



On The Fringe

Journal of the Native Plant Society of Northeastern Ohio

Letter from the President

Changes in the Society

The first half of our 31st year has seen some big changes for the Native Plant Society of Northeastern Ohio. We have an expanded web presence with the addition of our Facebook page. Many thanks to our webmaster, Meiring Borchers, for setting that up. We can be found on Facebook at:

www.facebook.com/pages/Native-Plant-Society-of-Northeastern-Ohio/25943215079881.

We completed another wonderful series of Spring wildflower walks that were very well attended. Thank you to all members who were able to attend those walks and special thanks to Tracey Kneirim for organizing the series. Sadly, Tracey has decided to step down from the board due to personal reasons. We all wish her well and will miss her energy. Also moving on is Bill Oberdick, who has served as NPS treasurer for the past few years. Bill and his lovely wife Barb have moved to the Columbus area to be closer to family. Bill brought a new level of professionalism and civility to our board, and we will miss his reasoned and cheerful presence at the board meetings. Bill has very graciously offered to stay on the board in an advisory capacity and help our interim treasurer Lisa Schlag ease into the job.

We are happy to welcome some new board members. Doug Yates, a professional arborist, is returning to the board. Lisa Schlag, a landscape technician and certified wildlife habitat steward, and Andrew Pratt, a professional horticulturalist, are new board members with great plant knowledge. We look forward to working with them.

Opportunities to Join a Society Committee

In addition to our standing positions of Membership chair - Jane McCullam, Program Chair - Judy Barnhart, Journal Co-Editors - Diane Christensen and Bill Oberdick, and Webmaster - Meiring Borchers, we have organized a host of committees to encourage new ideas and increase member participation in Native Plant Society projects. If you see a committee that looks interesting, we encourage all members to participate!

Program Committee – Develop at least 12 programs/walks per year. Work with naturalists, speakers and presenters and appropriate land managers to set up and run programs. Assure that program descriptions are submitted in time for Journal publication and other publicity. Assess the success of each program and report to the board. [Judy Barnhart, Chair]

Grant, Recognition & Awards Committee – Recognize members and others for lifetime achievement, exceptional dedication, life events, etc. Decide what is to be awarded, within budget guidelines, and design and commission the award. Also review grant proposals, prepare overviews of each proposal and make recommendations to the full board on recipients. [Jean Loria, Chair]

Journal & Media Committee – Determine the content of the *On the Fringe* Journal. Call for articles, select appropriate articles, edit and fit content, send Journal to printer, mail or electronically distribute Journal. Coordinate with webmaster to assure Journal archives are available on-line, save hard copy archives for storage and deliver as needed to storage. Create and distribute press releases for programs, events and announcements. [Diane Christensen Chair]

Special Events Committee – Handle all special events, such as the Annual Meeting, Picnics or conferences hosted by the NPS. Establish and submit a budget to the board for approval prior to the event. Work within the approved budget to secure venues, set menus, select and coordinate with speakers and presenters. Secure needed items such as AV equipment, tables, chairs etc. Coordinate

Board

President	Kathy Hanratty
Vice President	Judy Barnhart
Treasurer	Lisa K. Schlag
Secretary	Jean Loria
At Large	Diane Christensen
At-Large	Jane McCullam
Webmaster	J Meiring Borchers
Outreach Chair	Doug Yates
Founding President	Ann Malmquest

Standing Committee Chairs

Program	Judy Barnhart
Journal & Media	Diane Christensen
Journal Co-editor	Bill Oberdick
Special Events	Kathy Hanratty
Grant & Awards	Jean Loria
Marketing	Doug Yates
Mktg Co-chair	Andy Pratt
Photo Gallery	Lisa K. Schlag
Membership	Jane McCullam

The Journal of the Native Plant Society of Northeastern Ohio is published 4 times a year at Novelty, Ohio. ISSN 8756-6087. Questions or comments are welcome and may be addressed to Diane B. Christensen, 8400 Top Rail Lane, Novelty, OH 44072; 440-666-4870, dbpolice@roadrunner.com; or Bill Oberdick, 986 Bushwood Ln., Columbus, Ohio 43235-5016; 216-392-7027, bandbober@wowway.com.

The Mission of the Native Plant Society of Northeastern Ohio is to promote the study, appreciation and conservation of the native plants and plant communities of Ohio.

with caterers or volunteers as needed for all tasks, from set up to clean up. Follow up with a report to the board with a profit & loss statement and a report on the success of the event. [Kathy Hanratty, Chair]

Native Plant Urban Links Committee – Initiate conversation and coordination between the NPS and new and existing urban garden programs. Develop ways to link urban populations, especially youth, to nature and native plants and encourage participation in NPS programs and events. [Jean Loria, Chair]

Growth & Marketing Committee – Get the word out about the NPS and the programs and events through both traditional and non-traditional methods. Pass out literature at booths or events, use social media and develop new ways to increase participation at programs and events. Coordinate with the Membership chair and other committees as needed. [Doug Yates and Andy Pratt, Co-chairs.]

Photo Gallery Committee – Develop descriptive content for the photographs in the photo gallery. Work closely with the webmaster to get content added and to organize the plants into a cohesive and usable source of information about native plants. Develop uniform criteria for sharing photos. Work with photographers to assure the photos are credited properly or removed from the site if the photographer wishes. [Lisa Schlag & Jane McCullam, Co-chairs]

New Grant Program

In an effort to honor our mission ‘to promote the study, appreciation and conservation of the native plants and native plant communities of Ohio’, the board has decided to implement a new grant program. This program will be in addition to our annual endowment grant and will allow us more opportunities to encourage conservation, education and research on native plants through the year. Look for requests for proposals on our website and Facebook page. The funding for the new grants will come from a new policy to maintain a cushion of funds in savings and checking equaling no more than three years’ worth of operating expenses, freeing funds over that amount to be used for grants. We will also begin more active fund raising to help grow both the new grant program and the original annual grant fund, which was started years ago with a generous donation from a founding member. The need to support conservation of native plants and the places that harbor them has never been greater. We hope that our members will support these efforts. Please remember that the Native Plant Society of NE Ohio is a 501c3 charitable organization and gifts or bequests made to our grant fund are tax deductible.

Other ways to help support the mission of the Native Plant Society of Northeastern Ohio - Spread the word! Let people know about us and bring a friend with you to a walk or program.

Enjoy your fall!
Kathy

Program Schedule – Fall 2013

Saturday, Sept. 7, 10 – noon – Bradley Woods Reservation. Wendy Wierich, Director of Outdoor Education, Cleveland Metroparks, will lead us in this last remaining swamp forest in Cuyahoga County. It is one of the best kept secrets of Cleveland Metroparks. This former blueberry farm is home to many tupelos, pin oaks, sassafras, and elms. If you have specific questions, please call Wendy at Garfield Park Nature Center, 216-341-9228. For reservations, call Diane at 440-666-4870 (Cell). For directions go to www.clevelandmetroparks.com. At the main page, click on Find a Place, Maps and Reservations. Click on Bradley Woods (on the left side of the map) and the directions will be in available in pdf format.

Saturday, Sept. 28, 12pm – Gentian Walk, Audubon's Aurora Sanctuary. Last year we tried this walk on a week night. The setting sun shortened our stay and the Fringed Gentians were already closed or closing for the day. Directions: From Rt 306/43 in Aurora, take Pioneer Trail East. The parking lot will be on the right just past Page Road.

Saturday, Oct. 5, 9am – noon – Fall Fungus Intro and Walk, North Chagrin Nature Center. Tom Sampliner offers a 45 minute indoor introduction to common fall fungus species followed by a fungus foray in search of fruiting specimens. 3037 SOM Center Road, Willoughby, OH. Joint program with Cleveland Metro parks. Registration required, call 440-473-3370.

Saturday, Oct. 12, 10am – Gott Fen Stewardship Day, Portage County. The Native Plant Society has adopted this preserve to provide needed stewardship to protect the preserve from invasive species. On this work session we will cut European buckthorn under the direction of Rick Gardner, ODNR Botanist, and preserve manager Adam Wohlever. Wear appropriate footwear for wet conditions, knee-high boots recommended. Call Judy to register at 440-564-9151 (H) or 440-279-0890(W). This is a physically demanding program. Registration is limited to 8 participants. Car pool information provided upon registration.

Sunday, Oct. 13, 2pm – Gray Birch Bog, Brimfield. Chris Craycroft from the Portage Park District will lead this walk. The preserve is open only to guided tours. We will explore the unique fall flora that only bogs have to offer. For directions and reservations email Tracey at Shootingstarohio@gmail.com or call 330-388-9279 after 5pm by Friday 10/11.

Saturday, Dec. 14, 2 – 3pm – Fun Facts & Folklore about Ferns, Fronds and Fiddleheads. The West Woods, Nature Center. Discover the diversity of ferns found in Geauga County with this slide presentation including interesting facts and folklore associated with ferns. Fern samples and fossils available for viewing. Joint program with Geauga Park District. Directions: take St. Rt. 87 east from Rt. 306 in Russell Township approx. 2 miles to the park entrance on south side of the road. 9465 Kinsman road, Novelty, Ohio 44072.

Annual Meeting of the Native Plant Society of Northeastern Ohio

Saturday, November 2, 2013

5:00 p.m. to 8:00 p.m.

Annual Meeting of the Native Plant Society of Northeastern Ohio will be at Pine Lake Trout Club 17021 Chillicothe Rd., Chagrin Falls, OH 44023. Our guest speaker this year will be Nature Photographer and Naturalist from the Cleveland Museum of Natural History, Judy Semroc. Judy's presentation will include many of her breathtaking photos as she discusses the relationship between Native Plants and Pollinators!

Pollination Biology of *Aplectrum hyemale* Putty-root or Adam and Eve orchid

By Charles L. Argue

Aplectrum hyemale (Muhl. Ex Willd.) Nutt. is chiefly an orchid of moist, shady deciduous forests dominated by sugar maple, basswood, beech, and red oak. It often occurs scattered in dense aggregations and shows a preference for rich, fine-textured, loamy and slightly alkaline soils.

Capable of withstanding a wide variety of climatic conditions, it ranges from Minnesota, southern Quebec and Massachusetts to Oklahoma and Georgia; in Minnesota it is restricted to the southeastern quadrant of the state. The present account provides summary information on the genetic compatibility, breeding system, pollination mechanisms, and fruiting success of this orchid.

Leaf measurements suggest that plants must attain some minimum size before flowering and only one or two individuals from aggregates of 100 or more may flower in a given year. In a pioneering two year study in east central Illinois, Kevin Hogan, from the University of Illinois, Urbana, found that *Aplectrum* is fully self-compatible at the level of fruit production and that the flowers can self-pollinate (autogamy) and possibly, produce seed asexually (agamospermy) with no loss in seed production or viability (no inbreeding depression).

Although fruit set occurred in over 80 percent of flowers that were left to be pollinated naturally (open pollinated), pollinators were rarely seen. Only about one out of 50 flowers was visited during a five day flowering period. The frequency of insect visits to *A. hyemale* was only about 1/4000th of



Puttyroot, *Aplectrum hyemale* inflorescence.

Photo by David G. Smith
(www.delawarewildflowers.org/)
used with permission.

what other scientists recorded at the same site for earlier blooming spring ephemerals. The difference cannot be accounted for by the fact that the flowers of *A. hyemale* produce no nectar — the visitation rates among nectarless spring ephemerals were much higher. It may relate, however, to a decrease in pollinator availability between the blooming period for *A. hyemale* and the earlier blooming spring ephemerals.

Freshly placed pollen from another flower was never observed on the stigma. In fact, 26 hours of observation over four days revealed only about 12 individuals of the short-tongued bee, *Lasioglossum oblongum* (Lovell) visiting the flowers. Most merely landed on the inflorescences, remaining for up to one-half minute. Only five entered

flowers. Each entered only one and remained about five seconds. None were observed bearing pollen either before or after the flower visit.

In one case, a bee dislodged the anther-cap, and although no pollen was removed, two pollen masses were observed to be in contact with the stigma following the bee's departure. Thus, insect-facilitated self-pollination could be a factor. Although gene flow through pollen may occur, the available data do not confirm any actual transfer of pollen between plants, and in Hogan's opinion, *A. hyemale* is routinely autogamous and perhaps, agamosperous. The very limited pollinator visitation rates in this species may have favored selection for autogamy. Another worker, Paul Catling, has also reported autogamy in Illinois and Canadian populations of this orchid.

The usual sequence of events leading to pollination was the same in open-pollinated inflorescences and inflorescences enclosed to exclude pollinators. The pollen sacs were covered by the anther-cap in newly opened flowers. On the first or second day the cap dropped off, laying bare the pollen.

On the third or fourth day, the pollen was displaced, and fleshy, white lobes covered the stigma. The generation of these lobes was the result of contact between the stigmatic surface and the displaced pollen. Catling, indeed, described a 270-degree rotation of the pollen sacs onto the stigma following degeneration of the anther cap.

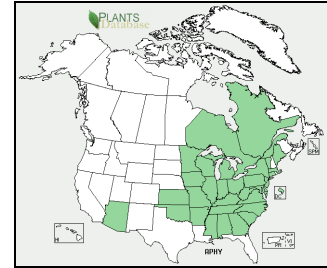
Patches of this orchid are said to be clonal. If so, the genetic variability resulting from autogamy

(or agamospermy) would approximately equal that resulting from pollen transfer within populations, and fruit-set could be increased with no additional reduction in genetic diversity. At the same time, the limited genetic variability reported for *A. hyemale* by several authors is not surprising in a species with a breeding system based on clonal growth and autogamy rather than outcrossing. Limited variability would, in turn, be consistent with the absence of any significant diversification in this monospecific genus.



www.delawarewildflowers.org

Charles L. Argue, Ph.D., research associate, Department of Plant Biology, University of Minnesota, and Minnesota Native Plant Society member. This article is modified from his book, *The Pollination Biology of North American Orchids*, vol. 2. Springer, New York (2012).



USDA website

Reprinted from the *Minnesota Plant Press*, The Minnesota Native Plant Society newsletter. Fall 2012, Vol.31, No. 4.

Invasive Plant:

Glossy Buckthorn and Common Buckthorn *Rhamnus frangula*, *R. cathartica*

DESCRIPTION

Both glossy buckthorn and common buckthorn are non-native woody shrubs or small trees that can reach up to 20 feet in height. Cutting the stems of either species reveals a distinctive yellow sapwood and pink to orange heartwood. Glossy buckthorn has gray-brown bark and lightly colored lenticels which give the bark a speckled appearance. Leaves of glossy buckthorn are entire, 1-3 inches long, shiny on the upper surface, oval shaped and slightly wavy. Flowers are 5-petaled, greenish white and the fruits are red, turning purplish black when ripe. Plants flower from late May until the first frost and fruits ripen from early July to September. Common buckthorn has smooth, deeply veined, oval leaves (1-2½ inches long) with toothed margins. Common buckthorn is a dioecious species with male and female flowers on separate plants. Flowers are 4-petaled and yellow green in color; fruits are black. Flowering takes place from May through June and fruits ripen from August to September. Twigs of common buckthorn are often tipped with short spines.



Glossy Buckthorn

John Watts

PROBLEM

Both glossy and common buckthorn have a wide habitat tolerance, rapid growth rates and extensive root systems. Both species produce abundant flowers and fruits throughout the growing season. Seeds are widely dispersed by birds. Once established, these species aggressively invade natural areas and form dense thickets displacing native species. They leaf out very early in the growing season and keep their leaves late into the fall helping to shade out native trees, shrubs and wildflowers.



ORIGIN

Glossy buckthorn is native to North Africa, Asia and Europe. It was introduced to North America as ornamental shrubs for fence rows and wildlife habitat and is still used in landscaping.

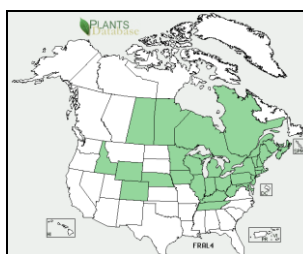
HABITAT

Glossy buckthorn typically invades wetlands including swamps, bogs, fens and wet meadows but also occurs in upland habitats such as woodland edges, old fields and roadsides. Common buckthorn is primarily an invader of upland sites including open woods, woodland edges, prairies

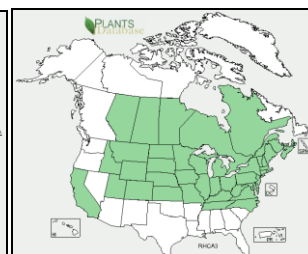
and open fields. Both species are capable of growing in full sun as well as heavily shaded areas. It is not uncommon to see both species sharing the same habitat. Buckthorns are most prevalent in central and northern Ohio.

CONTROL METHODS

Cutting and treating stumps or spraying foliage with systemic herbicide is the best method of control. Buckthorns are very difficult to control due to vigorous resprouting and a large seedbank. Without treatment, stems will resprout vigorously after cutting due to the extensive root system.



Glossy Buckthorn



Common Buckthorn

Taken from the INVASIVE PLANT SPECIES FACT SHEET of the Ohio Department of Natural Resources. <http://ohiodnr.com/dnap/invasive/2buckthorn/tabid/1997/Default>.

Wild Ones

Native Plants, Natural Landscapes

The concept of using native plants and reducing your lawn is gaining awareness, however most homeowners shy away from doing so because this practice does not produce the typical image of a suburban yard. Wild Ones offers tips on how to encourage your neighbors by helping them understand the benefits.

Wild Ones strives to become a widely recognized voice for native plants and the sustainable landscaping movement, promoting increased use of native plantings that create living landscapes through grassroots efforts by example, education, marketing, and personalized support. The Wild One's program *Native Plants, Natural Landscapes* promotes environmentally sound landscaping practices to preserve biodiversity through the preservation, restoration and establishment of native plant communities. Wild Ones is a not-for-profit environmental education and advocacy organization. Wild Ones started in 1977 and has chapters in 14 states, including three in Ohio: Oak Openings Region (Toledo area); Greater Cincinnati; and Columbus.

Publications include: *Wild Ones Landscaping with Native Plants*, *Rain Gardens*, and many publications are available for downloading.

For more information go to <http://www.wildones.org/>

Gott Fen State Nature Preserve Society's Stewardship Days in 2013: June 8 and October 13

By Diane Christensen

Gott Fen Nature Preserve is located in Streetsboro, Ohio. The Native Plant Society's stewardship program on Saturday, June 8th, hosted 30 attendees. Only fifteen participants were allowed into the fen at one time, so two trips were planned for that day. The program was led by Rick Gardner, Botanist with the Ohio Department of Natural Resources, Division of Natural Areas and Preserves.

Often a misunderstood community, fens have carried a variety of common names, including bogs, swamps, sedge meadows, alkaline bogs, prairie fens, bog fens, wet prairies, shrubby cinquefoil bogs, shrub carrs, tamarack fens, and cedar bogs, to mention a few. One reason for the confusion is that most Ohio fens are small and blend into other types of wetland communities.

In a broad sense, fens are characterized by having 1) relatively clear water coming from artesian sources that surface as springs or seeps; 2) a wet, springy calcareous substrate which supports mineral-loving species; 3) vegetation dominated by members of the sedge family; and 4) water pH between 6.3 and 8.2.

A good number of Ohio fens are developed on buried river valleys, which provides a vital function of filtering and providing a clean water source. The water is not evident, but according to Rick Gardner, the water flow is downhill.

Fens, in general, have numerous species but few dominants. They are among the most diverse plant communities in Ohio and frequently have carnivorous plants and bryophytes growing in them. Although we looked for sundews (carnivorous plants), none were found on this trip. We were able to find a grass-of-parnassus, however, on the second trip, we did locate some sundew. Fens have a characteristic set of plant species, which sometimes provide the best indicators of environmental conditions. The U.S. EPA's Ecologically Rich Areas Report has listed Gott Fen as one of the finest boreal fens in the State of Ohio.

The indicator plants that identify Gott Fen as a fen are *Rhamnus*, *Alnifolia*, Alderleaf Buckthorn; *Sambucus canadensis*, common elderberry; *Carex stricta* and *Carex sterilis*, sedges; *Toxicodendron vernix*, poison sumac; and starry solomon seal.

Below is a list of native plants that we found at Gott Fen.

Herbaceous Plants:

Angelica atropurpurea, purple angelica
Carex stricta, tussock sedge—dominant sedge at Gott Fen
Carex interior, inland sedge
Carex sterilis, dioecious sedge
Carex tetanica, stiff sedge
Cirsium muticum, swamp thistle
Cypripedium reginae, showy lady's slipper
Drosera rotundifolia, round-leaved sundew
Eleocharis elliptica Kunth—a spike
Equisetum fluviatile, water horsetail

Galium boreale, northern bedstraw
Larix laricina, tamarack
Parnassia glauca, grass-of-parnassus
Rubus idaeus, red raspberry
Maianthemum stellatum, starry solomon's seal
Sphagnum palustre, prairie sphagnum moss
Thalictrum dasycarpum, purple meadow rue
Thelypteris palustris, marsh fern
Triglochin palustris, marsh arrow-grass – state threatened



Cypripedium reginae, showy lady slipper

Photo by Tom Sampliner

Shrubs:

Gaylussacia baccata, huckleberry

Myrica pensylvanica, bayberry— largest population in Ohio

Potentilla fruticosa, shrubby cinquefoil— a fen indicator

Rhamnus alnifolia, alderleaf buckthorn

Ribes hirtellum, hairystem gooseberry

Salix bebbiana Sarg., Bebb willow— woody

Salix candida, hoary willow— threatened

The Native Plant Society has adopted this preserve to provide needed stewardship to protect the preserve from invasive plant species. The next NPSNEO Stewardship day at Gott Fen Nature Preserve is Saturday, October 12, 2013. The principal challenge is to reduce populations of *Rhamnus frangula*, glossy buckthorn, and *Rhamnus cathartica*, obovate buckthorn. Other invasive species found at Gott Fen are *Cirsium arvense*, Canadian thistle, and *Tussilago farfara*, coltsfoot.



Diane Christensen taking notes at Gott Fen
Photo by Jean Loria

Diane Christensen is on the Board for the Native Plant Society of Northeastern Ohio and is co-editor of *On The Fringe*.

This article was based in part on: *Ohio Wetlands: The Peatlands. Part II – Fens* by Barbara K. Andreas, Ph.D., *On The Fringe*, Vol. 19, No. 3.

The Genus *Liatris* and its Status in Ohio

By K. Roger Troutman

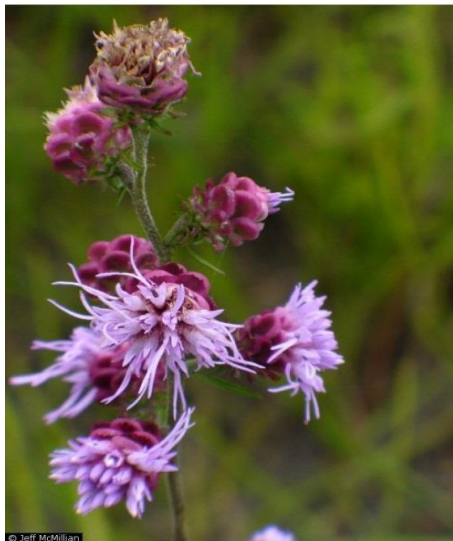
To most Ohioans, the alliterative phrase "Lovely *Liatris*" is a totally foreign term, yet it describes one of our most interesting groups of wildflowers. To the more informed, these plants are the purple spikes often seen in floral arrangements or flower beds. To the naturalist and botanically inclined readers among us, these plants are mid-summer to early autumn wildflowers seldom seen in the wild and then usually under appreciated. To this writer, they are a beautiful, often confounding group of plants that are worthy of initial appreciation, if not decades of serious study. Hopefully this article will move the reader towards the latter category.

Liatris, used as both a generic and common name, are also called gayfeathers, blazing-stars or sometimes, in the case of the larger headed species, button-snakeroots. They are members of the world's largest plant family: the Asteraceae, which numbers between 23,000 and 24,000 species. This number includes familiar plants such as sunflowers, thistles, asters, goldenrods, chicory and dandelions. Depending upon

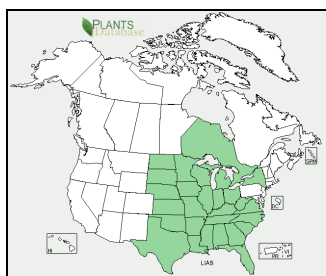
many general but high level characters, the family is broken down into 12 subfamilies which are further divided into about 40 tribes.

Blazing-stars are members of the tribe Eupatorieae (bonesets, joe-pye-weed and false bonesets), which is further subdivided into 14 subtribes. The genus *Liatris* resides in the subtribe *Liatrinae*, along with three other genera that contain nine species, with the latter three genera being native only to the southeastern states. Other fairly close relatives, but members of different tribes that superficially resemble blazing-stars, are the ironweeds, thistles and knapweeds.

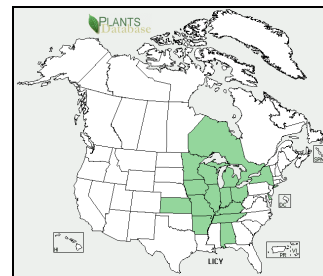
The common thread among all members of the Aster family is the fact that there are three flower types: all ray (or strap-like florets) such as dandelions; all disk (rayless) florets such as thistles; or a combination of both ray and disk florets such as sunflowers. In other words, they are composite flowers, with each "flower" consisting of several to many "florets". These floral types gave us the old family name *Compositae*. Florets are located on a common receptacle, which is



Liatris aspera
tall blazing star



Liatris cylindracea
Ontario blazing star



surrounded by one or more series of green appendages called phyllaries. This whole unit is called a head: more on this later.

Range-wide, the genus *Liatris* contains 35 species, 21 varieties, 12 hybrids (give or take several taxa—depending upon which authority you want to follow), and a dozen plus forms. There are also about 42 cultivars (cultivated varieties), which speaks to the horticultural and floricultural significance of the genus. Native blazing-stars are strictly a North American genus and are concentrated in the United States, with the exceptions being one taxon that reaches into northern Mexico (*Liatris punctata* var. *mexicana*), four species being found in southern Canada (*L. aspera*, *L. ligulistylis*, *L. punctata* and *L. spicata*) and a single species being found occasionally in the Bahamas (*L. Garberi*). Otherwise, gayfeathers naturally occur in every state on and east of the Front Range of the Rocky Mountains, except Vermont. As a genus, gayfeathers probably/possibly radiated out from Florida and secondarily out of Texas. Florida and Texas each have four state endemics. In addition, several species are (ignoring political boundaries) regional endemics.

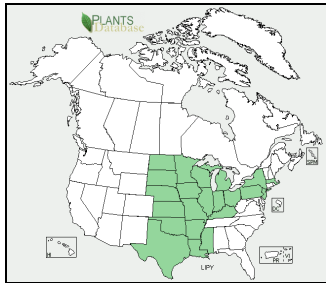
The genus *Liatris* is the one of the few plant taxa in the United States that has a determinate growth form (in other words, the individual plant grows to its full height whereupon the top head blooms first, proceeding down the stem until the bottom bud blooms); discoid (disk-like) composite flower heads; and perfect (both male and female parts in all the florets) flowers that have a single series of plumose or barbellate pappi.

Appearance-wise most flowering plants have single "units" of flowers that consist of male and/or female parts along with the associated non-sexual parts such as petals and sepals. One or more of these flowers makes up the inflorescence. Technically speaking however, composites, as explained earlier, have multiple florets (the vernacular "flower") that make up a head (capitulum). Thus multiple-headed composites have a very specialized inflorescence that is made up of multiple inflorescences.

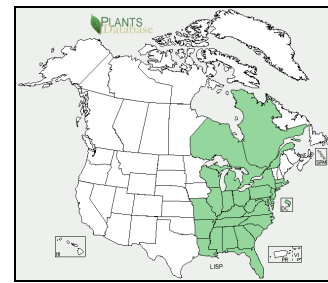
The heads of liatris are attached to the main stem by smaller stem-like peduncles which have a subtending bract. These peduncles may be very short where the head appears to be directly attached to the main stem (spiciform) or up to 6 inches or more long



Liatris pycnostachya Michx.
Prairie blazing star



Liatris spicata (L.) Willd.
dense blazing star



(raciform). The peduncles are usually single headed, although they may occasionally bear multiple heads. The inflorescence consists of sometimes solitary to several to over 100 heads, depending upon the species. As such, an inflorescence may vary, depending upon the number of heads, peduncle length and head count, from an inch in diameter and several inches in length, e.g., cattail-like, to six inches in silhouette diameter and three feet or more in length.

Each head is basically surrounded by a multiple series of loose to tight-fitting, sometimes green but often more colorful phyllaries or involucre bracts. The number of heads on a single peduncle varies from one to several scores while the florets in each head may vary from 3 to over 75, causing the heads to vary in shape from miniature cylinders to rounded golf-balls or miniature toy tops.

Each floret consists of a long tube attached via the embryonic seed to a naked receptacle. The tube is topped by a 5-parted, more-or-less star-shaped, showy, and the primary sex organs. Each successfully

pollinated floret develops a dark, hairy-ribbed "achene" topped by a pappus that assists in seed dispersal.

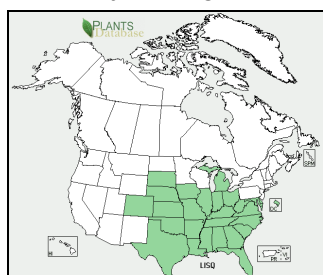
Except when the pollen-bearing anthers are mature, the pollen is pretty much hidden within the corolla tube. Corollas and the various female parts are usually various shades of moderate pink to light purple to dark magenta. Most species have a white form or variety and a few even have a lighter pink version of the usual magenta colors. A single variety of one species (non-Ohio) has yellowish corollas.

Finally, most species, thanks to pollinating insects, will produce fertile seed (hybridize) with almost any other liatris species wherever they are found occurring together. Speaking of insects, liatris flowers, to us humans, are odorless except for a single plant that, according to the collector, had an odor. Don't, however, try to convince any butterflies or other pollinating insects about their apparent lack of smell, as these six-legged critters abound, crawling or flitting around a blooming plant.

Vegetatively, all blazing-stars are perennials that



Liatris squarrosa (L.) Michx.
scaly blazing star



have rounded, turnip-like to irregular-shaped corms or sometimes thickened rootstocks. The corm is long-lived and in northern climates hardy, unlike the aboveground parts, which die back annually. Most of Ohio's plants are single-stemmed although multi-stemmed individuals are known. The stems are usually erect and fairly stiff and, depending upon the species, may be from 6" to 6' long. Leaves on an individual plant have entire margins and are arranged alternately up the stem. Leaves vary in number from a half dozen to scores depending upon the species. The lowest leaves, especially the basal ones, are the longest, up to about 10 inches and between one-eighth to two inches wide. The leaves become rapidly to gradually shorter upwards to the base of the inflorescence, where the leaves may or may not continue as head-subtending leaf-like bracts.

Depending upon the species, these plants will thrive in almost pure sand to rather heavy clay soil with a propensity for sandy soils. Again depending upon the species, liatris may be found in very dry to seasonally

very wet soils. These soils may be very shallow to very deep. For example, one species even grows in shallow, narrow crevices on otherwise bare rocks high in the southern Appalachian Mountains of North Carolina. Another species grows on nearly pure white sand in central Florida while most of our northern species have a propensity for deep prairie-like sandy-loams, where some roots may extend downward for several feet.

Almost all species "favor" full sun. They will survive in moderate shade, but are seldom found in heavy shade.

Blazing-stars may have been used by Native Americans medicinally. The group probably has some chemically interesting properties but I have not researched this aspect.

Their greatest commercial value is in the cutflower market, with millions of stems being sold annually from wholesale growers in such diverse places as Chile, Israel and South Africa. There is also a considerable horticultural market for young potted plants or bare corms.

The genus is one of the best attractors of butterflies and other insects. Liatris are a "must have" for any butterfly garden that features late-summer or autumn plants. Some species are usually included in many meadow or prairie restorations.

Ohio's Five Verifiably Native Species and Named Varieties

The usual paradigm of learning plant names is to look up a new find in a wildflower field guide. In nearly all cases, the first name used is the common or vernacular name. However, if one is to "grow past" the simple field guides, which usually only list the most abundant or showy species, a person sooner or later has to get involved with and learn botanical or scientific names.

However, I am a proponent of learning the botanical name first if one is going to seriously study a particular group. Why? Because the first name learned usually "sticks" the longest, that is, it is the most easily remembered and is most likely the last forgotten. The first in, last out concept also bypasses the idiosyncrasies and problems of multiple common names (or no common name) as they are found in different locations, persons or field guides or even as used in the same location, by the same person and/or field guide. Thus, by using botanical names, people "in the know" find it much easier to communicate with each other regardless of their botanical background or interest. In addition, botanical names are much more stable (and thus don't have to be relearned) because

such names cannot be changed without following a valid process of scientific inquiry called taxonomy.

As such, I will proceed to listing the botanical names of Ohio's *Liatris* species. As a memory aid, it also helps to associate the meanings of the various terms with the actual names. First the genus *Liatris* must be memorized because it is a Latin word made up by the author, one Johann Christian Daniel von Schreber, in 1791. The associated meanings of Ohio species names are a little more helpful. As examples, Ohio's species (in alphabetical order) are *aspera*, which means "harsh," alluding to the short, thick, stiff hairs

always found on the plant's stems; *cylindracea*, which alludes to the "cylindrical" shape of the plant's heads; *scariosa*, derived from "scarious," which alludes to dry, thin edges of the bracts of the heads; *spicata*, which references the "spike-like" sessile heads of the inflorescence; and *squarrosa*, which alludes to the "spreading tips" of the phyllaries. In addition our subtaxon of *scariosa* is actually the variety *nieuwlandii*, which was created in honor of Julius Arthur Nieuwland, a Belgian-born priest who was a professor of botany at the University of Notre Dame in South Bend, Indiana.

Key to *Liatris* Found in Ohio

To get to know the Ohio species better, the following is a key to blooming or fruiting plants.

This key does not work for out-of-state taxa, prebloomers or some in-state hybrids.

- A. Heads sessile (no peduncles), small (phyllary cross section less than 3/8" in diameter).....B.
- B. Phyllaries rounded and held tightly against the head (like shingles on a roof). Common in gardens but uncommon in damp natural areas.....*Liatris spicata*
- B.' Phyllaries with sharp points that recurve at the end; sometimes in gardens or escaped—not native to Ohio*Liatris pycnostachya*
- Most garden cultivars (some named) are intermediate between the above two species and cannot be definitely identified to species.
- A.' Heads usually not sessile, medium to large (greater than 3/8" in diameter).....C.
- C. Phyllaries tightly wrapped but with a single tiny tip on an otherwise rounded top.....*Liatris cylindracea*.
- C.' Phyllaries not tightly wrapped, with large loose tip or rounded.....D.
- D. Bracts with long curved tips.....*Liatris squarrosa*.
- D.' Bracts (aka phyllaries) rounded.....E.
- E. Heads sometimes sessile but often pedunculate. Edges of phyllaries with jagged (saw-toothed) edges turned inward.....*Liatris aspera*.
- E.' Heads almost always pedunculate, sometimes several inches long. Edges of phyllaries smooth but never turned inward.....*Liatris scariosa* var. *nieuwlandii*.

The Best Places To Find *Liatris* in Ohio

Blazing-stars in Ohio can be characterized as rare plants found in restricted habitats where, on occasion, they can become quite abundant. Their decline (if indeed they were ever common and widespread) was probably caused by agricultural activities, namely, tilling, tiling, grazing, herbicide use and fire

suppression.

—*L. aspera*, aka Rough blazing-star: Found most abundantly in the Shawnee State Forest (Scioto County) and/or Oak Openings (Lucas Co.) especially the TNC (The Nature Conservancy) Kitty Todd Preserve and the Toledo MetroPark Girdham Road sand dunes (Lucas Co.). This species (our second most

common) blooms in August-September. Usually found on rather dry or at least well-drained sites.

—*L. cylindracea*, aka Cylindric blazing-star: Inhabits relatively dry limestone barrens and glades primarily in Adams County, including Adams Lake SP and the TNC preserves. This species usually blooms in July-August and is a state threatened species. It was historically found at Buffalo Beats in Athens County. For some unknown reason, it is found nowhere in northern Ohio, but is the common blazing-star on the sandy areas on the north shore of Lake Erie in Canada.

—*L. scariosa*, aka Northern blazing-star: It is occasionally found scattered along roadsides in Adams County and at Erie County's NASA Plumbrook Station (permission needed to visit) and Castalia Prairie (Resthaven Wildlife Area) in Erie/Sandusky Counties. A few individuals remain (viable population?) along the railroad south of SR 95 just west of Marion and a roadside site just north of Milan (Erie County) beside US 250. It is our latest bloomer, flowering primarily from late August through late September. Prefers rich loamy, probably alkaline soils. This species may now be our rarest blazing-star.

—*L. spicata*, aka Marsh blazing-star: Found usually scattered but sometimes abundantly in Adams County TNC preserves and nearby roadside prairie openings; Cedar Bog (Champaign County); Killdeer Plains Wildlife Area (Wyandot County); TNC preserves (Lucas County), Castalia Prairie (Erie County), Lakeside Daisy SNP (Ottawa County), and Caledonia Prairie (Marion County). Most prairie restorations include this species as the primary *Liatris*. It is also a common escape but the survivorship of its cultivars is unknown. This species is/should be a garden/landscape replacement for the invasive alien Purple Loosestrife (*Lythrum salicaria*). This species prefers low-lying or damp areas, but will survive on some drier sites especially in flowerbeds. Seasonally, this blazing-star is the first of Ohio's blazing-stars to bloom, starting in early July.

This species is probably the most common species found outside of the sites mentioned in this and other species listings.

—*L. squarrosa*, aka Scaly blazing-star: Scattered throughout unglaciated Adams County, especially in nature preserves and along relatively undisturbed prairie openings. It can be found in small numbers at the Battelle-Darby MetroPark (Franklin County) bluffs and in greater numbers at the Lucas County, Toledo MetroParks Girdham Road sand dunes site. The species

is a July-August bloomer. It is usually found on dry to very dry sites. A state potentially threatened species.

Ohio's Three Non-native or Questionable Species

L. pycnostachya (crowded spike), aka Prairie blazing-star: This *Liatris spicata* near look-alike is native west of ~87th meridian but is often found as a ruderal and/or a garden or nursery escape. This species may migrate along railroads and is sometimes included in prairie restorations planted with out-of-state seed. The most naturalized planting (using Missouri seed?) is located on the Killdeer Plains Wildlife Area restoration northeast of the headquarters building.

The plains-inhabiting *L. punctata* (with translucent dots), aka Dotted blazing-star: In the heyday of the railroads there were occasional records for Ohio, but I am unaware of any recent (non-human transported) records.

The Appalachian *L. squarrolosa* (somewhat spreading), aka Southern or Appalachian blazing-star: This species is/was attributed to southern Ohio but has not been voucher-documented. Most herbarium specimens, so named, are probably misidentified individuals.

Ohio's Known Hybrids

It is probably a good scientific proposition (theory if you will) that *liatris* are geologically a very young plant group. As such, they haven't established close symbiotic relationships whereby certain insects concentrate on a particular plant species. In conjunction with this thought, *liatris* are not completely sterile across species lines. As such, we have "generalist" insects pollinating plants with pollen that still has the potential for producing fertile seeds between two different species. As such, blazing-star parents often produce fertile offspring that are intermediate in morphology wherever and whenever the respective parents bloom at the same time within the flight range of the pollinating insects. As such, I have personally found three hybrids in Ohio, i.e., *Liatris* × *Macdanieliana* (*L. cylindracea* × *L. squarrosa*) and *L. spicata* × *L. cylindracea* (both of which occur naturally in Adams County) and *L. scariosa* var. *nieuwlandii* × *L. pycnostachya* (a generation removed from parents planted in my backyard). The latter hybrid is somewhat "artificial" as the two parent species do not occur in the wild together in Ohio. In addition, I have never seen (or at least recognized) this combination anywhere else, either living in the wild or in a herbarium.

Reprinted from the *Mohican Native Plant Society Newsletter*. Autumn 2012, Vol. 12, No. 4.

Interesting Factoid:**Franklin Tree**
Franklinia alatamaha

Franklinia alatamaha sounds exotic, and it truly deserves its exotic name. Known as the Franklin tree, the lost camellia, or the lost Gordonia, it has perhaps the most romantic, mysterious past of any native American plant species. John Bartram and his son William discovered a modest grove of this unusually beautiful small tree in Georgia in 1765. By 1803, and perhaps a decade earlier, it had disappeared completely from the wild. *Franklinia* only survived because the Bartrams collected plants and seeds as avid horticulturists and propagated them in their Philadelphia garden in the last quarter of the 18th century. All cultivated plants today descend from one or more of their collected specimens.

They named the tree in honor of their friend Benjamin Franklin and the river beside which they had found it.

While it is unlikely that botanists will ever definitively know why the small isolated grove of *Franklinia alatamaha* disappeared in Georgia, there have been several theories put forward:

- The plant declined due to climate change, possibly after “moving” south during a previous ice age, and then suffered from a hotter climate as the ice sheet receded.
- Man destroyed the trees or habitat.
- The grove the Bartrams discovered was no longer genetically diverse enough to withstand pathogens or changing conditions.
- There was a local disaster such as a tidal flood or fire, but this seems very unlikely given the documentation of the site from 1765 to 1803.

None of these theories, however, explains why in their extensive travels neither the Bartrams nor their fellow botanists ever saw another *Franklinia* tree elsewhere, possibly suggesting the idea that the plant was introduced.

Michael Dirr—author of multiple horticulture books and the acknowledged expert on woody trees and shrubs—believes, however, that *Franklinia* is indeed a native American plant and was not introduced. He supports Frank Galle’s theory that the rise of cotton farming in the South ultimately caused the ruination of the species. Several botanists have identified an unknown cotton pathogen found in soil, perhaps a fungus, that is fatal to *Franklinia* and would have spread widely as it was carried downstream through erosion.



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This article was based in part on:
www.wikipedia.org/wiki/Franklinia,
www.terrain.org/articles/18/rowland and
www.georgiaencyclopedia.org.

Photo taken from www.USDA.gov

Book Review:

**The Brother Gardeners:
Botany, Empire and the Birth of an Obsession
By Andrea Wulf**

Reviewed by Glenn Dreyer

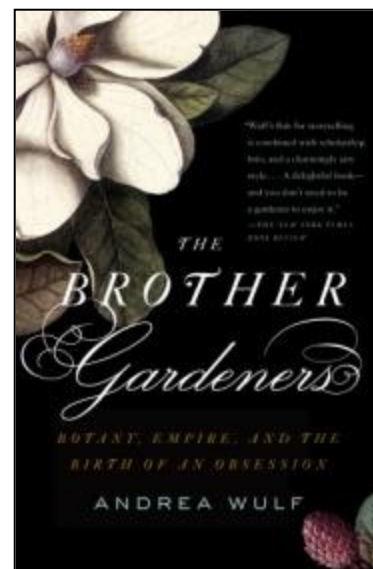
Vintage Books, Random House 2008

Hardcover, \$24.80

Paperback, \$16.16

368 pages

ISBN: 978-0-307-45475-1



Having strong interests in botany and history, I am very glad I found this book. Although definitely Anglo-centric, and written by a German, *The Brother Gardeners'* entire first half is about the early botanical explorations of the American colonies, which was driven by wealthy, new-plant-obsessed English gardeners.

Central to the intriguing tale that Andrea Wulf weaves is the business relationship between two Quakers, John Bartram, a poor farmer from Philadelphia, and Peter Collinson, a well-to-do London cloth merchant. Collinson was importing fabrics from around the world, and his connections allowed him to also import exotic plants for his garden. By 1734, very frustrated with the low success rate of getting seeds and plants delivered alive, he received a shipment from Bartram and realized he found someone he could work with. Soon "Bartram Boxes" packed with seeds and living plants were being received regularly by Collinson, who collected money for Bartram from subscribers, and distributed the plants to the English gardeners.

Around this time in England, gardening fever was spreading from wealthy aristocrats, who had used their landscapes as symbols of wealth and power for centuries, to a newly emerging middle class: amateur home gardeners, who were also quickly becoming plant crazy. This was also the time that the first practical, fairly scientific gardening books were being produced in English, and the time that a system of plant nomenclature would finally coalesce around the ideas of Carl Linnaeus. Linnaeus visited England in 1736 and absorbed all the information he could from what was the hub of plant imports from across the many continents being explored by Europeans for the first time.

For decades John Bartram explored and collected new plants from the flora of Eastern North American, faithfully packing and sending his treasures to London. Thanks to her extensive reading of correspondence, Wulf is able not only to detail the plant hunting adventures and the gardens created with the exotic American flora, but also does a great job of fleshing out the personalities of the actors in this botanical drama. Bartram seems the long suffering colonial who was able to become a reasonably wealthy farmer and amateur scientist, Collinson, though without formal education, became a member of the Royal Society and rubbed shoulders with the highest levels of British society. Linnaeus, rightly dubbed the "Father of Botany," comes off mostly as an insecure, egotistical twit.

The second half of *The Brother Gardeners* picks up in the late 1760s, around the time of Collinson's death, and revolves around the adventures and accomplishments of Joseph Banks, a wealthy gentleman and obsessive botanist. For his first big project, he bankrolled (at £10,000) and participated in the scientific contingent aboard Captain James Cook's ship the Endeavour, a voyage that, among many other adventures, "discovered" Australia; with notable stops in Rio, Tierra del Fuego and Tahiti. Banks's "pet botanist" on the trip was Daniel Solander, a pupil of, and heir apparent to, Linnaeus, who decided he liked working in England better than being under the great Swedish botanist's thumb. On their three-year voyage, Banks and Solander discovered many of the plants that grace British and southern-US gardens.

Banks's botanical enterprises continued and included the infamous "mutiny on the Bounty." That voyage was

designed to transfer a crop from the East Indies to the West Indies to feed the slave population there. Few people know that the Bounty was loaded with over 1,000 breadfruit tree saplings when the crew mutinied and set Captain Bligh and 17 other men adrift in a 23 foot launch in the middle of the Pacific. Bligh eventually made it back to England, and Banks immediately launched another breadfruit voyage. These early efforts to move crops around the world eventually resulted in a network of British tropical botanical stations or gardens that would fire England's economy and fuel the rise of the British Empire to the greatest and most widespread political entity on earth.

The book is supplemented with occasional black and line-drawn illustrations and two sets of color plates portraying the people and plants so vividly described in words. It ends with a "glossary" which is actually a table of plants imported to Britain with botanical and common names and notes where they are from and when and by whom they were introduced. Extensive endnotes for each chapter refer back to a bibliography, and a detailed index helps one find plants, people and incidents quite easily.

My previous understanding of John Bartram's role in the development of American botany and gardening was mostly as the father and predecessor of William Bartram, who followed in John's footsteps, and wrote about it in his famous *Bartram's Travels*. *The Brother Gardeners* filled out the rest of the Bartram family tree and reminded me of the exciting and important role plants have played in our history.

Reprinted from the *Newsletter of the Connecticut Botanical Society*, Fall 2011, Vol. 38, No. 2.

The Brother Gardeners was the winner of the American Horticultural Society 2010 Book Award and the winner of the Council on Botanical and Horticultural Libraries 2010 Annual Literature award—*The Editors*

Folklore:

Fungi: a Source of Natural Bioluminescence

By Tom Sampliner

Imagine needing the emergency services of the local shaman; however, the route to his dwelling is through a dense, dark forest and your journey will have to be at night. While not at your best you must travel and do it on uneven ground. Not to worry; the native peoples down through the ages have at least partially solved this problem with bioluminescence.

Bioluminescence is a naturally occurring phenomenon that arises from a number of different life forms, including plants, animals, and the fungi. The chemical processes that work to produce "cold light" are not the same among the different sources. Among the fungi, production seems to be limited to the active growing stage and limited to the mycelium or rhizomes.

Portions of decaying or even dead wood infected with fungi that manifest the glow in the dark phenomenon have been affixed to the trunks and limbs of trees to light the way through the dark forest. Thomas Edison may have invented the electric street lamp, but his native people predecessors both in the new and the old worlds had been using the fungi for similar purpose a very long time ago.



Armillaria mellea

Photo taken from www.treknature.com

*Armillaria tabescens*

Photo taken from commons.wikimedia.org

In Scandinavia, for example, for a very long time local people have affixed limbs infected with fungi they knew to glow in the dark. So too did they adorn the dwelling of the local shaman and chief with tell-tale fungi to announce the occupant to all. In the New World, long houses, wigwams, and other native dwellings were similarly affixed with what may be viewed as nature's first, but all natural, neon signs. There is no documentation of whether any shaman advertised discounts with the natural night lights.

Aristotle recorded the effect of cold fire light out in nature. Pliny in Roman times noted the luminous glow from wood in some olive groves. Anecdotal sources attribute the biblical reference to the "burning bush" encountered by Moses as a possible example of fungi glowing in the dark, though there are also other

scientific explanations for this phenomenon. In fiction, perhaps reflecting well-known local usage, Mark Twain had Huckleberry Finn and Tom Sawyer exploring a dark cave aided by some bioluminescent fungi to light their way. Back to the real world, it is recorded that during World War I, U.S. and allied soldiers used pieces of infected wood affixed to their battle helmets to act as their night light.

In our area, one of the more prominent producers of the glow is the honey mushroom group. In particular, the genus *Armillaria*, in both the ringed (*Armillaria mellea*) and ringless (*Armillaria tabescens*) form, emits a glow from its rhizomes or mycelium. This group is also known as a great infector and destroyer of trees. If you have ever seen a fallen log heavily endowed with black, stringy runners both on the outside and permeating the inner wood, these runners are a manifestation of the rhizomes of the honey mushroom. It is these black, lace-like runners that glow in the dark. The honey mushrooms are a widely collected edible species.

North America is just one region from around the globe where the bitter oyster mushroom (*Panellus stipticus*) finds home. Starting as a white knob it grows to a fan or kidney-shaped cap up to 1.2 inches (3cm) wide. Caps are orange-yellow to brownish, attaching to decaying wood on short stubby stalks somewhat off center to the cap. It is interesting that scientists confirm bioluminescence from the eastern North American specimens but not from the western. In this instance, the glow is localized to the edges of the gills and the junction of the gills with stem and cap. This species is being studied due to an ability to detoxify various environmental pollutants. Now there is something we need a lot more of.

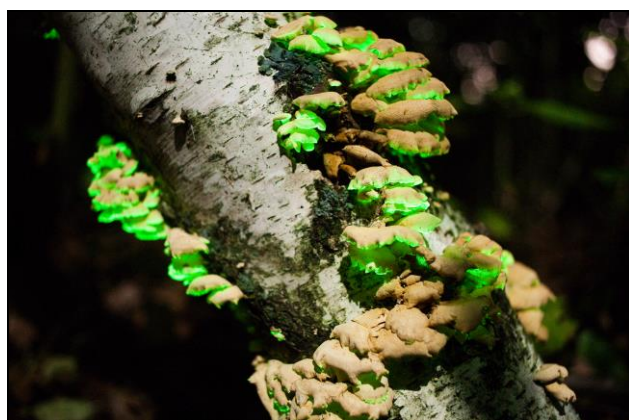


Photo taken from commons.wikimedia.org



Photo taken from www.messiah.edu

Panellus stipticus

Tom Sampliner is a professional naturalist and a former Board member of The Native Plant Society of Northeastern Ohio.

Marge Godale, a member of the NPSNEO, suggested that we print this poem about the Gentian native plant that she recently came across and that she particularly liked. We appreciated her suggestion and liked the poem. We hope our other readers do as well.

~ The Editors

The Last Flower of the Year

By Lucy Larcom

The gentian was the year's last child,
Born when the winds were hoarse and wild
With wailing over buried flowers,
The playmates of their sunnier hours.

The gentian hid a thoughtful eye
Beneath deep fringes, blue and shy;
Only by warmest moon-becomes won,
To meet the welcome of the sun.

The gentian, her long lashes through,
Looked up into the sky so blue,
And felt at home; the color, there,
The good God gave herself to wear.

The gentian searched the fields around;
No flower companion there she found.
Upward, from the woodland ways,
Floated the aster's silvery rays.

The gentian shut her eyelids tight
On falling leaf and frosty night;
And close her azure mantle drew,
While dreary winds around her blew.

The gentian said, "The world is cold;
Yet one clear glimpse of heaven I hold.
The sun's last thought is mine to keep!
Enough—now let me go to sleep."



Gentiana andrewsii
Closed Bottle Gentian

From The Crown Book *The Beautiful, the Wonderful and the Wise* by L.N. Chapin, with an introduction by Thomas Chase, M.A.L.L.D. (Harvard).

Published by John C. Winston and Co. in Philadelphia, PA. 1887. Copyright 1883

Photo by Tracey Knierim, former Board member of The Native Plant Society of Northeastern Ohio.



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Invasive Plant: Glossy Buckthorn and Common Buckthorn
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