



# Erythronium

Newsletter of the Iowa Native Plant Society vol. 25 no. 1 - April 2019

Mile-a-minute weed in Iowa, by Meaghan Anderson, ISU Extension and Outreach

**Background.** Mile-a-minute weed (*Persicaria perfoliata*; formerly *Polygonum perfoliatum*) is an annual in the Polygonaceae (smartweed) family that is native to Asia. This invasive vine is also known as Asiatic tearthumb. It was introduced in North America as early as the late 1800s but the first introductions likely did not persist. In the 1930s, an introduction as an accidental contaminant of nursery stock occurred in a Pennsylvania nursery. Since the 1930s, this weed has spread from this initial infestation to much of the mid-Atlantic United States, eventually reaching the eastern Cornbelt states of Indiana, Ohio, and Kentucky. There has also been a positive identification in Oregon. Mile-a-minute weed was found in Iowa during the summer of 2018.



*Persicaria perfoliata*; photo by Leslie J. Mehrhoff, University of Connecticut; Bugwood.org

In its native range in Asia, the weed is common along water or areas with moist soils and prefers full sun habitats. In the United States, it is found in both lowland and upland environments, typically associated with woodland edges or shrub areas (Stone 2010). It is not uncommon to find this herbaceous vine overtaking other plants in the area, including native trees and shrubs.

Currently the spread of this weed is facilitated by several mechanisms. It still moves via contaminated

nursery stock, as well as contaminated hay, soil, migratory birds (Riefner 1982), and logging equipment (Oliver and Coile 1994). Localized movement is also important via dispersal of its buoyant seeds, which allows spread with water movement (Stone 2010).

**Identification.** This species has several unique characteristics that differentiate it from other vine weeds in Iowa, making identification fairly simple. The leaves are shaped like an equilateral triangle with the petiole extending behind the leaf. Plant petioles, stems, and veins on the undersurface of leaves all have short, curved spines. As is common to members of the Polygonaceae family, an ochrea wraps around the stem at the base of each leaf petiole; mile-a-minute weed has distinct circular ochrea. It has small clusters of inconspicuous white flowers, but the fruit are clusters of small, shiny, blue berries <1/4 inch in diameter. Each fruit contains a singular black seed.

**Current status in Iowa.** The first, and only, detection of this weed in Iowa occurred in August 2019 in Marion County. It was found along the edge of a wooded stream area near an ornamental garden. The infestation was small, covering less than 1/4 acre, but the plant was thriving in the environment. The weed was climbing trees and overtaking ornamentals, including a stand of *Miscanthus* in the area. The landowner, an avid gardener, contacted ISU Extension and Outreach to confirm its identification after fighting a losing battle for several years to contain the invasive plant.

Since the plant is not known to be elsewhere in the region, it is likely the introduction to this site was facilitated by human activities. Our best guess is that seed was brought to Iowa via plants purchased from a nursery in a state where the weed is already present.

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## Leaves of the President's Notebook



**Ahhh Spring!** (written in late March...)

Another season starting! There are still a few vestiges of snow to be found, but one has to search harder to find them. The frogs in my yard are calling. Different birds are seen at the birdfeeder, and I sometimes need to get the bird book to confirm the identification of some. Flowers are blooming, slowly. I saw my first butterfly, a red admiral. A bat was also flying a few nights ago, so the insects must be flying!

We have some crocus blooming along with some other domesticated plants near the house. Maples are also blooming. I would expect the woodland wildflowers to start blooming if they haven't already. Pasque flowers should be up. I haven't seen any dandelions or violets yet, but I am sure it won't be long. It is supposed to be colder this coming weekend – such is the way spring often comes – warmer, then colder – roller-coaster temperatures!

A field trip to see skunk cabbage has already been announced. If you have a chance to go, don't miss it!

~ *Lloyd Crim*



Blood Root  
*Sanguinaria Canadensis*

An exhibit of wildflower paintings by Lydia E. Curtis will open at the Scottish Rite Park gallery in Des Moines in May and also on display at Desoto Bend National Wildlife Refuge in October and November. Both exhibits are free and open to the public. See the article on page 11 for more information and additional examples of her artwork.

© 2019 Lydia E. Curtis Wildflower Collection

## Calendar of Upcoming Events and Activities

Events sponsored or supported by INPS for the whole season are included here. More events will be added to the INPS website calendar as the season progresses, including more information about events already scheduled.

Iowa Wildflower Month is celebrated in May. Additional Iowa Wildflower Month events that are sponsored by others are listed following the INPS events for 2019.

INPS promotes Iowa Wildflower Month since it is an ideal time – less heat, fewer insects and ticks, and the welcoming sight of those early blooms – to try to encourage more folks to get interested in our native plants and natural areas.

Invite a friend to join you on an excursion into the beginning of the 2019 season!

### **Saturday, May 11 1:00 – 2:30pm**

#### **Wildflower Walk at Fowler Forest Preserve in Woodbury County**

Celebrate Iowa Wildflower Month by joining us for a walk through this woodland to view the diversity of spring wildflowers. Wear sturdy walking shoes. The trail is easy and well-maintained, and we will slowly walk up the hill, admiring the blooms along the way. Dawn Snyder, Education Programs Director at Dorothy Pecaut Nature Center, will lead this walk.

**Directions:** Fowler Forest is located 1/2 mile west of Smithland on Hwy 141 (3176 Iowa 141).

To view the large number of photos taken at last year's walk, visit the INPS website and go to the photos tab, the 2018 album, and Fowler Forest folder.

Sponsors: Woodbury County Conservation, Loess Hills Wild Ones, and Iowa Native Plant Society (INPS).  
More info: 712-258-0838

### **Tuesday, May 14 7:00 – 8:30pm**

#### **Ames High Prairie Walk in Story County**

Tom Rosburg will lead the first hike in this monthly series of visits to this prairie. Also known as the Richard W. Pohl Memorial State Preserve, the prairie is managed by The Nature Conservancy.

**Directions:** Park in the northwest lot at the high school (at 1921 Ames High Dr., Ames) and walk to the east entrance of the prairie. It is located behind the high school. Wear sturdy shoes and long pants as poison ivy is present. Walks will also be offered in June, July and September.

Sponsors: Friends of Ames High Prairie and INPS.

### **Thursday, May 16 6:00 – 8:00pm**

#### **Codfish Hollow Hill Prairie Walk in Jackson County**

Leaders: Ray and Patti Hamilton, Jessica Wagner, Tony Vorwald, and usually several other prairie pros. This 60 acre parcel has 20 acres with one dozen prime native prairie-covered limestone outcrops, interconnected with 20 acres of 30-year-old very-local-ecotype reconstructed prairie, and 20 acres of mixed grassland, woodland and savanna edges with hazel thickets. This

has been managed as a local biological preserve for 34 years. We should see blooms of puccoon, shooting stars, downy painted cup, blue eyed grass, birds foot violet, rock sandwort, and many more species emerging. Home of: 5 lined skinks, one of the world's northern most populations of original native purple coneflowers, rare prairie butterflies, seasonal nighthawk nesting, and seasonal woodcock nesting. Occasional visitors include bobcat and pileated woodpeckers.

**Directions:** From Highway 64 at east edge of Maquoketa: turn north onto Highway 62 and go one mile to 35th street (Codfish Hollow Rd). Turn right (east) onto 35th/Codfish Hollow Rd, and go 4 miles to the prairie which will be seen at the corner of Codfish Hollow Rd and 288th Ave.

Sponsors: Jackson County Conservation, Iowa Prairie Network (IPN), and INPS. More info: 563-652-3783

### **Thursday, May 23 7:00 – 8:30pm**

#### **Doolittle Prairie Walk in Story County**

This is the first in the 2019 series of walks at this prairie. The leader this year is Tom Rosburg. Additional dates: June 27, July 25, and August 22. The walk format is casual and informational, focusing on questions from participants and identification of both blooming and vegetative plants. This is a good opportunity to view the prairie as it changes during the summer. Insect repellent, long pants, and sturdy shoes are recommended. The site has pot holes so be prepared for some wet spots. **Directions:** Doolittle Prairie is located north of Ames and south of Story City. From I-35 take Exit 123 (Roland and E18/130th St exit) and go west on E18 for ~ 1/2 mile until 560th Ave (a gravel road); turn south and go 1 1/2 miles. There is a sign at the preserve entrance on the west side of the road - follow the lane back to the parking lot and prairie.

Sponsors: INPS, IPN, and Story County Conservation.

### **May 31, 2019, 5:00pm – June 2, 2019, 12:00pm**

#### **Loess Hills Prairie Seminar in Monona County**

Attend any of the evening programs in Onawa or outdoor sessions at the Loess Hills Wildlife Management Area and Sylvan Runkel State Preserve.

The Iowa Native Plant Society is a major supporter, one of many.

Sponsors: Monona County Conservation Board and Iowa Department of Natural Resources

More info: 712-433-2400

[mccbnat@mononacounty.org](mailto:mccbnat@mononacounty.org)

<https://www.loesshillsprairieseminar.com/>

### **Tuesday, June 11 7:00 – 8:30pm**

#### **Ames High Prairie Walk in Story County**

Carl Kurtz will lead the second hike in this monthly series of visits to this prairie. Also known as the Richard W. Pohl Memorial State Preserve, the prairie is managed by The Nature Conservancy.

**Directions:** Park in the northwest lot at the high school (at 1921 Ames High Dr., Ames) and walk to the east entrance of the prairie. It is located behind the high school. Wear sturdy shoes and long pants as poison ivy is present.

There will be additional walks in July and September.

Sponsors: Friends of Ames High Prairie and INPS

### **Saturday, June 22 10:00am – 2:30pm**

#### **Twin Oaks Field Trip in Warren County**

Leaders will be Tom Rosburg and Ron Eckoff. Twin Oaks is a 116 acre tract of semi-natural land in west central Warren County owned by Ron and Barbara Eckoff. The Eckoffs purchased the first 75 acres in January, 2000. The former pastureland had numerous bur oak trees in some areas. The previous owner grazed a cow-calf herd on the entire area and made hay off some of the less steep areas once a year. It had been many years since any of this land had been row cropped. Some evidence of prairie was soon discovered, and management by clearing cedar, elm and invasive species, such as multiflora rose was begun. A portion has been burned every year since 2005 except 2017. In general a given area is burned every 3<sup>rd</sup> year. In the spring of 2006 an adjacent 41 acres were purchased. Part of this area had been heavily grazed, and a portion was fenced off with a hay field and had not been grazed recently. The soils indicate that the majority of the land was historically savanna or savanna and woodland. Much of the pastureland had been improved with exotic cool season grasses and possibly fertilization. Approximately 25-30 acres have significant prairie and another 10 acres are oak savanna or woodlands. Woody vegetation has been removed from prairie areas. All trees other than bur oak have been removed from the savanna/woodland. In some woodland areas substantial thinning of bur oak trees was done. Management has not included any seeding. Current management has led to a substantial increase in

some prairie species. Current inventory includes about 216 native species and 48 non-native species. Butterfly milkweed, white wild indigo and pale purple coneflower should be doing well on June 22.

**Directions:** From Des Moines, take Interstate 35 south to exit 52 (St. Charles-St. Mary's exit). Turn left (east) and cross over the interstate to the first gravel road (20<sup>th</sup> Avenue), turn right and go about 1 mile. After you cross a creek you will go up a steep hill. At the top of the hill turn into the driveway on the left (16983). Immediately take the left fork of the driveway and follow the lane about ¼ mile. Plenty of parking is available.

Be prepared for pesky critters such as ticks, chiggers, and mosquitos. Bring a sack lunch and water bottle to fill; water and lemonade will be provided. It might be useful to bring a lawn chair for use during lunch. There will be a kybo on site.

### **Sunday, June 23 10:00am – 12:00pm**

#### **Dinesen Prairie Preserve Field Trip in Shelby County**

Denisen Prairie is a State Preserve near Harlan. It is 20 acres of native prairie hosting 114 plant species and providing habitat for prairie birds such as the bobolink and meadowlark. Glenn Pollock will lead this prairie walk. He hopes that the orchids there will be in bloom. Additional info will follow as well as a possible change in time, so be sure to check the INPS website calendar.

**Directions:** On Highway 59 in Harlan Iowa head east on Cyclone Street to 5th street, go north to M36 (5th street turns into M36 by a slight turn to the east). Travel 2.83 miles north, then 1.25 miles east. See sign and go north on one lane road. The address: 1837 1500th Street, Kirkman, IA.

Sponsor: INPS

### **Thursday, June 27 7:00 – 8:30pm**

#### **Doolittle Prairie Walk in Story County**

This is the second in the 2019 series of walks at this prairie. The leader this year is Tom Rosburg. Additional dates: July 25, and August 22. Please see the May 23 detailed description and directions to Doolittle.

Sponsors: INPS, IPN, and Story County Conservation.

### **Saturday, June 29**

#### **Kent Park Field Trip in Johnson County**

Join us to examine native and planted prairies in the park. It will be led by Johnson County Conservation Board restoration manager, Dave Wehde, who is passionate about plants and restoration and is in charge of Kent Park. The time and more details will be posted on the INPS website calendar.

Sponsors: INPS and Friends of Johnson County Conservation Board.

**Tuesday, July 16 7:00 – 8:30pm**

**Ames High Prairie Walk in Story County**

Deb Lewis will lead the third hike in this monthly series of visits to this prairie. Also known as the Richard W. Pohl Memorial State Preserve, the prairie is managed by The Nature Conservancy.

**Directions:** Park in the northwest lot at the high school (at 1921 Ames High Dr., Ames) and walk to the east entrance of the prairie. It is located behind the high school. Wear sturdy shoes and long pants as poison ivy is present. There will be no walk in August, and the leader for September 10 has not yet been named.

Sponsors: Friends of Ames High Prairie and INPS

**Thursday, July 25 7:00 – 8:30pm**

**Doolittle Prairie Walk in Story County**

This is the third in the 2019 series of walks at this prairie. The leader this year is Tom Rosburg. Additional date: August 22. Please see the May 23 detailed description and directions to Doolittle.

Sponsors: INPS, IPN, and Story County Conservation.

**Saturday, July 27 12:00 – 2:00pm**

**INPS Hoffman Prairie Field Trip in Cerro Gordo County**

This is a joint field trip with members of the Minnesota Native Plant Society. Hoffman Prairie State Preserve is owned by The Nature Conservancy in Iowa. It occurs just north of U.S. Highway 18 between Clear Lake and Ventura. The preserve is on the Des Moines Lobe of the Wisconsin Glacial Episode and was historically cut for hay.

Hoffman Prairie is a tallgrass prairie pothole complex with mesic to wet prairie and pothole marshes of various sizes. Mark J. Leoschke, botanist for the Wildlife Bureau of the Iowa Department of Natural Resources in Des Moines, will lead us on an exploration of the mid-summer flora. More information about Hoffman Prairie State Preserve can be found in the book *The Guide to Iowa's State Preserves* or online within the Iowa Department of Natural Resources web page under the subheadings Conservation/Iowa's State Preserves.

**Directions:** From the intersection of U.S. Interstate Highway 35 and State Highway 18 in Clear Lake in Cerro Gordo County (Interstate Interchange #194) drive west on U.S. Highway 18 (you will pass by a number of businesses including fast food restaurants, regular restaurants, convenience store/gas stations, a Fareway grocery store, etc.). Travel approximately 5 miles to

Cardinal Avenue (a gravel road just west of the preserve. There is a sign for the prairie on the north side of the road) and turn north (right). Park your vehicle on the east (right) side of Cardinal Avenue. Bring boots if you want to visit the wetter portions of the preserve.

Sponsors: INPS and Minnesota NPS

**August 8, 2019, 8:00am – August 10, 2019, 5:00pm  
2019 Iowa Prairie Conference at Central College in Pella and INPS ANNUAL MEETING**

Theme: Ensuring the Future of Prairie. The Iowa Prairie Conference is open to anyone interested in prairies.

Natural resource managers, educators, students, and prairie enthusiasts will gather for education, discussion, field trips, and networking opportunities.

The conference will open on Thursday, August 8, with a morning of restoration work at a local prairie remnant, and official conference activities will begin at Central College after lunch that afternoon. **INPS will hold our annual meeting over lunch that day, on August 8.**

Featured speakers include Jesse Nippert, Professor of Biology at Kansas State University discussing the impact of climate change on Tallgrass Prairie; Justin Glisan, the State Climatologist of Iowa presenting historical and recent climate trends in Iowa; and James Bever, Professor of Ecology and Evolutionary Biology at Kansas University highlighting the importance of soil bacteria and fungi on prairie biology and reconstruction.

Additionally, conference attendees will attend a “posters in the prairie” session highlighting research done at Central College’s Prairies For Agriculture Project, and an open presentation session will be held; additional information about abstract submission will be available on our website soon.

Last, and often the highlight of the conference, several field trips will take attendees to local remnant prairies and research sites. Field trips will be held in the morning to (hopefully) beat the August heat.

Questions can be addressed to Russ Benedict, Professor of Biology at Central College ([benedictr@central.edu](mailto:benedictr@central.edu); 641-628-5173).

More information and registration are available at: [https://centralcollege.formstack.com/forms/2019\\_iowa\\_prairie\\_conference](https://centralcollege.formstack.com/forms/2019_iowa_prairie_conference). Also, be sure to like the Facebook page, 2019 Iowa Prairie Conference!

INPS is a sponsor of the IPC, as are many other organizations.

**You may bring your own lunch for our Annual Meeting on August 8, or food will be available for purchase. We will meet in a side room of the College’s Central Market for our meeting. We hope to see you at the INPS Annual Meeting!**

**Thursday, August 22 7:00 – 8:30pm**  
**Doolittle Prairie Walk in Story County**

This is the last in the 2019 series of walks at this prairie. The leader this year is Tom Rosburg. Please see the May 23 detailed description and directions to Doolittle.

Sponsors: INPS, IPN, and Story County Conservation.

**Saturday, August 24 1:00 – 3:00pm**  
**Sunnycrest Prairie Field Trip in Dubuque County**

Details to be announced. Being organized by Brian Preston (Dubuque CCB) and Frank Olsen.

Sponsors: Dubuque County Conservation Board and INPS.

**Tuesday, September 10 7:00 – 8:30pm**  
**Ames High Prairie Walk in Story County**

This is the last hike of the season in this monthly series of visits to this prairie. Also known as the Richard W. Pohl Memorial State Preserve, the prairie is managed by The Nature Conservancy.

Park in the northwest lot at the high school (at 1921 Ames High Dr., Ames) and walk to the east entrance of the prairie. It is located behind the high school.

Wear sturdy shoes and long pants as poison ivy is present.

Sponsors: Friends of Ames High Prairie and the Iowa Native Plant Society

*Continue to check the INPS website calendar for updates about any of the events mentioned in this newsletter. There will also be additions to the calendar that you might not want to miss!*



**Iowa Wildflower Month programs or activities sponsored by others.** We always feature additional events that promote an interest in wildflowers in May.

**Saturday, May 4 8:30am – 4:30pm**  
**Into the Wild, Out with the Mustard 2019 in Allamakee County**

Held annually at Heritage Valley, a 1,200 acre nature area, near Decorah, IA

Volunteers will work together in small groups to hand-pull garlic mustard, one of the most invasive non-native plants in Iowa. Two volunteer shifts are available. Sign up for one or spend the day with us! Rain date May 11th, 2019. No experience necessary. Families welcome. Coffee, a sack lunch and equipment will be provided. See details at: <http://www.inhf.org/events/> Please RSVP to Melanie Lewis, INHF Volunteer Coordinator, at [mlouis@inhf.org](mailto:mlouis@inhf.org) or 515-288-1846, ext.

35. Sponsor: Iowa Natural Heritage Foundation

**Saturday, May 4 1:00 – 2:00pm**  
**Wildflower Hike in Polk County**

Hike through the woods to view and identify the dazzling display of spring wildflowers.

Jester Park Nature Center 12130 NW 128th St. Granger, IA Questions please call, 515-323-5339. FREE. No registration required. Sponsor: Polk County Conservation

**Sunday, May 5 10:00am – 1:00pm**  
**Garlic Mustard Pull at Rochester Cemetery**

Volunteers needed. Bring some friends!

**The need for help is more critical than ever.** Plan to work until noon or later.

For more information, contact Pete Kollasch.

[pkollasch@gmail.com](mailto:pkollasch@gmail.com)

**Additional dates: Saturday, May 11 and Sunday, May 12, also at 10:00am – 1:00pm**

Please come out and help us preserve this ecological gem. Take I80 East of IC to exit 268 (Tipton exit), go north 1 mile, take left onto Cemetery Rd. ½ mile.

**May 5 – 11, 2019 -- National Wildflower Week**

Always the first full week of May, National Wildflower Week commemorates the colorful blossoms that bring our landscapes to life. Whether they are on mountainsides, pastures or our own back yards, wildflowers create habitat, help conserve water and reduce erosion.

For more information visit [www.wildflower.org](http://www.wildflower.org).

**Saturday, May 11 10:00 – 11:30am**

**Spring Wildflower Hike in Ringgold County**

Come to the Dragoon Trace Nature Center and join Ringgold County Conservation Director Kate Zimmerman for a fun, interactive hike at the Dragoon Trace Nature Center. On the hike, participants will be immersed into our natural surroundings while playing nature bingo and learning how to identify spring woodland wildflowers. Prizes for bingo winners will be provided after the hike! Hike is on uneven terrain and is not appropriate for strollers or wheelchairs. This is a fun family event appropriate for all ages and FREE to the public. Registration is required. Please register by calling the Ringgold County Conservation Office at 641-464-2787 or email

[Ringgoldccb@ringgoldcounty.us](mailto:Ringgoldccb@ringgoldcounty.us)

**Tuesday, May 14 6:00 – 7:30pm**  
**Prairie Rescue at Cumming Prairie in Warren County**

People will meet at Great Western Trailhead Cumming,

IA <https://goo.gl/maps/w9xG7Wy9Edk> There is a need for lots of volunteers. Help remove unwanted species from a remnant prairie along the trail to help native species to flourish! We'll celebrate afterward with a drink at the Cumming Tap. The Tacopocalypse food truck will also be available.

No need to RSVP - just show up! See details and directions at: <http://www.inhf.org/events/>

Contact: Volunteer Coordinator Melanie Louis at [mlouis@inhf.org](mailto:mlouis@inhf.org) or 515-288-1846, ext. 35

Sponsors: Warren County Conservation and INHF

### **Friday, May 17 6:00 – 7:00pm**

#### **Plant, Grow, Fly Program in Warren County**

Join Blank Park Zoo & WCCB at the Annett Nature Center, 15565 118<sup>th</sup> Ave., Indianola, to learn about native prairie plants, pollinators and how you can create your own butterfly habitat. Plant, Grow, Fly is a conservation initiative to help protect our native pollinators. You will also learn how to register your garden. Every plant helps, so the first 20 participants registered will receive a free native prairie plant. This event is a kickoff to our Friends of Warren County Conservation Native Plant Sale. After the program plants will be available for purchase. All proceeds support environmental education programs and exhibits with WCCB. Please reserve your seat; registration will be open until May 16. Register at [www.warrencb.org](http://www.warrencb.org) or by calling 515-961-6169. There is no charge for this event.

### **Saturday, May 18 8:00am – 2:00pm**

#### **Native Plant Sale in Warren County**

Hosted by Warren County Conservation and Annett Nature Center, Friends of Warren County Conservation will be hosting their annual native plant sale at the Annett Nature Center, 15565 118<sup>th</sup> Ave., Indianola. There will be lots of native prairie and woodland plants available to choose from. Quantities are limited. All proceeds from the plant sale will benefit Warren County Conservation Board educational programming. [www.warrencb.org](http://www.warrencb.org)

### **Sunday, May 19 1:00 – 3:00pm**

#### **Bur Oak Land Trust Family Day at Turkey Creek Nature Preserve**

Turkey Creek Preserve is located at 2545 Sugar Bottom Rd NE, Solon

Admission is free. Free refreshments and t-shirts for kids while supplies last. This preserve is 107.24 acres of woods and former pasture land, including 5 acres of reconstructed prairie and also has geocache locations! Enjoy outdoor activities for kids of all ages with environmental educators on hand. Snacks and

beverages will be provided. Dress for a walk in the woods.

Sponsor: Bur Oak Land Trust, [www.buroaklandtrust.org](http://www.buroaklandtrust.org), with much local support. For more info, call Executive Director Tammy Wright at 319-338-7030. Our mission: To protect and conserve natural areas to enrich and engage current and future generations.

### **Monday, May 20 5:00 – 6:00pm**

#### **OWLS - Wildflower Walk in Buchanan County**

Enjoy the beauty of spring wildflowers at the Putty Root Preserve, 2408-2 262<sup>nd</sup> St, Independence, during this featured program for "Older, Wiser, Livelier Souls" (OWLS), while exploring Putty Root Preserve near Quasqueton. See and learn about many wildflowers in bloom. There are no defined trails and, although relatively flat, there will be uneven ground. Wear shoes or boots that are able to get a bit wet and muddy. OWLS is a program specifically designed for adults to learn and explore nature. Please register online at [www.mycountyparks.com](http://www.mycountyparks.com) or email or call Michael Maas. Michael Maas [mmaas@co.buchanan.ia.us](mailto:mmaas@co.buchanan.ia.us) 319-636-2617

### **Tuesday, May 21 7:00 – 8:30pm**

#### **May Hitch Hike in Pottawattamie County**

Meet at the Loess Lodge at the Hitchcock Nature Center, 27792 Ski Hill Loop, Honey Creek. Enjoy a guided hike through an area not normally open to the public and learn more about the plants, animals, and history of the prairie. Enjoy the spring wildflowers of the prairie including blue-eyed grass, puccoons, and locoweed.

The public is invited to attend all the hikes in this series. 2019 dates: May 21, June 18, July 16, August 20, and September 17. Weather permitting, \$3 admission to Hitchcock. Sponsored by the Pottawattamie Conservation Foundation.

### **Saturday, May 25 1:30 – 3:00pm**

#### **Bison on the Prairie at Neal Smith NWR in Jasper County**

Come to the Neal Smith National Wildlife Refuge at 9981 Pacific St. near Prairie City. Enjoy a short presentation on the history and management of the American bison. Take a guided walk along the Overlook Trail to search for the bison and elk herds while enjoying the spring landscape. Email [Doreen\\_vanryswyk@fws.gov](mailto:Doreen_vanryswyk@fws.gov) or call 515-994-3400 to register. Kid friendly.

### **Thursday, May 30 6:00 – 8:00pm**

#### **Spring Wildflower Hike in O'Brien County**

The Prairie Heritage Center is located at 4931 Yellow

Ave. near Peterson. Enjoy the colors of spring. We will be looking for the early blooms in the prairie at the center and then carpool to a nearby wooded location for more colors of spring. Sponsor: O'Brien County Conservation. Call the Prairie Heritage Center – 712-295-7200 for more information.

**Friday, May 31 ·8:00am – 12:00pm  
G.R.A.S.S. (Great Race Against Shrubs and Shade)  
in Monona County**

This is one of the largest land restoration days in the state. We'll remove cedars on the east slope at the Turin Wildlife Management Area (WMA) property near Turin to help keep the property's hillside prairies healthy and thriving. Please note: This event is not for the faint of heart. The terrain is steep and uneven, and the work is intense.

No RSVP necessary. Please bring water bottle, sturdy boots or shoes, helmet, gloves, safety glasses, ear plugs and sunscreen - if you have them (we will have a few extras). No experience necessary. Not recommended for children under 10. You will be asked to sign a liability waiver. Questions? Contact Volunteer Coordinator Melanie Louis at [mlouis@inhf.org](mailto:mlouis@inhf.org) or 515-288-1846, ext. 35.

Meet near 217768 Oak Ave (the nearest neighbor's address) approx 2 miles north of Hwy 175 on Oak Ave. Sponsors: INHF, TNC, and Iowa DNR

**After Iowa Wildflower Month, there are some additional 2019 events and workshops that may be of interest. Please see the INPS website calendar for details about these or follow the links.**

**June 2-5  
North American Prairie Conference – Houston, TX**  
Website: <http://www.northamericanprairie.org/>

**June 18, 9:30am – June 20, 2:00pm  
Cyperaceae & Juncaceae Workshop with Tom Rosburg and Bill Norris in Polk County**  
Chichaqua Bottoms Greenbelt, 8700 NE 126th Ave, Maxwell. Pre-registration is required. Registration is available online at [www.mycountyparks.com](http://www.mycountyparks.com). If you need assistance while online, call 515/323-5300. Questions? – Call Doug or Lael at 515-967-2596 or email [doug.sheeley@polkcountyiowa.gov](mailto:doug.sheeley@polkcountyiowa.gov). This event is sponsored by Polk County Conservation.

**August 13, 9:30am – August 15, 2:30pm  
Grass Identification & Ecology Workshop with Tom Rosburg in Johnson County**  
Conservation Education Center at F.W. Kent Park,

2048 Highway 6 NW, Oxford. Pre-registration is required. Contact Brad Freidhof, Conservation Program Manager, Johnson County Conservation Board at (319) 645-2315 or [bfreidhof@co.johnson.ia.us](mailto:bfreidhof@co.johnson.ia.us) to register or for additional course information.

**August 20, 9:30am – August 22, 2:30pm  
Aster Family I.D. and Ecology Workshop with Tom Rosburg at Whiterock**

Whiterock Conservancy's Bur Oak Visitors' Center (located 1 mile east of Coon Rapids on Highway 141). Contact Karla Van Roekel, Guest Services at 712-790-8221 ext. 1 to RSVP. Direct questions to Penny Perkins ext. 4. [www.whiterockconservancy.org](http://www.whiterockconservancy.org)



**Congratulations to our 2019 INPS grant awardees!**

INPS has awarded four 2019 grants, all of which will assist management of high-quality remnants in Iowa. These grants will purchase much-needed equipment to assist the Bur Oak Land Trust manage its multiple remnant parcels; help fund management of the Ames High (Pohl) Prairie; address invasives on Loess Hills bluffs even as it trains high-schoolers how to do so (our Restore Iowa! grant); and assist with the completion of a bioblitz in the Loess Hills, where information will be gathered to feed into future management efforts. Grant funding came in part from special funds from the Iowa Natural History Association; the Linda Scarth Memorial; and the INPS endowment at the Community Foundation of Johnson County. Our sincere thanks to all of these, and best wishes for success to our grant recipients!

Land Management Equipment for Invasive Species Removal.” \$1250 Restoration/Management proposal. Jason Taylor – Property Steward Specialist, Bur Oak Land Trust, Iowa City IA

BioBlitz at Hitchcock Nature Center.” \$500 Education proposal. Michelle Biodrowski - Naturalist, Hitchcock Nature Center, Pottawattamie County Conservation -- *This grant is funded in full by residual funds from the Iowa Natural History Association, which were awarded to INPS to further the former organization's goals.*

2019 Youth Attacking Invasive Species on Loess Bluffs.” \$1000 Restore Iowa proposal. Chad Graeve – Natural Resource Specialist/Park Ranger, Hitchcock Nature Center, Pottawattamie County Conservation -- *This grant is funded in part by funds from the Linda Scarth INPS Memorial, and is thus our second "Linda Scarth Memorial Grant."*



Management Endowment for Ames High Prairie.” \$1000 Restoration/Management proposal. Paul Readhead for Friends of Ames High Prairie (Pohl Prairie)

## 2018 Grant Reports (see others in the Fall/Winter issue of *Erythronium*)

### “Workshops and Education Events in 2018,”

\$250. Awarded to Veronica Mecko and Rich Erke, Southern Iowa Oak Savanna Alliance, Leon, IA.

The Southern Iowa Oak Savanna Alliance (SIOSA) was awarded a \$250 INPS grant for workshops and educational events in 2018. Using these funds, SIOSA held four events and purchased a new display board to showcase what SIOSA is all about.



The first event held was a burn workshop located at East Lake Park in Clarke County on Sunday, April 22<sup>nd</sup>. SIOSA, the US Fish & Wildlife Service, Clarke County Conservation, and Decatur County Conservation partnered to hold this workshop. Participants learned about what is needed before, during, and after a burn and why burning is important for prairies and pollinators. We discussed how to prepare a burn plan, what equipment should be used, and how to successfully execute a controlled burn. After a short lunch break, participants had the opportunity to start a fire and learn how to use the equipment properly. We had a small number of participants, but overall, they learned a lot and enjoyed this workshop!

Our second event was a Spring Ephemeral Walk at Springer Woods in Decatur County on Saturday, May 5<sup>th</sup>. We hiked through the 40-acre woods looking for spring wildflowers and plants. We saw many plants including Bloodroot, Wild Ginger, Spring Beauty, Dutchman’s Breeches, Trout Lily, Wild Onions, Wild Violet, Virginia Waterleaf, and much more!

The third event was a Prairie Walk at Bobwhite State Park in Wayne County on Saturday, June 23<sup>rd</sup>. During this event, participants could learn all about prairies,

including plant identification, wildlife, and prairie management. We had a great turnout to this event!

Our fourth and final event for the year was a Monarch Blitz at Slip Bluff Park in Decatur County on Saturday, August 4<sup>th</sup>. The Monarch Blitz was an opportunity to monitor Monarch butterflies and milkweed found in the park. Participants learned to identify milkweed species and Monarchs in the field and how to conduct a milkweed density study.

“Brush management at Chipera Prairie, Winneshiek County,” \$760. Awarded to Molly McNicoll, professor at Luther College, and Barb Schroeder of the Winneshiek County Conservation Board, Decorah, IA.

The INPS funded brush management in Chipera Prairie, a high quality remnant prairie preserve in southwest Winneshiek County. The grant funded removal of rough-leaf dogwood (*Cornus drummondii*) and prickly ash (*Zanthoxylum americanum*) where they were forming dense clonal patches, outcompeting prairie species, and resulting in prairie degradation. Interns spent 64 hours lopping woody stems and applying herbicide to stems in areas of prairie most likely to benefit from reduced competition. The removal, in combination with mowing and reintroduction of prescribed fire to portions of the prairie, will reduce the abundance of the shrubs. Native species that will benefit from the management include populations of shooting star (*Dodecatheon meadia*), prairie smoke (*Geum triflorum*), blazing star (*Liatris* sp.), marsh marigold (*Caltha palustris*). An additional goal of the project was to provide experiences for stewardship interns at Luther College and WCCB, by giving them an opportunity to work in a high-quality remnant and learn the benefits of collaborating among organizations. Both Luther College and the WCCB matched the grant funds with professional time, tools, and supplies.



## Climate Change, Plants, and Adaptation, by Thomas Rosburg

On March 25 I participated in a panel discussion hosted by Mighty Earth at the Des Moines Public Library. It was advertised as “Corn, Climate, & Conservation Forum: Iowa’s Environmental Future.” The topic of the discussion centered on the question - what is the future of our agricultural system in the era of rapid climate change? Joining me on the panel were Emma Schmit from Food & Water Watch, and Rose Garr from Mighty Earth. As often happens when discussing climate change, the phrase “we have to

adapt” was articulated during the discussion.

As an ecologist, I always cringe a bit when the implication is made that individuals, whether it be humans, plants or animals, will or have to adapt to the new climate. I know that what the person means is that organisms will need to adjust. The term adapt or adaptation is used colloquially to mean an adjustment or change. However, from a purely ecological viewpoint, it is critical to understand that adaptation means something different. It is the process whereby organisms respond to the environment in evolutionary time (i.e., over generations) via natural selection and differential reproductive fitness. In other words, it is the process that results in a species (or a population) becoming more fit for the environment over generations. Adaptation means there is a change in the phenotypic (and genotypic) composition of a population. Adaptation occurs at the level of populations, not individuals. Individuals, for example you and I, cannot adapt. We participate in the process of adaptation and natural selection by either surviving or dying. By surviving and reproducing, we contribute our genes and phenotype to the next generation, perhaps helping to push our species in a new direction. By dying and not reproducing, we don't contribute to the next generation.



*Smooth cliff brake, Pellaea glabella, at Bixby State Preserve*

The principal way that organisms respond to the environment is through adaptation of populations via evolution. However, it is true that organisms can respond to the environment at the level of individuals in ecological time (i.e., one's lifetime). This can happen in one of two ways. Higher animals are capable of learned behavior, meaning that behavior is adjusted or changed as a result of an individual's experience. It is in contrast to innate behavior, which results from adaptation in evolutionary time. The second way is acclimation (sometimes referred to as phenotypic plasticity in plants). It is manifest as an adjustment in anatomy, physiology or morphology that makes an individual more fit for the environment. Both

acclimation and learned behavior involve an adjustment or change in phenotype only – there is no concomitant change in genotype. An adjustment in phenotype via acclimation, for example an increase in the number of erythrocytes in our circulatory system at high altitudes, can be reversed if the environment that stimulated the acclimation returns to its former state. Acclimation is reversible in the organism's life time; adaptation can be reversed, but it requires generations of time. So it would be appropriate to say that in the presence of climate change, we as individuals need to acclimate and/or exhibit learned behavior. It is not correct to say we as individuals need to adapt – individuals cannot respond in that way.

I was tempted at the Mighty Earth forum to correct the use of the phrase “people have to adapt.” But I decided not to do so, because I know that what was meant was “people have to adjust.” I have gotten used to the usage of adapt as meaning adjust; Merriam-Webster lists adjust, accommodate, conform and reconcile as synonyms for adapt. However, later as I thought about it more, I decided I probably should have spoken out. I missed a golden opportunity to make a critical point.

As organisms deal with climate change that is unprecedented in its rate of change, acclimation and learned behavior will be the first line of response. However, both have limits in how effective they can be. Organisms vary greatly in their ability to respond in ecological time. The ability to acclimate and the ability for learned behavior, which again are mechanisms that provide individuals a way to respond to environmental change, are both the result of adaptation. Thus ultimately, the future of life in an era of climate change, depends on the capability for species to adapt. Species survival is dependent on adaptations providing phenotypes more suitable for the new climate, or adaptation that increases an individual's ability to acclimate.

It occurred to me that when adaptation is used in its correct ecological and evolutionary context, the consequences of climate change are more alarming. First of all, will we and other organisms have sufficient time to adapt to climate change? It is important to understand that the conventional way the word adapt is used reflects acclimation, and not its true ecological meaning. Thus when someone says, “People have to adapt” the colloquial understanding is make an adjustment, and humans have some ability to do that via acclimation and learned behavior. But the use of adapt in that non-specific manner diminishes its real meaning and importance. It takes generations of time to truly adapt, which is what organisms must eventually do

when faced with a changing environment.

Secondly, the consequence of climate change may profoundly affect the natural world in a way that you may not have considered. Adaptation requires generations of time, variation in phenotypes, and natural selection. Which species are best suited for quickly adapting to climate change? Species with short generation times and large populations that exhibit substantial variation and broad biogeographic ranges. In the plant world, these are more likely to be ruderal, early successional species. Many invasive plant species come to mind. Long-lived perennial, conservative, and rare species, as well as species with fragmented populations, are at a disadvantage for dealing with rapid climate change.

I am sure that conservation biologists and natural resource managers have known climate change poses significant challenges for conservation. Lengthening growing seasons, increasing precipitation, more intense precipitation and storms, and greater unpredictability make their work more difficult, just as it does for farmers and agriculture. Ecological theory that predicts invasive and ruderal species will be favored by evolution over many of the species that characterize our best natural areas, adds an additional, serious ecological challenge to the already daunting tasks faced by natural resource managers. In the last decade or so, invasive species have become the top threat to the protection of biodiversity. The likelihood that the problem of invasive species will only get worse with climate change is a very somber prospect. It seems we are only just beginning to understand the size of the hole we have dug called climate change and the impacts it will bring to future generations.

## Wildflowers of the Upper Midwest –The Watercolor Collection of Lydia E. Curtis, *by*

*Andrew C. Hayes*

Nearly 50 years after the creation of the last painting in this collection, the exhibit *Wildflowers of the Upper Midwest* is being presented at multiple venues in Iowa this year. Thirty watercolor paintings, out of the collection of over 150, were on exhibit through April 26<sup>th</sup> at the gallery at the Neal Smith National Wildlife Refuge, near Prairie City. In May, they will move to the Scottish Rite Park gallery in Des Moines. In October and November, the gallery at the Desoto Bend National Wildlife Refuge will host the exhibit. All of these are free and open to the public.

Lydia Curtis was born in 1886 on a farm about six miles west of Charles City, Iowa, the 2<sup>nd</sup> of four daughters of Fred and Sophia Krueger. Her grandfather

was the first to farm this land in the 1850's, breaking the native prairie. The property included the prairie, timber and wetland areas typical of the landscape so valued by the people moving in from the East. Lydia's older sister wrote a family history in 1963, which included the following:

*The near-by timber was an ideal locale for little girls to grow up and learn to know birds, flowers and trees. Our parents knew and loved wildlife. Our father was a born naturalist. No plant, stone, tree or bird escaped his notice. A tramp through the woods was fun and we always learned something new from his knowledge about nature. In the spring, we strolled along the creek into the woods where bloodroots, bluebells, Dutchmen breeches and violets grew in profusion. Sometimes we picked flowers until we could carry no more. Our mother patiently untangled our armfuls and showed how they must be put into water. She told us not to pick so many because some must be left for seed...*

Fred recognized his 2<sup>nd</sup> daughter had a gift for art, so he arranged for her to have private lessons while attending high school. She subsequently went to Highland Park College, in Des Moines, Iowa. Not only did she graduate in 4-years, but she also was a faculty member during that same time, teaching classes on 'pen arts' to her fellow students. One of her students, James Hubert Curtis, later became her husband.

Over the next 30 years, she managed the home and raised five children. Hubert was a civil engineer, holding positions in several Iowa counties and cities. Lydia found some time to continue working on her art, focusing on oil and watercolor paintings. Hubert died in 1944, so Lydia went to work for the Army Corps of Engineers. One of her responsibilities was to hand-draw snow pack maps of the upper Missouri River watershed. These maps helped predict run-off and flood risks for the coming spring.

Finally, in 1958 at age 72, Lydia retired and began a 15-year project to paint in watercolors the wildflowers indigenous to the upper Midwest. Most of her specimens were found in Minnesota, where she first lived in St. Paul and later Morris, with some from areas of Iowa during visits with several of her children. She always had her own wildflower garden in the yard. Sunday drives in the countryside around Morris were missions to find wildflowers along the road, the railway embankments and near streams or lakeshores. For each specimen, she kept copious notes on the individual specimens to later develop narratives about them. Initially she sketched in pencil the flowers and used the notes to paint later. She often put the specimens in vases but also developed a technique to freeze the

flowers. This allowed her to paint them at her leisure while still having their true colors as a subject to capture.

Over 13 years she produced about 250 plates of wildflower species. She also developed a short narrative on the flowers depicted in each plate. These descriptions included details on the plant, such as preferred growing conditions, seasonality and morphology. She also included details on the medicinal and food uses by the native Americans and pioneers. At age 85, she felt she no longer could “do justice to the beauty of the wildflowers” due to failing vision and an unsteady hand. She continued to research each specimen and completed narratives on their lore.

A year before her death, Lydia created an introduction for her work:

*In presenting these sketches of wild flowers, I have not attempted to show all plant structures in scientific detail. I have tried to show the coloring and beauty of these flowers so even a child may recognize them and enjoy them when found. With the rare, hard to find flowers I hope to help preserve the memory of their beauty.*

*Even during the span of my lifetime vast prairies of the Midwest have been subdivided into farm tracts and are now cultivated. Many swampy, marshy areas have been tiled and drained, so are now making up the fertile acres that produce America’s fabulous yields of corn, wheat and other grains. Woodlands, too, have been cut over, cleared and either cultivated or pastured.*

*All of this has helped build up our material prosperity and our culture as we know it. However there has also been a loss. Our unexploited woodlands, prairies and swamps had a wealth of plant growth which has been replaced with cultivated crops. Among these plants are many of our choicest wild flowers. To simplify travel conditions even roadsides are mowed at regular intervals, too often cutting down any chance wild flowers before they have had time to form and ripen seed. Hence our wild flowers are becoming less abundant; many varieties are rare. Only the more hardy ones remain with us in appreciable numbers. Flowers in all of their varying color and form have always intrigued me. Thus in humble reverence I offer these sketches fully aware they do not show the glow and glory of the flowers themselves, but in the hope that they may help others to experience the joy I have known because of our native wild flowers. Lydia E. Curtis 1973, Morris, Minnesota*

The images here were provided by Andy Hayes. The Latin name in the image captions represents the current scientific name. Andrew Hayes is Lydia’s grandson. Along with Cora Curtis Hayes and 12 first cousins, the family has established the Lydia E. Curtis Wildflower Collection. The family welcomes additional opportunities to present these works to the public. You can contact the author with your interest in additional venues: [ach\\_igh@hotmail.com](mailto:ach_igh@hotmail.com).

© 2019 Lydia E. Curtis Wildflower Collection



**Bellwort; Merrybells; Strawbell  
(Uvularia grandiflora)**

The Bellwort pushes up through the former year’s leaves of the woodland in May. It is fairly hardy but fragile and easily broken. Its stem is smooth and leafless up to its first branches. At this point a long parallel veined leaf clasps the stem so closely it appears as if the stem had grown through the leaf. The 1.5-inch-long blossoms hang pendant-like from the terminus of the gracefully arched branches. There are no petals but six greenish yellow sepals that are ridged at the edges, and at the centers have deep honey bearing grooves. The short stamens and pistils are hidden by the drooping sepals. Several leaves surround each blossom almost hiding the flower.

The Latin name Uvularia means palate referring to the way the blossom hangs downward.

Three varieties of this attractive and native to Minnesota. They are distinguished by their Latin names viz. Uvularia perfoliate, Uvularia grandiflora and Oakesia sessilifolia.

The Oakesia has several marked differences from the others. Its stem is angled; its leaves are not clasping and there are no ridges in the flower cup.

**Small Blue Violet  
(Viola palmata)**

This Violet belongs to the stemless variety, that is, its leaf and flower stems both come up from an underground root stem. The plant is smaller than the more common Meadow Violet and the color of the blossom is more blue than purple or lavender. The anthers are prominent appearing as a deep yellow center of the blossom.

These sketches were made from specimens growing in our Wild Flower garden in St. Paul, Minnesota.



**Prairie Smoke  
(*Geum triflorum*)**

This lovely prairie flower, once so plentiful, is known by several names such as Torch Flower, Plumed Avens and Old Man's Whiskers. It cannot survive cultivation. Now that the virgin prairies are mostly cultivated it is becoming very rare.

When I was a little girl we lived in north Iowa between a large native prairie and some timberland. The prairie was not fenced and farm houses were far apart. My father rented some of the prairie land and hired a man to herd cattle on it. Sometimes he would drive out to see how the herdsman and cattle were doing. Frequently he took me and my sisters with him. In June and July, we would find patches of Prairie Smoke growing in the grass. We were always delighted to find these flowers so different from most plants.

At the base of the plant there is a rosette of attractively notched base leaves 3-6 inches long. They are broader at their tips than near the base. From this base almost naked red stalks arise which are divided into three branches. The branches are terminated by ruddy red buds. As the blossom opens the white petals are small and insignificant, but there are an abundance of pistils which grow into a hairy head with numerous hair-like appendages. These are delicately colored and make an unusual showing with the ruddy sepals surrounding them and the ruddy stems holding them to the wind. From a distance they give an impression of a cloud or smoke, hence the common name of Prairie Smoke. In some area they are known as Old Man's Whiskers.

The specimen was found in a bit of prairie turf just south of the Minnesota-Iowa border near Chester, Iowa.

**Virginia Spring Beauty, *Claytonia virginica*, by  
Stephen Johnson and Mary Stark**

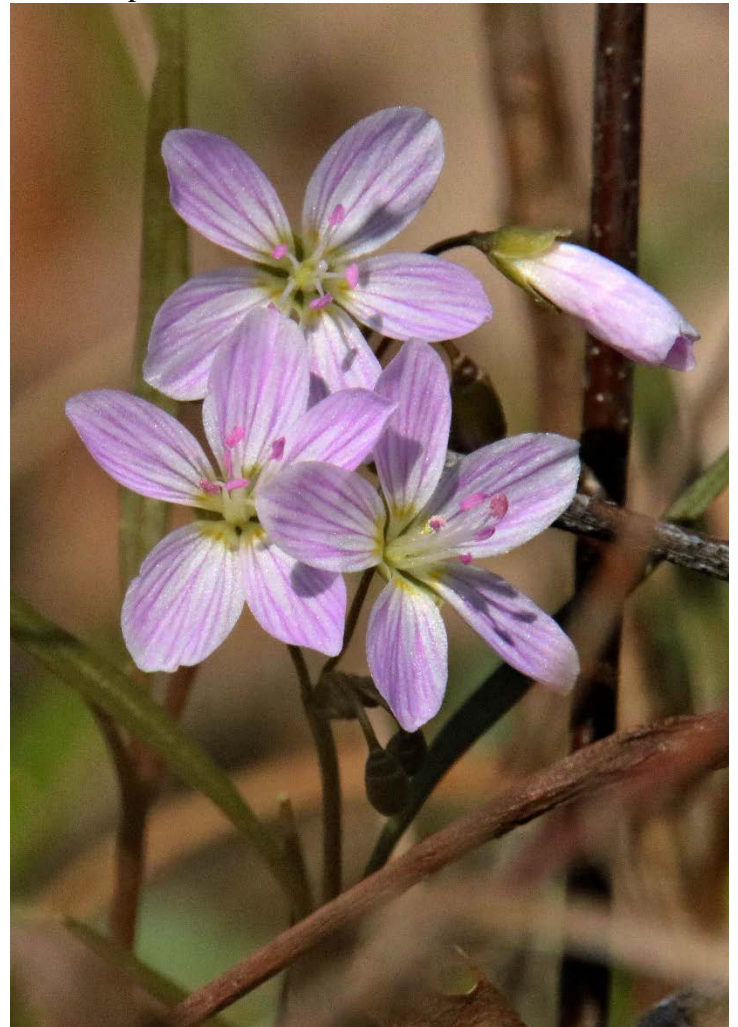
"Earth laughs in flowers," *Hamatreya*, Ralph Waldo Emerson

Virginia spring beauty is an early wildflower, initially diminutive, and common to Iowa woodlands; it possesses lustrous crystalline candy-striped flowers. These characteristics christen the plant with a very appropriate common name of spring beauty. Its genus name, *Claytonia*, is one created by Carolus Linnaeus to honor Dr. John Clayton, Virginia's first resident botanist and one of the first in the New World to have international renown.

In Iowa woodlands it can be quite abundant although as ephemeral as humans as the context of the Emerson poem suggests. We have seen it in a park within the city limits of Pella, reaching densities of 30 plants per square meter. Such populations can be subject to drastic crashes and the species has intricacies that are often hidden from the unaided eye.

The plant is typically found in basic and neutral loamy soil areas over much of eastern United States and Canada. There are subtle morphological and phytochemical differences in Virginia spring beauty across this wide range, enough to divide the plant into four races (I-IV) based on differences in several plant characters including flavonoid chemistry and leaf ratios. The flavonoids we may be able to discern through taste but readily visible leaf ratios tell us how narrow or wide is a leaf. So of the four races, the two with narrow leaves are southern and eastern in distribution. Iowa has race III with wider leaves

statewide and wide-leaf race IV only in the most southern part of the state.



Color variations exist such as two yellow flowered subspecies, but in the upper Midwest there is the seemingly simple variation from nearly white flowers to those that are rose pink, but in fact we are witnessing an ecological contest between the white and pink flowered plants. These two color morphs are typical even though the deep pink form is favored by pollinators and the white form more often passed by; simultaneously the pink form attracts herbivores such as slugs and the white form not so much. This is an example of opposing selection pressures maintaining the less desirable white color form in the population. Pollinators have little choice and visit white flowers when herbivores have cropped the pink ones.

The flowers are also protandrous, meaning they are first staminate or male staying that way for just one day. Then anthers wither and filaments recurve back to the petals and the flower, stigma expanded, becomes pistillate or female for one or two days. This is thought to reduce the probability of self-pollination. Many forest flowers utilize either protandry, or its opposite protogyny to encourage cross-fertilization.



Because it provides, especially in the pink-flowered form, copious nectar, it is very popular with bees. We

have seen several species of bees (yet-to-be - determined) visit it. The more consistent visitors are digger bees (Andrenidae). One common visitor, Carlin's digger bee (*Andrena carlini*) is a generalist. These bees visit a plethora of native wildflowers but also woodland edge weeds such as dandelion (*Taraxicum* sp.). These bees drink *Claytonia* nectar but take little to no pollen. The more important pollinator is the *Claytonia* specialist, *Andrena erigeniae*. We have observed populations of *A. erigeniae* in two woodlands parenthetically margining the Des Moines River, south of the dam, typically observing the nondescript but harrier than *A. carlini* males visiting *C. virginica*, but have noticed a slight but thus far consistent difference in integument color between the female *A. erigeniae* in these wooded areas north of the river, where the population of *C. virginica* is small, diffuse and principally white-flowered and south of the River, where the *C. virginica* population is large, dense and contains many pink-flowered forms. Female *A. erigeniae* North of the river exhibit a uniform dull metallic bronze hue while females to the south are darker hued being either predominantly black with a thoracic hint of bronze or possessing a thin patina of thoracic bronze. This difference in appearance may suggest either genotypic variation but may also be preliminary evidence of some genetic drift through isolation. The habitat of the south side woodland is also elevated and dry which may inhibit slug activity, preserving the pink-flowered plants for pollinators.



But of course some very bad things await such a common plant. The worst comes in the form of a rust fungus that unlike most rust fungi, such as the economically important wheat rust, is autoecious meaning it completes its life cycle on one host- that host is of course none other than *C. virginica*. When we first saw this we contacted the Iowa State Cooperative Extension Service. Dr. Lois H. Tiffany reported that it was *Puccinia marie-wilsoniae* var *marie-wilsoniae* and told us this rust was a specialist of *Claytonia* and that it

is highly prevalent in the Midwest. Since her report we have seen the infection everywhere there is a population of spring beauty, and rather zombie-like, the infection causes the plants slightly or grossly to alter their usual growth form. The alterations typically ensure that the aeciospore-laden ulcers face outward by causing leaves to twist or become vertical in a form that resembles a fourth or fifth ballerina arm position or to roll into a contorted spiral. Ultimately, it kills the plant and as such acts as a density dependent disease reducing population numbers such as the aforementioned 30 plants per square meter dropping down to about five per square meter, hence the sometimes wild density swings in populations of spring beauty. Enough spring beauty usually survives to rebuild the population, drawing in bees, and again, the “Earth laughs in flowers.”

## The Dixon National Tallgrass Prairie Seed Bank Conserves Native Plant Diversity and Supports Habitat Restoration, by David Sollenberger

The ability of seed banks to successfully store seeds of economically important crops for long periods of time has been adopted by plant conservationists as a method for conserving dwindling plant diversity across the globe. The premise of seed banking is that if seeds are dried to 15-24% relative humidity and stored at -20°C, many species can be held in a dormant state for decades to hundreds of years. The Dixon National Tallgrass Prairie Seed Bank (DNTPSB) at the Chicago Botanic Garden has embarked on a project to conserve taxa of the tallgrass prairie, a globally threatened ecosystem, by systematically collecting and banking seeds of species important for habitat restoration. Using techniques established at the Millennium Seed Bank Project, a project in the UK to conserve native plants globally, we focus on collecting seeds of species on our target list from each of 12 ecoregions (Omernick, level 3) that comprise the heart of the tallgrass prairie ecosystem. We seek large populations of at least 50 individual plants to capture 95% of the genetic diversity within. Collecting protocols ensure that the reproductive potential of a population is not compromised by collecting no more than 20% (10% for annuals) of the mature seeds at the time of harvest. A minimum of 3000 seeds is required for periodic germination testing to monitor viability retention of seeds in the bank. Small quantities of seeds can be withdrawn for non-profit research and restoration projects at the discretion of seed bank staff or by the owners without restrictions at any time. DNTPSB can

support future habitat restoration projects by holding and distributing seeds of genetically diverse populations from across the region which may help mitigate the effects of climate change.

### Background on Seed Banks, Seeds of Success, and DNTPSB

Historically, the role of seed banks was to conserve the genetic diversity of economically important plants. More recently, seed banks have expanded their role to include the conservation of rare plant species. In 2004, the Royal Botanic Garden at Kew in the UK initiated a project called the Millennium Seed Bank Project (MSBP) to collect and bank seeds of 10% of the world's flora by 2010. The decline of biodiversity around the world was the impetus for MSBP to expand ex-situ conservation for all plants globally. They partnered with the Bureau of Land Management's Seeds of Success (SOS) Program. SOS expanded to include several more botanic gardens and similar institutions to collect seed across the country to help with this project.

Shortly after joining SOS, the Chicago Botanic Garden established the Dixon National Tallgrass Prairie Seed Bank (DNTPSB). The tallgrass prairie is a globally threatened ecosystem, so it seemed especially important to continue the work that the MSBP started in the Midwest. Unlike MSBP, DNTPSB's approach to ex-situ conservation is to make multiple collections of species across their geographic range to conserve the adaptive characteristics of those plants to their local environments. For instance, a population of *Andropogon gerardii* in the sand hills of Nebraska has adapted to local environmental conditions that differ from a population of *A. gerardii* in the Grand Prairie region of central Illinois. The strategy that we chose to conserve these adaptive characteristics in the Seed Bank is to collect species across the tallgrass prairie region by ecoregion (ecologically distinct regional designations).

There are over 3000 taxa of native vascular plants in the tallgrass prairie ecosystem. Eventually we hope to have collections of all of those species in the bank but, for now, we have prioritized our collecting efforts on a smaller list. We target species that are important for the restoration of common habitats in the ecoregion, i.e. prairies, woodlands, wetlands. Using NatureServe's comprehensive lists of plant taxa for 12 ecoregions (Omernick, level III) that comprise the core of the tallgrass prairie ecosystem, we developed a numbering system where taxa in each ecoregion were designated a 1, 2 or 3 based on a set of criteria that considered a species conservatism, geographic range and restoration suitability. The numerical tally resulted in a target list

of 545 native species:

<http://www.sciencecollections.org/files/sciencecollections/uploads/files/Restoration%20target%20list%202019.pdf>. Although we tried to be objective, we realize there is some bias in the selected list and welcome suggestions for additions and subtractions.

#### Why Bank Seeds?

For millennia, seeds have been stored by humans to sow for next year's crops or to provide food for future consumption. Many seeds of temperate areas of the world have the capability to retain viability for long periods of time; especially if the correct environmental conditions are in place. This capability is a survival mechanism so that seeds can exist in a dormant state when environmental conditions are unfavorable for plant growth. If seeds are dried to between 15% and 24% relative humidity and stored at around -20°C, seed physiology is slowed to the point that longevity in the dormant state can be retained for decades to hundreds of years for many species. Periodic germination testing of seed samples in the bank is recommended to measure attrition of seeds viability over time.

Seed banking native seeds is not an alternative to habitat restoration. Unlike in-situ conservation, seeds stored in seed banks under stable environmental conditions have been removed from their natural habitat and, therefore, are unable to evolve with a changing environment. Despite this limitation, seed banking is an efficient way to preserve the genetic diversity held within wild populations. One important way seed banking can support habitat restoration is by assisting in the migration of plants to new areas which can be impeded by habitat fragmentation. Seeds can be selected from the bank from a nearby region to establish a new population or augment an existing one. This is especially important in today's world where climate change is occurring at such a rapid pace that plants in isolated habitats need to move or perish.

#### The Seed Banking Process for Common Species

The process DNTPSB uses for banking wild seeds is similar to that used by MSBP and other banks with similar missions. We start by seeking out healthy (usually large) populations of targeted species. If the seeds of 50 individuals in a population are collected, 95% of the genetic diversity in that population is captured. To ensure the reproductive potential of the population is not compromised, we limit seed collection to 20% of the mature seeds available at the time of harvest (10% for annuals). We also try to collect across the geographic range of the population without bias towards more robust or fecund plants. Plants smaller in stature and/or producing less fruits should not be under represented in the collection because they

may have alleles that are important for the survival of the species in a changing environment. Also, protocols dictate that collections of 3000 seeds or more are necessary to provide samples over time for germination trials.

Large populations of well over 50 individuals generally provide greater genetic diversity than those with less individuals. If populations have less than 50 individuals, it is best not to make the collections and seek larger populations in the ecoregion in which to collect seeds. If no large populations can be located, a smaller collection can occasionally be made with permission of seed bank staff using special collecting protocols. Sometimes, a population may be large but the species may have naturally low fecundity so few seeds are produced and collected resulting in less than 3000 seeds. In these instances, approximately the same number of seeds should be collected from each plant. Equal representation in a bulk collection improves the chances of selecting seeds from multiple parents for germination trials or other withdrawals from the bank.

In addition to the seed collection, a data sheet, two herbarium samples, a DNA sample and photographs are included in a complete collection for DNTPSB. Collectors are sought across the tallgrass prairie region to make collections for the seed bank. A stipend is paid for each complete collection and shipping costs are covered as well.

When collections arrive at the Seed Preparation Lab at the Chicago Botanic Garden, the seeds are checked for quality, the herbarium specimens for authenticity, and the data sheets for accuracy. The collections are then accessioned and placed in the seed dryers. The seed dryers hold the seeds at 15°C and 15%-24% relative humidity. For the next few months, the seeds are cleaned, counted, weighed and a small sample is x-rayed. X-rays allow us to quickly assess the condition of the seeds. If the x-rays show the seeds are filled we assume that they are viable. True viability, however, can only be established by germination testing. Although the cleaning process is rigorous, it is important not to discard seeds that do not fall into the average size. In commercial operations, these seeds are sometimes discarded to maximize the purity of the seeds. We would rather keep a little chaff in our collections along with larger and smaller seeds that may be important genetically.

When finally ready for storage in the seed vault, several months have passed allowing the seeds, which are kept in the dryer throughout his process, time to attain the 15% - 24% RH that is necessary for them to survive at -20°C. The seeds are first divided and half sent away to another seed bank for redundant storage.



The seeds that remain at DNTPSB are then divided again into a quarter for germination/research and a quarter for conservation. They are then sealed in moisture proof foil envelopes, labeled and then filed away in the vault.

#### A Seed Storage Facility for Everyone

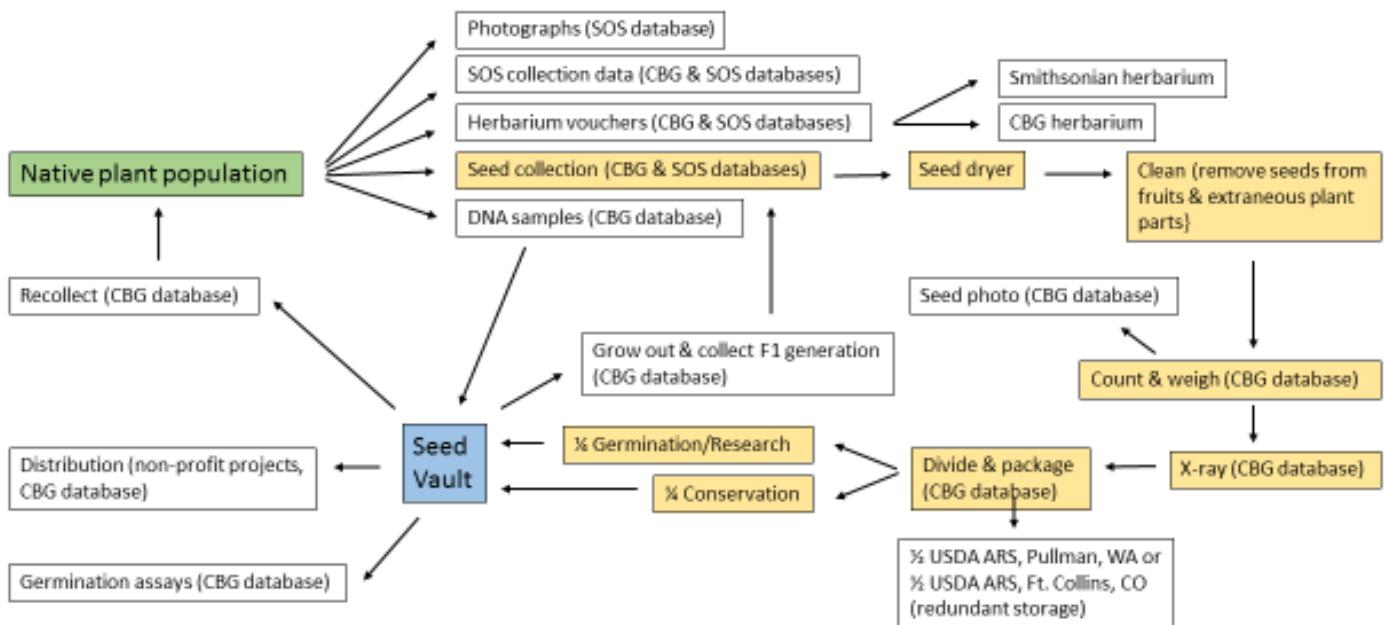
The DNTPSB is a native seed repository for anyone wishing to conserve native seeds for the future. Although our objective is to collect seed on our target list, we will generally accept seeds of any native taxa that would benefit from long-term conservation. Small quantities of seeds (between 50 and 100 seeds) can be withdrawn from the bank for research, restoration projects or other non-profit ventures at the discretion of seed bank staff unless strictly prohibited by the owner of the seeds. A small restocking fee is charged for each withdrawal. Owners can remove their seed donations to the bank free of charge at any time but we encourage at least some seeds remain in the bank. If seed reserves are depleted, we attempt to gain permission to recollect at the original site. If that is not possible, the alternative is to grow out the remaining seeds, collect

the first generation of seeds and return them to the bank. This alternative method is not ideal because of genetic drift associated with the depleted number of seeds in the collection and because individuals better adapted to the novel environmental conditions during the grow-out will be expressed, further reducing the genetic diversity of the collection.

The UN recently committed to scale up ecological restoration of degraded habitats for the next decade (2021-2030). The impact of this action on conserving biodiversity globally and curtailing climate change could be substantial. Seed banks will play an important supporting role in these restoration efforts. The ability of most temperate native plant species to survive for long periods of time as dormant seeds and the efficiency of storing large numbers of seeds of numerous taxa in a relatively small place makes seed banking an effective conservation strategy.

*If you are interested in becoming a seed collector for DNTPSB please contact David Sollenberger, Seed Bank Manager: [dsollenberger@chicagobotanic.org](mailto:dsollenberger@chicagobotanic.org).*

DNTPSB Flow Diagram



Mile-a-minute weed in Iowa – (continued from page 1)  
We did not find mile-a-minute weed in the wooded area with deep shade or along a stream below the property.

While this weed is unlikely to be a concern for agricultural crop production in the state, it poses a serious threat to non-crop lowland and upland areas. This weed spreads easily via the small, blue fruit and is likely to spread from the initial location if steps are not taken to eradicate it.

Eradication and management. Eradication of this and

other invasive weeds is no simple task. Significant effort is necessary to eliminate plants prior to seed production and monitor the area for newly germinating plants to drive down the weed seed bank. Studies have shown the seed of this weed may persist for several years in the soil.

Several effective management options exist. Mile-a-minute weed has a shallow root system, making hand pulling a viable option if thick gloves are worn. Several herbicides are effective against this species, including

glyphosate and triclopyr.

Information available suggests that mile-a-minute weed is adapted to Iowa's climate and will have ample opportunity to spread in our natural areas. Individuals should monitor habitats like edges of wooded areas, particularly those with moist soil environments, for this invasive weed. The primary mechanisms of long-distance movement should limit its spread to the state, but localized movement of unknown or unmanaged infestations currently here will be a concern.

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### Announcement: "Hot Off the Press"!

Jimmie Dean Thompson of Ames, a Charter Member of the INPS, became the first recipient of the *Iowa Academy of Science Distinguished Citizen Scientist Award* at the Society's annual meeting on April 26<sup>th</sup>! Jimmie has authored or coauthored six publications about Iowa's Flora and has contributed thousands of specimens to Iowa State's Ada Hayden Herbarium.

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Looking back at 2018: Photos by Kenneth Heiar from the June 9<sup>th</sup> field trip to Ciha Fen and Cedar River Crossing (see more of Kenneth's photos at <https://speakingofnature.tumblr.com>)



Two-flowered Cynthia, *Krigia biflora*, at Ciha Fen



Pale-spiked lobelia, *Lobelia spicata*, at Ciha Fen



Wild or Prairie petunia, *Ruellia humilis*, at Cedar River Crossing



Prairie larkspur, *Delphinium carolinianum*, at Cedar River Crossing