



The Lady-Slipper

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The Slender Lip Fern in Kentucky

By James Beck



A single low dolomite ledge near Cedar Creek in Bullitt County harbors one of the most unique plant populations in Kentucky. At a distance this might appear to be a population of the hairy lip fern, *Myriopteris lanosa* (Michx.) Grusz & Windham, a species known from >20 Kentucky counties. Most will probably know *M. lanosa* as *Cheilanthes lanosa* (Michx.) D.C. Eaton, a species recently transferred (along with most North and Central American species of *Cheilanthes*) to *Myriopteris* (Grusz

and Windham 2013). However, closer inspection will reveal that these Bullitt Co. ferns have smaller, nearly beadlike ultimate segments that are densely hairy underneath, keying clearly to the slender lip fern, *Myriopteris gracilis* Fée (*Cheilanthes feeii* T. Moore), in either Jones (2005) or Cranfill (1980).

As the only known *M. gracilis* locality in the state, this small population would warrant considerable attention. Further investigation would reveal, however, that it is also one of three highly disjunct populations of this species in the eastern United States. The slender lip fern is widespread in the western and central U.S., common on calcareous rock outcrops from British Columbia south to northern Mexico, from southern California east to the Ozark Plateau and the upper Midwest's "Driftless Zone" (Windham and Rabe 1993). The Bullitt Co. population, discovered by Clyde Reed in the early 1950s, represents a ca. 200 km disjunction from the nearest populations in southern Illinois (Reed 1952). The other two eastern disjunct populations are in southwestern Virginia (Wieboldt and Bentley 1982) and Durham Co., NC (Rothfels et al.

(Continued on page 6)

KNPS President's Message by Zeb Weese

As I write this it seems like the chilly weather is here to stay for while. For most of our native plants the growing season is over and it is now time to hunker down for the winter. While that slows down our field trips, it gives us a chance to focus on some other things. First up is our inaugural Kentucky Botanical Symposium at Bernheim Forest (see page 3), which will replace our standard Fall meeting. This is an effort to bring together everyone in Kentucky working on native plant issues to exchange information and ideas—professional botanists, academics, land managers and amateur enthusiasts. This will hopefully become an annual event. Our plans are to have this symposium focus on more technical and scientific issues and have Wildflower Weekend each spring remain mostly about having fun in the woods. Not that the symposium won't be fun, particularly the field trips to Pine Creek Barrens and Bernheim's glades!

The dormant season is also a great time to address some habitat issues. Winter is the best time to work on many woody invasive plants through stump cut treatments, such as bush honeysuckle, or to improve habitat for glades. The KNPS is planning a work day to help a population of white gentians on private property. We'll be sharing information on that workday as it firms up, this will be a great time for the seventy people(!) who have participated in the KNPS Stewardship Certification Program to date to put some of their classwork to use! Speaking of which, the Certification Committee is hard at work organizing the course for 2015, which will likely be held in the Louisville area. If you are interested in participating and want to get on the waiting list, please send an e-mail to certification@knps.org.

Finally, I am more than sad to say that we have lost a very important member of the KNPS family. Dr. Tom Barnes passed away at his home in early October. Our prayers are with his family. More information on Tom's contributions to the KNPS and biodiversity in Kentucky are on page 4, along with some of his stunning photography.

See you all at they symposium, *Zeb*

RENEW YOUR KNPS MEMBERSHIP FOR 2015! SEE BACK PAGE FOR DETAILS!

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The Lady-Slipper is intended to be published by the Kentucky Native Plant Society [IRC 501(c)(3)] in March, June, Sept., and Dec. Deadlines are the 10th of the prior months, but Editorial Committee members welcome article submissions at any time. Send dues and membership status inquiries to:

Kentucky Native Plant Society Membership, 801 Schenkel Lane, Frankfort, KY 40601

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The Kentucky Native Plant Society presents the inaugural
KENTUCKY BOTANICAL SYMPOSIUM



Date: October 24/25
2014

Time: 9:00 AM-4:00PM

Location: Bernheim
Forest-Garden Pavilion

Fee (per day):

\$10 members
(KNPS)

\$25 non members
(includes 1 yr KNPS membership)

What: Speakers, fields
trips, booths and displays
by native plant nurseries
and conservation groups

OCTOBER 24 (FRIDAY) SPEAKERS

9:00 am – registration/coffee and snacks

9:30- Zeb Weese, KNPS president, Heritage Land Conservation Fund Biologist-KNPS business

9:40-10:00 - Tara Littlefield, Natural Heritage Botanist, Kentucky State Nature Preserves Commission—
Overview of Kentucky's Plant Conservation Program

10-10:20- Dr. Allen Risk Morehead State University Botanist—Kentucky's least explored habitats: slanting
sandstone outcrops of Cumberland Mountain

10:20-10:40-Mason Brock-graduate student/Botanist, Botanical explorations of Austin Peay University
program botanists

BREAK: 20 MINUTES

11-11:20- Dr. Brad Ruhfel, Eastern Kentucky University Botany Professor, Herbarium curator—Plant
Diversity Research at Eastern Kentucky University

11:20-11:40-Joyce Bender-KSNPC Natural Areas Manager-Invasives/rare plant stewardship

BREAK FOR LUNCH 1:20 HOUR

1:00-1:20- Deborah White—Woods and Waters Land Trust Director-Rare plant conservation on protected
lands

1:20-1:40- Andrew Berry—Bernheim Forest Manager, Bernheim plant research and stewardship

1:40-2:00- Daniel Boone, Regional Expert Botanist-Tackling obscure groups—the herbaceous Smilax!

2:00-2:20- Dr. Quinn Long, Missouri Botanical Garden Ecologist/Botanist—Testing ecosystem reference
conditions using experimental reintroductions of an endangered plant

BREAK 20 MINUTES

2:40-3:00- Dr. Valerie Pence- Director of Plant Research. Research at the Cincinnati Zoo & Botanical Gar-
den's CREW for propagating and preserving rare plants

3:00-3:20 - Martina Hines, Vegetation Ecologist, Kentucky State Nature Preserves Commission—Recent
projects by KSNPC natural heritage ecologists

3:20-3:40 - Beverly James—Floradiff preserve manager- plant research/stewardship/bioblitz.

OCTOBER 25 (SATURDAY) FIELD TRIPS

Meet at Garden Pavilion at 9:00 AM

Field trips lead by ecologist Marc Evans and other
professional biologists to Pine Creek Barrens and Bernheim
Forest and Glades.

Advanced registration recommended. Payment at door.

Send an email to info@knps.org or call 502-573-2886 to register.

If you would like to reserve a box lunch on October 24 ONLY (\$8/Bernheim café),
prepayment is required for meal, indicate when preregistering.

Dr. Thomas G. Barnes, 1957-2014

Tom Barnes passed away on October 12 after a long battle with illness. This is a great loss to the KNPS family and the conservation community of Kentucky as well as to his loved ones. Tom was not only a former KNPS president, but a generous man who gave freely of his time and talents to this and many other conservation organizations. He regularly led field trips and gave presentation on biodiversity issues to groups of all types, from local garden clubs to the KNPS Wildflower Weekends. In many ways, Tom personified the KNPS; he was a respected academic whose invasive species management research influenced land managers in Kentucky and throughout the nation, including the graduate students he mentored, but his real passion was educating the general public about biodiversity issues. He truly loved nature for its beauty, as well as understanding its scientific importance.

An accomplished photographer, his photographs appeared in books, websites, calendars, magazines, and other outlets all over the world, including at the Chicago Botanical Garden, the Audubon Aquarium, the Smithsonian and the Bronx Zoo—but he allowed groups like KNPS free access to his photos provided they were used to educate the public on biodiversity issues.

As the wildlife extension professor in the Department of Forestry at the University of Kentucky, Tom authored more than 50 scientific research articles, 60 cooperative extension publications and 100 magazine articles, most of which focused on native plants and natural areas. His research emphasis has been on the restoration of native grasslands and his extension programs focus on the conservation of biodiversity and wildlife management.

Tom may be best known for his natural history books, many of which were co-sponsored by the KNPS. His book, *Kentucky's Last Great Places*, was nominated for the Kentucky Literary Award in non-fiction. Other published books include *Gardening for the Birds*, *The Wildflowers and Ferns of Kentucky* with Dr. Wilson Francis, *The Rare Wildflowers of Kentucky* with Deborah White and Marc Evans, *The Gift of Creation—Images from Scripture and Earth* with Norman Wirzba, and *How to Find and Photograph Kentucky Wildflowers*.

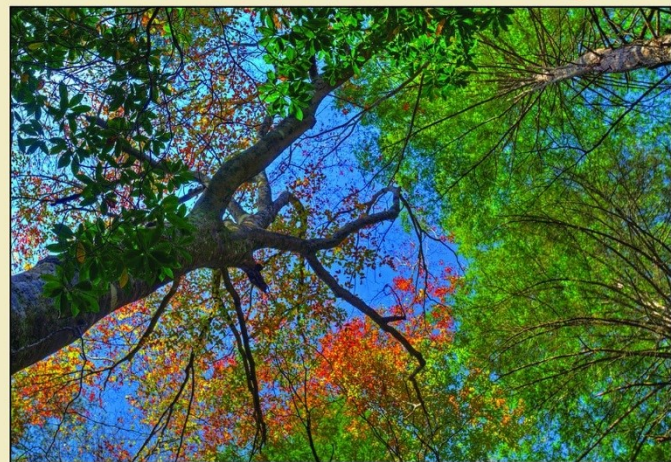
His most recent book, [Kentucky, Naturally: the Kentucky Heritage Land Conservation Fund at Work](#), was just published in July 2014. In 2003 *Kentucky's Last Great Places* also inspired the Kentucky Educational Television production of the same name, the most popular program in the network's history. Tom created and hosted another popular KET program focusing on native plants in 2007, *A Walk Through Kentucky's Wildflowers*.

A devout Catholic, he contributed to [The EcoTheo Review](#), a nonprofit effort to unite the environmental and religious communities. A memorial Mass will be conducted at the [Holy Spirit Parish Newman Center](#) in Lexington, Tuesday, October 28th at 7 P.M. Tom is survived by his wife, Jamie Barnes of Barbourville and two children, Jeremiah and Michaela Barnes both of Lexington.



KENTUCKY, *Naturally*

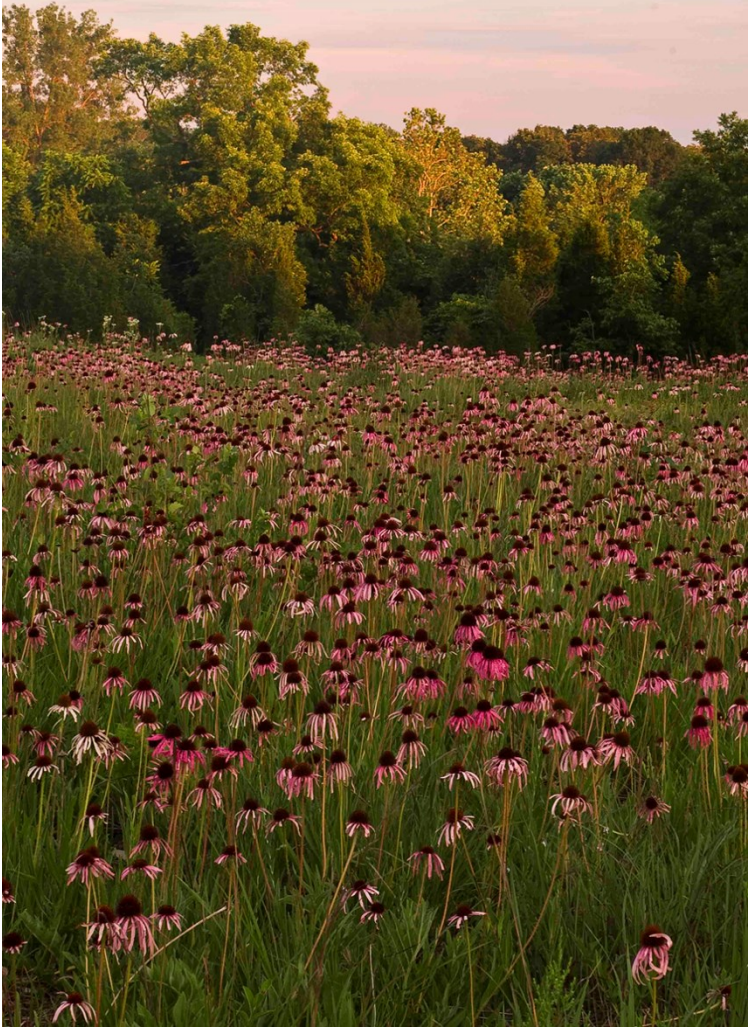
THE KENTUCKY HERITAGE LAND CONSERVATION FUND AT WORK



THOMAS G. BARNES



Baker Natural Area, photo by Thomas G. Barnes, from *Kentucky, Naturally*



Dew, photo by Thomas G. Barnes



Hazell dell Meadow, photo by Thomas G. Barnes, from *Kentucky, Naturally*



Blue-eyed marys, photo by Thomas G. Barnes, from *Kentucky, Naturally*

(Continued from page 1)

2012). These Kentucky, Virginia, and North Carolina populations add to what is already a remarkably large geographic range, a surprising level of geographic success considering that *M. gracilis* is exclusively asexual. The slender lip fern undergoes a modified meiosis that produces unreduced spores, which germinate and produce free-living unreduced gametophytes that then develop into adult sporophytes through mitosis. Because they bypass both recombination and the fusion of gametes, asexual species like *M. gracilis* are essentially genetically "frozen" lineages, with minimal opportunity to create new genetic variation. Sex and recombination are traditionally thought of as necessary for maintaining the variation needed for adaptation, and asexual species are generally considered incapable of long-term evolutionary success. However, *M. gracilis* is one of a number of asexual species that occupy wider ranges than their sexual relatives. Although these big ranges could perhaps indicate success over shorter evolutionary time scales, they could simply be biogeographic illusions. As a polyploid (triploid), *M. gracilis* could have been derived from a sexual ancestor repeatedly over time. As a result, its broad distribution could represent a single, successful lineage or a composite of several geographically smaller lineages formed at different times.

This research question is the focus of my graduate student David Wickell's M.S. thesis at Wichita State University, and we have spent the 2013 and 2014 field seasons collecting *M. gracilis* across its wide range. That is what brought me to Cedar Creek this July- the chance to visit the disjunct Kentucky population and add it to our growing genetic dataset. On the long drive east from Wichita I prepared myself for disappointment, however. Although Reed noted

that plants were "quite frequent" in his original publication, by 1980 Ray Cranfill noted only "three or four adult individuals." These plants were presumably the ones observed and photographed by Richard Cassell and the Kentucky State Nature Preserves Commission's Deborah White in 1994, although subsequent visits failed to re-locate this population. On my visit I had the good fortune of working with KSNPC's Tara Littlefield, and within 10 minutes she




Photo by James Beck

led me right to the plants! The population was healthy and sporulating but still quite small (nine adult individuals), and thorough searches of numerous nearby ledges failed to locate additional plants. Photos, geographic coordinates, and habitat notes were taken, along with a tiny amount of leaf material from one plant. DNA extracted from this material will be analyzed along with 94 samples from 20 states collected by myself, my student David, and several collaborators. From each plant we will obtain a kind of genomic "fingerprint," and the relative genomic distinctiveness of each plant will allow us to determine how many lineages are found across *M. gracilis*' range. The logic is straightforward; individuals from the same lineage are asexual clones of one another and should be essentially genetically identical. On the other hand, individuals from different lineages should exhibit considerably higher levels of genomic distinctiveness. Data from our 95-individual dataset should clearly distinguish between the two alternatives discussed earlier: that of a single successful asexual lineage, or that of many restricted, less successful lineages. The status of the KY and VA (also visited in July) populations will be particular interest. Do these two populations represent the same asexual lineage, suggesting a sort of "stepping" stone colonization? Or do they belong to different lineages, suggesting that *M. gracilis* was once more widespread and diverse in eastern North America?

Whatever secrets *M. gracilis* holds, the opportunity to visit a truly unique piece of the Kentucky flora was one this native Kentuckian will remember. Special thanks go to the KSNPC for permission to conduct sampling, to Tara Littlefield (KSNPC) for showing me the site, and to Richard Cassell, Ray Cranfill, Ron Jones, and Deborah White for insightful correspondences.



Cranfill, R. 1980. *Ferns and Fern Allies of Kentucky*. Kentucky State Nature Preserves Commission Scientific and Technical Series, no. 1. 284 pgs.

Grusz, A.L., and M.D. Windham. 2013. Toward a monophyletic *Cheilanthes*: the resurrection and recircumscription of *Myriopteris* (Pteridaceae). *PhytoKeys* 32: 49-64.

Jones, R.L. 2005. *Plant Life of Kentucky*. The University Press of Kentucky. 834 pgs.

Reed, C.F. 1952. Notes on the ferns of Kentucky, III. *Cheilanthes feei* on Silurian limestone in Kentucky. *American Fern Journal* 42: 53-56.

Rothfels, C.J., E.M. Sigel, and M.D. Windham. 2012. *Cheilanthes feei* T. Moore (Pteridaceae) and *Dryopteris erythrosora* (D.C. Eaton) Kunze (Dryopteridaceae) new for the flora of North Carolina. *American Fern Journal* 102: 184-186.

Wieboldt, T.F., and S. Bentley. 1982. *Cheilanthes feei* new to Virginia. *American Fern Journal* 72: 76-78.

Selecting a Wildflower Field Guide

by Bill Edwards

Whether you are a novice or an experienced hiker, you cannot help but notice that many wildflowers, of all colors and types, can be present many months of the year. You may have also noticed that some wildflowers seem to be blooming in different locales at different times of the year. Because there are many wildflower Field Guides available at book stores and park offices, it may seem somewhat bewildering when shopping for an appropriate reference source to carry along with you on your hiking experiences. In the following paragraphs, I will outline some possible factors you might consider before making your next purchase of a useful wildflower Field Guide.

Paper or Plastic? In today's ever evolving electronic world, your first inclination might be to ignore the printed versions of a Field Guide and immediately seek an electronic solution. Beyond the obvious fragility of plastic-encased I-phones, etc., is the unknown predictability of electronic access. In an urban setting, you will likely have reasonable, timely access to an electronic Field Guide, provided there are no sunspot flares or electric grid disruptions. However, wildflowers also grow in many natural areas without cell towers or satellite access, leaving you without any electronic sources of knowledge.

How do you intend to use the Field Guide? If you are hiking in an area you are unlikely to visit frequently, like Mt. Denali National Park, you might want to consider the purchase of a geographically limited paperback that focuses on Alaskan and alpine wildflowers. If you are someone who frequently hikes throughout Kentucky, you will likely benefit from a more comprehensive local Field Guide that includes wildflowers commonly found throughout the state: from the Mississippi River bayous; to the knobs of Shawnee Hills; to the inner Bluegrass prairies; and, to the mountainous Appalachian plateau. If you are fortunate enough to travel more widely in North America, I would suggest you utilize multiple regional Field Guides rather than attempt to carry around a heavy, bulky tome illustrating several thousand North American wildflowers.

When do you intend to conduct your hiking opportunities? There are some of us who prefer the cooler spring trails more than the hot weather of late summer hikes. If you are a decidedly sea-

sonal hiker, the purchase of a Field Guide focused on your choice of season is likely to be a more appropriate choice than one containing seasonal wildflowers you are unlikely to see. If you are a year-round, experienced hiker, a more comprehensive Field Guide will likely be a wiser choice. Bear in mind, that the more comprehensive a Field Guide book is, the more likely it is to be heavier and bulkier in your backpack.

What is your level of expertise? The targeted audiences of wildflower Field Guides range widely: from the very basic, requiring an ability to read English; to the highly definitive, requiring extensive knowledge of Latin and botanical terminology. What is that pretty, little 4-petaled white flower (see photo) found along the trails or roadsides in late spring? For hikers just becoming acquainted with the identification of wildflowers, I would recommend a field guide primarily organized by season and/or by bloom colors or both.



Unless you are already an expert in wildflower identifications, be careful not to purchase a highly technical book that requires you to know the approximate botanical family before you can identify a certain species. For instance, in the accompanying photo to this article, one could note key field marks: actinomorphic; 4-sepal calyx; 4-petal corolla; 6-stamen androecium; 2-carpel gynoecium; and a fruiting dehiscent siliqua. Why, of course, this wildflower is likely to be in the Brassicaceae tribe of the Cruciferae family, right?

Coming Attractions: In my next article, I plan to briefly overview the pros and cons of Field Guide (FG) books that can be purchased locally, and easily carried in your pocket or backpack. Absent any specific e-mail requests from KNPS members, I plan to review the following resources: Newcomb's Wildflower Guide; Peterson's FG to Northeastern Wildflowers; Carman's Wildflowers of Tennessee; Yatskievych's FG to Indiana Wildflowers; and, Barnes and Wilson's Wildflowers & Ferns of Kentucky. Did you identify the 4-petal white flower as *Alliaria petiolata*? It's also known as Garlic Mustard, an invasive exotic.





Kentucky Native Plant Society
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Frankfort, KY 40601

2015 KNPS Membership Application or Renewal

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The Kentucky Native Plant Society was founded in 1986 for everyone interested in the native plants, trees, and wildflowers of Kentucky. Plants are essential to both the well-being of our Commonwealth's natural ecosystems and our enjoyment of its unique environment. With members in Kentucky and neighboring states, the Kentucky Native Plant Society is a leader in promoting education about, appreciation for, and conservation of the native flora of our Commonwealth.