North American Mycoflora Project

Without a sequenced specimen it's a rumor

Thanks to

Bob Mara and Jean Lodge (local arrangements)

Karen Hughes (Fesin Website)

David Rust, Else Vellinga, Nathan Wilson for input into the program

NSF Research Coordination Network grant

Fungal Environmental Sampling and Informatics Network

FESIN

Photoby Clark Ovrebo: Cortinarius elegantioides Great Smoky Mountains National Park

Goals of this meeting are:

1) to outline a white paper targeted for *BioScience*

2) Create a framework to progress toward a mycoflora

Possible title for the paper:

"A North American Mycoflora – you mean we don't already have one of those?" – Erik Lilleskov

"Working toward a North American Mycoflora: an old fashioned idea, whose time has finally come"

A rough outline for the paper

- What is a mycoflora and what can it do for the scientific community?
- Why don't we have one already?
- What do we need to do to produce one?
- What tools or advantages do we have now that make it possible?
- What would a modern mycoflora look like?
- What kind of time scale and funding will be needed to accomplish it?

A rough outline for the paper

- **What is a mycoflora and what can it do for the scientific community?**
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- **What do we need to do to produce one?**
- **What tools or advantages do we have now that make it possible?**
- **What would a modern mycoflora look like?**
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http://www.northamericanmycoflora.org

North American Mycoflora Project

Without a sequenced specimen, it's a rumor

HOME | **GLOSSARY**

The long-term goal of this project is to produce a modern, comprehensive **mycoflora** of **macrofungi** for North America. This would be a resource that contains **monographic** treatments of all the macrofungi. It would provide online keys and downloadable applications, up to date distribution maps, links to macroscopic and microscopic images, and links to nucleotide sequences and phylogenetic trees. We are a long way from this goal and will need the help of everyone interested in this project to get there.

The recent push for a North American Mycoflora was been made by articles by **Matheny and Vellinga 2009**, and **Bruns 2011** in the *Inoculum*, and the call was repeated by **Bruns and Beug 2012** in *McIlvanea*. However, the idea of a mycoflora is hardly a new one (see Petersen's **short historical perspective here**). Nevertheless we have never really made a serious attempt at producing a Mycoflora in North America. In fact we have never had even a regional mycoflora for any part of the continent. However, we think that the combination of web-based tools, trained citizen scientists, and DNA sequence analysis open up the possibilities for producing the first North American Mycoflora for Macrofungi within our life times.

You may wonder how a mycoflora would be different from the field guides and foray lists already available. **Vouchered herbarium specimens** is a big part of the answer. In any monographic treatment species concepts are anchored to physical specimens. So that when one gives a species description, it is followed by a

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What will a mycoflora provide?

- Baseline data for conservation
- The first broadly based view of biogeographic patterns in North American Fungi
- A great sequence database for ecological studies
- Enhanced identification tools
- A recruitment tool for the field of mycology at both the professional and the citizen science levels

What do we need to do to create a mycoflora?

- Assemble (and scrutinize) existing herbarium records and literature
- More sampling
- Recruit and train more people
- New sequence acquisition and analysis
- Create modern monographs
- Set some realistic short-term goals and a structure to work toward long-term goals
- Find funding

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Email from Tim Baroni:

"The issue I foresee is gathering a critical mass of workers to produce such a product. North America is a big piece of real estate with a significant number of taxa yet to be described in most all groups of macrofungi."

Email from Karen Nakasone

"This is something I am interested in but never imagined that it could be done -- too many species and not enough taxonomists. But nothing ventured nothing gained, right? "

How big is the mycoflora?

Biodivers Conserv (2007) 16:37–48
DOI 10.1007/s10531-006-9108-8

ORIGINAL PAPER

Global diversity and distribution of macrofungi

Gregory M. Mueller · John P. Schmit · Patrick R. Leacock · Bart Buyck · Joaquín Cifuentes · Dennis E. Desjardin · Roy E. Halling · Kurt Hjortstam · Teresa Iturriaga · Karl-Henrik Larsson · D. Jean Lodge · Tom W. May · David Minter · Mario Rajchenberg · Scott A. Redhead · Leif Ryvarden · James M. Trappe · Roy Watling · Qiuxin Wu

Based on current names

10,000 macromycetes occur in North America and 65% are unique to the continent

Conclusions of Mueller et al 2007:

Using a list of names to estimate species is not ideal….

However the data sets for each region are often woefully incomplete and most taxonomic groups have not been recently monographed, so numerous cryptic species will likely be uncovered. Therefore, we are confident that our numbers represent very conservative estimates for macrofungal diversity in each region.

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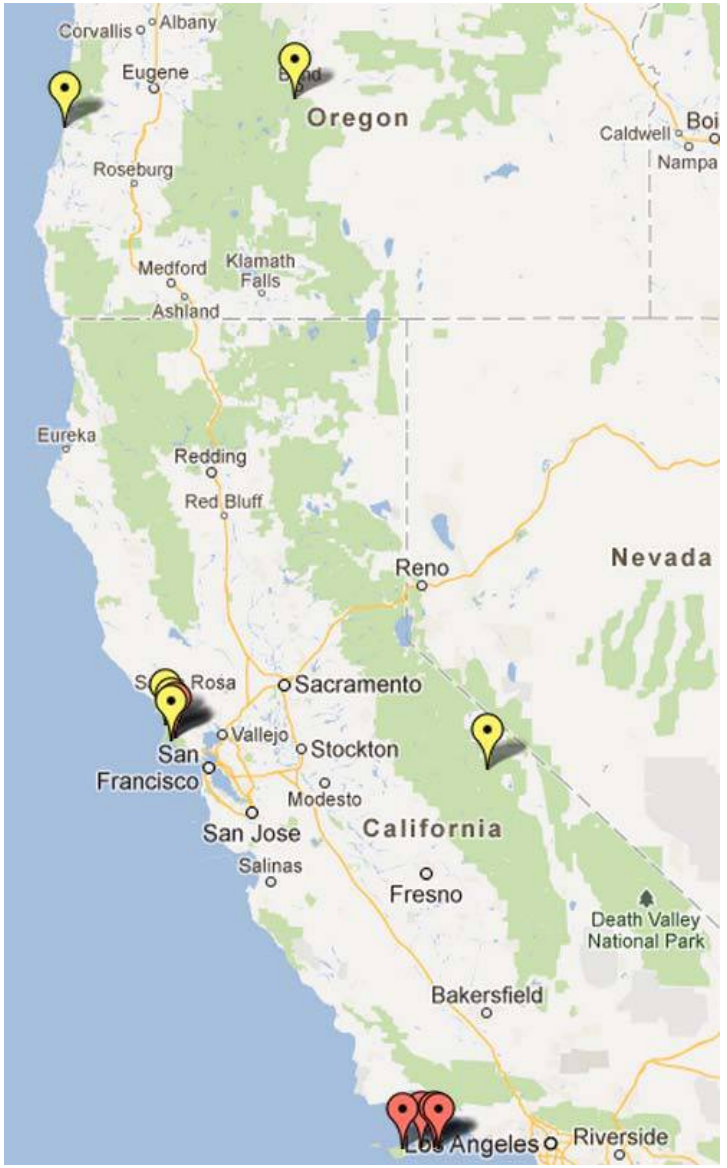
Why do we need sequences?

- Allows us to compare across regions and studies
- Allows us to connect current collections to types (and therefore correct names)
- Allows us to connect environmental sequences to organisms

Suillus quiescens - its known distribution is expanded by sequences from pine roots (yellow)



How much sequencing do we need and who will do it?

- 10,000 species X 10 accessions of each = 100,000
- We obviously want to make access to sequencing widely available
- A centralized sequencing facility that gives everyone access to the sequence analysis would be ideal.

Barcode of Life

Identifying Species with DNA Barcoding

About Community Resources Events Partners News

PUBLICATIONS

Wolbachia and DNA Barcoding Insects: Patterns, Potential, and Problems
M. Alex Smith, Claudia Bertrand, Kate Crosby, Eldon S. Eveleigh, Jose Fernandez-Triana, Brian L. Fisher, Jason Gibbs, Mehrdad Hajibabaei, Winnie Hallwachs, Katharine Hind, Jan Hrcek, Da-Wei Huang, Milan Janda, Daniel H. Janzen, Yanwei Li, Scott E. Miller, Laurence Packer, Donald Quicke, Sujeevan Ratnasingham, Josephine Rodriguez, Rodolphe Rougerie, Mark R. Shaw, Cory Sheffield, Julie K. Stahlhut, Dirk Steinke, James Whitfield, Monty Wood, Xin Zhou, 7(5): e36514, May 2 2012, *PLoS ONE*,
Discussion

A New Species of Soapfish (Teleostei: Serranidae: Rypticus), with Redescription of R. subbifrenatus and Comments on the Use of DNA Barcoding in Systematic Studies
Baldwin, C.C. & L.A. Weigt., No. 1, 23-36, Apr 3 2012, *Copeia*

UPCOMING EVENTS

17 SEPTEMBER 2012

THIRD EUROPEAN CONFERENCE FOR THE BARCODE OF LIFE (ECBOL3)
Royal Flemish Academy of Belgium for Sciences and the Arts

DEADLINES

Deadline of early-bird registration: **July 15, 2012**
Deadline of abstract submission: **August 1, 2012**
Deadline of registration: **September 1, 2012**

More Info

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4 hours ago

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PNAS

Nuclear ribosomal internal transcribed spacer (ITS) region as a universal DNA barcode marker for *Fungi*

Conrad L. Schoch[a,1], Keith A. Seifert[b,1], Sabine Huhndorf[c], Vincent Robert[d], John L. Spouge[a], C. André Levesque[b], Wen Chen[b], and Fungal Barcoding Consortium[a,2]

[a]National Center for Biotechnology Information, National Library of Medicine, National Institutes of Health, Bethesda, MD 20892; [b]Biodiversity (Mycology and Microbiology), Agriculture and Agri-Food Canada, Ottawa, ON, Canada K1A 0C6; [c]Department of Botany, The Field Museum, Chicago, IL 60605; and [d]Centraalbureau voor Schimmelcultures Fungal Biodiversity Centre (CBS-KNAW), 3508 AD, Utrecht, The Netherlands

Edited* by Daniel H. Janzen, University of Pennsylvania, Philadelphia, PA, and approved February 24, 2012 (received for review October 18, 2011)

Dear Tom

We have just received notice that our federal government has hugely reduced support to Genome Canada and this will have very great impacts on our project**. We have decided that we must focus our efforts solely on animals and plants.**

Best wishes Paul [Hebert]

What do we need to do to accomplish this?

- Assemble (and scrutinize) existing herbarium records and literature
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What Characterists Should We Strive for in a Modern Monograph?

- ✓Comprehensive, accurate, current information for the targeted taxa (easily edited)
- ✓Specimen and sequence-based, with lots of cross-links to metadata
- ✓Great keys with lots of illustrations
- ✓Lots of color images
- ✓Portable
- ✓Inexpensive to the users

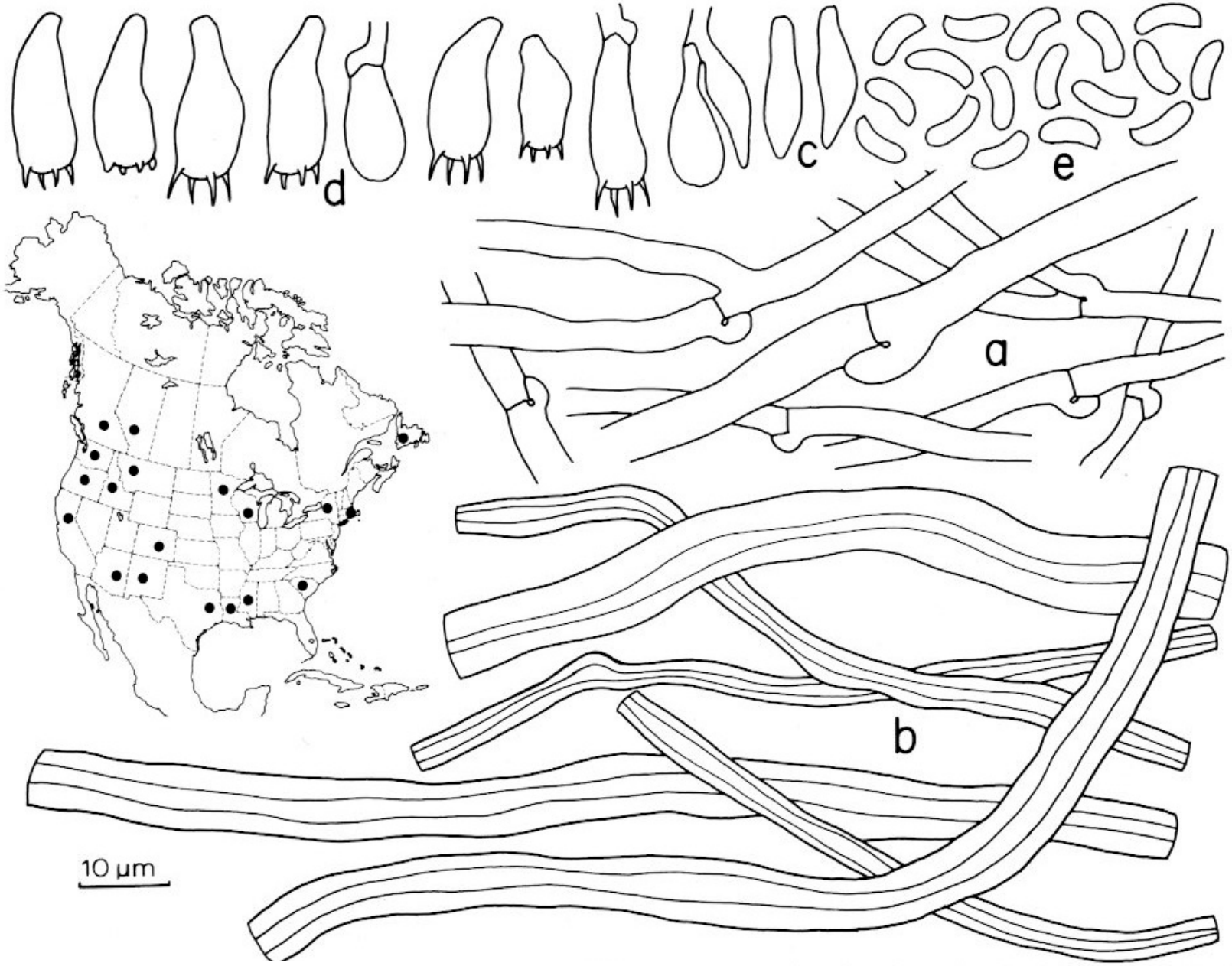

Fig. 113. *Cinereomyces lindbladii*). a, generative hyphae, b, skeletal hyphae, c, cystidioles, d, basidia, e, basidiospores.

KEY TO FAMILIES AND GENERA

1. Spores pale brown to yellowish, with an inner ornamented sporewall and a hyaline outer one ..... **Ganoderma**
1. Spores hyaline to rusty brown, with a simple wall **2**
2. Tubes separate, but closely packed ..... **Fistulina**
2. Tubes coherent, hymenophore poroid, lamellate, daedaleoid or hydnoid to strongly incised 3
3. Fruitbodies brown, becoming black with KOH, generative hyphae with simple septa, dark brown, acute setae absent or present, cystidia never present ..... **Hymenochaetaceae**
3. Fruitbodies variably colored, if black in KOH, then always with clamped generative hyphae, generative hyphae with clamps or simple septa, dark brown setae never present, cystidia absent or present ..... **Polyporaceae.**

HYMENOCHAETACEAE

1. Spores finely ornamented, fruitbodies small, pendant or stipitate, on dead wood ..... **Coltriciella**
1. Spores smooth, fruitbodies small to very large, resupinate, pileate to stipitate, on dead wood or the ground **2**
2. Fruitbody more or less centrally stipitate, usually on the ground, setae never present ..... **Coltricia**
2. Fruitbody resupinate, pileate, sometimes with a lateral, tapering base, setae present or absent **3**
3. Hymenophore hydnoid to deeply incised ..... **Hydnochaete**
3. Hymenophore distinctly poroid 4
4. Hyphal system dimitic with skeletal hyphae, fruitbodies mostly woody and perennial ..... **Phellinus**
4. Hyphal system monomitic, fruitbodies mostly fragile when dry **5**
5. Context distinctly duplex, upper loose part often separated from the lower dense part by a black zone **6**
5. Context homogeneous **7**
6. Setae absent, spores usually abundantly present, ellipsoid and pale yellowish, fruitbodies 5-20 mm thick, on living trees or plants ..... **Phylloporia**
6. Setae present, spores usually difficult to find, cylindrical and hyaline, fruitbodies 1-3 mm thick, on dead wood ..... **Cyclomyces**
7. Spores hyaline to rusty brown in KOH, pileus if present, hirsute, villose to glabrous, normally without a crust ..... **Inonotus**
7. Spores olivaceous brown in KOH, pileus glabrous and with a distinct crust, at least close to the base ..... **Aurificaria**

POLYPORACEAE, CONDENSED KEY TO MAIN SECTIONS

A. Fruitbody more or less centrally stipitate (all species with numerous pilei from a common base belong here) **1**
A. Fruitbody resupinate to pileate, sometimes with a tapering lateral base or stipe ..... **B**
B. Hymenophore irregular, hydnoid, lamellate, daedaleoid to sinuous **17**
B. Hymenophore with angular to round pores, sometimes slightly split and dentate in the dissepiments ..... **C**
C. Spores ornamented **31**
C. Spores smooth ..... **D**
D. Amyloid or dextrinoid reaction in spores, cystidia or hyphae **38**
D. No amyloid nor dextrinoid reaction in spores, cystidia or hyphae .... **E**
E. Generative hyphae with simple septa **47**
E. Generative hyphae with clamps ..... **F**
F. Tubes and context brown, purplish black, orange, brick red or cinnabar red **63**
F. Tubes and context white, ochraceous, yellow to pale brown ..... **G**
G. Cystidia present in hymenium or context **80**
G. Cystidia absent from hymenium or context ..... **H**
H. Hyphal system monomitic **85**
H. Hyphal system di or trimitic **93**

POLYPORACEAE AND SOME POROID REPRESENTATIVES FROM OTHER FAMILIES

Basidiocarps more or less centrally stipitate

1. Spores ornamented **2**
1. Spores smooth **6**
2. Spores amyloid or dextrinoid **4**
2. Spores non-amyloid **5**
3. Spores dextrinoid ..... **Diacanthodes**
3. Spores amyloid **4**
4. Spores coarsely crested, 5-8 µm in diameter ..... **Bondarzewia**
4. Spores finely asperulate, 4-5 µm in diameter ..... **Amylosporus**
5. Spores angular, fruitbody grayish to orange ..... **Boletopsis**
5. Spores globose with pitted walls (Ganodermoid) ..... **Polyporoletus**
6. Fruitbody with many pilei from a common base **7**
6. Fruitbody with a single pileus or a few fused or lobed **11**
7. Fruitbody globose with numerous small pilei, context brown ..... **Globifomes**
7. Fruitbody stipitate and branched, context white to ochraceous **8**

ANNOTATED KEY TO PACIFIC NORTHWEST POLYPORES

Prepared for the Pacific Northwest Key Council
by J. Ginns, Vancouver Mycological Society, January 2007

Pileus 2-7 x 2-12 x 1-2 cm, sessile, semicircular to conchate, surface appressed-tomentose, red; **context** red to orange-red, zonate, soft-fibrous or soft-corky; **tubes** 2-6 mm deep; **pore surface** smooth, red; **pores** 2-4 per mm, round to angular, occasionally daedaleoid. **Basidiospores** 4.5-6 x 2-3 µm, oblong-ellipsoid; **context** trimitic, **generatives** with clamps.
Color picture figure 512 in Lincoff (1994). Note 12.

Pycnoporus cinnabarinus

Michael Beug

16b Pore surface not bright cinnabar red

.....17

17a Basidiocarps resupinate or effuse-reflexed; pores large, 1-3 mm diameter, orange with white edges, soon becoming irpiciform

.....*Pycnoporellus alboluteus*

Pileus surface when present orange, rough-fibrillose; **context** orange, soft-fibrous, becoming cherry red with KOH; **tubes** 10-20 mm deep, walls orange with white, irregular, jagged edges. **Basidiospores** 6-10 x 3-4 µm, cylindrical; **leptocystidia** 50-100 x 6-12 µm, cylindrical, walls hyaline, thin; **context** monomitic; **generatives** lack clamps.
Color picture figure 747 in Lincoff (1994). Note 13.

Pycnoporellus alboluteus

Andrew Parker

SYNOPTIC KEY TO GENERA

	Basidocarp			Color of context or pore surface					Hymenophore			Black zone in context	Reddish cuticle	Glabrous crust	Hirsute-hispid
	Stipitate	Pileate	Resupinate	White-pale brown	Yellow	Red	Brown	Black	Hydnoid	Lammelate-irreg.	Poroid				
Abortiporus	●			●							●				
Albatrellus	●			●	●	●					●				
Amylocystis		●		●							●				
Amylosporus	●			●							●				
Anomoporia			●	●	●						●				
Antrodia		●	●	●							●				
Antrodiella		●	●	●							●				
Aporpium			●	●							●				
Aurificaria		●					●				●	●			
Auriporia			●		●						●				
Bjerkandera		●		●				●			●				
Boletopsis	●			●							●				
Bondarzewia	●			●							●				
Byssoporia			●		●						●				
Ceriporia			●	●		●					●				
Ceriporiopsis			●	●							●				
Cerrena		●		●						●		●			
Chaeteporellus			●	●							●				
Climacocystis		●		●							●				●
Coltricia	●						●				●				●
Coltriciella	●						●				●				
Coriolopsis		●					●				●				●
Cryptoporus		●		●							●				
Cyclomyces		●					●				●	●			
Daedalea		●		●						●					
Daedaleopsis		●		●			●			●	●				
Datronia		●					●				●	●			
Diacanthodes	●			●							●				
Dichomitus		●	●	●							●				
Diplomitoporus			●	●							●				
Donkiporia			●				●				●				
Earliella		●	●	●						●			●		
Echinodontium		●				●			●						
Echinopora		●	●								●				
Fistulina	●	●				●					●				●
Fomes		●		●							●			●	
Fomitella		●		●							●		●		
Fomitopsis		●		●							●		●	●	
Fuscocerrena		●	●				●		●		●				
Ganoderma	●	●					●				●		●	●	
Globifomes		●		●							●			●	
Gloeophyllum		●					●			●	●				●
Gloeoporus		●	●			●					●				
Grifola	●			●							●				
Hapalopilus		●	●			●	●				●				
Haploporus		●		●							●				
Heterobasidion		●	●	●							●			●	
Hexagonia		●					●				●				●
Hydnochaete			●				●		●						
Hydnopolyporus		●		●					●		●				
Inonotus	●	●	●				●				●				●
Irpex		●	●	●					●						

	Type of rot		Spores					Cystidia Setae (s).					Gen.hy.		Hyphal system			
	White	Brown	Pigmented	Amyloid	Dextrinoid	Ornamented	Thick-walled	Hymenial	Tramal	Smooth	Apically encr.	Coarsely encr.	Simple septate	Clamps	1-mitic	2 mitic/skel.	2-mitic/bind.	3-mitic
Abortiporus	●							●		●			●	●	●			
Albatrellus		●						●			●			●	●			
Amylocystis		●		●		●							●	●		●		
Amylosporus		●		●				●		●				●	●			
Anomoporia		●		●									●	●		●		
Antrodia		●						●		●				●		●		
Antrodiella	●													●		●		
Aporpium	●													●		●		
Aurificaria	●												●		●			
Auriporia		●						●			●			●		●		
Bjerkandera	●		●			●	●							●	●			
Boletopsis														●				
Bondarzewia	●			●		●	●						●		●			
Byssoporia													●	●				
Ceriporia	●												●		●			
Ceriporiopsis	●													●	●			
Cerrena	●							●		●				●				●
Chaeteporellus	●							●						●	●			
Climacocystis	●							●			●			●				
Coltricia		●	●										●		●			
Coltriciella		●	●		●						●		●		●			
Coriolopsis	●													●				●
Cryptoporus	●													●				●
Cyclomyces	●							●		●			●			●		
Daedalea		●												●				●
Daedaleopsis	●													●				●
Datronia	●													●		●		
Diacanthodes	●				●									●	●			
Dichomitus	●													●			●	
Diplomitoporus	●													●		●		
Donkiporia	●													●		●		
Earliella	●													●				●
Echinodontium	●			●		●		●			●			●		●		
Echinopora		●											●	●	●			
Fistulina	●													●		●		
Fomes	●													●				●
Fomitella	●													●				●
Fomitopsis	●													●				●
Fuscocerrena	●													●		●		
Ganoderma	●		●			●	●							●				●
Globifomes	●													●				●
Gloeophyllum		●						●		●	●			●		●		●
Gloeoporus	●												●	●	●			
Grifola	●													●		●		
Hapalopilus	●													●	●			
Haploporus	●				●	●								●				●
Heterobasidion	●					●							●			●		
Hexagonia	●													●				●
Hydnochaete	●							●		●			●		●			
Hydnopolyporus	●												●					
Inonotus	●		●					●		●			●		●			
Irpex		●							●			●	●			●		

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Leaves, Barro Colorado Island, Panama
Opuntia, New World
Tree genera, Madagascar
Trees, Shrubs & Vines, North America
Wildflowers, North America

Vertebrates

Birds, North America
Frogs & Toads, World checklist
Frogs & Toads, North America
Frogs & Toads, Panama
Lizards, North America
Mammals, North America
Marine Mammals, World
Salamanders, North America
Shorefishes, Tropical eastern Pacific
Snakes, North America
Turtles, North America

Fungi

Fungi, North America
Graphis, World
Chaetosphaeriaceae
Hysteriaceae
Tubeufiaceae
Xylariaceae

Other

Goldenrod associates
Invasives, North America
Land Snails, Jamaica
Sea anemones

Insects

Bees (over 70 guides)
Bees -- world checklist
Apoid wasps, North American checklist
Bumblebees & mimics, North America
(use Bombus guide when experienced)
Butterflies, North America
Caterpillars, North America
Cicada species, North of Mexico
Crane Fly Pests, Adult
Cricket and katydid species, North of Mexico
Dragonflies, North America
Dung Beetles, North America
Goldenrod associates
Insect orders, World
Ladybugs, North America
Leaf Beetles, Panama & Ecuador
Membracoidea -- world checklist
Mosquitoes, North America
Moths, North America · Georgia · Clarke County
Ticks, North America

Ants -- world checklist

Ants Ascension Island
Azores
Brazil
Barbados
Bermuda
Cambodia
Central America
Ecuador
Hispaniola
Hawaii
India
Indonesia
Israel
Ivory Coast
Kenya
Madeira
Micronesia
Mona Island
Navajo Nation
New Caledonia
Niue
North America
Philippines
Sabah
Samoa
St. Helena
St. Lucia
Tiputini
Tonga
Tristan da Cunha
Uganda
USNC
Vietnam

A piece of the Xylariaceae key (by Andy Miller)

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25 kinds match:
Annulohypoxylon annulatum
Annulohypoxylon cohaerens
Annulohypoxylon multiforme
Annulohypoxylon truncatum
Biscogniauxia atropunctata
Biscogniauxia marginata
Biscogniauxia pezizoides
Daldinia childiae
Hypoxylon croceum
Hypoxylon crocopeplum
Hypoxylon fragiforme
Hypoxylon fuscum
Hypoxylon howeianum
Hypoxylon intermedium
Hypoxylon lenormandii
Hypoxylon perforatum
Hypoxylon rubiginosum
Hypoxylon subgilvum
Pyrenomyxa picea
Rosellinia subiculata
Whalleya microplaca
Xylaria corniformis
Xylaria hippotrichoides
Xylaria liquidambar
Xylaria magnoliae

REMAINING (number with state)
Asci, shape
Cylindrical (24)
Globose to subglobose (1)
Ascospore, shape
Ellipsoid (24)
Subglobose (1)
KOH-extractable pigment, color
None (9)
Orange or reddish (5)
Greenish (4)
Yellow or greenish (3)
Dark brown (1)
Greenish brown (1)
Orange or greenish (1)
Yellow-brown (1)
Stromata, color
Dark colored dark brown to dark gray or black (11)
Brown colored brown to grayish-brown (7)
Reddish colored orange to red or dark

Check boxes for all that apply. If uncertain, skip character or select several states. Then click on any search button.
Navigate with above index or scroll bar.
Number scored for a state is in green.

1. **Stromata, position** search

21☐ Horizontal 4☐ Vertical


2. **Stromata, number of perithecia** search

24☐ Multiple perithecia in stromata 1☐ Single perithecium in stromata


3. **Stromata, shape** search

3☐ Club-shaped 2☐ Crust-like 2☐ Cup-like to disc-shaped 10☐ Flat and bumpy 1☐ Flat, not bumpy 10☐ Half-rounded globular mounds 1☐ Round, ball-shaped 1☐ Round, pea-shaped 1☐ Thread-like to hair-like









4. **Stromata, color** search

7☐ Brown colored brown to grayish-brown 11☐ Dark colored dark brown to dark gray or black 4☐ Purplish colored purple to purplish-brown 5☐ Reddish colored orange to red or dark red 1☐ White to gray with black dots ostioles

5. **Stromata, ostioles** search

9☐ Not distinct 16☐ Papillate 1☐ Surrounded by a poorly developed circle 1☐ Surrounded by a well developed circle 1☐ Surrounded by a white ring





6. **Asci, shape** search

24☐ Cylindrical 1☐ Globose to subglobose


7. **Ascospore, shape** search

24☐ Ellipsoid 1☐ Subglobose


What Characterists Should We Strive for in a Modern Monograph?

- ✓Comprehensive, accurate, current information for the targeted taxa (readily edited)
- ✓Specimen and sequence based, with lots of cross-links to metadata
- ✓Great keys with lots of illustrations
- ✓Lots of color images
- ✓Portable
- ✓Inexpensive for the users
- ✓Electronic

Can we connect existing web resources together to provide the platform we need?

- Herbarium databases, Mycoportal – primary repository of specimens and analytical tools for geographic information retrieval
- Mushroom Observer – primary entry of images and data for new collections
- Discoverlife.org – primary key interface
- Wikipedia or EOL – primary location for species pages
- Genbank for deposition of sequences, but here we need a database that can be annotated – with crosslinks to specimens

What do we need to do to accomplish this?

- Assemble (and scrutinize) existing herbarium records and literature
- More sampling
- Recruit and train more people
- New sequence acquisition and analysis
- Create modern monographs
- Set some realistic short-term goals
- Find funding

Email from Tim Baroni:

"Money to do this work would serve as an important factor to bring morphological taxonomists into a group effort. We basically have been pushed off of NA to tropical regions in the past two decades to obtain funding to work. Not all bad because we have been finding lots to keep us busy, but unfortunately our numbers are not growing like they need to in order to tackle such a project with any ease."

What would funding do for us

- Pay salaries for postdocs, students, and professionals to do the work and to train additional people
- Pay for travel for new collecting
- Pay for curation of the specimens
- Pay for web-related construction and upkeep
- Pay for sequencing
- Allow young taxonomists to work in North America and achieve tenure

Funding must be available for Canadian and Mexican parts of the project as well

- From Scott Redhead: "….Canada covers a rather large land mass for North America, and yet I don't see that much from Canada in the program or among the attendees."

A rough estimate of funding needs

- Assuming six regional centers for organizing and sequencing collections distributed across the continent
- Each center would need to hire a postdoc, hourly help or student support, pay for travel, pay for sequencing, pay for curation
- Conservatively $300,000/year/center; X 6 centers; = 1.8 million/year; X 10 years = 18 million

How do we find this kind of money?

- We convince others it's worth it!
- "Others" might include: NSF, Foundations, Individuals
- For existing NSF support - REU supplements, "broader impact outreach" are natural ways to tap into small amounts of money

And without additional funding what can we do?

- We can start with the pieces for which we can find money
- We can coordinate these pieces so that they fit together

North American Mycoflora Project

Without a sequenced specimen it's a rumor

Presentations Today

8:30 AM	registration and breakfast	
9:00 AM	Welcome, Introduction, and charge	Tom Bruns
9:30 AM	Mushroom Observer (and EOL) as a repository of images and metadata	Nathan Wilson
10:00 AM	Group authoring of web content - how to keep quality and accuracy high and resolve conflicts: the Wikipedia example	Daniel Mietchen (presenting remotely)
10:30 AM	Coffee break	
10:45 AM	Discoverlife.org: Modern Random-access, image-rich keys and beyond	John Pickering
11:15 AM	Assembling the existing data available in Herbaria	Barbara Thiers
11:45 AM	The Nordic Mycoflora and thoughts on making large mycofloristic projects	Henning Knudsen

1:15:00-3:00	Examples of ongoing surveys	
1:15	Great Smoky Mts. Survey	Ron Petersen
1:30	Pt Reyes & Yosemite	Else Vellinga
1:45	NAMA Voucher program	Patrick Leacock
2:00	SW mycoflora project	Scott Bates
2:15	Potential contributions towards a North American-wide Mycota from Canada	Scott Redhead
2:30	Coffee break	
2:45-3:00 PM	Discussion on Surveys	
3:00-4:45 PM	Examples of Modern monographic or regional taxon oriented work	
3:00	Agaricus	Rick Kerrigan
3:15	Rooting out Phaeocollybia: lessons learned & a second chance.	Lorelei Norvell
3:30	Russula in North America	Bart Buyck
3:45	A mycoflora for the Inocybaceae of Australia	Brandon Matheny
4:00	Large-scale barcoding of fungal collections	Todd Osmundsen
4:15-4:45	Discussion and Concluding remarks	
5:30-9:00	Dinner and social Kelly’s 196 Crown St	

Sunday Afternoon Discussion Sessions

Davies Hall

2-3:30 PM	Topics	Assigned leaders
Session 1	**Goals and Structure**	Else Vellinga, Mike Wood, Ron Petersen
Session 2	**Physical logistics (specimen/taxonomy related)**	Brandon Matheny, Scott Redhead, Roy Halling, Patrick Leacock, Lorelei Norvell
Session 3	**Physical logistics (survey related)**	David Rust. Karen Nakasone, Bart Buyck, Sharon Cantrell
Session 4	**Web and Database Issues**	Barbara Thiers, Nathan Wilson, John Pickering, Scott Bates
3:30-4:00	**Coffee**	
4-5:30	**Short summary from each group.** **Discussion of funding** **Final remarks**	

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