

BUTLER

UNIVERSITY

FRIESNER HERBARIUM



Annual Report Academic Calendar Year *2021/2022*

Department of Biological Sciences
College of Liberal Arts and Sciences
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Indianapolis, Indiana 46208

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Layout and Photographs (unless otherwise noted)

Front Cover Photos: The Changing Seasons

- Spring—Eastern Redbud (*Cercis canadensis*)
- Summer—White Oak (*Quercus alba*)
- Fall—Sugar Maple (*Acer saccharum*)
- Winter—Red Oak (*Quercus rubra*) Photo by Vern Wilkins

Herbarium Highlight

We Are Open!



We moved into our newly renovated space the second week of March 2022 and immediately reopened to the public. First visitors included Butler class tours, Botany researchers, and other interested people from the community around Indianapolis.

We are incredibly grateful to Butler University Administration for their support and to the many donors that made this possible.

Here's to another productive 100 years of Botany at Butler!!!

FRIESNER HERBARIUM

September 1, 2021 - August 31, 2022

Accomplishments

- ◆ **In March 2022, the herbarium officially opened in its renovated space in Gallahue Hall, 077.** The collection was moved to its new facility in March of 2021 but then was mostly unavailable for the following year due to continued construction. Upon opening, several visitors from outside the Butler community arrived to work on various research projects utilizing herbarium resources.
- ◆ **Visiting research botanists** Dr. Mark P. Widrlechner, Iowa State University, and Scott Namestnik, Natural Heritage Program Botanist at the Indiana Department of Natural Resources, Division of Nature Preserves, began their extensive studies into the *Rubus* genus. Read more about this important work in the Visitors section.
- ◆ **Continued support for the Indiana Plant Atlas** (begun with funding from a Butler University Innovation Fund Grant) from the Indiana Academy of Science, in the amount of \$2,500 will be made available annually through 2023 to support maintenance costs of the site.
- ◆ **Consortium of Midwest Herbaria (CMH)** – all data and images are now uploaded directly to the CMH which provides easier and faster access to collections located throughout the Midwest.
- ◆ **Herbarium imaging and digitization continued** with graduate student assistant Grace Olsen (Butler grad, December 2021), imaging Indiana specimens for the Indiana Plant Atlas which is now complete. **Over 44,000 specimens have their data and images displayed on the Atlas** which provides important botanical information for academic researchers, environmental consultants, conservation groups, and the public at large. Newly accessioned specimens will be imaged and added as they are acquired. **Imaging of our out-of-state and foreign holdings** is now proceeding.

Loans and Gifts

Loans returned:

Approximately 500 specimens of *Panicum* and *Dichantherium*, of the Poaceae family, to Paul Rothrock, IU, who examined the question as to how to handle the group of *Dichantherium acuminatum* for Indiana. Specimens will be updated with the annotations in the Indiana Plant Atlas and the Consortium for Midwest Herbaria.

Approximately 150 Indiana specimens of the genus *Rubus* to Dr. Mark Widrlechner of Iowa State University who studied the identity and distribution of Indiana's *Rubus*.

Gifts of specimens:

Scott Namestnik, Botanist, Division of Nature Preserves, Indiana Department of Natural Resources, deposited 97 specimens in August, which were collected from multiple locations across Indiana, in the spring and summer of 2021.

Dr. Rebecca Dolan, former Herbarium Director, deposited specimens of *Dipsacus strigosus*, a rare teasel alien that original comes from Ukraine and western Russia. This plant which is now widely naturalized in several parts of Europe, was found on the edges of the Butler woods near the new bike path.

Various other collectors, including Marcia Moore, deposited specimens of species that had not been documented in certain counties previously.

At right, *Trifolium incarnatum* (Crimson clover), a new record for Hancock County, Indiana, collected by Marcia.



Loans and Gifts continued:

Gifts made:



The Herbarium gifted five cabinets to Cliff Chapman, Executive Director of the Central Indiana Land Trust, for use at their northside Oliver's Woods property. They are beginning

a herbarium of their own and training volunteers in collection and mounting techniques. The collection will be used for public education purposes.

Endowment and Gift Funds

The Friesner Herbarium Endowment, established by Ray's widow, Gladys, paid the wages for student assistants working in the Herbarium.

We accept donations through the **Herbarium Gift Fund** to further our mission of preserving and enhancing the collection. Please contact Marcia Moore at mmoore@butler.edu, or (317) 940-8302 for information on how to donate; or contact Butler University Advancement at (317) 940-9469, or gifts@butler.edu. Online giving is an option (<https://www.butler.edu/advancement/make-a-gift/>), simply designate that your gift is to benefit the Herbarium Gift Fund.

Funded Research Grants and Contracts

Indiana Academy of Science Community Grants Recipient – June 2022 through June 2024, \$5,000.00 in continuing support of the Indiana Plant Atlas.

Visitors to the Herbarium:

Indiana *Rubus* work

Botanists Dr. Mark Widrlechner (on the right) from Iowa State University and Scott Namestnik (on the left) from the Indiana Department of Natural Resources teamed up in 2021 to begin a study of the genus *Rubus*



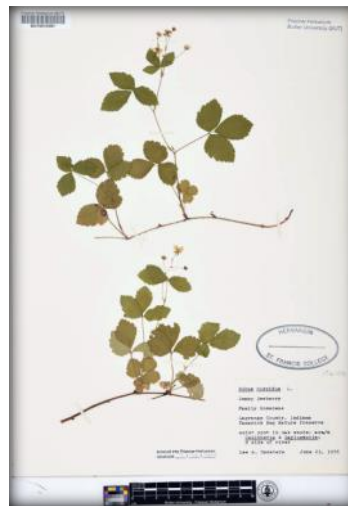
(blackberries and raspberries) in Indiana. This work is being supported by the Indiana Native Plant Society, and is the first comprehensive study of the genus focused exclusively on the Hoosier State since the time of Charles Deam before WWII.

In 2021, Mark and Scott surveyed herbarium specimens from Indiana's major collections (including those at the Friesner). At the end of 2021, they expanded their study by locating key *Rubus* collections curated in out-of-state and smaller in-state herbaria. These specimens would complement those already examined and should provide a richer sense of Indiana's *Rubus* diversity.



Visitors continued:

To work efficiently, it was important to find a central location willing to house the specimens they turned up. Marcia Moore was pleased to offer the new Herbarium facility to manage loans from sister herbaria across North America. Providing facilities in the newly renovated Gallahue Hall allowed Mark and Scott to carefully examine and annotate these specimens. A total of 1,661 specimens have been received for examination which must be carefully stored and repackaged for return when Mark and Scott have completed their work. They have visited twice so far in 2022 and are planning another stay in November. Mark and Scott's ultimate goal is to produce up-to-date descriptions, keys, and maps that both document what has been found in our state so far and guide field botanists and others interested in identifying *Rubus* species and recording their current status.



At left, *Rubus allegheniensis* (Allegheny blackberry), collected by Ray Friesner in Marion County (Bacon's Swamp), May 16, 1922.
At right, *Rubus hispidus* (Bristly dewberry), collected by Lee Casebere in LaGrange County (Tamarack Bog Nature Preserve), June 25, 1976.

Visitors continued:

Mike Homoya, retired State Botanist, co-instructor of a botany class at Marian University, brought the class to tour the herbarium and discuss herbarium techniques.

Student visitors: Biology majors in the BI111 course and students in the Botany BI302 class toured the Herbarium. Non-majors in Marva Meadows' Natural World—Plants class also toured.

Dr. Jeanne Nemeth, art professor at Herron School of Art & Design, IUPUI campus, and **Stefan Petranek**, Associate Professor of Photography and Intermedia at Indiana University's Herron School of Art & Design, visited the herbarium this summer to research native plants of Indiana for a project they are doing with the Indiana University School of Medicine Radiology Department. The project involves creating images of native plants using MRI and PET Scanning equipment. Botanical specimens will be collected and recorded using ultrasound, MRI, and CT medical scanning methodologies. A series of images will be constructed offering a glimpse into the beauty and otherwise unseeable internal structure of plant anatomy. The goal is to increase knowledge and engage the public in new ways of looking at and appreciating the natural world.

Inquiries, surveys, & requests for database information:

Questions about common milkweed (*Asclepias syriaca*) pods to promote attracting Monarch butterflies.

A Delaware botanist doing botanical surveys of the Great Cypress Swamp with Delaware Wild Lands inquiring about a specimen we have posted online of *Pluchea camphorata* that was collected in Delaware. Locality information was redacted because of the sensitive nature of the species. I was able to share information and photos with him so that he could determine that the species was instead *Pluchea odorata*.

A California botanist with the US Forest Service submitted an inquiry about a lichen species that is reported from only eight sites in California. He found one of the species of interest on our Consortium site and was requesting a loan to determine the correct identification. We had it entered as *Cetraria lacunosa* and he was able to determine it as *Platismatia lacunosa*.

A report of larch trees (*Larix laricina*) in southern Indiana, not far from Louisville. These trees have previously only been reported in northern climates. The information was passed along to the state botanist for confirmation.

A Penn State undergraduate student requested all of our data on *Cersis canadensis*, the Eastern Redbud for a research project.

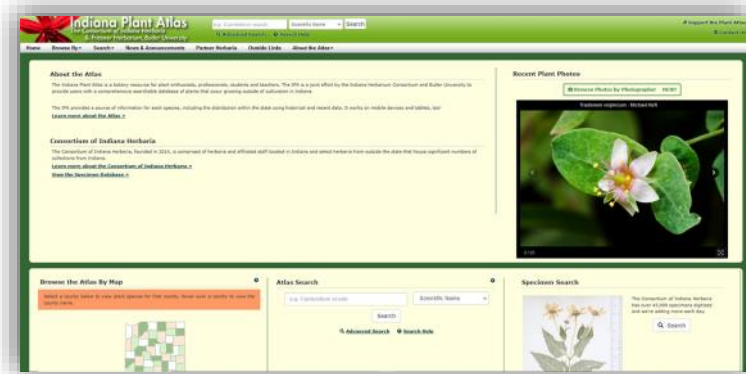
Several observations of species in areas not vouchered on our Indiana Plant Atlas. I am collecting these observations so that they may be recorded online when that feature becomes available to us.

Requests for the Tree Walk brochure which is out of publication currently. We are waiting for the end of construction and tree replanting to update this often asked for brochure. An interactive, online version is also being planned.

University of Florida Ph.D. student Evgeny Mavrodiev requested small fragments of leaf tissue from 17 collections of *Tragopogon pratensis*, all collected by Ray Friesner. The samples will be used for DNA extraction in his study.

Indiana Plant Atlas (IPA):

The Indiana Plant Atlas (IPA, <https://indiana.plantatlas.usf.edu/>) continues to be a botany resource for plant enthusiasts, professional botanists, students and teachers. The IPA compiles and presents data on county-level occurrences of Indiana's spontaneous flora, plants that grow outside of cultivation, based on records vouchered by herbarium specimens. Thousands of photos of live plants are also available on the site, along with other information on the species. The IPA currently contains over 44,000 records of data and specimen images.



Additional photos, data, and images for new voucher specimens that we acquire will be added as they become available. Google Analytics indicate that we have experienced an increase of 45% usage since we went live in 2016. We average over 800 visitors per month, with approximately 70% being new visitors to the site, many of whom access the IPA using a mobile device.

The IPA is an Indiana-specific resource that compliments and builds on other online biodiversity portals associated with the iDigBio national effort funded by the National Academy of Science. Data posted to the IPA are also published to the **iDigBio** website, and from there to the Global Biodiversity Information Facility GBIF), an international site that compiles and serves specimen data from across the globe.



Friesner Herbarium Digital Collection (FHDC):

We have completed imaging of Indiana specimens for **the Friesner Herbarium Digital Collection (FHDC) housed by Butler University**, with additions made when new deposits of specimens are placed with the herbarium. We are now in the process of imaging specimens collected from outside of Indiana—both in the United States, and in other countries.

Specimen sheets are imaged and metadata sent to Janice Gustafarro, Butler metadata librarian at Irwin Library. Images are posted online at <http://palni.contentdm.oclc.org/cdm/landingpage/collection/herbarium4>. Currently, we have about 2774 species represented, approximately 190 plant families, and 44,682 items in the digital collection. There are items from all Indiana counties and 22 countries in addition to items from Antarctica. The stats from the digital software indicate 20,934 page views during the past year.



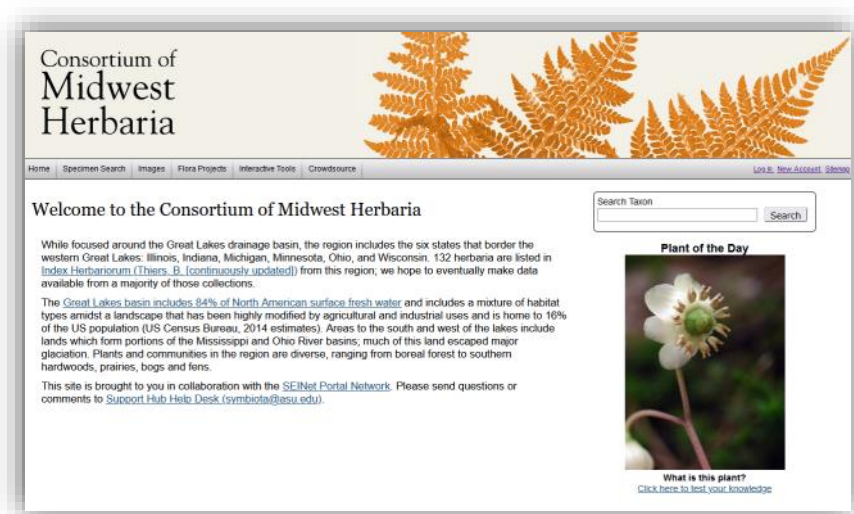
Featured in the collection: at left, Dr. Willard Nelson Clute, who arrived at Butler in 1928, standing in front of Jordan Hall. He established the Butler Botanical Garden (now Holcomb Gardens), was the co-founder of the American Fern Society, and directed mounting and filing of specimens in the BU Herbarium.



Isoetes engelmanni (Appalachian quillwort), one of Clute's early specimens collected in New York, June, 1896. The specimen on the right side of the sheet was collected by Raynal Dodge, July, 1894. The two were collecting partners and thus mounted both specimens on one sheet for comparison. This was recently imaged and added to our online collection.

Consortium of Midwest Herbaria (CMH)

The Consortium of Midwest Herbaria (CMH, <https://midwestherbaria.org/portal/>), is a specimen digitization effort focused around the Great Lakes drainage basin, including the six states that border the western Great Lakes: Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin.



Current collection statistics for our site on the CMH show that we have 53,656 specimen records, 171 families, 817 genera and 3,702 total taxa represented. As we move forward with imaging out-of-state and foreign specimens in our collection, we will directly use the Symbiota portal housed within the Consortium site to upload data and images. All specimen images will also be posted to the Friesner Herbarium Digital Collection (FHDC), under a separate link for “collected outside of Indiana.”

Butler Prairie

Dr. Andrew Stoehr, Butler Associate Professor of Biological Sciences, manages the prairie site. Marcia Moore continues to manage the prairie web pages on the Herbarium website. The prairie serves as an outdoor laboratory for classes and as a research site. Dr. Stoehr brings his ornithology students to the prairie where there are feeders set up enabling them to observe foraging behavior, and they also conduct projects looking at diversity.

In March, 2022, Dr. Stoehr and Dr. Travis Ryan, conducted a controlled burn of the prairie. “Prescribed fires” help ensure that the prairie remains a prairie, by burning off woody species that have invaded, and allowing prairie plants to germinate and grow.



Herbarium Sponsored Activities and Community Service

Marcia was asked to present a workshop to volunteers at the Central Indiana Land Trust property, Oliver's Woods, on the north side of Indianapolis. They obtained 5 of our old cabinets from our herbarium and are building a herbarium of their own. The workshop involved collection protocols, drying, mounting, and labeling specimens, and proper preservation of specimens.

Marcia continues to serve on the organizational steering committee of the **Indiana Plant Conservation Alliance (INPCA)** which was created in March, 2020 to conserve rare plants in Indiana. Working with the mission statement, ***"Collaborating to conserve Indiana's rare plants and their natural habitats,"*** INPCA is a partnership of organizations and individuals working to protect native plants, especially at-risk species, through a variety of conservation efforts.

INPCA held their first Annual Partners Meeting, held virtually in January 2022, with presentations by Rebecca Dolan (Using Genetics to Create Self-sustaining Reintroductions of Rare Plants), Rich Hawksworth (Rare Plants in the Home Landscape: Getting Up Close and Personal with Conservative Species), Jennifer Ceska (People, Imperiled Plants, and Finding Your Village: Stories from the Georgia Plant Conservation Alliance), Species Conservation Teams, and INPCA Committees. We are busy planning our second annual meeting to be held January 27, 2023, in person at Franklin College. Read about us at: <https://indiananativeplants.org/indiana-plant-conservation-alliance/>

The herbarium provided lunch for the annual ecological restoration workday in the Butler Woods, where students remove invasive garlic mustard and small bush honeysuckles. Students from Marva Meadow's non-major introductory biology classes, and Phil Villani's botany class participated.

Many phone and e-mail questions from Butler staff, students, and the public were answered, and plants were identified on request.

Other News

Marcia continues to serve on the Awards Committee of the Indiana Academy of Science, as well as reviewing submissions to the Academy's *Proceedings* in the Plant Systematics Section.

Marcia virtually attended several professional development courses offered by iDigBio and the Symbiota Support Hub:

- * Macroalgae Portal 4-week webinar series
- * Monthly workshops on various components of the digitization process
- * Collaborative Georeferencing of Herbarium Specimens
- * The Digital Data Conference: Enhancing and Advancing the Quality of Digitized Data. Held in May, this 3-day virtual conference was co-sponsored by iDigBio and the Chicago Field Museum
- * Biodiversity Digitization: Celebrating a decade of progress, co-sponsored by iDigBio and the Museum of Natural History at the Smithsonian Institution

These interactive webinars help to increase knowledge and expertise with our digitization efforts.

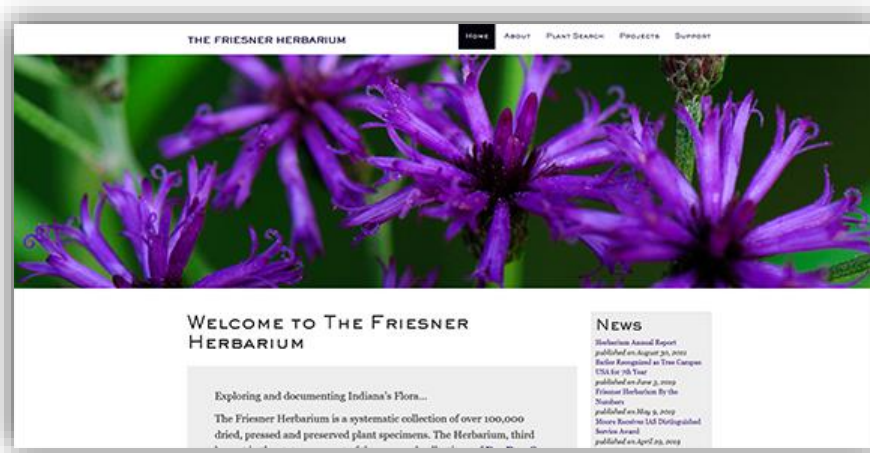
Marcia was invited to join a consortium of 40 other herbaria for submittal of a NSF (National Science Foundation) grant proposal: **SAPLING: Tree Species of the Americas: a Project Leveraging Informatics, Natural history, and Geography**. If funded, the project will digitize and mobilize images and metadata for an estimated 2.36 million herbarium specimens from North America through South America, including 266 tree genera housed in 41 U.S. herbaria.

Specifically for the Friesner Herbarium, this will involve 11,222 completely digitized specimens (i.e., databased record including geocoordinates and image) through project funding. This total includes 4,836 specimens that require complete data entry; 5,097 that require imaging, and 11,222 that require georeferencing. Some species involved in the grant proposal have already been imaged and databased, but have never been georeferenced. The project would pay for 2 student assistants to complete this work over a 3-year time period.

New and Continuing Activities for the remainder of 2022 and 2023

- Plan for resumption of the Annual Herbarium Open House during 2023 to showcase the new facility as well as the Gallahue Hall Renovation.
 - Develop a 5-year strategic plan for on-going and future projects.
 - Work with faculty to incorporate Herbarium resources in classroom, lab, and field exercises for students.
 - Foster contacts with Herbarium supporters in the community and other organizations.
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Butler University's Friesner Herbarium — exploring and documenting Indiana's flora and beyond



*Information about the Herbarium can always be found at:
<https://herbarium.butler.edu/>*