



PTERIDOPHYTE COLLECTIONS CONSORTIUM



The Pteridophyte Collections Consortium: 420 million years in 1.7 million specimens

Carl J Rothfels, Cindy Looy, Diane Erwin, **Joyce Gross**, **Amy Kasameyer**, **Edward Gilbert**, Matt von Konrat, Emily Sessa, Kimberly Watson, Richard Rabeler, Michael Sundue, Patrick Sweeney, Shusheng Hu, Robyn Burnham, Patricia Gensel, Alan Weakley & Li-Bing Zhang

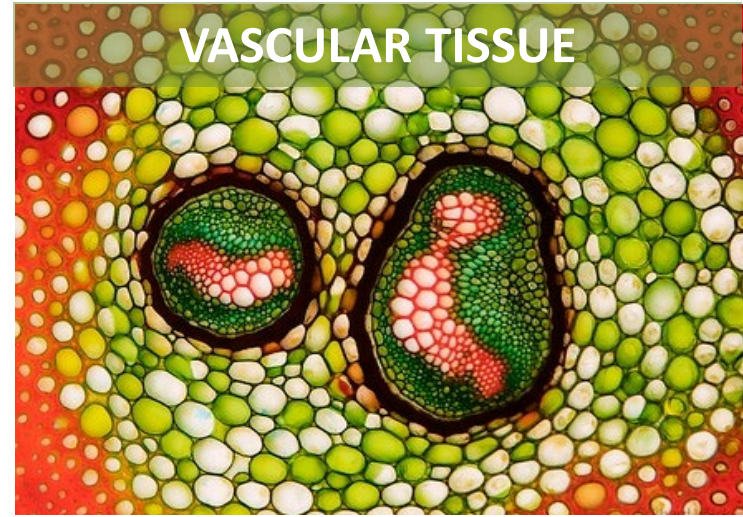




What are pteridophytes?



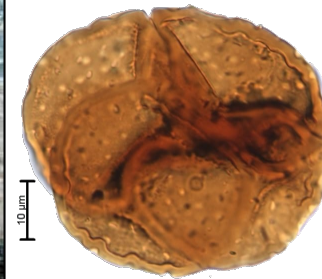
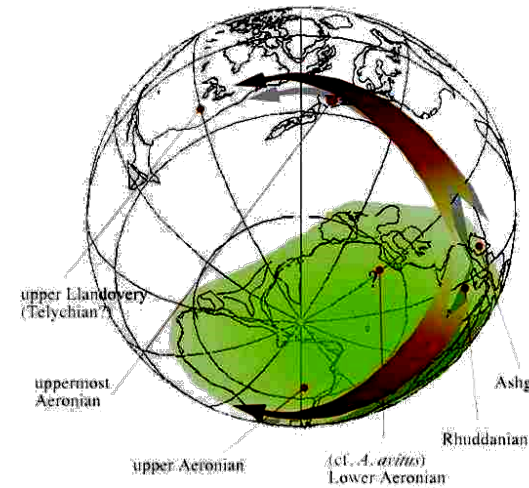
+



Ambitisporites: the spore of *Cooksonia*, the oldest known vascular land plant



Late Silurian, Naturalis



Ambitisporites, Late
Ordovician, Steemans, Liège



PALAEOBOTANY

A tree without leaves

“The newly described **Gilboa tree**, a member of the Pseudosporochnales, had no leaves and a limited root system, and displayed an economical strategy whereby a single long-lived organ, the trunk, grew vertically.”





PTERIDOPHYTE
COLLECTIONS
CONSORTIUM

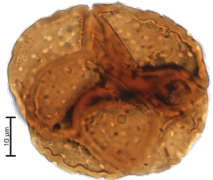
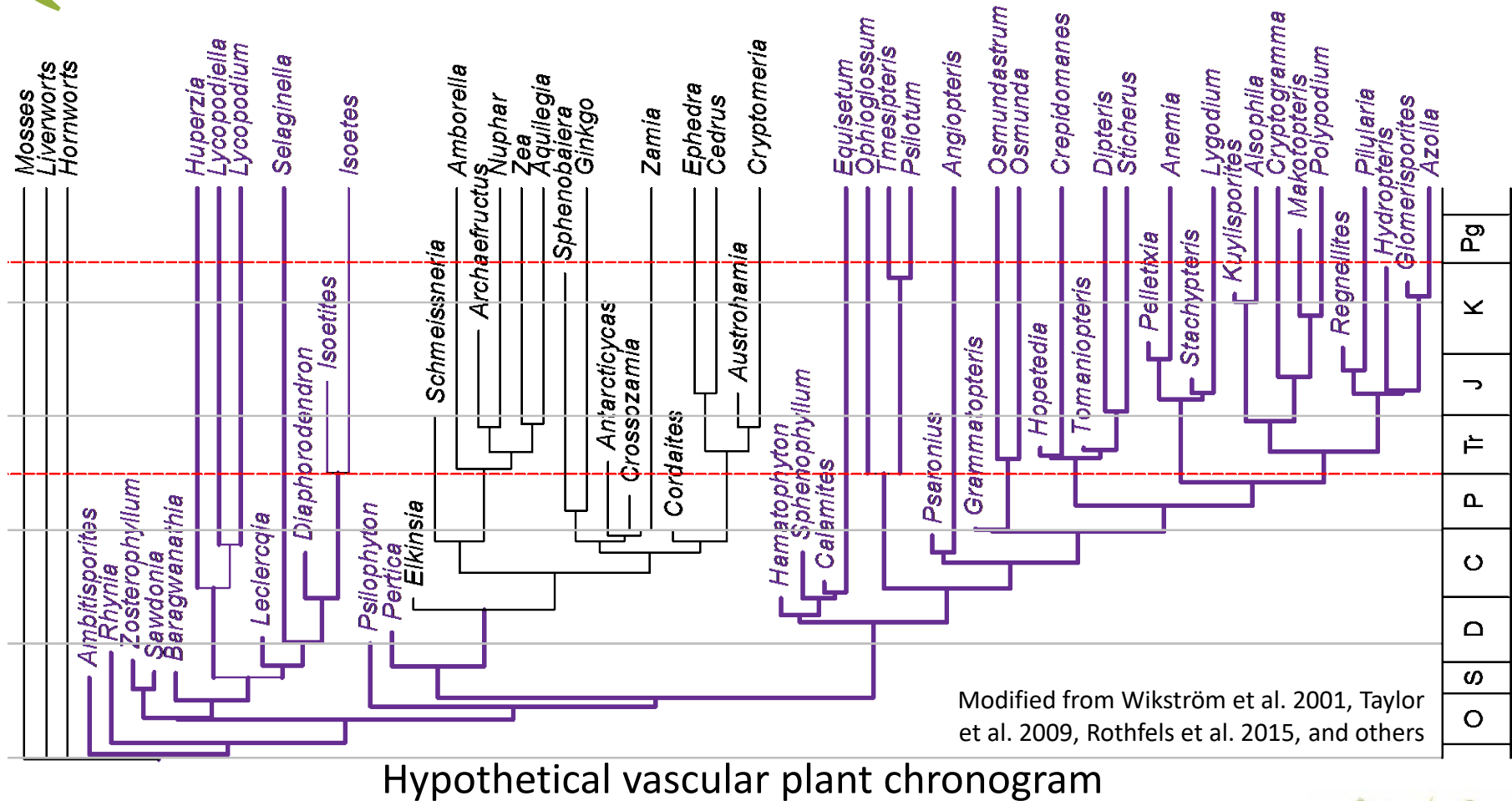
Late Pennsylvanian peat forests with arborescent
lycopods, horsetails, ferns, Hannah Bonner.



Asterophyllites, Calamites branch



Includes all the fossil and extant vascular spore plants, from *Ambitisporites* to *Azolla*



PALEO COLLECTIONS
Ambitisporites: the spore of *Cooksonia*
the oldest known vascular land plant

HERBARIUM COLLECTIONS
Azolla: an extremely reduced and
specialized freshwater fern



- 1) Establish a Pteridological Collections Consortium
 - Integrate the communities
- 2) Provide a digital portal and community focal point
 - Dissemination, visualization, and analysis of fossil and extant pteridophytes specimen images and data
- 3) Digitize **1,766,671** pteridophyte specimens
 - 100,193 fossil specimen
 - 1,666,478 herbarium specimens



Pteridological Collections Consortium

36 PCC members, 9 core institutions,
20 sub-awards and 7 contributors

University of California, Berkeley (lead institute)

Oregon State University
University of Washington
Bishop Museum
University of California, Davis*
University of Hawai'i*
National Museum of Natural History*

New York Botanical Garden

Rutgers University
University of Texas, Austin

University of Michigan

University of Minnesota
Miami University, Ohio
Ohio University*

Field Museum

University of Wisconsin
Michigan State University

Missouri Botanical Garden

University of Florida

Denver Museum of Natural History
Museum of Northern Arizona
Brown University

University of North Carolina

Duke University
Natural History Museum of Utah
Arizona State University
University of West Virginia*

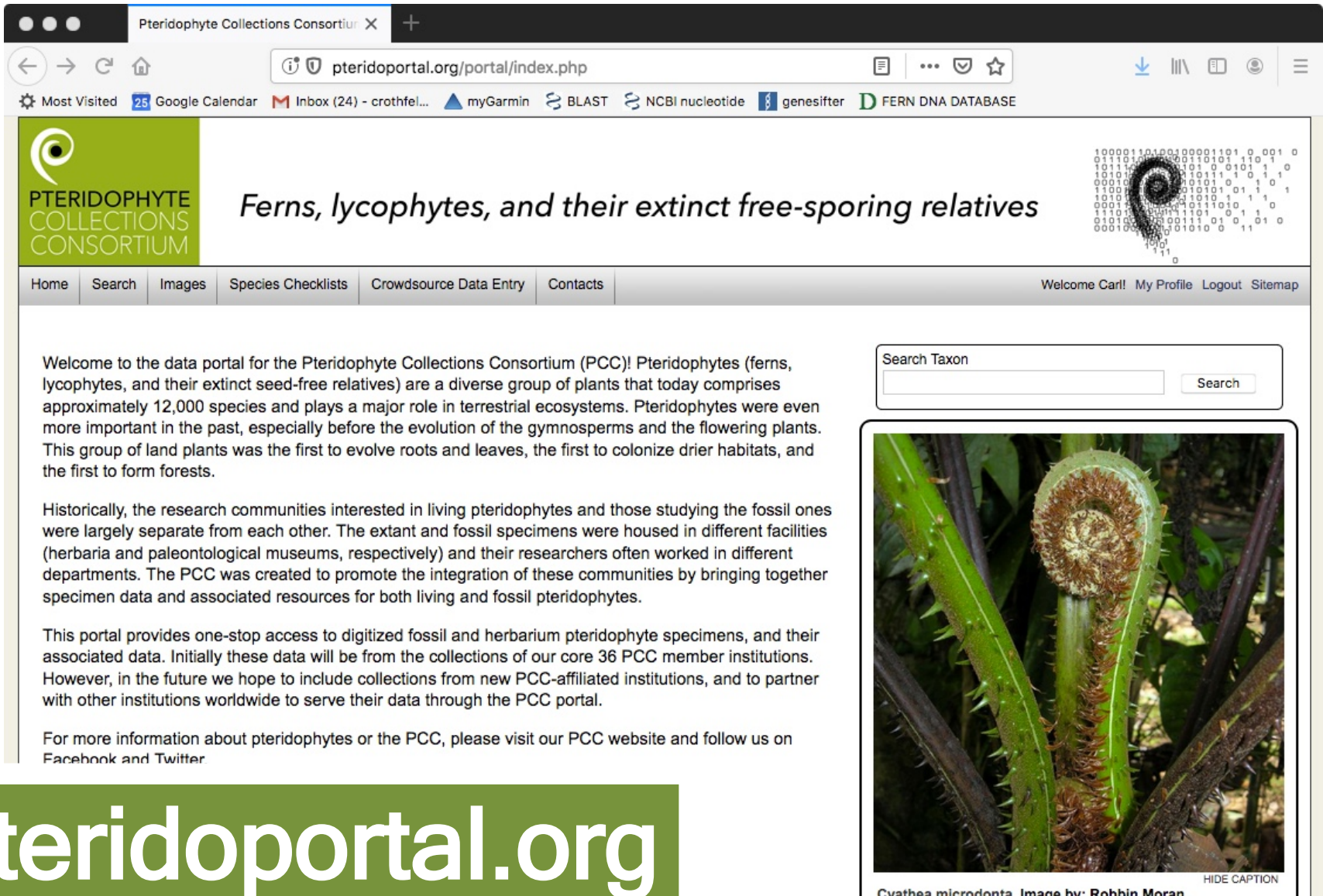
Yale University

University of Alaska
Botanical Research Institute Texas
University of Oklahoma
University of Connecticut*

University of Vermont

University of New Hampshire
Drexel University
Indiana University*





The screenshot shows the pteridoportal.org website interface. At the top, there is a navigation bar with the Pteridophyte Collections Consortium logo and the title "Ferns, lycophytes, and their extinct free-sporing relatives". Below this is a search bar and a navigation menu with links for Home, Search, Images, Species Checklists, Crowdsourcing Data Entry, and Contacts. The main content area contains a welcome message and three paragraphs of text. On the right side, there is a search box labeled "Search Taxon" and a photograph of a fern frond with a developing fiddlehead. The website footer includes the URL "pteridoportal.org" and a "HIDE CAPTION" link.

PTERIDOPHYTE
COLLECTIONS
CONSORTIUM

Ferns, lycophytes, and their extinct free-sporing relatives

Home Search Images Species Checklists Crowdsourcing Data Entry Contacts

Welcome Carl! My Profile Logout Sitemap


Welcome to the data portal for the Pteridophyte Collections Consortium (PCC)! Pteridophytes (ferns, lycophytes, and their extinct seed-free relatives) are a diverse group of plants that today comprises approximately 12,000 species and plays a major role in terrestrial ecosystems. Pteridophytes were even more important in the past, especially before the evolution of the gymnosperms and the flowering plants. This group of land plants was the first to evolve roots and leaves, the first to colonize drier habitats, and the first to form forests.

Historically, the research communities interested in living pteridophytes and those studying the fossil ones were largely separate from each other. The extant and fossil specimens were housed in different facilities (herbaria and paleontological museums, respectively) and their researchers often worked in different departments. The PCC was created to promote the integration of these communities by bringing together specimen data and associated resources for both living and fossil pteridophytes.

This portal provides one-stop access to digitized fossil and herbarium pteridophyte specimens, and their associated data. Initially these data will be from the collections of our core 36 PCC member institutions. However, in the future we hope to include collections from new PCC-affiliated institutions, and to partner with other institutions worldwide to serve their data through the PCC portal.

For more information about pteridophytes or the PCC, please visit our PCC website and follow us on Facebook and Twitter

Search Taxon Search



Cyathea microdonta. Image by: Robbin Moran. [HIDE CAPTION](#)

pteridoportal.org



Herbarium specimens in the portal:

765,587 occurrence records
258,758 (34%) georeferenced
427,912 (56%) occurrences imaged
366,688 (48%) identified to species

Total herbarium specimens digitized:

394,586 skeletal records created
337,857 fully transcribed
82,274 geo-referenced
480,563 imaged



iNaturalist specimens in the portal:

116,163 occurrence records
115,786 (100%) georeferenced
116,161 (100%) occurrences imaged
112,143 (97%) identified to species



Digitize 1,7M pteridophyte specimens

extant specimens, herbaria, iNaturalist and fossils



Herbarium specimens in the portal:

765,587 occurrence records
258,758 (34%) georeferenced
427,912 (56%) occurrences imaged
366,688 (48%) identified to species

Total herbarium specimens digitized:

394,586 skeletal records created
337,857 fully transcribed
82,274 geo-referenced
480,563 imaged



iNaturalist specimens in the portal:

116,163 occurrence records
115,786 (100%) georeferenced
116,161 (100%) occurrences imaged
112,143 (97%) identified to species

! Fossil specimens in the Portal:

1 occurrence record

Total fossil specimens digitized:

18,395 specimens databased
19,305 specimens imaged
7,648 spcm. records geo-referenced
87 localities geo-referenced

DELAY

Development Paleo Symbiota
module was more complicated
than expected

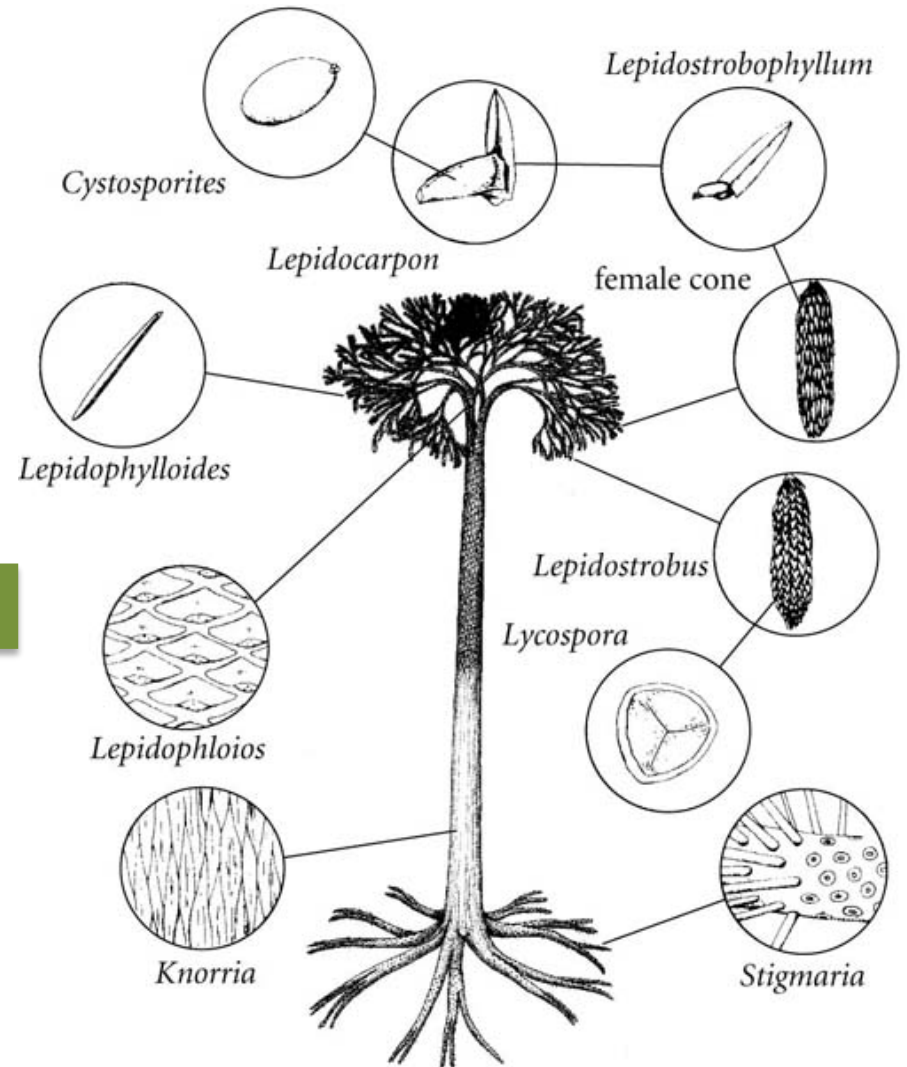
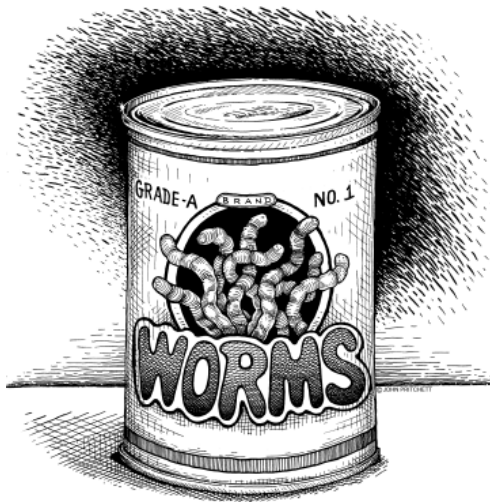
Paleo Symbiota module

Scripted from scratch by Ed Gilbert,
Darwincore compatible, currently
being tested by Diane Erwin

Occurrence Data	Determination History	Images	Linked Resources	Admin
Collector Info				
Catalog Number ?	Other Cat. #s ?	Collector ?	Number ?	Date ?
16		Chaney, R.W.		
Associated Collectors ?				Verbatim Date ?
<input type="button" value="Dupes?"/> <input type="checkbox"/> Auto search				
Latest Identification				
Scientific Name ?		Author ?		
Pteris silvicola		Hall, C.C.		
ID Qualifier ?	Family ?	Pteridaceae		
Identified By ?	Hall, C.C.	Date Identified ?	1927	
Locality				
Country ?	State/Province ?	County ?	Municipality ?	
United States	Oregon	Crook County		
Locality ?				
Grays Ranch VIII, UCMP 135; Gray's Ranch, 11 mi. E of Post, Crook Co., Oregon. 1 mi. E of ranch house and 11 miles E of Post, a group of red hills are conspicuous in a draw running S into the Crooked River Valley. The shale capping one of these hills, and more or less continuous around the draw is highly fossiliferous. This hill lies E of N of the central red and white				
Security: Locality Security ? <input checked="" type="checkbox"/> Lock Security Setting Reason: on Federal land <input type="checkbox"/> Deactivate Locality Lookup				
Latitude	Longitude	Uncertainty ?	Datum ?	Verbatim Coordinates ?
				TRRS: T16S R20E sec 36 W 1/2
Elevation in Meters ?	Verbatim Elevation ?	Depth in Meters ?	Verbatim Depth ?	
Paleontology				
Eon ?	Era ?	Period ?	Epoch ?	Stage ?
Precambrian	Cenozoic	Paleogene	Oligocene	Rupelian
Early Interval ?	Late Interval ?			
Rupelian	Rupelian			
Absolute Age ?	Storage Age ?	Local Stage ?		
	Oligocene			
Biota (Flora/Fauna) ?	Biostratigraphy (Biozone) ?	Taxon Environment (Formation Marine) ?		
Bridge Creek				
Group ?	Formation ?	Member ?	Bed ?	
	John Day			
Lithology ?				
shale				
Remarks ?				
This locality is part of Crooked River assemblage of Meyer and Manchester (1997) UC Publ. Geol. S				
Element ?	Slide Properties ?			
sterile pinnule				
Misc				
Habitat ?				
Substrate ?				

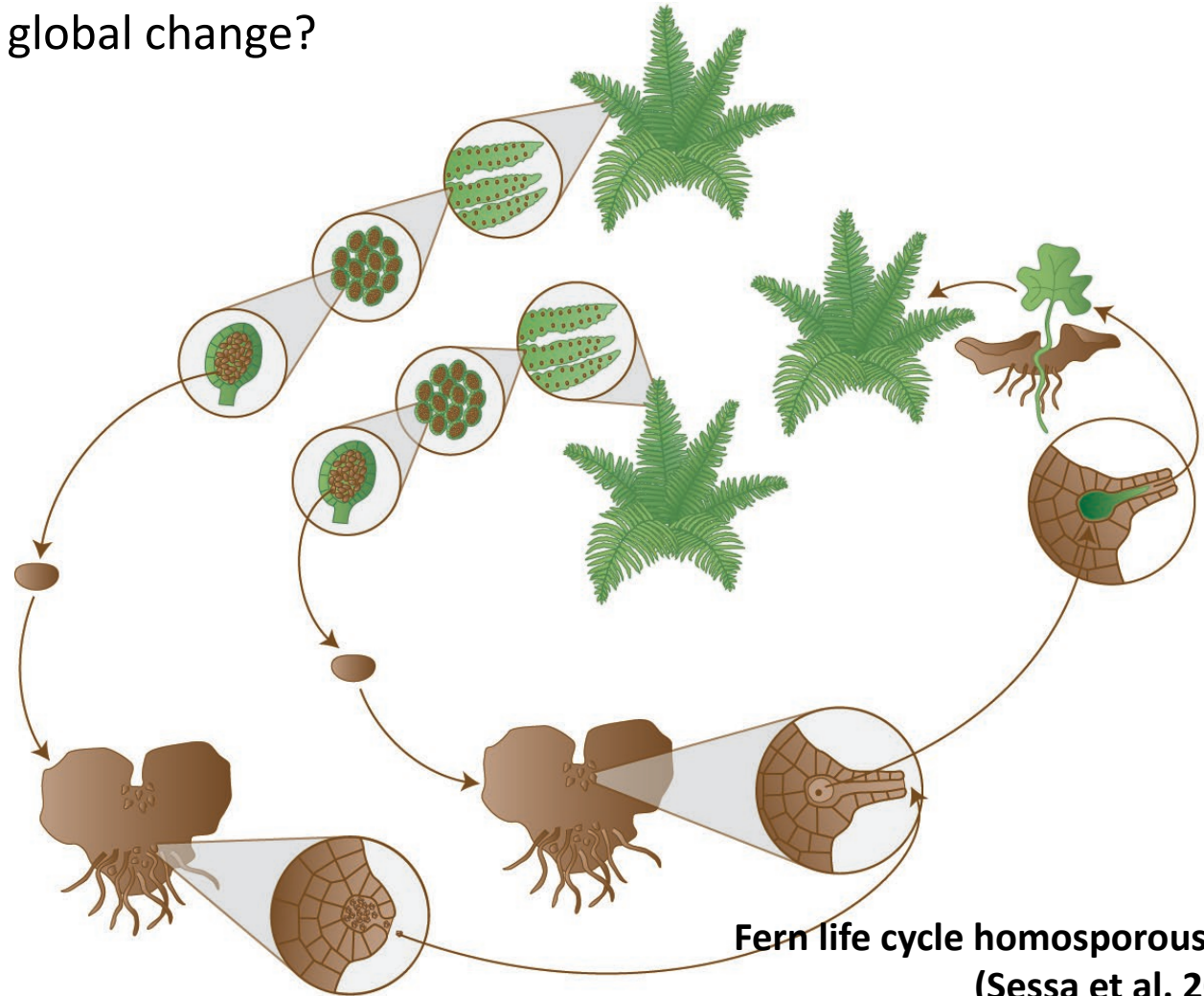


Fossil names in thesaurus



The genera *Lepidophylloides*, *Lepidostrobus*, *Lycospora*, *Lepidostrobophyllum*, *Lepidocarpon*, *Cystosporites*, *Lepidophloios*, *Knorria*, *Stigmaria* are all produced by **LEPIDODENDRON**

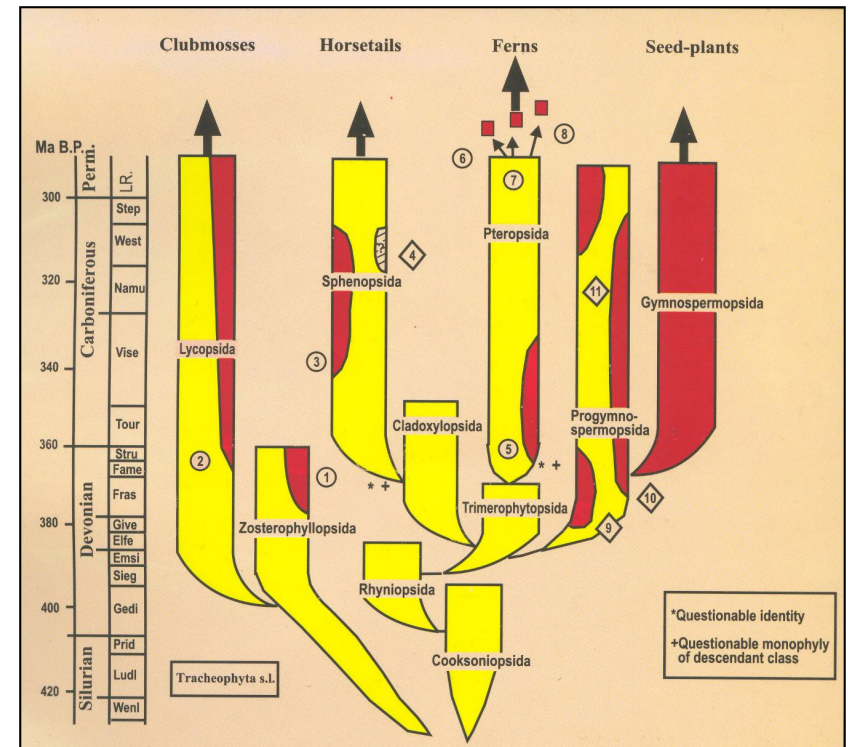
- Pteridophytes have an intimate connection to abiotic conditions, how do they respond to global change?



Fern life cycle homosporous fern
(Sessa et al. 20160)

- Pteridophytes have an intimate connection to abiotic conditions, how do they respond to global change?
- What factors influence the diversification and geographic distribution of lineages through time, e.g., heterospory?

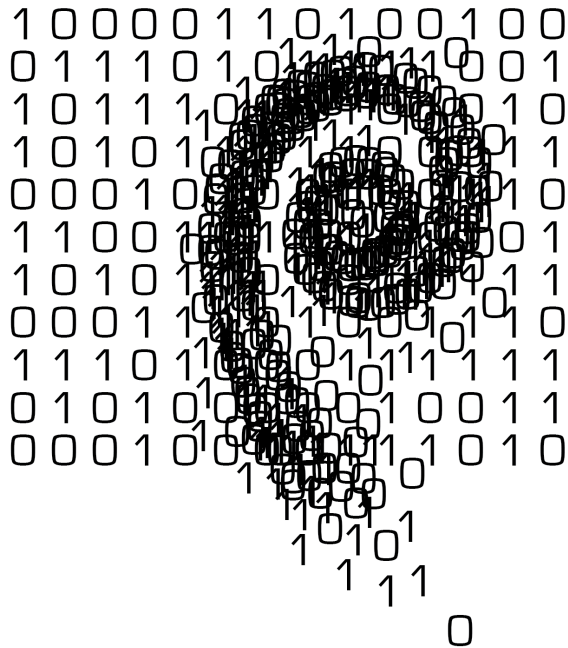
Tentative phylogeny of vascular plants showing ancestor-descendant relationships and occurrence of heterospory (Bateman and DiMichele, 1994)



- Pteridophytes have an intimate connection to abiotic conditions, how do they respond to global change?
- What factors influence the diversification and geographic distribution of lineages through time, e.g., heterospory?
- Integrating fossil and extant data to improve our understanding of the evolution of the vascular plant tree of life.



**PTERIDOPHYTE
COLLECTIONS
CONSORTIUM**



**Thanks for your attention!
Want to know more?**

**Contact the UCB team at
pteridophytes@berkeley.edu**

Or have a look at our:

Portal: pteridoportal.org

Web: pteridophytes.berkeley.edu

Twitter: twitter.com/pterido_TCN

Facebook: facebook.com/pteridophyteTCN/

