WVA Herbarium Newsletter

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Fern Grant Finale

The NSF Pteridophyte Collections Consortium grant was completed in 2023. It created a global database (pteridoportal.org) of nearly 2.5 million fern records from 36 collaborating institutions.

WVU Herbarium participation resulted in digitization (imaging and label data transcription) of all vascular non-seed specimens. These comprise 8,694 total collections, representing 695 species worldwide.

The project scope included fossils of extinct ferns, although WVU Herbarium has no paleobotanical material. This produced a combined taxonomic framework (name checklist and phylogeny) for study of fern trait evolution, as well as spatio-temporal species range analyses. Georeferenced (latitude/longitude coordinates) specimens facilitate mapping applications that can be integrated for climate change modeling.

A public crowdsourcing module provides educational impact and community science workforce options. Great appreciation goes to local volunteer Mike Breiding and to partners at UNC Chapel Hill for their efforts and expertise! An article detailing project outcomes has been submitted for publication by team leader Dr. Carl Rothfels (Utah State University).

West Virginia Digital Flora Released!
Interactive Plant Identification Program

Traditional species identification (using flora keys or other printed guide books) is often difficult, and modern image-based apps may be incomplete or imprecise. This XID software program, coauthored by Dr. Ford-Werntz and Bruce Barnes, includes all 2,600+ vascular plants of West Virginia to complement and extend the *WV Vascular Flora Checklist and Atlas* (2006).

The computer system enables a user to identify plants based on observed characteristics, entering those traits to delimit matching species (by open access key). Trait selection menus span the breadth of plant features, from general growth form through stem, leaves, flowers, fruit, and seed. Most choices only require a simple evaluation of number, size, shape, or color. Images of the characteristics and species photos supplement the interactive identification algorithm.

Once a few menu choices are picked, the software system is very effective at reducing potential compatible options. By comparing the provided descriptions and pictures to an unknown plant, the species is generally readily identified. Note that only Microsoft Windows computers and tablets are supported (no Apple version nor Android app).

Key sections include angiosperms, graminoids, conifers, and ferns, because these groups have different trait sets. There are menus of relevant features, as well as lists of genera and species. Flowering plants have categories for general characteristics (11 options), root, stem, leaf (29 options), flower (36 options), and fruit (4 options). There are separate menus for five large, specialized families, with 22 additional trait options.

West Virginia Digital Flora is available by **free** download at flora-id.org. In the upper right select 'Download Apps', then 'Flora ID for Windows'. At the bottom of the page select 'Get Flora ID for Windows PC here'. Under 'State/ Province or Region' select 'West Virginia, US' (item price of $0.00). Add it to the cart, and then checkout: your account will have a zip file to download. Open the zipped folder, run the setup file, and you are ready to explore and learn West Virginia plants!

Invasive Plants Project Completion

In its final year of U.S. Forest Service (USFS) funding, the invasive plants contract centered on Asian Jointed Grass (*Arthraxon hispidus*). Observations focused on the fruit awn (filamentous appendage), using herbarium specimens, field collections, and cultivated plants.

This species can have awnless fruit or produce short- or long-awned fruit. Awn length may be related to dispersal ability and invasive spread. Thus, geographic location and year of collection were features of interest, as well as 14 traits relative to light and moisture levels.

Measurement of study material showed mixtures between awnless and short-awned plant populations. These forms were more abundant than long-awned populations in the invasive range.

High light exposure plants performed better overall, with greatest reproductive capacity in long-awned types. However, short-awned plants did better in poor growing conditions and may be more resilient.

These findings were presented by USFS researcher Dr. Cindy Huebner at the summer Botany 2024 national meeting and at the fall 2024 Midwest Invasive Species Conference.

Curatorial Dashboard

WVU Herbarium specimens are being digitized (label data and/or image posted) in the Symbiota collections management system, located at SERNECportal.org. To date 124,161 records (of an estimated 190,000 total) can be accessed and searched remotely through the public web interface.

There are nearly 96,000 images, and 96% of the WVU Herbarium records are identified to species. These represent 6,019 taxa (including varieties) from 1,471 genera in 240 families. However, only 7% of the material is georeferenced.

User accounts exist with a variety of permission levels, enabling restrictions for data edits and redacted information. Various tools facilitate error discovery and data cleaning, as well as finding duplicate specimens. Comments can also be left with corrections or questions.