

Toward a checklist of Indiana fungi

Scott T. Bates, Justin Golday, Rachel L. Kunnen, and Nathanael J. Pilla
Purdue University North Central, Westville, IN 46391

Background:

- Fungi are filamentous, or sometimes unicellular, heterotrophic organisms with absorptive nutrition, and many fungal species (e.g., mycorrhizal forms) are essential symbiotic partners of vascular plants, providing them with nutrients such as phosphorus, while others are key decayers of organic matter that benefit the biosphere by cycling carbon.
- A wide range of natural communities exist in Indiana, and some areas in the state support high levels of plant diversity. For example, over 1,100 plant species have been documented within Indiana Dunes National Lakeshore. Considering the tight linkages between vascular plants and their fungal counterparts, a high level of fungal diversity might also be expected across the state.
- We examined numerous digitized records of fungal specimens available online in a public database. To supplement these data, we carried out online searches of records of fungi from the state in the scientific literature, including a wealth of digitized publications from the Proceedings of the Indiana Academy of Science spanning from 1894 to 1982.

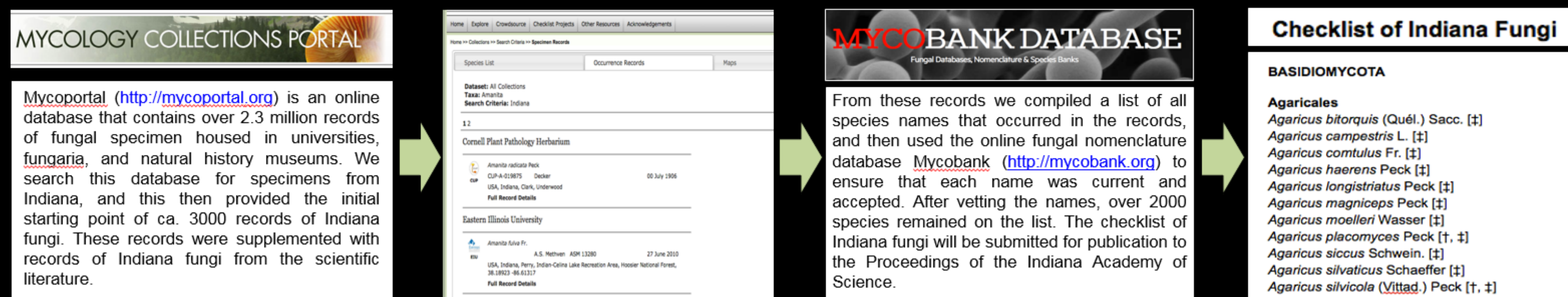


Figure 1. Project workflow. Many online resources are now available that allow researchers to access a rich heritage of biodiversity data, and this project relied solely on digitized records of Indiana fungi. The records accessed included documentation of physical fungal specimens collected within the state and made available through an online database, as well as mention of species of Indiana fungi occurring within digitized copies of scientific publications. The project also used other online tools, such as nomenclatural databases that provide information on currently accepted fungal names and species synonymy.

Methods:

- Fungal specimens housed in universities, fungaria, and natural history museums across the United States were searched for specimens from Indiana on the Mycology Collections data Portal (http://mycoportal.org), a Symbiota software database that currently contains over 2.3 million records.
- Records of Indiana fungi from MyCoPortal were supplemented with those from the scientific literature, and a number of historical mycological publications containing records of Indiana fungi were accessed online from the digital archive of the Proceedings of the Indiana Academy of Science (https://journals.iupui.edu/index.php/ias/index).
- A list of scientific names were then compiled from all the records of Indiana fungi recovered, and the current taxonomic status and synonymy for each species were verified using the online fungal nomenclature database MycoBank (http://www.mycobank.org), and the system of classification followed that outlined in MycoBank.

Results:

- The species included on the Indiana checklist represent three major phyla (Ascomycota, Basidiomycota, Chytridiomycota, Zygomycota) in the Eumycota (the true fungi) and one major phylum (Oomycota) in Chromista (organisms with fungus-like life cycles outside of the Eumycota, many of these being plant pathogens).
- The Indiana checklist contains a number of species that have importance to humans, such as important pathogens of agricultural crops (e.g., *Magnaporthe oryzae*), deadly poisonous mushrooms (e.g., *Amanita bisporigera*), and choice edibles (e.g., *Morchella angusticeps*).
- Thus far, over 3000 records of fungi occurring in Indiana have been recovered from MyCoPortal and the scientific literature, and we have begun to compile a list of over the 2000 fungal species represented in these records that will be presented in publication submitted to the Proceedings of the Indiana Academy of Science.

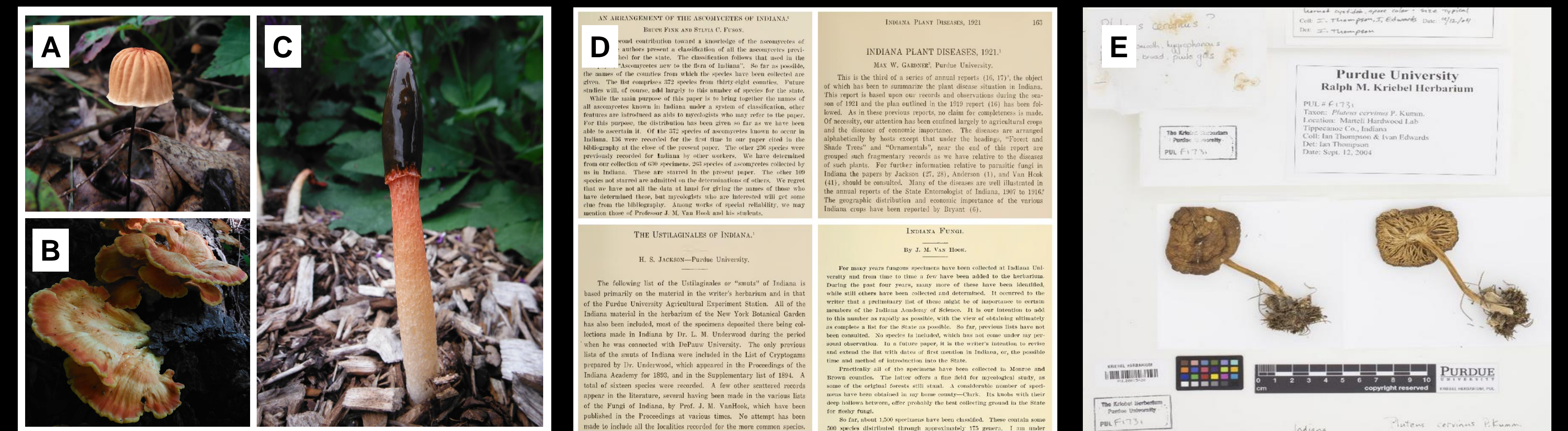


Figure 2. Records of Indiana Fungi. A wide range of fungal diversity can be found within the state of Indiana, including macroscopic fruiting bodies recognizable as mushrooms (A), bracket fungi (B), and stink horns (C). Records of Indiana fungi were culled from digitized copies of scientific publications (D) focusing on, or mentioning, fungal species occurring within Indiana, as well as, online records referencing physical specimens of fungi (E) collected in various localities throughout the state that were accessible through online resources.

Citations:

- Busteed, R.C. 1936. James M. Van Hook. Proceedings of the Indiana Academy of Science 45:22-24.
- Choi, Y.D. and N.B. Pavlovic. 1998. Experimental restoration of native vegetation in Indiana Dunes National Lakeshore. *Restoration Ecology* 6:118-129.
- Fisher, M.C., D.A. Henk, C.J. Briggs, J.S. Brownstein, L.C. Madoff, S.L. McCraw & S.J. Gurr. 2012. Emerging fungal threats to animal, plant and ecosystem health. *Nature* 484:186-194.
- Gries, C., E.E. Gilbert & N.M. Franz. 2014. Symbiota – A virtual platform for creating voucher-based biodiversity information communities. *Biodiversity Data Journal* 2:e1114.
- Harmon, P.F. & R. Latin. 2005. Winter survival of the perennial ryegrass pathogen *Magnaporthe oryzae* in north central Indiana. *Plant Disease* 89:412-418.
- Rose, J.N. 1886. Mildews of Indiana. *Botanical Gazette* 11:60-63.
- Schoknecht, J.D. 1982. Contribution to the flora of Indiana: Fungi of West-Central Indiana on the occasion of the sixth annual A. H. Smith Great Lakes Foray. *Proceedings of the Indiana Academy of Science* 91:140-143.
- Underwood, L.M. 1892. Some additions to the state flora from Putnam County. *Proceedings of the Indiana Academy of Science* 1:89-91.
- Van der Heijden, M.G., J.N. Klironomos, M. Ursic, P. Moutoglou, R. Streitwolf-Engel, T. Boller, A. Wiemken & I.R. Sanders. 1998. Mycorrhizal fungal diversity determines plant biodiversity, ecosystem variability and productivity. *Nature* 396:69-72.
- Whitaker Jr, J.O., C.J. Amlaner Jr, M.T. Jackson, G.R. Parker & P.E. Scott. eds. 2012. *Habitats and Ecological Communities of Indiana: Presettlement to Present*. Indiana University Press.
- Wilson, A.W., J.L. Beckerman & M.C. Aime. 2014. First Report of the White Pine Blister Rust Fungus, *Cronartium ribicola*, on *Ribes odoratum* in Indiana. *Plant Disease* 98:277-278.