

Peer Assessment of 5-year Performance  
ARS National Program 301:  
Plant, Microbial and Insect Genetic Resources,  
Genomics and Genetic Improvement

Summary Comments and Recommendations  
Randy Woodson, Panel Chair  
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# National Program 301 Assessment Panel

- Ten accomplished scientists (genetics, genomics, molecular biology and breeding)
- Diverse in expertise, job assignment, geographic location

Panel convened in Beltsville, MD  
September 14-15, 2005



# Scope of National Program 301

- Largest National Program with about 180 projects
- As many as 300 scientists at 50 locations
  - Annual budget of \$128 million

## Charge to the Assessment Panel:

- Assess 5-year performance and impact level of 22 research problem areas
- Consider overall national program, not individual projects
- Provide feedback to ARS leaders, stakeholders, and partners

# The Assessment Provides....

- Feedback and guidance to ARS scientists and leaders to help focus efforts on the potential goals for next program cycle

# NP 301 Composed of Three Research Components

- Genetic Resource Management
- Genetic Characterization and Genetic Improvement
- Genome Databases

# Criteria used for Impact Assessment

- Crop varieties or improved germplasm released
- Crop germplasm accessions conserved and distributed
- Crop genetic/genomic tools developed
- Crop genome information provided to users

# Criteria used for Impact Assessment

- Technology that has been publicly released, patented or licensed, and/or commercialized
- Influence on other researchers in the same or related fields
- Advancement of scientific knowledge
- Major agricultural problems ameliorated, mitigated or solved
- New or improved scientific methods or tools



# Documentation of Impact vs. Goals

- NP301 Action Plan
- 2000-2005 Accomplishment Report
- National Program Leader Overview
- Publications and databases
- Professional working knowledge of panelists

# Overarching Comments

- NP301 represents a critically important area of discovery for US and World agriculture
- NP301 scientists are making key and significant contributions to science and agriculture
- A number of problem areas within NP301 are unique to ARS and represent work of national importance
- NP301 provides key support to others through the conservation of germplasm and the development and maintenance of databases

# Research Component I: Genetic Resource Management

# Safeguarding Threatened Genetic Resources and Associated Information

- Medium impact
- Develop a strategic plan for germplasm collections that addresses customer needs
- Build on strong international collaborations
- Implement a strategy for ARS to assume the leadership role to safeguard plant, microbe and insect collections

# Conserving Genetic Resources

- High impact
- Develop strategic plan to ensure germplasm facilities are aligned with conservation goals
- Ensure health and safety of accessions
- Ensure genetic integrity of collections, particularly in cross-pollinated species

# Conserving Genetic Resources

- Enhance efforts to conserve “minor” crop species
- Develop and implement a strategy for conserving critical genetic and genomic collections

# Documenting and Characterizing Genetic Resources

- Low impact
- Work towards a replacement of GRIN that ensures compatibility with other emerging genetic databases and takes in to account user needs

# Expanding Germplasm Evaluation and Characterization

- Medium impact
- Expand molecular evaluation capabilities in each of the germplasm facilities and projects
- Expand collaborative “characterization” projects on accessions in collection
- Ensure genetic integrity (make it a priority)



# Technology Transfer

- High impact
- Excellent job in the distribution of germplasm

# Research Component II: Genetic Characterization and Genetic Improvement

# Tools for Genetic/Genome Analysis

- Medium-high impact
- Identify key areas where USDA-ARS is best positioned to lead in the development of genetic tools (strategic approach)
- Avoid redundancy with other public research programs

# Special Research Populations and/or Genetic Stocks

- Medium impact
- Encouraged to elevate this as a priority area
- Identify key gaps in special research collections and genetic stocks

# Genetic Determinants of Important Traits

- Medium impact
- Develop a mechanism to document key contributions in gene and genetic discovery
- Develop a process to focus genetic discovery in minor crops on industry needs

# Genome Characterization/Mapping

- Medium-high impact
- Develop clear goals for genome characterization that are tied to crop improvement

# Expansion of Genetic/Genomic Database Resources using Model Species

- Medium impact
- ARS should focus efforts where it has a unique opportunity and unique responsibility to lead in this area.

# Advances in Genetic/Genomic Theory

- High impact
- Continue strong support for basic research in genetic and genomic theory, with focus in areas that are often under investigated including minor crops



# Genetic Improvement: Release of Superior Genetic Resources

- High impact
- The agency should continue its efforts to support genetic improvement with particular attention being paid to those underserved species
- Work to capture usage data on germplasm and varieties

# Capitalizing on Untapped Genetic Diversity in Crop Improvement

- Medium-high impact
- Develop strategic goals for sources of genetic diversity in collaboration with research component I
- Clarify how ARS will work with the private sector in capitalizing on genetic resources
- Develop flexible MTA's for collaborative projects

# Genetic Mitigation of Abiotic and Biotic Stress

- Medium-high impact
- Strengthen programs in abiotic stress, while continuing strong support for biotic stress resistance
- Work to set priorities for crop improvement by species
- Develop and implement projects that seek to improve crops for low input situations such as organic production

# Genetic Improvement of Product Quality/Value

- Medium impact
- The panel cautions ARS against following the various bandwagons in this area and focus on output traits that add clear value to the product

# New Genetic Methods for Crop Improvement

- Low impact
- The agency should focus its efforts on the development of assays that help in the evaluation and advancement of germplasm, particularly those that are easy and inexpensive to implement

# Research Component III: Genome Databases

# Long-term Stewardship of Genome Databases

- High impact
- Agency should take immediate action to replace the vacant national program leader in this area
- Form a genome database advisory committee composed of users and contributors
- Focus of improving usefulness of databases to the research community
- Utilize Interagency Working Group as a mechanism to prioritize commitments

# Development of Interconnected/Interoperable Genome Databases

- Medium impact
- Make interconnectivity a very high priority to Ensure long-term usefulness of databases



# Analyses of Genomic Data

- Low impact
- USDA-ARS is encouraged to invest resources in this critical area to emerge as the “go to organization” for analysis of crop and related species genomes
- Continue long tradition of partnering with university collaborators
- Ensure strong linkages back to crop improvement programs within the agency

# NP301 Accomplishment Review

The panelists appreciate the opportunity to contribute to making a strong and productive National Program 301 even better

Thanks for listening!

