



The Microfungi Collections Consortium: A Networked Approach to Digitizing Small Fungi with Large Impacts on the Function and Health of Ecosystems

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What are microfungi?

Kingdom Amoebozoa

Phylum Mycetozoa

Class Myxogastria (5 orders, 14 families, 62 genera and 888 species)

Class Dictyostelia (1 order, 2 families, 4 genera, 93 species)

Kingdom Stramenipila

Phylum Oomycota (1 class, 13 orders, 25 families, 106 genera, 956 species)

Kingdom Eumycota (Fungi)

Phylum Ascomycota

Subphylum Pezizomycotina

Class Arthoniomycetes (1 order, 4 families, 78 genera, 1608 species)

Class Dothideomycetes (11 orders, 90 families, 1302 genera, 19,010 species)

Class Eurotiomycetes (10 orders, 27 families, 281 genera, 3401 species)

Class Geoglossomycetes (all macrofungi)

Class Laboulbeniomycetes (2 orders, 5 families, 151 genera, 2072 species)

Class Lecanoromycetes (all lichens)

Class Leotiomycetes (5 orders, 19 families, 641 genera, 5587 species; ~100 species of macrofungi in Leotiales)

Class Lichinomycetes (all lichens)

Class Orbiliomycetes (1 order, 1 family, 12 genera, 288 species)

Class Pezizomycetes (all macrofungi)

Class Sordariomycetes (15 orders, 64 families, 1119 genera, 10,564 species; ~1000 species of macrofungi in Clavicipitales, Hypocreales, and Xylariales)

Subphylum Saccharomycotina (1 class, 1 order, 13 families, 88 genera, 906 species)

Subphylum Taphrinomycotina (4 classes, 4 orders, 5 families, 10 genera, 140 species)

Phylum Basidiomycota

Subphylum Agaricomycotina (all macrofungi)

Subphylum Pucciniomycotina (8 classes, 18 orders, 36 families, 247 genera, 8324 species)

Subphylum Ustilaginomycotina (1 class, 3 orders, 12 families, 62 genera, 1113 species)

Phylum Blastocladiomycota (1 class, 1 order, 5 families, 14 genera, 179 species)

Phylum Chytridiomycota (2 classes, 4 orders, 14 families, 105 genera, 706 species)

Phylum Glomeromycota (1 class, 4 orders, 9 families, 12 genera, 169 species)

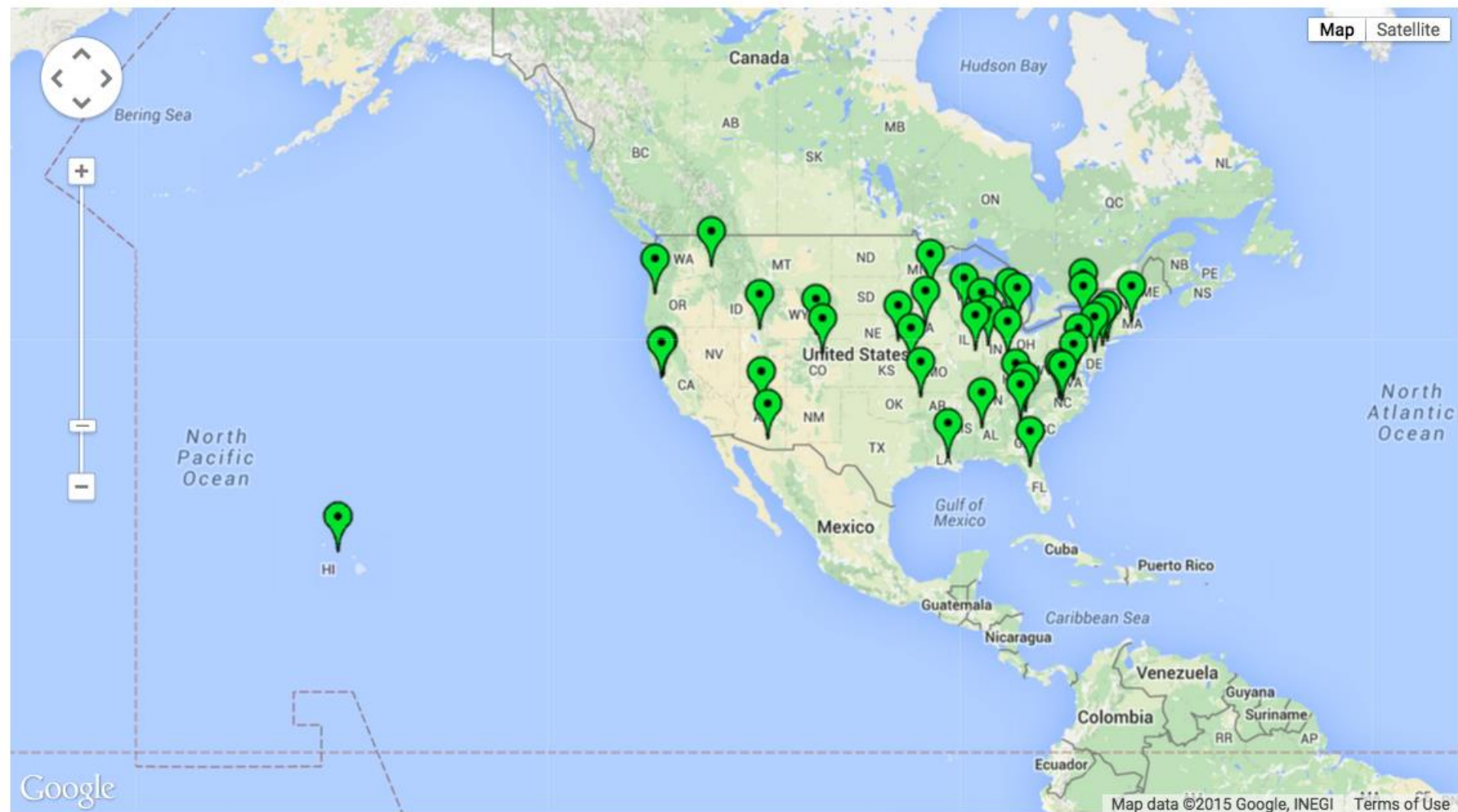
Phylum Neocallimastigomycota (1 class, 1 order, 1 family, 6 genera, 20 species)

Phylum Zygomycota (4 subphyla, 10 orders, 27 families, 168 genera, 1065 species)

~4500 genera

~56,000 species

MiCC Participants Map



- 1.2 million microfungi specimens
- 380,000 existing records
- 53,000 existing images
- 264,000 specimen slides
- 38 institutions in 31 states

| State | Institution Name and (Herbarium Code) | Specimens in MyCoPortal | Specimens Databased | Specimens to Digitize |
|-----------------------|---|-------------------------|---------------------|-----------------------|
| Alabama | University of Alabama (UNA) | 0 | 500 | 0 |
| Arizona | Rocky Mountain Research Station (FPF) | 0 | 4,622 | 0 |
| Arizona | University of Arizona (ARIZ) | 8,474 | 11,526 | 20,000 |
| Arkansas | University of Arkansas (UARK) | 0 | 40,000 | 10,000 |
| California | San Francisco State University (SFSU) | 0 | 500 | 0 |
| California | University of California (UC) | 297 | 0 | 56,500 |
| Colorado | Denver Botanical Garden (DBG) | 2,774 | 0 | 0 |
| Florida | University of Florida (FLAS) | 104 | 0 | 40,000 |
| Georgia | University of Georgia (GAM) | 0 | 0 | 40,000 |
| Hawaii | Bishop Museum (BISH) | 0 | 7,973 | 0 |
| Illinois | The Field Museum (F) | 3,898 | 6,102 | 70,000 |
| Illinois | University of Illinois (ILL/ILLS) | 37,929 | 10,177 | 55,000 |
| Indiana | Purdue University (PUR/PUL) | 0 | 96,480 | 55,570 |
| Iowa | Iowa State University (ISC) | 9,000 | 1,000 | 35,800 |
| Kansas | University of Kansas (KANU) | 0 | 2,971 | 0 |
| Louisiana | Louisiana State University (LSUM) | 945 | 0 | 10,000 |
| Maryland | U.S. National Fungus Collections (BPI) | 518,290 | 0 | 0 |
| Massachusetts | Harvard University (FH) | 7,719 | 5000 | 54,000 |
| Michigan | Michigan State University (MSC) | 0 | 0 | 31,500 |
| Michigan | University of Michigan (MICH) | 8,856 | 0 | 65,000 |
| Minnesota | University of Minnesota (MIN) | 5,569 | 931 | 50,000 |
| Nebraska | University of Nebraska (NEB); specimens digitized by University of Illinois | 0 | 2000 | 50,000 |
| New Jersey | Rutgers University (CHRB) | 0 | 0 | 40,000 |
| New York | Cornell University (CUP) | 26,590 | 60,000 | 18,000 |
| New York | New York Botanical Garden (NY) | 65,511 | 25,000 | 248,000 |
| New York | State University of New York (SYRF) | 0 | 0 | 18,000 |
| North Carolina | North Carolina State University (NCSLG) | 518 | 1,892 | 0 |
| North Carolina | University of North Carolina (NCU); specimens digitized by University of Florida | 318 | 0 | 18,000 |
| Ohio | Miami University (MU) | 0 | 0 | 50,000 |
| Oregon | Oregon State University | 10,624 | 19,376 | 0 |
| Pennsylvania | Academy of Natural Sciences (PH) | 0 | 9,335 | 32,000 |
| South Carolina | Clemson University (CLEMS); specimens digitized by University of Florida | 0 | 0 | 4,800 |
| Tennessee | University of Tennessee (TENN) | 11,170 | 5,000 | 0 |
| Utah | Utah State University (UTC) | 1,481 | 0 | 0 |
| Virginia | University of Richmond (URV); specimens digitized by NYBG | 0 | 0 | 3,000 |
| Washington | Washington State University (WSP) | 0 | 70,156 | 0 |
| Wisconsin | University of Wisconsin (WIS) | 0 | 0 | 120,000 |
| Wyoming | University of Wyoming (RM/RMS) | 0 | 0 | 28,200 |
| Totals: | | 720,067 | 380,541 | 1,223,370 |

GRAND TOTAL: 2,323,978

Data Management

MYCOLOGY COLLECTIONS PORTAL

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Welcome Andrew! My Profile Logout Sitemap

Welcome to the Mycology Collections data Portal

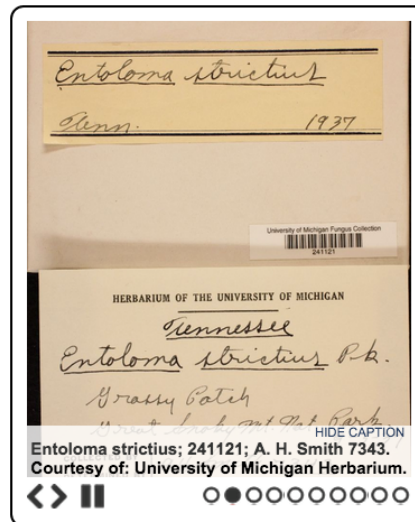
The Mycology Collections data Portal (MyCoPortal) is more than just a web site - it is a suite of user-friendly, web-based data access technologies to aid taxonomists, field biologists, ecologists, educators, and citizen scientists in the study of fungal diversity. The data are derived from a network of universities, botanical gardens, museums, and agencies that provide taxonomic, environmental, and specimen-based information. Using the Symbiota (<http://symbiota.org>) system of virtual online floras, these data are directly accessible to dynamically generate geo-referenced species checklists, distribution maps, and interactive identification keys, all linked with a rich collection of digital imagery documenting fungal diversity of North America.

Fungus of the Day



What is this fungus?

[Click here to test your knowledge](#)



News and Events

- **NSF Press Release (#15-092)** - NSF awards fifth round of grants to enhance America's biodiversity collections
- **NSF Press Release (#12-082)** - US National Science Foundation awards support for The Macrofungi Collection Consortium, a collaboration of 35 institutions in 24 states for the purpose of databasing some 1.4 million dried scientific specimens of macrofungi (NSF ADBC 1206197).
- **December 2013** - 1,546,358 occurrence records supplied by 31 different data providers have been integrated into MyCoPortal.
- **NEW** - MaCC records are now part of the Zooniverse project *Notes from Nature*. Please help us by transcribing specimen labels ([link](#)).
- Image provided by New York Botanical Garden.

Please join the Mycology Collections Portal as collaborators or regular visitors, and send your feedback to mycoportal.contact@gmail.com.

Symbiota Portals: 18 million records served through 621 collections in 22 Portals (9 TCN Portals)

Data Management

Open access of data

Management & Oversight



Gries C, Gilbert EE, Franz NM. 2014. Symbiota - a virtual platform for creating voucher-based biodiversity information communities. *Biodiversity Data Journal*, 2: e1114. doi:10.3897/BDJ.2.e1114



Research Questions

1) What are the effects of anthropogenic disturbance to the environment on the temporal and spatial distribution and phenology of microfungi?

2) Can we use historic and current distributional patterns of microfungi as models for the early detection of invasive species to reduce their potential deleterious effects? Can we use these same data to detect endemism and biodiversity hotspots in microfungi?

3) How do climatic changes influence the dispersal, distribution, and functioning of soil microfungi?

Management of the network

INHS Team



Andrew Miller
PI



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Informatician



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Tiffany Bone
Digitization
Expert



Agilda Dema
Transcriber

Management of the network

MiCC Advisory Board



Gil Nelson (iDigBio)



Barbara Thiers (MaCC TCN PI)



Greg Mueller (Chicago Botanical Gardens)



Rob Guralnick (Notes from Nature)



Ed Gilbert (Symbiota)

Management – oversight

Past Year Totals

| Institution | Object | 2014-10 | 2014-11 | 2014-12 | 2015-1 | 2015-2 | 2015-3 | 2015-4 | 2015-5 | 2015-6 | 2015-7 | 2015-8 | 2015-9 | 2015-10 |
|---|-----------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Ada Hayden Herbarium, Iowa State University | Specimens | 14 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | 150 | 446 |
| | Stage 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Stage 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | 149 | 409 |
| | Stage 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Images | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 411 | 970 |
| Arthur Fungarium, Purdue University | Specimens | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 236 |
| | Stage 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Stage 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Stage 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Images | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bernard Lowy Mycological Herbarium (Louisiana State University) | Specimens | 23 | 1050 | 341 | 218 | 112 | 0 | 0 | 2 | 0 | 0 | 1 | 245 | 208 |
| | Stage 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 2 |
| | Stage 2 | 7 | 562 | 180 | 117 | 43 | 0 | 0 | 0 | 0 | 0 | 1 | 209 | 201 |
| | Stage 3 | 15 | 482 | 155 | 100 | 69 | 0 | 0 | 2 | 0 | 0 | 0 | 22 | 2 |
| | Images | 1068 | 215 | 615 | 0 | 4154 | 7 | 5 | 24 | 1 | 0 | 1 | 0 | 415 |
| Field Museum of Natural History | Specimens | 39 | 90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 476 | 1047 | 830 |
| | Stage 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | Stage 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 246 | 405 | 276 |
| | Stage 3 | 14 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Images | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 55 | 772 | 736 |
| Julian H. Miller Mycological Herbarium | Specimens | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 559 | 765 |
| | Stage 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 660 |
| | Stage 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 559 | 105 |
| | Stage 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Images | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 592 | 1845 |
| University of Illinois Herbarium | Specimens | 156 | 203 | 71 | 0 | 0 | 0 | 0 | 31 | 6109 | 2775 | 3406 | 1017 | |
| | Stage 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 159 | 0 | 0 | 4 | |
| | Stage 2 | 154 | 164 | 71 | 0 | 0 | 0 | 0 | 31 | 80 | 0 | 1033 | 1012 | |
| | Stage 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | |
| | Images | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 15 | 8328 | 12423 | 6515 | 1362 |
| University of Nebraska State Museum, C.E. Bessey Herbarium | Specimens | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2135 |
| | Stage 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Stage 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Stage 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Images | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2135 |
| University of Wisconsin-Madison Herbarium | Specimens | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1805 | 3631 | 2423 |
| | Stage 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| | Stage 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1775 | 3609 | 2414 |
| | Stage 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Images | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 820 | 1330 |
| Wilhelm G. Solheim Mycological Herbarium | Specimens | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 195 | 349 |
| | Stage 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 194 | 349 |
| | Stage 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Stage 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Images | 0 | 0 | 0 | 406 | 0 | 0 | 442 | 0 | 0 | 0 | 0 | 0 | 0 |



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Microfungi comprise a loosely defined artificial group of Fungi and fungal-like organisms that include such things as bread molds, plant pathogens, powdery mildews, rusts, slime molds, and water molds. In general, these fungi are difficult or impossible to see with the unaided eye. A **taxonomical classification of microfungi** suggests the group contains 4468 genera and 55,989 species.

Microfungi are ubiquitous throughout the world and some cause major economic impacts as pathogens of animals, plants, and other fungi. Many **microfungi** are harmless saprobes, breaking down large complex chemical structures such as lignin found in wood into usable simple compounds. Despite their importance, little is known about the diversity, distribution, ecology, or host relationships of microfungi throughout the United States.

The Microfungi Collections Consortium (MiCC) is a collaborative effort among **38 US institutions** to digitize specimen label data from 2.3 million North American microfungi specimens and make these data available online to the broader community through the **MyCoPortal** website. A proposal submitted in October 2014 to the National Science Foundation's **Advancing Digitization of Biodiversity Collections** program was **granted in July 2015**. **Dr. Andrew N. Miller** of the **Illinois Natural History Survey** serves as the Project Leader.

www.microfungi.org



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Microfungi Community

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68 post reach this week

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ABOUT

Microfungi comprise a loosely defined artificial group including bread molds, plant pathogens, powdery mildews, rusts, slime molds, and water molds.

http://www.microfungi.org/ Promote Website

PHOTOS



Status Photo / Video Offer, Event +

Write something...

Microfungi Published by Elizabeth Mico Yesterday at 7:28am

Mycorrhizal fungi at work!



Fungi can help monarchs self-medicate

By changing milkweed chemistry, soil microbes alter the spread of a crippling monarch parasite

NEWS.SCIENCEMAG.ORG

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Microfungi Published by Elizabeth Mico September 30 at 4:51pm

"We propose that the current rapid warming in the maritime Antarctic...will facilitate the colonization of soil by a wider diversity of fungi than at present,

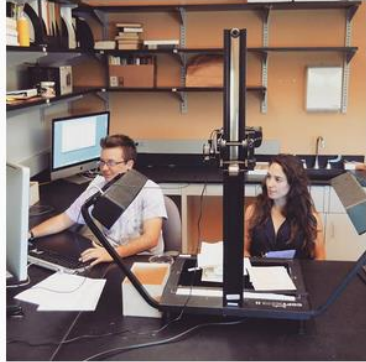
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