peony), which open along only a single side, or to **legumes** (e.g., beans, peas), which usually split along two sides or seams. Perhaps the most commonly seen dehiscent fruit is the **capsule**, which opens in a variety of ways. Most split lengthwise along seams (e.g., iris, hibiscus, lilac). However, poppies shed their seeds through small holes near the top of the capsule. Species of plantain, common weeds in lawns, have capsules that form a lid that pops off to release the seeds.

Indehiscent fruits (those that do not open at maturity) are of several kinds. **Samaras** are winged fruits, found on maples, ashes, and elms, among others. **Nuts** have a hard shell; true nuts include acorns, chestnuts, and hazelnuts (filberts). Several "nuts" belong to other fruit types. The almond is the pit of a drupe. Brazil nuts are the bony seeds of a large capsule that opens by a lid. Peanuts are also seeds, but from a specialized legume pod that ripens underground (an individual peanut is akin to a pea from a pod).

Several fruits are so small that they appear to be, and are commonly referred to as, seeds. A **schizocarp** separates into two one-seeded sections when ripe. The "seeds" of anise, dill, fennel and parsley are all schizocarps. Supplying humanity with half its daily calories are grasses, whose characteristic fruit is the **caryopsis**, informally called a grain. Wheat, rice, oats and corn (maize) are caryopses. Each grass grain or kernel is an individual fruit whose solitary seed is completely fused to the fruit wall (i.e., the fruit wall and the seed within are inseparable). **Achenes** differ from caryopses in that their seeds are attached to the fruit wall at only one place. Hence the seed of an achene (which does not open on its own) can be freed by peeling away the fruit wall. Buttercups and buckwheat form achenes. A sunflower is an achene-like fruit whose ovary, like that of the apple, sits beneath the rest of the flower. The individual fruits of the strawberry are tiny achenes that resemble seeds attached to the outside of a red, fleshy, swollen receptacle.

Some plants have flowers with more than one pistil (Figure 2a). In other words, within a single

flower there are several pistils, each of which forms its own fruit. At maturity the resultant "fruit" is an aggregate of many smaller fruits derived from the several pistils of a single flower (Figure 2b). Blackberries and raspberries are examples of such **aggregate fruits**, with the juicy fruitlets attached to a common receptacle. Although outwardly similar in appearance to a blackberry or a raspberry, a mulberry is actually derived from the pistils of many individual flowers (rather than from a single flower). The numerous flowers in a cluster on a branch of a mulberry tree each forms its own fruit and these small, individual fruits become united into a larger **multiple fruit**. Pineapples and osage-oranges (hedge-apples) are two more examples.

These are but a few examples of commonly encountered fruits. On a global scale, the diversity found throughout the plant kingdom is staggering, with many unusual fruits difficult to pigeonhole as to "type."

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Native Plant Societies and Grassroots Conservation

By Stanwyn Shetler

The runaway development across North America since World War II, but especially in the more recent years, has been destroying or fragmenting natural habitat at an ever-more-alarming rate. This has stirred up unprecedented concern for the future of the native flora among not only the professionals but the general public as well. Habitat loss is the number one threat to our native plants. Second only to this threat, surely, is the rampant spread of invasive alien species such as English ivy *Hedera helix,* Japanese honeysuckle *Lonicera japonica,* and various bush honeysuckles *Lonicera* spp., multiflora rose *Rosa multiflora*, Norway maple *Acer platanoides*, tree-of-heaven *Ailanthus altissima*, garlic-mustard *Alliaria petiolata*, stilt grass *Microstegium vimineum*—and the list goes on.

A call to arms, these and other threats have spurred the rapid growth of the native plant movement. It represents the concerned response of citizens everywhere and the single most potent grassroots force organized to do something about the threats. **Conservation of the native flora is the common cause of all native plant societies.** All their efforts are directed, ultimately, to that end. Across North America volunteers with dedication and determination increasingly are taking up the challenges of habitats and their species being destroyed or overrun by exotics. They are the "bucket brigades" that federal, state and local authorities often depend on to help eradicate the scourge of invasive alien plants from our parks and other wild places. One such local brigade, for example, recently rid an 80-hectare park in the Washington, DC, area of most of its 8 hectares of invasive monocultures.

Native plant societies are carrying the "warfare" directly to commercial growers, nurserymen, legislators, and other officials to enlist their active cooperation in controlling invasives at the point of introduction and sale. In an increasing number of cases, societies are making the critical difference in getting laws passed that prohibit or greatly limit the sale and use of the most pernicious alien invasives. Highway departments are being pressed to use native rather than introduced species in plantings along roadways. Indeed, "plant native" has become the accepted rule for reclamation, restoration, and beautification projects, thanks in large measure to the native plant societies.

The internet has greatly multiplied the power of native plant societies to reach, activate, and organize their members, especially on short notice, to do battle for the native flora. Hardly a day goes by without my own e-mail containing one or more calls for volunteers to come to a "pulling party," write a letter, give testimony, or otherwise take up the cause of conserving our wild places and native species.

Native Plant Movement

The beginnings of a popular movement to save North America's native plants trace back to 1900, when the New England Wild Flower Society was formed as the Society for the Protection of Native Plants. It claims to be the oldest institution in the United States dedicated to the conservation of wild

plants. In 1902, the Wild Flower Preservation Society of America was founded at the New York Botanical Garden. Its center of operation moved to Washington, DC, in 1925, becoming The Wild Flower Preservation Society, which ceased to exist in 1972.

Interestingly, the Audubon movement to save our native birds also was just getting started around 1900 but gained popularity and force more quickly than the native plant movement, which after a burst in the first part of the 20th century didn't really blossom until the latter half of the century, notably in the last 35 years or so. The parallel concerns of the preservation pioneers were the collecting of native flowers to supply florists and the killing of native birds to supply hatters with plumes, both common practices of the day.

Today there are numerous native plant societies, including a state- or province-wide society in nearly every state or province. The North Carolina Wild Flower Preservation Society, founded in 1951, was one of the earliest, possibly the first, of the state societies. My own state's organization, the Virginia Native Plant Society, was formed in 1982 under the name Virginia Wildflower Preservation Society. The name was changed in 1989 to emphasize the society's concern for the native flora as a whole.

The California Native Plant Society, founded in 1965, is the largest and probably the most visible of the state and provincial societies. The Florida Native Plant Society appears to be the next largest state or provincial society. Perhaps the youngest of these societies is the Native Plant Society of British Columbia, dating officially to 1997. At the continental level there is now the North American Native Plant Society, which is what the Canadian Wildflower Society, formed in 1984, has become. New York stands out among the few states without a statewide-society.

The societies vary greatly in size and thus in capacity to advance their cause. The largest ones can operate on a completely different scale from the smaller ones. In 2002, the California Native Plant Society had 10,000 members, 32 chapters, a budget of $800,000, and 14 full- or part-time, paid staff, enabling it to undertake serious research in addition to major conservation actions. The New England Wild Flower Society, which operates the famous Garden-in-the-Woods, had 6000 members, a statewide chapter in each constituent state, a budget of $2.3 million, and 24 full- or part-time employees. By contrast, many state and provincial societies have fewer than 1000 members, some fewer than 300; have an annual budget of little more than $50,000, often much less; and operate entirely or almost entirely with volunteers.

The grassroots programs of native plant societies are many and varied, defying simple characterization. Conservation education is a common thread that ties together many of the activities. In addition to field trips, a universal feature, the educational activities may include public lectures, conferences, workshops, classes and school programs, tours, native-gardening demonstrations, and of course newsletters and special publications of various types.

The Virginia Native Plant Society, for instance, has collaborated with the state's Department of Conservation and Recreation to produce a set of widely used fact sheets on the most troublesome invasive alien plants. It is also in its 15th year of designating a "Wildflower of the Year" from within its territory and distributing an information leaflet about it to the public. The featured species in 2003 is the yellow trout-lily, *Erythronium americanum*. (All can be seen at http://www.vnps.org.) Most of the societies now have web sites and are getting ever better at using them to communicate with their members and the public and provide all sorts of information, including photo galleries of native plants.

Because they lack the resources to conserve wild lands directly, most native plant societies channel their efforts to save habitats and rare species mainly into letter-writing or e-mailing campaigns and various other forms of advocacy. Such efforts are particularly important at the local level because land-use decisions are largely made by local jurisdictions.

Native Plant Alliances

Many of the societies are now working together with other concerned organizations and agencies of government in a number of alliances. The New England Plant Conservation Program, organized in 1991 by the New England Wild Flower Society to form a regional conservation effort, is one such alliance. The Plant Conservation Alliance, founded in 1994 as the Native Plant Conservation Initiative, brings together federal agencies and many non-federal cooperators in the U.S. to create a national voice for native plant conservation and for parity with animals in public and private spending and effort. Recently formed to amplify this national voice is the Native Plant Conservation Campaign, spearheaded by the California Native Plant Society and prominently involving native plant societies in a network with other like-minded organizations across the country.

Plant Rescues

Once habitats are doomed by impending development, salvage or rescue becomes a last resort, and native plant societies routinely marshal volunteers—"bucket brigades" of a more literal sort—to conduct plant rescues. This can be a debatable practice under some circumstances, and careful guidelines are needed. It can be a cop-out for developers who do not want to consider preservation in situ. What to do with the rescued plants can raise controversial ethical questions, such as whether to transplant them into the wild and thereby, in a sense, falsify the history of a natural habitat.

Gardening With Natives

Gardeners are often drawn to native plant societies because of the natural affinities, and, not surprisingly, gardening interests often strongly influence society activities. Gardening and landscaping with native plants are more popular than ever. This is due in no small part to the societies, which have made "planting native" an imperative of conscience and a duty and have effectively communicated the virtues of doing so. Native plant sales are perhaps the most popular of the activities sponsored by many of the societies or their chapters, and typically their best fund-raisers. One of the largest of such sales is the Pacific Northwest Native Plant Sale, cosponsored by the Native Plant Society of British Columbia.

Research

Research is part of the stated mission of most of the societies, and some are able to support basic research with their own funds or to secure grants and contracts to conduct projects. A few are helping to support state flora projects.

The Future?

What about the future? Are the programs of the past and present adequate to make a difference in the future struggle to save the rapidly vanishing habitat on every hand? The only way to save species is to save habitat, and this should be the singular focus of all native plant societies.

Their members constitute an ever-growing army of grassroots conservationists who daily are making a difference in the fight to preserve and protect the native North American flora. If a tally of significant victories were made, I am sure that every society, and not just the largest ones, could report some. The Native Plant Society of Oregon, for instance, has stated that without its tireless efforts Oregon would not have an Endangered Species Act.

But the battle has only begun, and the future holds infinitely greater challenges than the past. Our societies must be very clear in their aims so as to make the best use of their grassroots army. We must avoid letting worthy but subordinate aims substitute for the main mission. In this respect, I think it is important to sound a few cautions, intended as alternative perspectives, not black-and-white prescriptions, for future planning.

Challenges At the Crossroad

As I see it, we in the native plant societies are at a crossroad of sorts, and the time has come for some sober revaluation of our efforts to save native species. Among the many important and varied activities of our societies, the two with the highest profile in many cases, I suspect, are eradication of alien invasives and selling and planting natives. Will we become known primarily as eradicators? Will our societies be remembered more for saving wild habitat or for adding to the planted landscape?

We must not lose sight of the fascinating dynamics of plant dispersal, migration, and colonization and that every flora on Earth is made up of longtime residents ("natives") and newcomers ("aliens"). The composition of a local flora is a matter of time and process, and a sharp moral boundary should not be drawn between the older and the newer members of a flora. Only a relatively few of the many alien plants in North America make up the invasive scourge, and not all invasive species are alien. The struggle, which we must continue to fight if there is to be any natural habitat to save, is against the invasive aliens, a point that should always be made clear. Too much emphasis on aliens broadly encompassed can lead to instinctive disdain for many beautiful and beneficial elements of our present-day floras and to misunderstanding our aims among those not versed in the science of plant distribution and the language of native plant conservation.

Gardens and formal landscapes are an integral part of our lives, and certainly the use of native species in gardening and landscaping where possible is commendable. Native plant gardens can be an invaluable educational tool. But should planting natives be a dominant thrust? Surely native plant societies are primarily in the business of saving wild places, not adding to or promoting planted landscapes. As our civilization busily turns natural landscape into planted landscape, we should be a voice for slowing

down that conversion and not part of the clamor for more of it. Increasingly, the natural landscape of North America is being compromised by the blurring of the line between the natural and the artificial (planted).

The "plant native" trend, which urges the use of native species not only in formal gardens and landscapes but also in all kinds of other circumstances, has the worrisome consequences of greatly increasing the commercialization of the native flora and of putting too much accent on planting as a means of preserving native species. This may bring a higher risk of unscrupulous suppliers collecting in the wild. The native plant societies help to stimulate and supply the market with their own high-profile conferences and plant sales, which would seem to signal that gardening with natives is a primary reason for their existence. Shouldn't our societies be best known as front-line advocates of natural process in the re-vegetation of land and as minimizers of intervention, letting nature be nature whenever possible?

What Is a "Native," Anyway?

Ultimately, everything hinges on the meaning of "native," and we have tended to avoid controversy by taking its definition for granted. It is a matter of time-scale, geography, and process. A species can be native on one level and not on another. When does a newcomer become an old-timer? If a species is native to an area, does that convey nativeness on any given individual of that species anywhere in the area? We can be so focused on the species level that we forget about the meaning of native and alien at the level of the individual, the only tangible unit of distribution.

Typically, a species is considered native to North America if it was present somewhere on the continent in pre-Columbian times. I see it as truly native to a given site only if it reached that site by the natural forces of dispersal and colonization without deliberate human intervention. Further, I would say that a native, whether from near or far, becomes an alien introduction the moment it is sowed or transplanted by human agency. Its point of origin is only part of its story. Thus, in a real sense, the act of planting makes aliens of natives.

Everything we know about the nativeness of plants comes ultimately from the plant geographer's records of past and present distributions of the species. The geographer's distribution maps and explanations are only as authentic and reliable as the individual records that make up the dots on the maps. Transplanting or sowing falsifies in some measure, however small, the history of a species' migration and establishment and thus also any conclusions about where it is truly native.

Watch Words

Society has come to accept artificial vegetation and counterfeit biomes as the real thing. From plastic greenery to whole theme parks, ours is an age of fabricated landscapes of little redeeming value as surrogates for nature. Even our grave-side bouquets are plastic, certainly the ultimate mockery of perpetual care. As our native plant societies face the future, surely we should give priority to the fundamentals of conserving species in the wild, spending more time studying and preserving them and less time planting and manipulating them. Our watch words and our message to all should be, Save Habitat!

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Acknowledgements

I am indebted to many of the publications and web sites of native plant societies and especially to the many individuals who kindly responded on behalf of their society to my requests for information. The interpretations are my own, however, and those who have helped me should not be held responsible for my views expressed here. www.newfs.org/publications-and-resources/native-plant-societies.html. (Botanical Clubs and Native Plant Societies of the United States and Canada, compiled by M. M. Walker, 2002.)

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Stage's Pond State Nature Preserve

Jeff Johnson

If you've ever heard that a small group of concerned citizens can't stop progress, then you haven't heard the story behind Stage's Pond State Nature Preserve. Imagine, if you will, bulldozers scraping off the top layer of soil, backhoes digging basements and construction crews building homes on postage-stamp-sized lots. Not what most people would call an ecological triumph; even worse when you understand that all of this was happening on high-quality wetland habitat. This is what happened 35 years ago in Pickaway County.

What made this wetland different from countless others lost to development was that it had become the favorite haunt of many local birders. They didn't want to see yet another great birding site lost to development. What began as a grassroots effort turned into a statewide appeal to save a beloved local landmark.

Through the efforts of the Pickaway Garden Club, the local movement eventually included the Garden Clubs of Ohio, The Nature Conservancy, and the Ohio Department of Natural Resources. Their concerted efforts led to the permanent protection of this wetland mecca. The 178-acre site became a state nature preserve in 1974.

Much of the preserve had been farmed and many of the now wet locations had been tiled and drained. Over the years, the tiles were broken and the water returned.

Two distinct features are present at the preserve. The larger area has for years been termed a kettle pond, a relict of Ohio's glacial past. New evidence has created some doubt as to the pond's formation; however, that doesn't matter to the wildlife using the site. The smaller area—once drained and covered with crop rows— is now a shallow depression that forms up to three distinct ponds depending on water depth.

Both wetland areas support myriad bird species, especially during spring and fall migrations. In the summer, it's not uncommon to see osprey circling above the ponds waiting to dive upon unsuspecting fish below. Bald eagles have been seen periodically as well. And on any day, visitors can easily spot the Canada geese and mallards who reside year-round.

If you can name a species that migrates through the state, chances are it has been seen at Stage's Pond. Divers and dabblers call the pond home for several months each year. Cormorants, mergansers, buffleheads, pintails and canvasbacks have all been reported in the past year by regular visitors. And although it has been awhile, I have seen rails in the grasses along the edge of the small pond.

But don't just come to Stage's Pond to see its wetland habitat and occupants; there's much more to see. The old farm fields are recovering. Much of the upland ecology is early successional, and numerous birds are found in these areas as well. Deeper in the preserve, a fairly mature woodlot brings in another cadre of bird species.

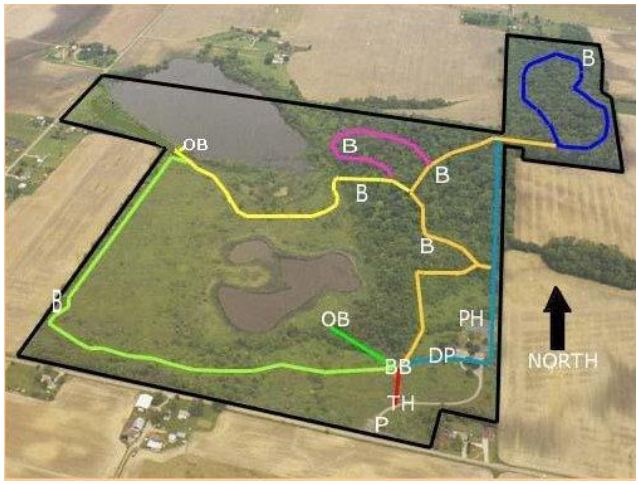
Stage's Pond is equally diverse botanically. Aquatic, field, woodland and marsh species abound from April to late October, although the spring season offers the most variety in the form of colorful native wildflowers.

Location:

Located in Pickaway County 5 miles north of Circleville on U.S. Route 23; proceed 1.5 miles east on Hagerty Road to the preserve parking lot and trail system To learn more, visit www.ohiodnr.com/dnap.

Jeff Johnson is South Central District Preserve Manager, Ohio Department of Natural Resources, Division of Natural Area and Preserves

Reprinted from *Natural Ohio*, Spring 2009. Division of Natural Area and Preserves, and www.ohiodnr.com/dnap



Common Milkweed

Gordon Mitchell

Everybody should be familiar with milkweeds. As kids, we liked to open a ripe seedpod and release the seeds into the air to watch them float. We also liked to break a off a leaf to observe its milky sap.

There are several species of milkweeds that are native to this area. The species that is most common around here is the Common Milkweed (*Asclepias syriaca* L.).

The Common Milkweed is a member of the Milkweed Family (Asclepiadaceae). The genus name, *Asclepia*s, was named after Aesculapius, Asclepius orAsklepios, the Greek god of healing and medicine. The specific epithet, *syriaca*, was named after Syria because the Swedish botanist Carolus Linnaeus (Karl von Linne) mistakenly thought the plant was a native of the Middle East when he studied it in 1753.

The Common Milkweed has gone under many different names. Other scientific names for this plant are *Asclepias cornuti* Decaisne, *Asclepias intermedia* Vail, and *Asclepias kansana* Vail. Other common names for this plant are Common Silkweed, Cotton Tree, Cottonweed, Milkplant, Milkweed, Monarch Flower, Pink Milkweed, Rosy Milkweed, Silkgrass, Silkweed, Silky Swallowwort, Swallowwort, Virginia Silk, Virginia Swallowwort, and Wild Cotton.

Toxicity

The Common Milkweed is a toxic plant. Consuming this plant may lead to stomach and intestinal troubles, breathing difficulties, fevers, muscle spasms, staggering, sweating, weakness, and even death.

This plant is also toxic to livestock, especially cattle and sheep. Fortunately, most livestock avoid it in the field.

Milkweed contains alkaloids, resinoids, volatile oils, and the cardiac glycosides asclepiadin, syriogenin, and uzarigenin. These cardiac glycosides can increase the contractibility of the heart muscle and can both slow and strengthen the heartbeat. Although, there are some medicinal uses of these glycosides as heart medications, excessive amounts can lead to cardiac arrhythmia and cardiac arrest.

This plant can also be an external problem to some people. Their milky sap can cause contact dermatitis to some people who have sensitive skin.

Edible Uses

Although the Common Milkweed is considered to be a toxic plant, parts of it can be made edible if they are properly prepared. The parts that are edible are the young shoots (up to 8 inches high), the young leaves (until the flower buds form), the flower buds, the flowers, and the young soft fruit pods (about 1 inch long). Cutting off the young shoots will allow this plant to re-sprout a new shoot.

Do not eat any of the mature plant parts. These older parts contain more toxins than the younger parts.

Asclepias syriaca
©Shaw Nature Reserve

The edible parts may be eaten as potherbs. They contain vitamins A and C and beta-carotene. Boiling them for about 20-30 minutes will remove the toxins. These edible parts must be placed in water that is already boiling and they must be boiled in at least 2-3 changes of boiling water. The second and third waters must also be boiling when the plants are added. Although the plant parts should be rinsed between water changes, placing them in cold water and waiting for it to boil will give the potherb a bitter flavor.

Because the flowers have sweet-tasting nectar, they have their own uses. The French Canadians gathered the flowers in the early morning when there is dew upon them. These dew-covered flowers can be boiled down into a palatable brown sugar. The flowers can also be chopped into pieces and made into jam.

The seeds also have edible uses. They contain about 20% edible oil similar to soybean oil and can be used as a substitute. However, the seeds must be kept dry to avoid their decomposition.

The milky sap, when exposed to the air, will dry and harden and can be chewed like gum. This sap contains fat, gum, and sugar. However, this gum will probably have a bitter taste.

Medicinal Uses

Despite the toxicity of the Common Milkweed, it also has some medicinal uses. Both the Native Americans and the early European settlers used this plant as medicine. During the 1880's, this plant was listed in the U.S. Pharmacopeia.

A tea made from the fresh or dried root can be used as an alterative, an anodyne, an anthelmintic, a cathartic, a cicatrisant, a diaphoretic, a diuretic, an

emetic, an expectorant, and a sedative. The tea can be used to treat asthma, bronchitis, cancer, catarrh, dropsy, dyspepsia, kidney stones, pleurisy, rheumatism, scrofula, and typhoid. These roots are best collected in the fall.

Other parts of this plant had medicinal uses, too. A leaf infusion was used for treating stomach ailments. The stem can be boiled and be used as a poultice for treating rheumatism.

The milky sap can be used for treating insect stings, moles, ringworms, and warts. The sap, which contains latex, can be used as a bond for healing cuts. This sap forms a strong adhesive pellicle upon the skin. The sap can also be used for treating saddle sores.

Other Uses

Besides food and medicine, the Common Milkweed has even more uses. Both the Native Americans and the European settlers had various uses for this plant.

The Native Americans probably grew this plant for their own cultivation. Milkweed plants have been found growing near the remains of Native American homes and villages.

When the European settlers arrived, they also used and cultivated this plant. The Common Milkweed became so important to the Europeans during the colonial period that they exported some of these plants to Europe.

The flowers had uses other than food. They were used for making a dye. The silky haired tufts were used as stuffing for cushions, mattresses, pillows, and upholstery. They were also used as insulation, as a cotton substitute, and as thread. Some factories in 19th Century New England were making clothing and other personal items from this tuft.

During World War II, these tufts were used extensively by the military. They were used as a replacement for the tropical tree, Kapok (*Ceiba pentandra* L.). These tufts were collected by civilians and used for stuffing life jackets, life preservers, and flight suits. These tufts had a very high degree of insulation and buoyancy. Some farmers at that time even raised Milkweed on their farms solely for their tuft.

The dried fruit pods can be used as decoration. They have been used in arts and crafts, in flower arrangements, in wreaths, and as Christmas tree ornaments.

The stem's tough outer fibers can be used as cordage. It can be used as a substitute for flax or hemp. This cordage can be used as bowstrings, fishing lines, nets, and rope. These fibers can also be made into cheap muslin cloth, paper, and sandals. To obtain these fibers, the stems must first be peeled and rolled.

The milky latex sap can be used as glue. During World War II, it was used in experiments as a rubber substitute. However, converting the latex into rubber proved to be too costly.

Present-day scientists have now found a new use for the Common Milkweed. This plant is a good indicator of damage from ground-level ozone pollution, which is harmful to humans. Exposure to ozone will leave distinct tiny dotted, dark purple or black lesions upon the upper leaf surfaces. By observing these damaged leaves, scientists will know how much harmful ground-level ozone is present.

Nuisance Plant

Although the Common Milkweed is a native plant, some people may consider this plant to be a nuisance weedy plant. It can spread rapidly and can be very difficult to eradicate. Aside from spreading by seed, the Common Milkweed will spread by its root system and form entire colonies. Eradicating a few colony members will not eradicate the entire colony. The plant's deep root system will allow the plant to survive droughts and soil disturbances. These deep roots can even survive plowing. The Common Milkweed is also resistant to some herbicides. Repeated herbicide applications may be required to completely eradicate this plant.

Description of the Common Milkweed

Perennial

Height: 2½ -6 feet.

Stem: The stem is erect, downy, fibrous, grayish green to red, hollow, stout, solitary, and unbranched. These stems have milky sap. If an unwanted insect climbs the stem, its sharp feet may puncture the stem and release the sticky sap upon that insect, causing it to become stuck and even die. Baltimore Orioles {*Icterus galbula* L.) and Orchard Orioles (*Icterus spurious* L.) may strip some of the dead stems and use those strips for building their nests.

Leaves: The leaves are simple, opposite or whorled, broad, elliptical, oblong, oval, and ovate. These leaves are also thick and leathery. The leaves have rounded bases and acuminate tips, and have entire or wavy margins. Each opposite pair alternates their position from their adjacent pairs. Each leaf is about 3-11 inches long and about 2-7 inches wide. Its top is light green and its bottom is gray and downy. There is a prominent pinkish midvein on the leaf underside. Its petioles are short and stout. Like the stems, their sap is also milky.

These leaves are a favored food of the Monarch Butterfly caterpillars (*Danaus plexippus* L.). Eating these

leaves will allow the toxic cardiac glycoside to be absorbed and accumulated into their bodies. Although this toxin does not harm the caterpillar, it does give the insect a bad taste, which will protect it from predators. The Monarch Butterfly also lays its eggs upon the leaf undersides (along with placing them on the stems and on the flowers).

Flowers: The flowers are fragrant and vary from pink to purple (sometimes with various shades of brown, green, red, and white). These flowers are arranged in dense, drooping, 2-4 inch wide globular or flat-topped umbelled clusters. These clusters are either located at the top of the plant or within the upper leaf axils. Each plant may have about 1-8 clusters and each cluster may have about 20-130 flowers. Each flower has a 1-inch long stalk, is about ¼-½ inch wide, is about 3 to 4½ inches long, and is radially symmetrical. The flower has 5 persistent hairy sepals with reflexed lobes, 5 united petals with reflexed lobes, 5 stamens, and 2 pistils. When these flowers bloom, they bloom from the center of the cluster outward. This plant usually flowers after its second year. Flowering season is usually May to August.

The 5 stamens unite with the pistil to form a central column. Atop the column is a crown or corona of 5 inflated erect hoods. Each hood is about 1/8-1/6 inch long. Located within each of these hoods is a curved horn that projects outward from the hood.

This flower is insect-pollinated. The structure of the flower regulates the pollination of it. The pollen is attached to the pollinia, a waxy or granular structure that resembles a saddlebag. The pollinia are located within 5 narrow slits on the column.

When insects land upon the slippery central column to obtain the flower's nectar, they place their feet into those slits to get a good footing. Each slit has 2 attached pollinia. When the insect removes its feet from the slit, it may sometimes pick up one of the pollinia. With the pollinia attached to its feet, the insect transports it to another flower.

The stigma, which is also located within the slits, receives the pollen when an insect places its feet within that slit. Some insects will get their feet caught in the slits and will die trying to free themselves or will succumb to a predator.

These bright flowers may also attract Hummingbirds. Our local species is the Ruby-throated Hummingbird (*Archilochus colubris* L.).

Because of the difficulty in pollinating these flowers, very few of them are ever pollinated. A single umbel may only yield one fruit pod.

Fruit: The fruit is a gray-green or brown, fleshy, wooly, warty follicle or pod. This elongated or ovoid pod is about 2¾ -5½ inches long and is bilaterally symmetrical. Its base is large and rounded and its tip is pointed. The inside of the pod is shiny, silky, and yellow. These pods are erect and are usually arranged singly or in 2's. When the pods are ripened, they open along one side to release up to 450 compacted and overlapping seeds. Fruiting season is usually from September to early winter.

Blossom
© Prairie Moon Nursery

Seed pods
© www.monarchwatch.org

Seeds: The seeds are brown or black, about 1/5-1/4 inches in diameter, rounded, hairy, and have flattened margins. Each seed has a tuft of silky hairs at its tip. The American Goldfinch (*Carduelis tristis* L.) and other bird species may use these hairs to line their nests. These seeds are wind-borne and may travel up to 100 feet. The seeds also have a high germination rate and may remain dormant in the soil for up to 3 years.

Root: The root system has a thick, fibrous, and deep taproot (which may reach over 10 feet) and horizontal, creeping white rhizomes. These rhizomes can also travel for great distances (up to 10 feet per year), set new roots, and sprout new plants. These extensive root systems help prevent soil erosion. These rhizomes do most of their growing from July to September.

Because of their deep and extensive root system, this is a very difficult plant to transplant. However, the fleshy rhizomes can be cut into pieces, having at least one bud, and can be used for propagating new plants. These pieces should be planted before late fall.

Habitat: Disturbed areas, dry areas, fields, meadows, orchards, pastures, prairies, riverbanks, roadsides, thickets, waste areas, and woods' edges. Common Milkweed is often found in cloned colonies.

Range: Eastern United States, except Florida, and Canada as far west as the Great Plains. It has been naturalized in Europe. It is the most common milkweed in the northeastern U.S.

Gordon Mitchell works for the Columbus OH Metroparks and is a member of the Columbus Native Plant Society.

How to Use Newcomb's Wildflower Guide

By George Ellison

For some years now, I've been conducting non-technical bird, wildflower, tree, and fern identification workshops for various institutions in western North Carolina. At this point in time. I've become just about as interested in the process of teaching plant and bird identifications as in the actual field identifications themselves.

When conducting wildflower identification workshops. I teach participants how to use *Newcomb's Wildflower Guide* (L. Newcomb. 1977. Little Brown and Company. 490 p.). For those who have been using the picture book method of identification, learning to use "Newcomb's" will substantially enhance their wildflower identification capabilities. Since this is a field guide that's widely known and utilized in the eastern part of North America, I thought it might be interesting for readers of this column to compare notes with me regarding its use. I'd be interested in receiving any feedback at one of the addresses cited below.

My methods vary according to the group I'm working with. If it's a small group (five to 12 or so participants) of the sort I generally work with via the North Carolina Arboretum, Smoky Mountain Field School, Southwestern Community College, or one of the field trips for the Native Plants Conference, I give the 30-minute presentation outlined below and then make a 6-8 hour field trip to various habitats where most of the flower types will be encountered.

At each stop I assign a plant to either an individual or several members of the group for identification. After making sure they're on the right track. I let them go at it on their own. Once they decide upon an identification, sometimes with my assistance. I let each individual or group explain to the others how they arrived at that particular conclusion. By the end of the day, the average participant is pooped, but he or she goes home with a firm working knowledge of Newcomb's system.

When I'm involved with large groups of 25 or more participants (as I often have with Elderhostel programs), the method described above is cumbersome. In this instance. I still give the introductory presentation. But instead of assigning plants for identification. I ask members of the group to describe particular plants encountered during nature walks as if they were going to run it through the Newcomb's key system; that is, they describe the plant as to flower, plant, and leaf types. This gets interested participants used to looking at plants in the way they'll need to when they start working on their own.

Newcomb's range map for the "Geographical Area Covered by the Guide" depicts the upper mid-Atlantic and Midwestern states as well as New England and eastern Canada. I've found that it works very well throughout the eastern woodlands. The farther south one goes in Florida or west of the Mississippi the less useful it becomes. I use Roger Tory Peterson's *A Field Guide to Wildflowers - Northeastern and North-central North America* (Boston: Houghton Mifflin Company. 1968) as a general supplement to Newcomb's. For those living in or visiting the Southern Appalachian region, I recommend Richard M. Smith's *Wildflowers of the Southern Mountains*, a compendium of photos and tips for identifying plants down to species level.

The Newcomb's method is based on using a "Three Classifications" chart inside the front flyleaf of the paperback edition (or on the front endpaper in the hardcover edition). Using a flip chart or dry erase board. I talk each group through the chart using wild geranium (*Geranium maculatum*) as an example. This gives me a chance to discuss items like regular and irregular flowers, plants with no apparent leaves at flowering time (e.g., cranefly orchis), leaf arrangements, and leaf types. For wild geranium they come out of this exercise with the digits 5-4-3. which are then taken to a Locator Key in the front portion of the text. Wild geranium is a good example because it leads to a concise section in the Locator Key rather than to a longer more complex one. After answering a few questions in the Locator Key, which I ask one of the participants to read aloud and answer for the group, they are directed to pages 280-281 where wild geranium is described textually and depicted in a line drawing.

Before heading into the field for an identification session. I give some additional tips, as follows, for using Newcomb's:

(1) When considering the "Plant Type" section in the "Three Classifications" chart, remember to assign the plant to the "Shrubs" or "Vines" category when applicable.

(2) Don't jump at the first likely option in the Locator Key. Consider all of the options before proceeding. That way, if you make a wrong turn, you'll be able to backtrack and compensate.

(3) When identifying a plant with a flowering head comprised of numerous flowers (e.g., speckled

wood lily), treat one of the small flowers making up the flowering head the same way you would a single-flowered plant: that is, each single flower in a speckled wood lily umbel would have six parts.

(4) You normally need a plant to be in flower to make an identification, but sometimes a fruiting structure will be clearly divided into the same number of sections as its flowering structure had displayed.

(5) Remember that Newcomb's always uses the leaves located at the center of the stem as the diagnostic leaves. For instance, a plant like flowering spurge (*Euphorbia corollata*) displays three whorled leaves near its flowering head, but it will only key out in "Newcomb's" if you apply the alternating leaves found on the central stem.

(6) When directed from the Locator Key to a page in the text, remember that, if there are too many plants of that type to describe on one page, the section will be indicated as "continued" at the bottom of the page. Some sections are continued for as many as three or four pages.

(7) And finally. I suggest that when participants start using Newcomb's on their own that they run a few plants they already know the identity of through the keys. This will provide a "comfort zone" in which users of the book can become more familiar with the twists and turns often involved in making an accurate identification.

George Ellison is a writer and naturalist who resides in Bryson City, North Carolina. He can be contacted at ellisongeorge@cs.com or via www.georgeellison.com.
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A Tale of Three Orchids

Hal Horwitz

Orchids are one of the largest plant families. The most recent estimates vary from 18,000 to 20,000 species worldwide. Although popularly thought of as tropical, they are found growing on every continent except Antarctica. *The Flora of North America* (2002) recognizes 208 species on this continent.

This is the tale of three Virginia orchids, three species recently found in that state for the first time. Virginia now boasts 58 orchid species among its flora. The manner in which each of these "new" orchids was found is instructive for us wildflower enthusiasts as we educate ourselves and, if we're lucky, make our modest contribution to the complex field of botany.

Some years ago, I was sitting in a classroom at the College of William and Mary listening to a Master's student report on his study of the flora of a section of Rappahannock River drainage in Lancaster County. The county, which is in an area of Virginia known as the Northern Neck, is on the coastal plain and borders both the Rappahannock River and Chesapeake Bay. The student's thesis had taken two years and involved choosing a well-defined area and going back season after season, recording every species found. Most of the species noted were routine, known to grow in the study area. However, I nearly came out of my seat when slides of *Cypripedium kentuckiense* flashed on the screen. This largest and most wonderful of the lady's slippers in North America had never been found east of Kentucky before this discovery. An incredible colony of more than 400 plants had been located over 500 miles from its closest neighbor. It is the only known population of the southern lady's slipper (a.k.a. ivory lady's slipper) on the coastal plain. The plant grows up to 38 inches and the flower lip can measure 2-1/2 inches. The lip color varies from nearly white to ivory to pale lemony yellow as contrasted with the golden yellow of similar species. The lip opening is formed by margins that neither fold inward nor outward. The lip is not slipper-shaped either, but more like a rounded oval. *Cypripedium kentuckiense* became the 56th orchid for the state of Virginia.


Cypripedium kentuckiense

A year later while I was visiting the VA Division of Natural Heritage, the state agency responsible for maintaining an inventory of rare native plants, animals and natural communities, their chief botanist showed me some satellite images of Virginia. They were color infrared photographs taken from space in winter, when the trees are bare; this specialized view gave scientists new ways to evaluate land cover. Infrared images show soil as red, ponds as black and exposed rock as blue. Since the underlying rock formations in this part of the state are limestone, the blue splotches among the predominant red on the map looked promising and begged further investigation. Perhaps these represented limestone barrens and harbored botanical communities unusual to Virginia.

Spiranthes magnicamporum

All the promising-looking areas were on private land, and it took some time to gain the approval of landowners to search their property. Another limiting factor was the location; the sites were all about 400 miles from the Natural Heritage offices and not close to any large town. Nearly a year later, after multiple visits in different seasons, an orchid new to Virginia, *Spiranthes magnicamporum* (great plains ladies' tresses), a Midwestern species, was found growing on three of those splotches on the map. This find was quite a shock, since the nearest known population was over 300 miles away.

The infrared images allowed a trained observer to discover limestone barrens eventually found to contain multiple elements of Midwestern prairie plant life. High-tech science had located Virginia's 57th native orchid.

Now let me tell you about Stan Bentley, an amateur plant hunter from the western part of Virginia who loves native orchids. He has used up every spare minute of the past quarter century walking the byways and trails of western Virginia and the adjacent state of West Virginia. A few years ago, he ran across a little plant unknown to him in West Virginia, not a mile from the Virginia state line. What he saw was a stand of plants that looked for all the world like young, stout stems of *Corallorhiza maculata* var. *maculata* (spotted coral-root), an orchid flowering in the mountains of Virginia and West Virginia from mid- to late July.

The two observations that eventually led him to examine the plants in much greater detail were that the flowers never seemed to open and that the stems were thicker than those of spotted coral-root. It was obvious that this was a species he had neither seen before nor read about. He called Dr. John Freudenstein, the recognized authority of the genus *Corallorhiza*, who visited the site and confirmed the uniqueness of this orchid. According to Dr. Freudenstein, this orchid is similar to a Mexican species of coral-root, but quite unlike anything north of the Mexico-United States border. In December 1999, the plant was officially described in a botanical journal as one new to science, *Corallorhiza bentleyi*.

In the intervening years, Bentley's coral-root has been located in several places in mountainous southwestern Virginia, adjacent to the original West Virginia site. In some locations the flowers never open fully and the lip is dark red, while in others the lip is yellow and open. All discoveries of Bentley's coral-root to date have been in deciduous Appalachian forest on somewhat disturbed sites. Stan Bentley contributed orchid species #58 for Virginia.

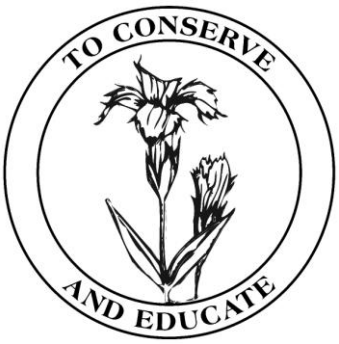
I find these three stories interesting because of the lessons they teach: there are still lots of botanical discoveries to make if you are persistent, if you use all the tools at your disposal, and if you stay inquisitive. Just because something looks familiar from a distance, does not guarantee that it is. Investigate anyway; it just might be something different. You may have been down that road previously, but you might have overlooked a rare plant or perhaps it did not bloom the year you searched. In addition, do not assume that all botanical exploration is complete. There is still much to discover. Imagine the thrill of finding a plant never described before!

When I was first getting involved in photographing wildflowers, one of my early mentors, an elderly man, would literally jump up and exclaim to the searched-for plant, "Wow, you're the most beautiful flower I've ever seen." At the time I thought it a little silly, but as time progressed I came to appreciate his outbursts. His reaction was a wonderful expression of joy and a blessing that someone could maintain such enthusiasm and freshness of outlook throughout their life.

I invite you to join the hunt, maintain your persistence and enthusiasm. Delights await.

Hal Horwitz began photographing people, places and things - above and below water - over 40 years ago. Two decades ago he became fascinated with wildflowers and has photographed little else since. Hal has developed a special interest in the orchids native to North America. Reprinted from *The Blazing Star*, Newsletter of the North American Native Plant Society, Spring 2005

Corallorhiza bentleyi



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