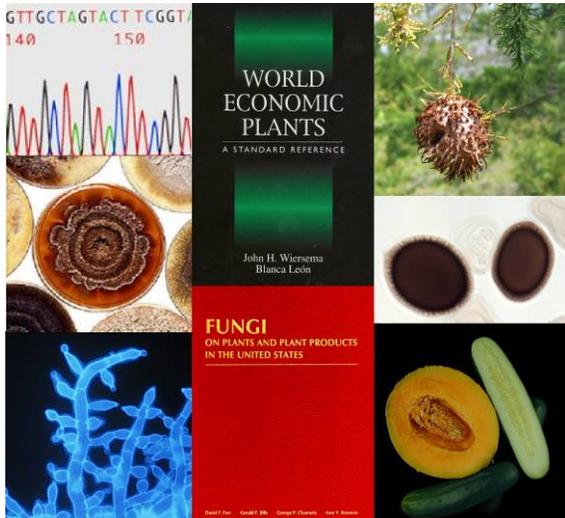


Systematic Botany & Mycology Laboratory



**Plant Sciences Institute
Henry A. Wallace Beltsville Agricultural
Research Center
Agricultural Research Service
United States Department of Agriculture
Beltsville, Maryland**

The mission of the Systematic Botany and Mycology Laboratory is to increase the knowledge and application of the systematics of fungi and vascular plants essential to developing new technologies and solving problems in sustainable and conventional agriculture.

The Systematic Botany and Mycology Laboratory is the center of research and service for the systematics of agriculturally important vascular plants and fungi in the United States.

The U.S. National Seed Herbarium and the U.S. National Fungus Collections are maintained and developed as research resources for use by the national and international research community.



Updated March 2006



USDA ARS

ARS is the U.S. scientific research agency responsible for solving agricultural problems of national importance.

ARS research develops solutions to a wide range of problems related to food and agriculture—problems requiring long-term commitment of resources and problems unlikely to have solutions with the quick commercial payoff that would convince private industry to do the research. These problems range from protecting crops and livestock from costly pests and diseases to improving quality and safety of agricultural commodities and products, determining the best nutrition for humans from infancy to old age, sustaining natural resources, and ensuring profitability for producers and processors while keeping costs down for consumers. In addition to serving this broad range of customers, ARS provides research to support Federal action and regulatory agencies.

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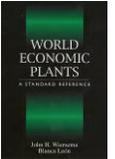
Website: <http://www.ars.usda.gov/ba/psi/sbml>

Research Accomplishments by The Systematic Botany & Mycology Laboratory



Fungi on Plants and Plant Products in the United States. This reference contains records of fungi on plants in the U.S. organized by host and by fungus.

World Economic Plants: A Standard Reference. 10,000 economic plant species including accepted scientific names, important synonyms, common names, economic uses and geographical distribution.



A new species of *Trichoderma*. This species controls the witches' broom disease of chocolate.

Karnal Bunt. A related species from ryegrass was distinguished allowing continued export of U.S. wheat.



Chocolate Pathogens. Characterization of the genetic relatedness of the frosty pod and witches' broom pathogens of chocolate allows for more effective disease control.

Daylily Rust. Characterization of the invasive daylily rust pathogen, *Puccinia hemerocallidis*.



GRIN Taxonomic Databases. Names, distribution, and economic uses for over 60,000 species of vascular plants.

Fungal Databases. Worldwide literature is reviewed for information and references on distribution, taxonomy, and biology of plant pathogenic fungi and is available over the internet.

Interactive online identification keys to plant-associated fungi. Keys to species of *Trichoderma*, *Tilletia*, *Hypomyces*, *Ravenelia* and rusts on legumes with images, descriptions and taxonomy.

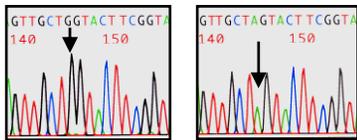
Systematics is the study of biological diversity. It is the science that discovers, describes, and names organisms.

Knowledge of the systematics of fungi and plants is essential for solving problems in agriculture.

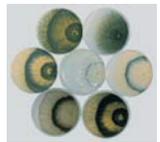


Researchers at the Systematic Botany and Mycology Laboratory (SBML) study the systematics of plants important as genetic resources and fungi that are biological control agents and plant pathogens.

DNA sequence analysis is used to determine the identity and relationships of fungi.



Karnal bunt Ryegrass bunt



Microscopic and cultural features are also used to identify and characterize fungi.



Accurate characterization of plant pathogenic fungi allows plant pathologists to more effectively manage diseases.

Fungal Research Programs at SBML:

Systematics of *Phomopsis/Diaportha*

These fungi cause cankers on crops such as soybeans, sunflowers and fruit. The chestnut blight and dogwood anthracnose fungi are related to this group of fungi.

Systematics of bunt and smut fungi

These fungi include the cause of Karnal bunt of wheat, an important quarantine pathogen, and bunt fungi associated with turf grass seed.

Systematics of rust fungi

Rust fungi can cause serious diseases of agricultural crops such as soybeans and wheat, or ornamental plants such as daylilies. Some have potential for controlling invasive weed species.

Systematics of the genus *Trichoderma*

Some species in this group, such as *T. harzianum*, can control plant diseases. Another species, *T. aggressivum*, causes a disease of commercial mushrooms.

Fungal Information Resources at SBML:

Fungal Databases

An outstanding online database of current information on the systematics of plant pathogenic fungi is maintained by SBML. Worldwide literature is reviewed for information and references on distribution, taxonomy, and biology of plant pathogenic fungi.

U.S. National Fungus Collections

Herbarium collections housed at the SBML serve as unique reference resources for the study of agriculturally important fungi. Over one million dried fungal specimens are available.

Vascular Plant Research at SBML:



Accurate scientific names are essential for communicating about economically important plants.

Important Plant Resources at SBML:

Germplasm Resources Information Network (GRIN)

Data available include the scientific names of about 60,000 species of vascular plants as well as common names, distribution records, and economic uses. Specialized searches of GRIN data relating to economic plants, noxious weeds, families and genera, or seed associations are possible.

Legume fruits & seeds identification system.

An interactive identification system for all legume fruits and seeds to genus is available via the Internet. This system is extremely useful to regulatory officials in preventing the introduction of noxious weeds and to seed analysts for the identification and certification of legume seeds.

U.S. National Seed Herbarium

Seed collections housed at the SBML serve as a unique reference resource for the study of agriculturally important plants.





Systematic Botany & Mycology Laboratory



Scientific Staff

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Research Leader and Director of the U.S. National Fungus Collections. Research on the systematic biology of plant-associated ascomycetes and their asexual states.

Dr. M. Catherine Aime.

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Research on the systematic biology of rust fungi (Uredinales) as plant pathogens and weed biocontrol agents and fungi causing diseases of tropical crops such as chocolate.

Dr. Lisa A. Castlebury.

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Research on the systematic biology of Ustilaginales (smut and bunt fungi) and Diaporthales (canker fungi). Projects focus on Karnal bunt of wheat, *Tilletia indica*, and disease-causing species of *Diaporthe/Phomopsis*.

Dr. David F. Farr.

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Research on systematic biology of plant pathogenic coelomycetes. Develops and directs interactive identification systems and databases of fungi on plants and specimens in the U.S. National Fungus Collections.

Dr. Joseph H. Kirkbride, Jr.

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Research on the systematics of *Lotus*, birdsfoot trefoil, and related legumes as well as *Cucumis* and related melons and squashes. Director of the U.S. National Seed Herbarium.

Dr. Gary J. Samuels.

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Research on the systematic biology of *Hypocrea* and its asexual state *Trichoderma* and related fungi used in biological control of important agricultural pathogens.

Dr. John H. Wiersema.

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Provides nomenclatural and taxonomic information on vascular plants for the USDA Germplasm Resources Information Network. Studies taxonomy of the Nymphaeaceae and the genus *Nymphaea*, the water-lilies.

APHIS Staff

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Identifies fungi of plant quarantine significance in particular those found on plant materials intercepted at ports of entry.

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Identifies fungi of plant quarantine significance in particular those found on plant materials intercepted at ports of entry. Investigates the taxonomy and biology of plant pathogenic fungi.

