

**USDA Agricultural Research Service**  
**Assessment of National Program 303 (Plant Diseases)**  
**May 2005**

Executive Summary

A panel of eight plant pathologists was convened in Beltsville, MD on April 13-14, 2005 to conduct a 5-year retrospective review of ARS National Program 303 (Plant Diseases) based on accomplishments and impacts reported for 65 projects organized under five broad Research Components and 21 more specific Discovery Areas. The panel found that Program 303 is making essential and unique contributions to United States Agriculture. A robust federal research program on plant diseases is needed for the foreseeable future and, in fact, the national need is increasing.

The panel's assessment of accomplishments and impacts in the 21 Discovery Areas ranged from low to high. The panel was pleased to see a number of high impact projects under host plant resistance, pathogen biology, and some in biological control and pathogen identification. The panel was disappointed to observe the generally low impact of projects in cultural control. The panel suggests that the cultural control programs should become more robust and include more aspects of fundamental science. Research that addresses diseases in particular commodities should continue to be a high priority, especially where this research is not being conducted by industry or state experiment stations. Overarching themes and mechanisms that span commodity needs should be emphasized to a greater extent. Examples of crosscutting areas include genomics, epidemiology and modeling, vector interactions and basic mechanisms of disease and pathogen biology. The panel applauds the roles that ARS plant pathologists have played in leading collaborative efforts and the building of scientific communities and would like to see even more of these initiatives in the future.

Plant pathology is a discipline at the forefront of agricultural biosecurity. Panelists suggested that biosecurity, emerging diseases, and invasive species be given even higher priority in 303 programs over the next 5 years than they are today. In particular, the panel would like to see more visible partnerships of ARS with APHIS. The panel felt it was in the national interest for ARS to take a strong leadership role in developing and maintaining national repositories and corresponding databases for plant pathogen isolates and plant germplasms that serve to differentiate pathogen races and biotypes. It is no longer possible to maintain these critical resources within universities or the private sector.

The National Program Retrospective Review Process is limited by the nature of the data that the panelists are able to view. In the absence of positive indicators, panelists assumed, perhaps in error, that some of the projects were of low impact. The panel suggests that project leaders be provided with additional training on how to write their program accomplishment document, especially the construction of a useful impact statement that includes specific economic data where available. The Office of Scientific Quality Review (OSQR) evaluations are very important to ensure program quality at a

project level and should be continued. Future Overall Program panels would benefit from access to summary comments from the OSQR panels. This is especially relevant to the assessment of progress in intervening years following OSQR reviews that identified substantial weaknesses. The panel recommends that a continually updated Strategic Plan (tiered system with individual projects nested under Components and Discovery Areas) become the centerpiece of the Program Reporting and Evaluation Process, and that this should be available on the public web site. It would be useful if individual project descriptions and reports were linked to the ARS Strategic Plan and included milestones, accomplishments, impacts, and key publications and other documentation.

*Recommendations in Component Areas:*

- Encourage ARS scientists to continue to publish in good quality scientific journals.
- Establish national priorities for pathogen diagnosis and detection within each major application area (e.g., [1] pathogens having high impact on yield and producer income; [2] pathogens of regulatory/quarantine importance; [3] pathogens of importance for national biosecurity, and [4] pathogens of high interest for understanding basic mechanisms).
- Develop a targeted collaboration between ARS and APHIS to identify high-priority detection and identification needs, and to develop standardized, validated, and optimized tools to meet these needs.
- Expand ARS research programs in biocontrol to increase efforts in controlling foliar, soilborne, and postharvest disease on a broader range of crop and horticultural plants. However, the Panel suggests that biocontrol research that is solely descriptive is less likely to result in significant outcomes and impacts. Strengths are observed for projects with comprehensive team approaches.
- Increase ARS efforts in sequencing microbial biocontrol genomes and in developing functional genomic resources that are critical to understanding the influences of the environment on biocontrol performance.
- Create cooperative opportunities for ARS scientists with plant pathologists at other institutions to bolster research on cultural control of plant diseases.
- Continue to encourage the use of contemporary approaches toward the understanding of processes that take place during disease development.
- Continue support for multi-investigator efforts and community-based efforts on fundamental biology of important pathogens (diseases).
- Continue to encourage genomic and functional genomic efforts for important pathogens.

- Continue to encourage the use of contemporary approaches toward understanding host/pathogen/vector interactions and disease development.
- Prioritize resistance breeding on emerging diseases based on objective risk analyses and input from stakeholder groups.
- Develop standard protocols for high-precision phenotyping of disease traits.
- Support research that compares recombination (chromosomal) and sequence maps for economically important disease traits.
- Provide physical infrastructure and scientists for maintaining worldwide collections of pathogens, germplasm, and data related to disease resistance.