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

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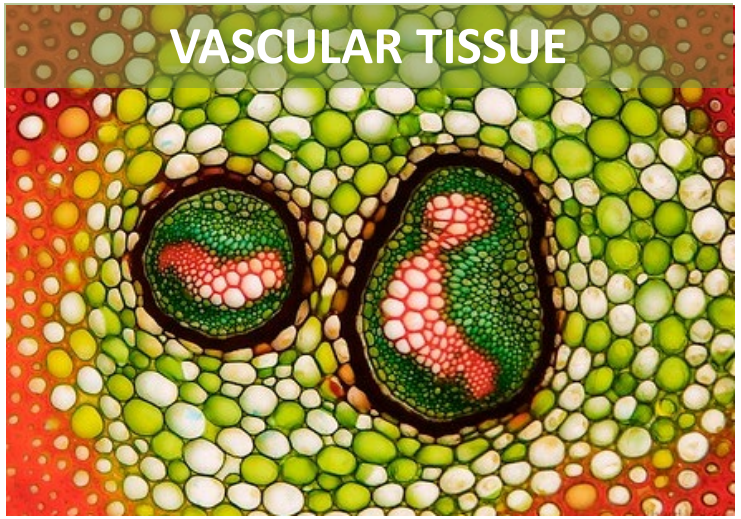
What are pteridophytes?

+



Steve Matson, Robbin Moran,, Eckhard Völcker and Diane

Images_Wes Testo;

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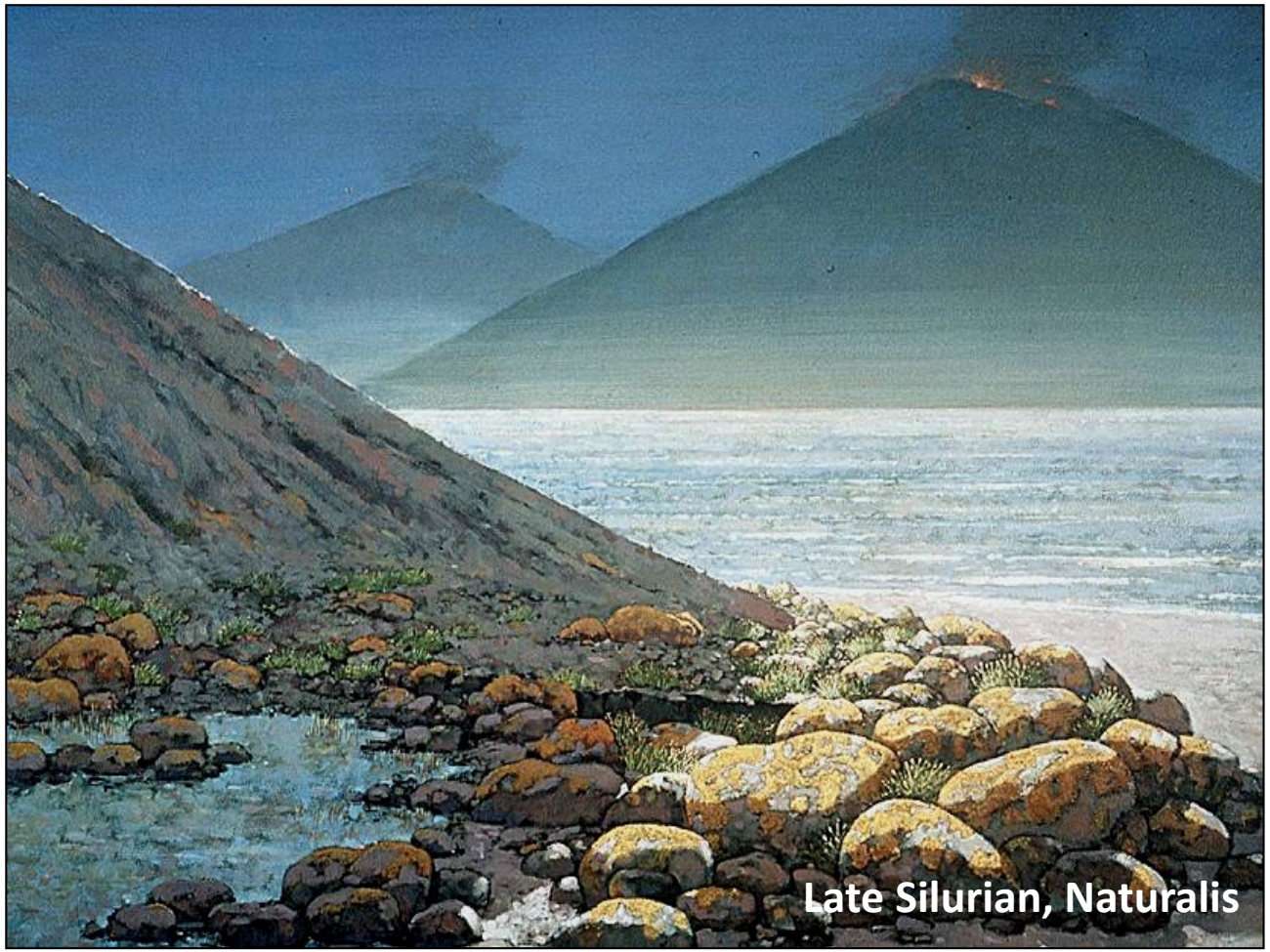
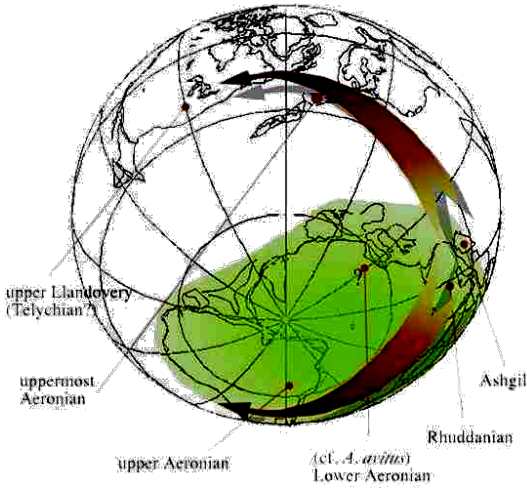
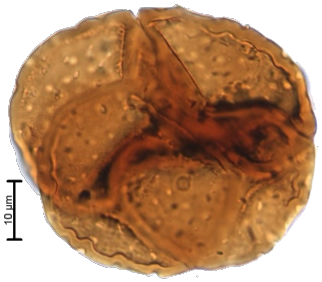
Ambitisporites: the spore of *Cooksonia*, the oldest known vascular land plant







***Ambitisporites*, Late Ordovician, Steemans, Liège**

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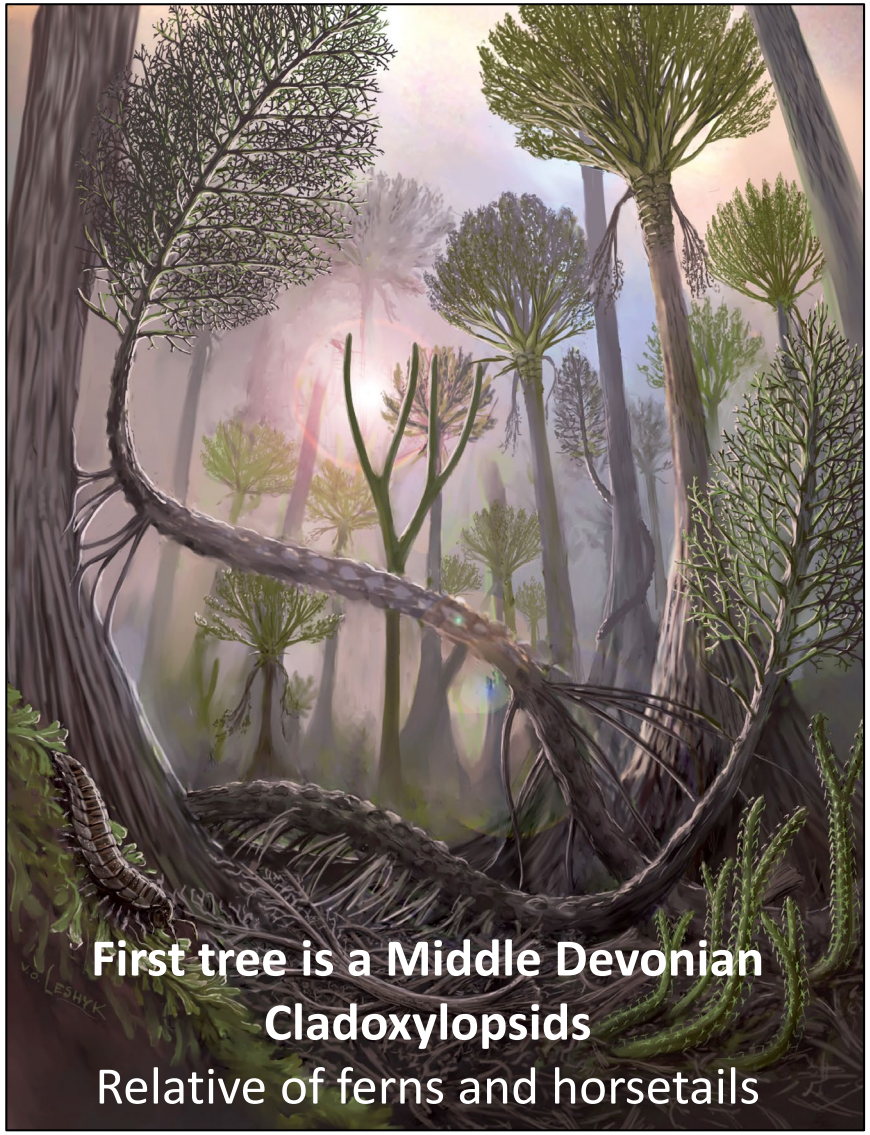
NEWS & VIEWS



First tree is a Middle Devonian Cladoxylopsids

Relative of ferns and horsetails

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."

Bill Stein

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Asterophyllites, Calamites branch

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

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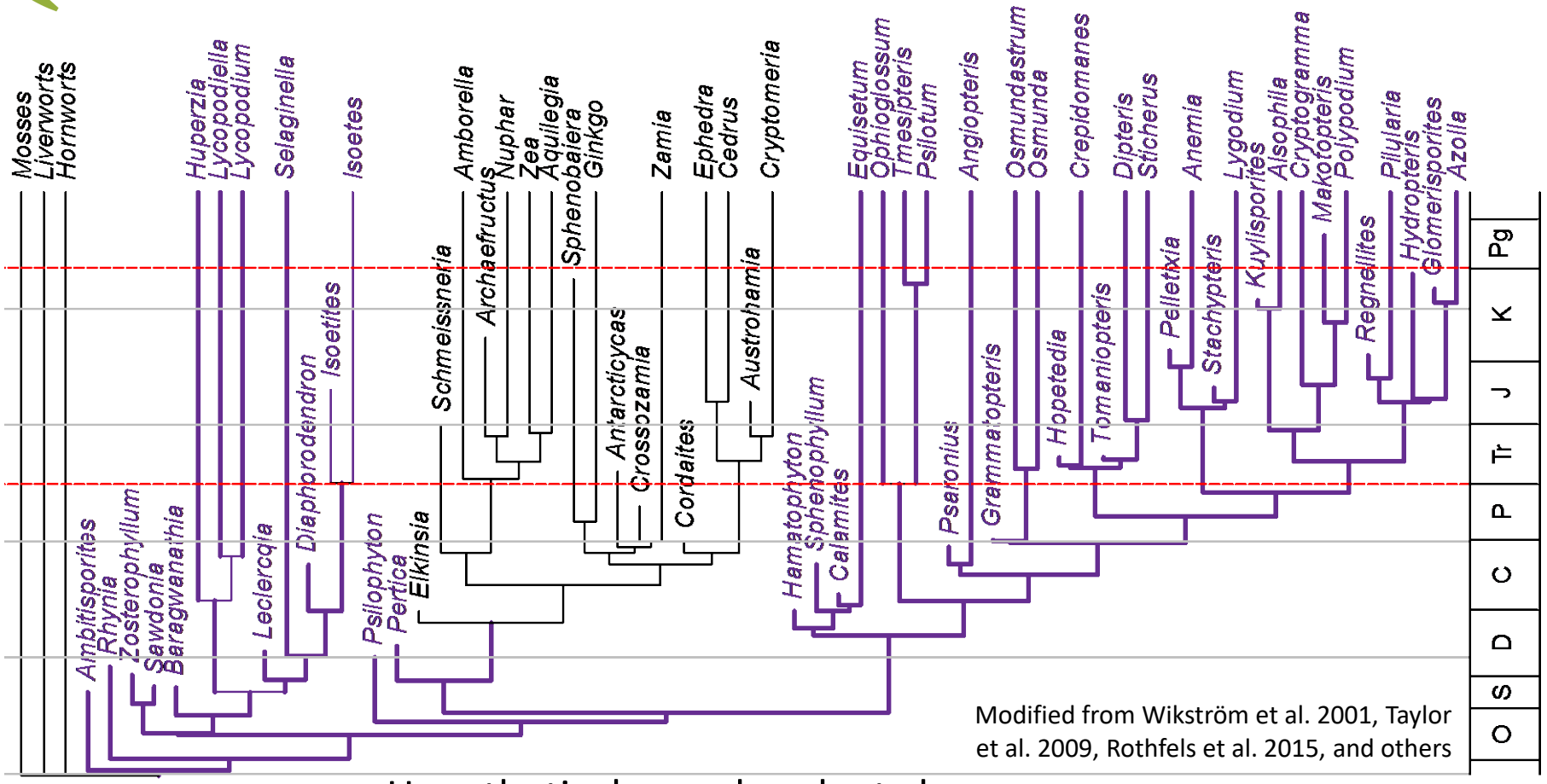
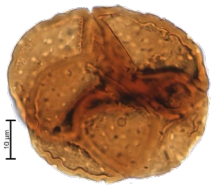
Includes all the fossil and extant vascular spore plants, from *Ambitisporites* to *Azolla*



Modified from Wikström et al. 2001, Taylor et al. 2009, Rothfels et al. 2015, and others

Hypothetical vascular plant chronogram



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

HERBARIUM COLLECTIONS
***Azolla:* an extremely reduced and specialized freshwater fern**

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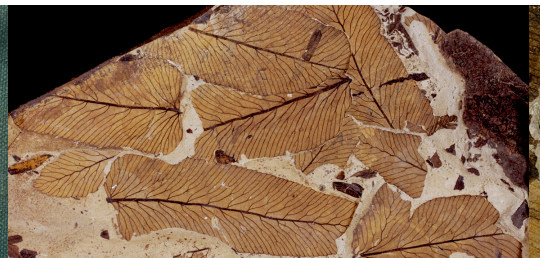
Our main goals

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

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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*

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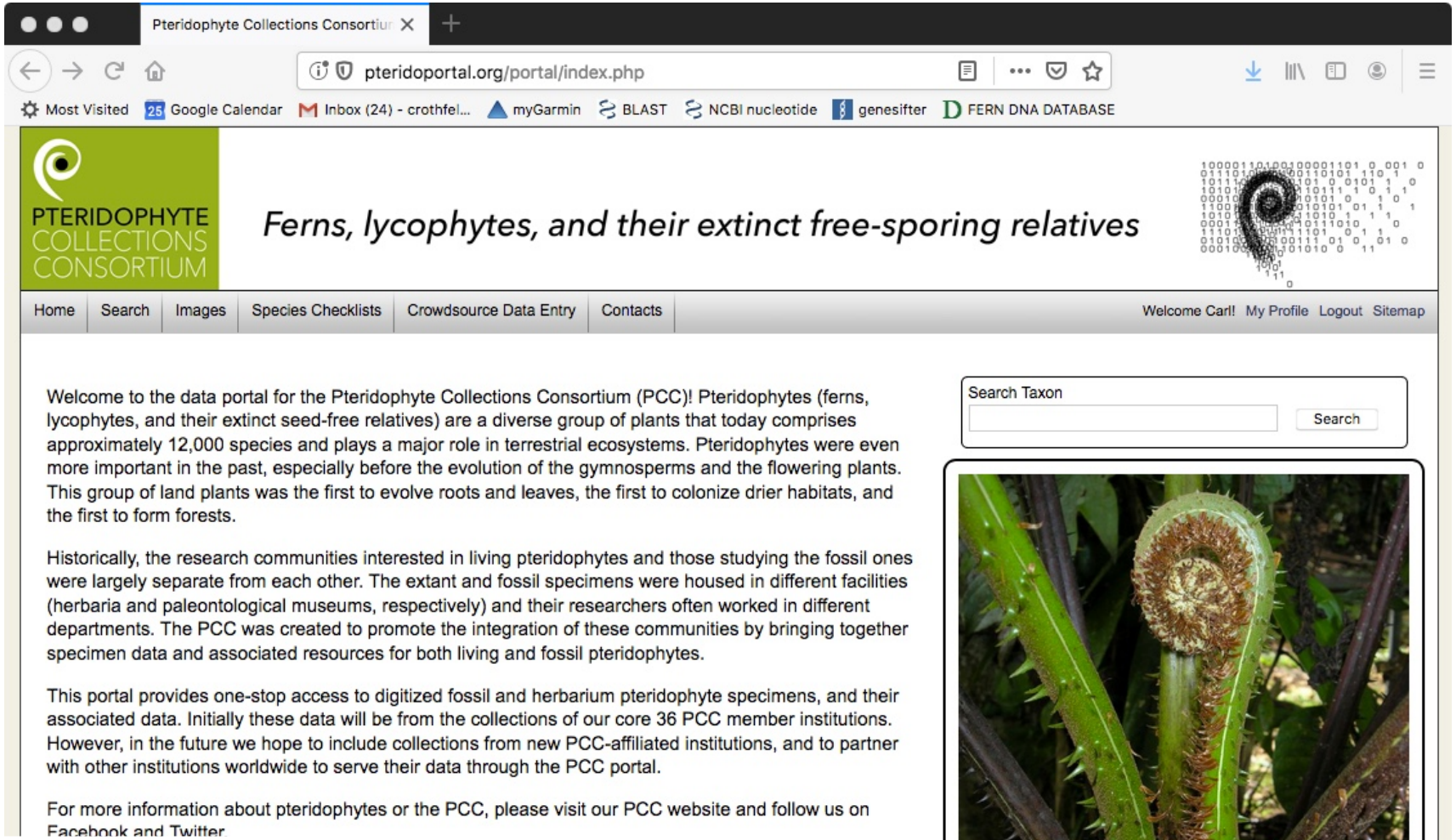
The pteridoportal

includes specimen- and observation-based biodiversity data



pteridoportal.org

PTERIDOPHYTE COLLECTIONS CONSORTIUM

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

iNaturalist specimens in the portal:

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

Total herbarium specimens digitized:

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

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iNaturalist specimens in the portal:
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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

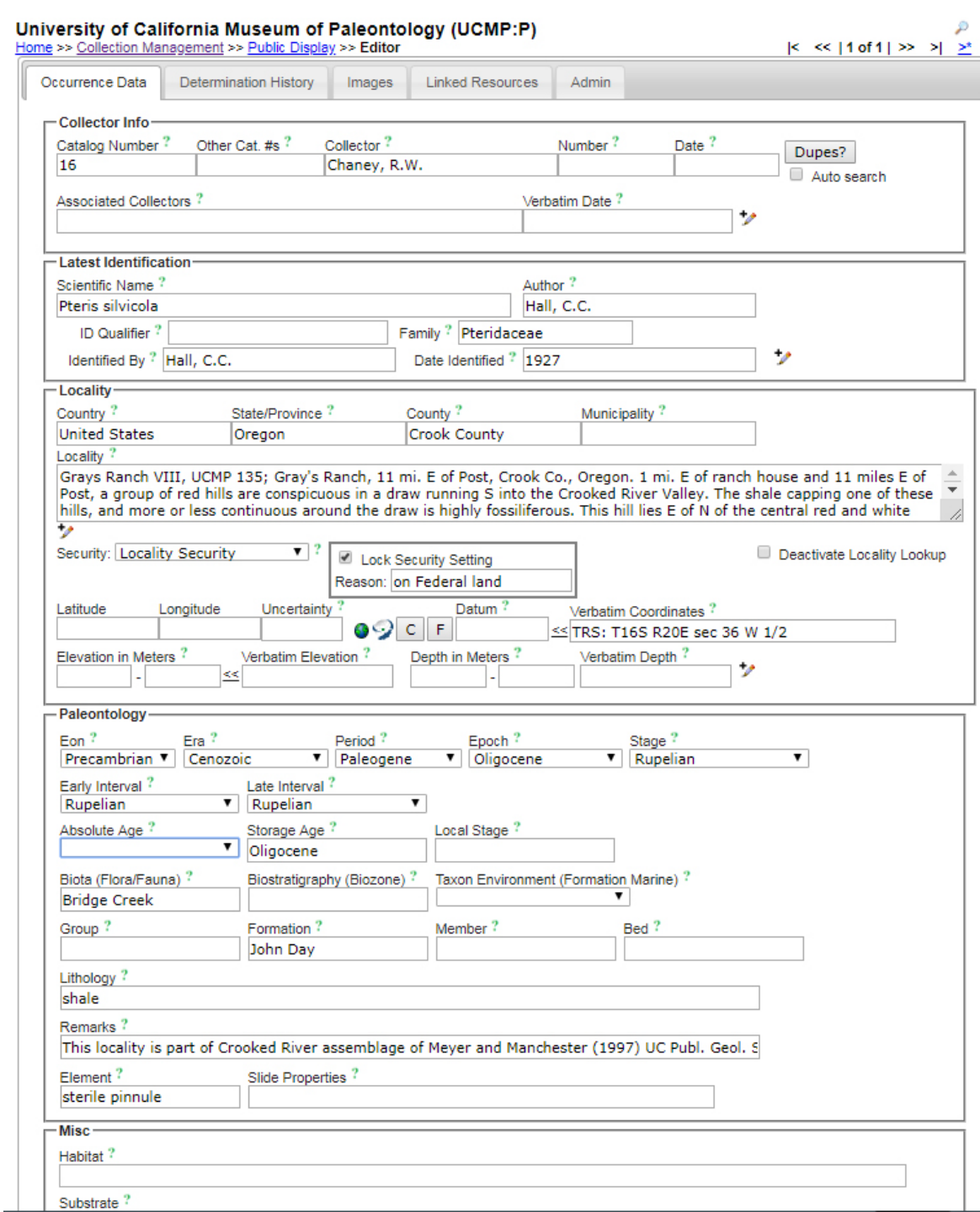
DELAY

Development Paleo Symbiota module was more complicated than expected

PTERIDOPHYTE COLLECTIONS CONSORTIUM

Paleo Symbiota module

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



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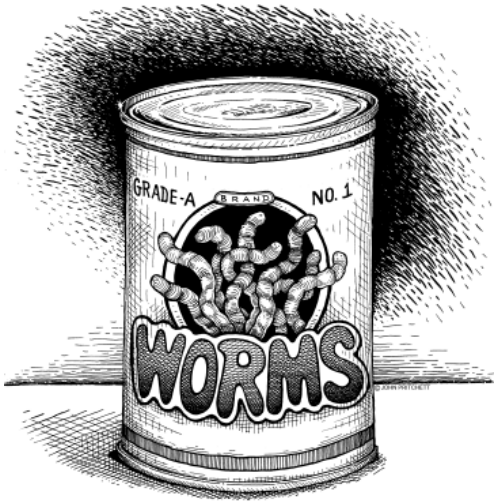
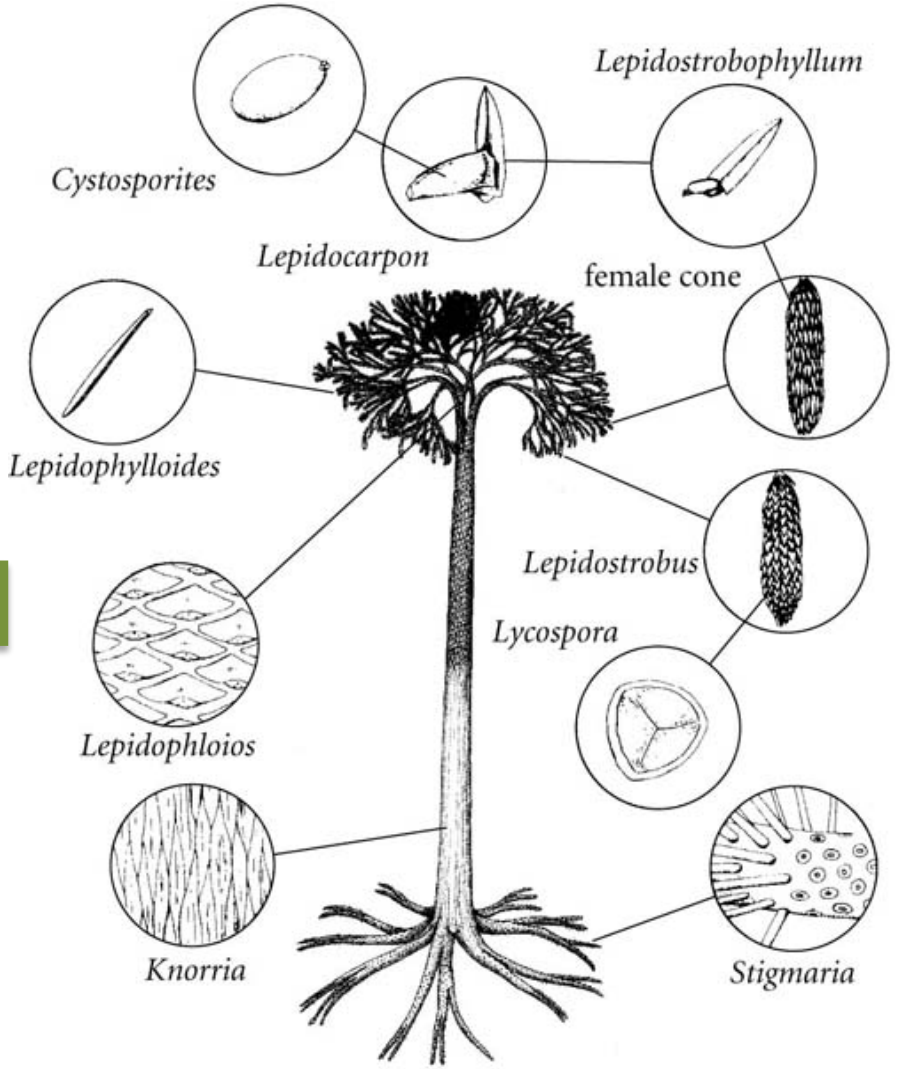
Fossil names in thesaurus



OUR PALEO



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

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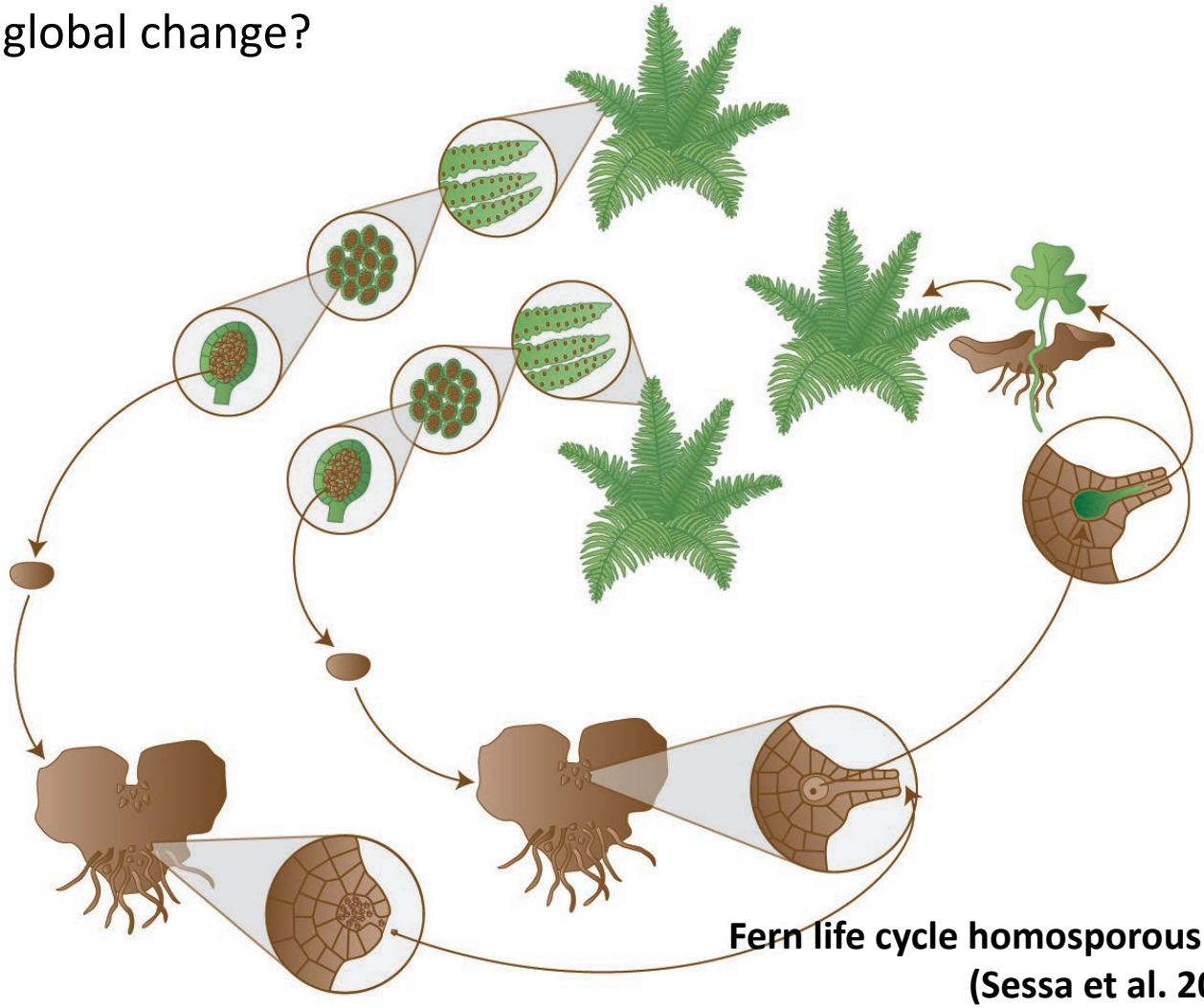
Enabling science

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



Fern life cycle homosporous fern (Sessa et al. 20160

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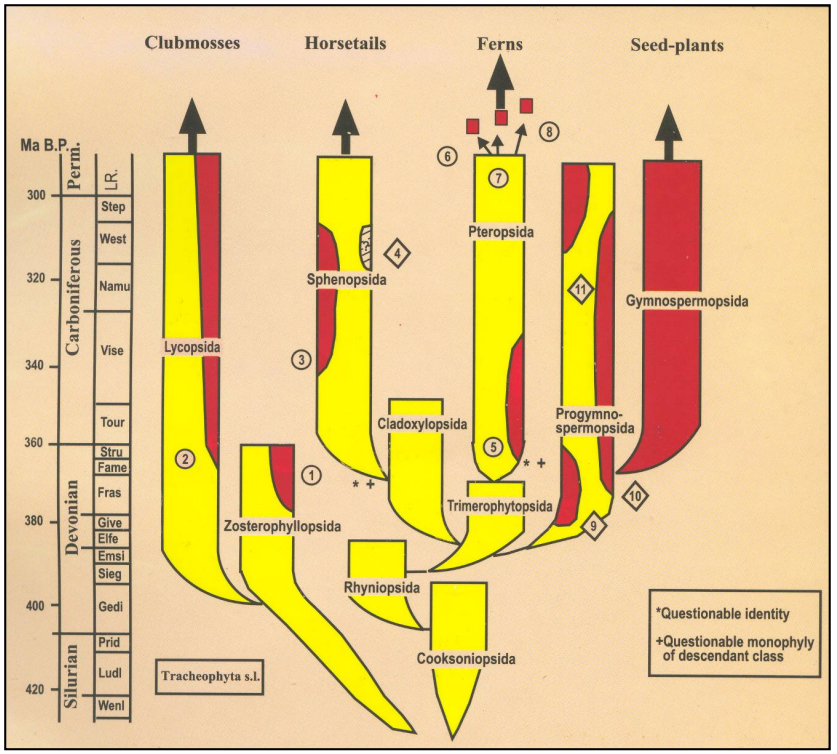
Enabling science

- 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)

PTERIDOPHYTE COLLECTIONS CONSORTIUM

Enabling science

- 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.

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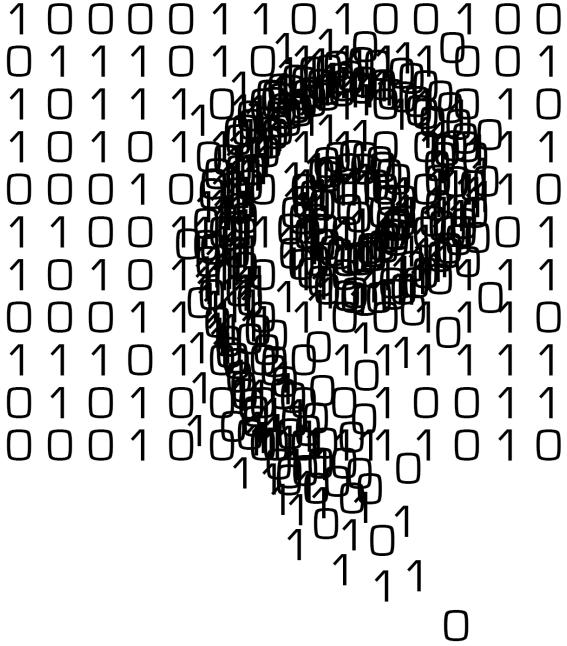

Thanks for your attention!
Want to know more?

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/