ONAPA NEWS

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INSIDE THIS ISSUE

Of the Royal Fern family—the Flowering Ferns—three are native to Ohio

By Allison Cusick

Ages ago when I was learning botany, I was puzzled by the name "Flowering Fern Family" given to the Osmundaceae. Ferns, of course, do not flower. They reproduce from spores, not seeds. A flowering fern is an oxymoron. In folklore, however, a flowering fern makes perfect sense. All plants need flowers to reproduce. Right? Ferns therefore must have very, very special flowers. Ferns only bloom for an instant on St. John's Eve, June 23, at midnight on the moors when the powers of evil are exalted — as Conan Doyle famously wrote. Anyone courageous enough to gather fern seed on that night could attain the power of invisibility. Medieval witches routinely confessed to having fern seed in their bag of magic tricks. Makes perfect sense. Right?

More prosaically, the real "flowering fern" is the royal fern of Europe, *Osmunda regalis.* It's a majestic plant often 6 to 8 feet in height, its broad green leaves are fronds standing tall on a platform of older leaf bases. The spore-bearing portion of the frond is at the summit and turns bright orange-brown when the spores ripen in mid-summer. This suggests a flower cluster atop the greenery. The Osmundaceae are called the Royal Fern Family in most reference works today, instead of the older, misleading name. An odd exception is the *Peterson Field Guide to the Ferns* (Cobb, et al., 2005) which still uses Flowering Fern Family.

The classification of ferns presented an insuperable difficulty for Carl Linnaeus. His sexual system of classification was based entirely on the number of arrangements of stamens and pistils. These reproductive organs were obviously in the flowering plants, but not visible in ferns. Mosses. liverworts, fungi and algae were equally problematic. In Linnaeus' monumental *Species Plantarum* of 1753, such problem plants were buried at the very end of

American royal fern

Volume 2 under the name Cryptogamia, that is, plants with "hidden marriage". The secrets of fern reproduction only were discovered in the mid-to-late 19th century.

Osmunda is one of Linnaeus' original fern genera from 1753. It originally contained more than a dozen species. The genus subsequently has been broken up with increasing knowledge of fern relationships. The meaning of the name *Osmunda* is unknown. The two most common theories are that it is derived either from an obsolete Germanic word for the god Thor, or is a misunderstanding of Old French for "fern". But no one is really certain.

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Ohio's royal ferns are tolerant of various habitats

The Royal Ferns, Osmundaceae, are a small family with only about 15-25 species in 4-5 genera on every continent except Antarctica. Three of these species grow in Pennsylvania [and Ohio] — cinnamon, interrupted and royal ferns. All three species are widespread and common to frequent in the state. They often occur very near to one another. None of them have specialized habitat requirements. They grow in moist, but not water-logged, acid to sub-acid substrates. Typical habitats include bogs, meadows, thickets, and the bushy edges of swamps and low woodlands. They reach their best development in open sun or semi-shade, but they will tolerate moderate shade as well.

The growth habitat of Osmundaceae is distinctive. The fronds are almost woody at the base. These bases persist long after the death of the deciduous, green portion of the leaf. The hardened leaf bases accumulate over time, creating a platform which elevates the fern above the ground surface. This process is very slow. There are reliable reports of royal ferns in English gardens which are at least 500 years of age.

Cinnamon fern is among our most photogenic ferns. The bright orange "cinnamon sticks" standing tall amid the pale green, unfurling sterile fronds are a delightful sight in spring wetlands. These "sticks" are fertile leaves; they are great masses of sporangia or spore bodies and nothing else. After the spores are released, the fertile leaves wither away. The fertile leaves arise from the center of the vertical rootstalk, while the green, sterile leaves are produced from its outer edge. The sterile leaves, of course, are photosynthetic, creating the energy for future growth.

Cinnamon fern is distributed over a broad area of eastern North America, from southern Canada south to Florida, east Texas and northern Mexico. It's found throughout Pennsylvania, but is especially common in the Appalachian Mountains and the Poconos.

The rootstock of cinnamon ferns grow very slowly outward and upward. Steeves and Wetmore (1953) estimated that the rhizomes of this species increase in length no more than "several millimeters" per year. It would not surprise me to discover that large cinnamon ferns in the Appalachian Mountains were 200 or more years old, based on their size in relatively undisturbed habitats. I stress, however, that this is only a personal guess.

Cinnamon fern is easily identified even when the orange fertile fronds are absent. There's a conspicuous tuft of brownish hairs at the point where the green leaflets attach to the main stem of the sterile leaf. The cinnamon fern, therefore, is the fern with the hairy armpits. This character is unique among the ferns in our area.

For more than 200 years cinnamon fern has been known by the Linnaean name *Osmunda cinnamomea*. Palaeobotanists and molecular biologists, however, have made a remarkable discovery about this common fern. Cinnamon fern is the ancestral species of Osmundaceae. The other members of the family diverged from that species at least 200 million years ago. Indeed, cinnamon fern fossils date from the beginning of the Jurassic Period. The rise of the Royal Fern family apparently coincides with the rise of the dinosaurs. Moreover, the cinnamon ferns of that period appear identical to those existing today. The cinnamon fern truly is a "living fossil", essentially unchanged for 200 million years. Molecular and genetic studies confirm this relationship.

Based on this research, the scientific name of cinnamon fern should be changed to reflect this unique status—*Osmundastrum cinnamomeum* (L) C. Presl. This is not a modern name, surprisingly enough. The Czech botanist Carl Presl of Prague (1794-1852) published that name in 1847. The Latin combining form "*astrum*" signifies an incomplete resemblance. I don't know just how Presl became acquainted with the cinnamon fern. He never botanized outside of Europe. Presl possibly encountered this fern in a

Photos by Guy Denny

Cinnamon "sticks" are characteristic of this royal fern ancestor

botanical garden.

Osmunda claytoniana, interrupted fern, is unmistakable when the fertile leaves are present. The middle third of a green frond is transformed into brown masses of sporangia which "interrupt" the upper and lower thirds of the leaf. Most fronds on the plant are sterile and at first glance resemble the sterile leaves of cinnamon fern. The "armpits" of the interrupted fern, however, are naked, not hairy. Interrupted fern ranges from southern Canada south to the Appalachians to Georgia and Alabama and in the Midwest to Missouri and Arkansas, a more restricted distribution than other Osmundaceae in North America. It's generally distributed in Pennsylvania, but seldom forms large populations.

Interrupted fern exhibits sporangia which form between upper and lower third of the leaf.

Linnaeus named this species in memory of John Clayton (?1695-1773). Clayton was born in England and became an enthusiast botanist after arriving in Virginia in 1715. He was a county clerk in Gloucester County, Virginia, for most of his life. Clayton produced a manuscript on the Virginia flora which he forwarded to the Dutch botanist Jan Frederic Gronovius for comments and possible publication. However, Gronovius used Clayton's notes for his own Virginia flora of 1739 and did not credit Clayton at all. Fortunately, Clayton's specimens had been widely distributed in Europe by his friends and this gained Clayton a high reputation.

Linnaeus must have esteemed Clayton since he named numerous species after the Virginian, as well as the genus *Claytonia*, the spring beauties. The Linnaean names today are Clayton's memorials.

It used to be said that the royal fern grows on every continent (except Antarctica, of course). That statement is based on an outdated taxonomic concept, however. Botanists formerly treated *Omunda regalis* L. as a single, worldwide species with as many as seven varieties or subspecies. As with *Osmundastrum*, molecular research has revealed that these smaller units deserve to be recognized as individual entities. The species *Osmunda regalis* now is restricted to the plants of Europe, the Middle East and North Africa. Other epithets apply to royal ferns in other parts of the world. These are distinguished on sporangia or spore size and venation patterns, as well as ploidy level. However, the variants aren't well understood and need further research.

American royal fern

Osmunda spectabilis Willdenow is the American royal fern. Until recently, it has been known as *Osmunda regalis* L. var. *spectabilis* (Willd.) A. Gray, a name used in many reference works such as *The Plants of Pennsylvania* (Rhoads and Block, 2007). The American royal fern was described by Carl Ludwig Willdenow (1765-1812) in his revision of Linnaeus' *Species Plantarum*. Willdenow was born and raised in Berlin and seldom left the confines of Prussia. (The nation of Germany didn't exist prior to 1871.) Despite this lack of travel, he became acquainted with an enormous range of flora in the famed collection of the Berlin Botanical Garden, of which he was director. That's likely where Willdenow saw both the American and European royal ferns, probably side-by-side. He also influenced many important botanists who traveled worldwide and thus brought specimens to him. Willdenow was mentor to Alexander von Humboldt (1769-1859), for example, one of the greatest naturalists of all time. That's how a stay-at-home botanist became familiar with the plants of the world.

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(Left to right) Randy Carmel, president of the Killbuck Watershed Land Trust, maintains social distance with stewardship assistants Jason Short, Landon Lemmens, and Madison Brown. Not pictured, Mariola Castrejon.

2020 stewardship assistants make a great team

By Jennifer Windus

ONAPA began interviews for new stewardship assistants in early March and interviewed five of the eleven applicants we received. We had an excellent pool of applicants this year. We decided to hire three of the individuals we interviewed and bring one stewardship assistant back from last year, Mariola Castrejon. Mariola is a graduate student at The Ohio State University and will work with us one day a week through August. Madison Brown graduated from Bowling Green State University with a BS in Environmental Science in December and lives in Delaware. Landon Lemmons graduated from West Virginia University in May with a BS in Horticulture & Wildlife and lives in Hudson. Jason Short just completed his junior year as a biology major at the University of Akron and lives in Apple Creek. We are excited to have a new crew of stewardship assistants and look forward to having our volunteers work with them.

ONAPA is partnering with the Killbuck Watershed Land Trust (KWLT) this year to help them manage Brinkhaven Oak Barrens in Holmes County. The KWLT is contributing $3,000 towards the ONAPA stewardship program, so our stewardship assistants will be working with Randy Carmel, KWLT President, to control invasive plants at Brinkhaven Oak Barrens, as well as other KWLT properties and easements. Landon and Jason, who both live in NE Ohio, will be working with Randy 1-2 days a week for this season. Brinkhaven Oak Barrens was recently dedicated as a state nature preserve which provides an additional layer of protection for the 114-acre preserve. Besides controlling woody species in the two barrens, several invasive plants in the woods (e.g., garlic mustard, Dame's rocket, Japanese stiltgrass) need to be controlled and this is more than Randy or our volunteers can handle each year. Randy is happy to have some help this year and expects that we will accomplish significant progress with stewardship. We look forward to a continued, rewarding partnership with the KWLT!

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So, if you are a Kroger customer who has a Plus Card that is presently registered for the Kroger Community Rewards Program supporting ONAPA, then you helped make a difference by generating **$2,003.57** to date from the Kroger Rewards Program to help fund ONAPA activities and projects. A big **Thank You** from the Board for what you have accomplished!

Remember that all participants must re-enroll each year to continue earning rewards for ONAPA. Kroger will not automatically renew your participation in this program at the end of the year so mark your calendars on the date you renewed so next year you will know when it's time to re-enroll.

AmazonSmile is a website operated by Amazon that lets customers enjoy the same wide selection of products, low prices, and convenient shopping features as on Amazon.com. The difference is that when customers shop on AmazonSmile, Smile.Amazon.com, the AmazonSmile Foundation will donate 0.5% of the price of eligible purchases to the charitable organizations selected by customers. Sign up for AmazonSmile and support ONAPA today!

Queen Anne's Lace started in colonial gardens

By Guy Denny

By mid-summer, old fields, roadsides, and waste places throughout Ohio are teaming with Queen Anne's lace, also known as Wild Carrot. This weedy species with its characteristic finely cut leaves is a native of Europe but was inadvertently introduced to North America by early colonists. Early colonists brought carrot seeds with them from the Old World to grow as a popular garden vegetable in their new land.

The domestic garden carrot (*Daucus carota* var. *sativus*) eventually escaped from their gardens and reverted back to its wild ancestor, Wild Carrot or Queen Anne's lace (*Daucus carota*). Unlike its domesticated relative, wild carrot has a slender, whitish, tough root. However, being a biennial, the young tender first year roots of the wild carrot can be prepared and eaten like garden carrots. The wild root, like its cultivated counterpart, is rich in vitamin A and minerals. Over the years in Europe, extracts from boiled wild carrot were used as an antiseptic diuretic. A tea made from the seeds was also used to eliminate intestinal worms and relieve gas. Today, research confirms the diuretic and worm-expelling properties of this species.

Queen Anne's lace is easily recognized with its lacy, flat clusters of tiny white flowers in the shape of a flat-topped compound umbel so characteristic of the parsley or carrot family, *Umbelliferae* also known as Apiaceae. Each main flower head or inflorescence is composed of as many as 500 individual tiny whitish flowers that often have at their center a single, tiny deep red-purple flower.

These plants are scientifically known as *Dacus carota* forma *carota*. This single dark purple-red flower is how the wild carrot became known as Queen Anne's lace. Queen Anne (1665-1714) of Denmark was Queen to James I of England. According to folklore, the Queen challenged the ladies of the court to produce a lace with a pattern as intricate and lovely as the flower head of wild carrot. She also participated in the challenge and while doing so, pricked her finger. The central red flower of the umbel symbolizes a drop of royal blood from the Queen's finger that dripped onto the lace.

Plants with all white flowers, lacking the central purple-red flower (forma *epurpuratus*), are also commonly encountered in the field. Very rarely, all pink flowered variants (forma *roseus*) may also be discovered. After pollination, when the flower heads bear seeds and dry out, they curve upward forming a cup-shaped cluster reminiscent of a miniature bird's nest. Queen Anne's lace may indeed be a weed, but it is clearly a most interesting weed.

Royal ferns of Ohio

Continued from page 3

Osmunda spectabilis occurs from Newfoundland to Manitoba, south to Florida, eastern Texas and northern Mexico, as well as on the islands of the Caribbean. Though widespread in Pennsylvania, it's most frequent in the mountain and northern counties. It's easily distinguished from related species, since the sporangia are clustered in the upper third of the fertile frond and all the leaves, sterile and fertile, are twice-compound. Our other Osmundaceae have once-compound leaves. *Osmunda spectabilis* is the tallest fern in Pennsylvania and thus is quite conspicuous. The fronds often reach four feet high and may attain five feet in optimal conditions. Even so, it still is shorter than the European royal fern.

The Peterson Field Guide to Ferns, second edition (Cobb et al., 2005), has full descriptions of these species, and all three species are pictured in color on page 171. The scientific names for Osmundaceae in the Peterson guide aren't up to date, but otherwise this book is highly recommended. Don't make the mistake of using the first edition, though. That edition is not at all helpful.

An enjoyable botanical activity is to search for all three Osmundaceae in the same county or even the same small area. It's not that difficult and is time well-spent in the great outdoors. A day in nature is never wasted. But at all costs avoid the moors on St. John's Eve at midnight when the powers of evil are exalted!

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Author Allison Cusick was the Chief Botanist for the Ohio Department of Natural Resources. He holds degrees from Ohio State and Kent State Universities. He is author or co-author of three books and more than 50 scientific papers on the flora of eastern North America. He is presently a Research Associate of the Carnegie Museum of Natural History.

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Small group stewardship projects continue in preserves

By Jennifer Windus

Despite the coronavirus restrictions, ONAPA has been able to continue its stewardship projects during March-May. We are working in smaller groups of 10 people or less, practicing social distancing, and wearing face masks when in close proximity. We had 5 projects in March, 7 projects in April, and 5 projects in May. These included trips to Fowler Woods to scout for invasives (garlic mustard and butterweed) and repair the boardwalk, pulling garlic mustard at Miller Preserve, Clear Fork Gorge, Davey Woods, and Bonnett Pond Bog, and cutting woody species at Richfield Heritage Preserve and Brinkhaven Oak Barrens. Since we could not work on DNAP preserves during most of March and April, we worked with other partners to help them with habitat management, such as at Richfield Heritage Preserve and Brinkhaven Oak Barrens. We had a small, loyal crew of volunteers that appreciated being outside with other people to accomplish great stewardship work, while staying healthy!

Photos from our projects above show (clockwise, from left): garlic mustard pull at Miller State Nature Preserve; carrying out the spoils from Miller; Richfield Heritage Preserve volunteers; and Brinkhaven Oak Barrens woody species control.

For more photos and summaries of projects, visit ONAPA.org/VOLUNTEER.

ONAPA Board still planning Annual Meeting for August 22

The ONAPA Annual Meeting is still scheduled for Saturday, August 22, at The West Woods Nature Center in Novelty, part of Geauga Park District.

We have arranged for Lisa Rainsong to be the keynote speaker. We are planning field trips to bogs and fens, Mentor Marsh, a canoe and kayak trip on the Upper Cuyahoga River, and a lichen walk.

However, due to the coronavirus situation, we may decide to cancel or modify the meeting in the next month or so. Watch our website for more details – registration would begin in July on our website if we continue to proceed with the meeting.

West Woods Nature Center
9465 Kinsman Road
Novelty, Ohio
(Geauga County)

Fowler Woods boardwalk repair completed

By Dick Moseley and Jennifer Windus

Many of you know from reading last quarter's Newsletter that the boardwalk at Fowler Woods was damaged from deadfalls of ash and other trees, and was in poor condition which limited visitation to the preserve. We began boardwalk repairs in January and February. It was our hope to have the boardwalk repairs completed before the spring wildflower season, but the Coronavirus pandemic entered the picture and we were temporarily delayed in making the repairs since groups were not permitted to work in the preserve.

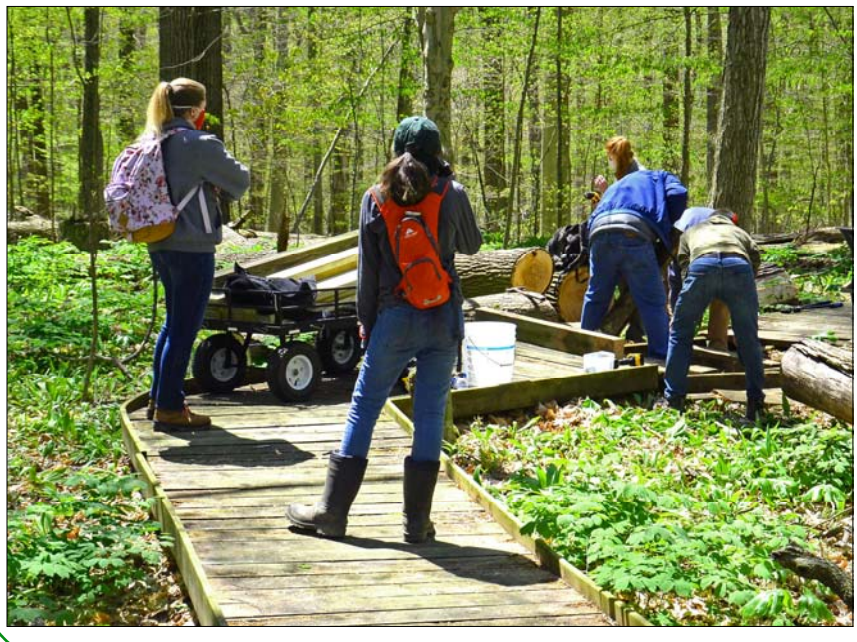
Recently we received permission to again work on the boardwalk, so ONAPA volunteers along with DNAP staff have worked to make temporary repairs to the boardwalk. The work on the boardwalk was completed on May 6, after three workdays. ONAPA volunteers and DNAP staff worked with masks on and observed social distancing as much as possible so as not to adversely affect one another.

The last workday was a beautiful spring day with bright sunshine and a reasonably cool day to work. Many visitors came to Fowler Woods to bird watch and enjoy the wildflowers and the beautiful day for a walk in the woods. Several asked us as we worked if we were volunteers and we responded that we were. Many thanked us for repairing the boardwalk and expressed their deep appreciation for our efforts to make the trail usable.

It is with special thanks to the volunteers and staff that the boardwalk is now available to the public to view the beautiful wildflower display for which Fowler Woods is noted. I want to also recognize Dr. David and Susan Jarzen, ONAPA members from Lakeland, who made a special donation toward the purchase of new boards for the trail repair. It was during their visit to Fowler Woods in early January that they noted the destruction by fallen trees: they wanted to help financially for the repair of the boardwalk. The remaining boards purchased to repair the boardwalk were paid for by ONAPA, so membership supported this special project!

You will be pleased to know that the Division of Natural Areas and Preserves has recently contracted with Jagger Construction Company of Lima to replace the existing boardwalk which is over forty years old and build a new boardwalk trail at Fowler Woods with a projected start this June 1 and a completion date of November 1, 2020. The project is being funded by a Federal Recreation Trail Grant. This matching grant for $486,200.00 will include the Division's 20 percent match of $97,240.00, which will be funded from the Income Tax Checkoff Program. Unfortunately, the preserve will be closed to visitors during this construction period but we can look forward to a brand new boardwalk.

We may have one more work day at Fowler Woods prior to construction which will entail removing all the new boards from the boardwalk that were recently installed. This salvage work will give us new materials for boardwalk repairs in other preserves or for use in building a new boardwalk in a preserve.



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