



## Microbial Genomics Activities

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Microbial genomics has been recognized as a priority by the Public Policy Board of the American Phytopathological Society and by the Society's membership. In 2000-2001 a prioritized list of plant pathogenic microbes was developed with broad based participation of APS members and committees. This list was revised in 2003 and is available at the APS web site (<http://www.apsnet.org/media/ps/top.asp>). This list includes species of fungi and oomycetes, bacteria, mollicutes, viruses, and nematodes recognized to be of critical importance based on economic and biological criteria. The list is currently undergoing a second revision and will be released this fall.

**The Situation:** At the time of the drafting of the list only one plant pathogenic bacterial genome and several viral genomes were available in the public domain. Since that time the draft genomes of the rice blast fungus, head blight (scab) of wheat and corn smut (<http://www.broad.mit.edu/annotation/fungi/fgi/>) and about 25 plant pathogenic bacteria have been released. Several other plant pathogenic fungi and bacteria are currently being sequenced. Still, the plant associated microorganisms are underrepresented amongst sequenced microbial genomes and only one genomic sequencing project is underway for the critically important plant parasitic nematodes. In order to leverage the tools of the genomics revolution to agriculture we desperately need the primary sequence data and continued funding for functional genomics and education. Additionally, development of readily accessible data repositories and the tools to facilitate analyze the sequences will require significant resource allocation for bioinformatics efforts. To address these issues the APS PPB organized a Federally funded workshop to acquire international input on how to enhance these areas in the future. A whitepaper was generated that describes the background and outcomes of this meeting and may be found at *APSnet* (<http://www.apsnet.org/online/feature/microbe/>).

**The Problem and Resolution:** Continued and enhanced investment in research is needed to open new directions for research and application. *Expand investment in microbial genomics to include sequencing and functional genomics of microbes that threaten or enhance plant health. This is essential to understand virulence and survival, and mechanisms used by microbes to protect and/or enhance plant growth and for rapid diagnosis.*

**Outcome:** Understanding of virulence mechanisms and basic biology regarding the spread and survival of plant pathogens, including threat agents. This will be the basis for new approaches to control. Discovery of novel genes, molecules, or sequences as the basis for the development of new tools for accurate and rapid diagnosis of plant diseases and for determining global relationships of plant pathogens of concern. Coupled with the available genome sequences of crop hosts the rate of understanding of plant disease should be greatly accelerated and allow for continuing benefits to the grower, consumer and US economy.