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TRACKING TRENDS & PERFORMANCE IN BASIC RESEARCH

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2009 : January 2009 - Hew Hot Papers : David S. Hibbett

## NEW HOT PAPERS - 2009

November 2009



David S. Hibbett talks with *ScienceWatch.com* and answers a few questions about this month's New Hot Paper in the field of Plant & Animal Science.



**Article Title: A higher-level phylogenetic classification of the Fungi**

Authors: Hibbett, DS, et al.

Journal: MYCOL RES

Volume: 111

Issue:

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\* Clark Univ, Dept Biol, Worcester, MA 01610 USA.

\* Clark Univ, Dept Biol, Worcester, MA 01610 USA.

\* Natl Ctr Biotechnol Informat, Natl Lib Med, Bethesda, MD 20892 USA.

\* Louisiana State Univ, Dept Biol Sci, Baton Rouge, LA 70803 USA.

### SW: Why do you think your paper is highly cited?

This article presented a comprehensive classification of the Fungi, based on recent molecular evolutionary studies. The article had over 60 authors, representing 13 nations. This paper is being cited because 1) Fungi represent a huge and tremendously important group of organisms, which impact human affairs through their activities as pathogens, decayers, and beneficial symbionts; 2) This classification impacts all disciplines that are concerned with fungal biology, because it affects the names that are applied to the major groups of Fungi; 3) The classification also embodies the tremendous progress that has been made in understanding the evolutionary history of Fungi, principally through analysis of molecular data.

### SW: Does it describe a new discovery, methodology, or synthesis of knowledge?

The classification itself is a synthesis of results from many individual studies. However, the process of assembling the classification represented a new way of working for fungal taxonomists. This was a multi-year effort, requiring coordination among many individual researchers and several different organizations that have independently presented comprehensive classifications for Fungi in the past, such as [GenBank Index Fungorum](#), and the [Tree of Life Web Project](#).

As a result of this work, each of these groups is presently using the same higher-level classification for Fungi, which will be of benefit not only to fungal biologists but also students, teachers, and applied scientists (e.g., fermentation biologists, plant pathologists, [biofuel](#) developers, medical mycologists, etc.).

### SW: Would you summarize the significance of your paper in layman's terms?

This paper presents a major new classification of the Fungi, based on recent evolutionary studies using DNA sequences. Fungi are of profound importance to

humans, because they cause diseases (in plants and animals), produce food (including fermented foods), decay wood and other materials, and are used in biofuel production and many other biotechnological applications. It is important that fungal biologists and applied scientists be able to communicate with precision about the organisms with which they work.

Classifications enable precise communication because they provide a uniform set of names for groups of organisms. Classifications are also important because they represent our understanding of the history of life. Biological classifications contain nested sets of named groups, each of which is thought to represent a single and complete branch of the tree of life, also called a clade. Thus, the evolutionary history of life, which consists of nested clades forming a tree, is embodied in the nested set of names in a classification. We were able to construct this classification because of the tremendous progress in reconstructing fungal evolutionary relationships that has resulted from the work of many individual research groups.

*"This project grew out of two community-based efforts supported by the United States National Science Foundation..."*

**SW: How did you become involved in this research, and were there any problems along the way?**

This project grew out of two community-based efforts supported by the United States National Science Foundation, including the "Deep Hypha" Research Coordination Network, which provided a forum for fungal evolutionary biologists from 2001 to 2006, and the **Assembling the Fungal Tree of Life** (AFTOL) project, which is an ongoing project that involves collaborative research on fungal phylogenetics in multiple laboratories. There were surprisingly few problems in constructing the "AFTOL classification." All the scientists involved recognized the benefit and timeliness of the project, and worked cooperatively to construct the classification.

**SW: Where do you see your research leading in the future?**

The AFTOL classification is not fully resolved, which reflects the limits in understanding of fungal phylogeny. Some of the most problematical aspects concern the earliest branching events in the evolution of the Fungi. Reconstructing the pattern of branching at the base of the tree is important for understanding events such as the colonization of the land by fungi and the evolution of filamentous growth. The ongoing AFTOL project aims to resolve some of these (and other) problems, using datasets containing many gene sequences.

**SW: Do you foresee any social or political implications for your research?**

I believe that this work does have social and political implications, but they are indirect. Our classification will facilitate all fields of research that involve fungi. Therefore, our classification will have social impact, to the extent that fungal biology impacts human affairs. Considering the importance of fungi in health and agriculture, I would venture that our classification will indeed benefit society.

**David S. Hibbett**  
**Professor**  
**Biology Department**  
**Clark University**  
**Worcester, MA, USA**

**Web**

→ Related info: **Peer Bork** talks with *ScienceWatch.com* and answers a few questions about his Fast Breaking Paper in the field of Computer Science regarding the Tree of Life Web Project.

Keywords: fungi, comprehensive classification, recent evolutionary studies using dna sequences, fungal biology, the evolutionary history of fungi, analysis of molecular data, fungal taxonomists, fungal biologists, genbank, index fungorum, the tree of life web project, "deep hypha" research coordination network, assembling the fungal tree of life project, fermentation biologists, plant pathologists, biofuel developers, medical mycologists.



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