NP 301 Plant Genetic Resources, Genomics and Genetic Improvement Panel Report

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Introduction

This Panel Report provides the background of the 2013 National Program (NP) 301 Plant Genetic Resources, Genomics and Genetic Improvement Panel Review. The project plans reviewed by these panels were applicable to the mission of the National Program to *"safeguard and utilize plant genetic resources (genetic raw material), associated genetic and genomic databases, and bioinformatic tools to ensure an abundant, safe, and inexpensive supply of food, feed, fiber, ornamentals, and industrial products for the United States and other nations."*

In collaboration with the Office of Scientific Quality Review (OSQR), and the National Program Leaders, Peter Bretting, Deborah Fravel, Kevin Hackett, Jack Okamuro, Sally Schneider, Roy Scott and Gail Wisler, divided 154 plans into 32 panels. After considering several candidates, Dr. Joyce Loper, Scientific Quality Review Officer (OSQR), appointed a Chair for the 32 panels (Table 1).

Because of the very large size of this review, a former officer, Dr. Steven Huber, was enlisted to serve as the Scientific Quality Review Officer for a number of the panels. Dr. Huber was involved in approval of those panels, oversight of their review, and certification of researcher responses to review for those panels.

Table 1. Plant Genetic Resources, Genomics and Genetic Improvement Panels

Panel	Panel Chair	Panel Meeting Date	Number of Panelists	Number of Projects Reviewed
Panel 1A – NPGS Superpanel: Genebanks 1 Technology & Systematics	Dr. Ken Richards, Retired Research Manager, Canadian Genetic Resource Program, Agriculture and Agri-Food Canada, Saskatoon, Canada	January 7-8, 2013	5	11
Panel 1B – NPGS Superpanel: Genebanks 2 Seed	Dr. Ken Richards, Retired Research Manager, Canadian Genetic Resource Program, Agriculture and Agri-Food Canada, Saskatoon, Canada	January 8-9, 2013	5	12
Panel 1C – NPGS Superpanel: Genebanks 3 Clonal	Dr. Ken Richards, Retired Research Manager, Canadian Genetic Resource Program, Agriculture and Agri-Food Canada, Saskatoon, Canada	January 10-11, 2013	4	9
Panel 2A – Plants & Environment: Genetics & Disease Resistance	Dr. Anne Sylvester, Professor, Dept Molecular Biology, Univ Wyoming, Laramie, WY	March 18, 2013	6	5
Panel 2B – Plants & Environment: Abiotic Stress	Dr. Thomas Juenger, Associate Professor, Section of Integrative Biology, University of Texas, Austin, TX	February 5, 2013	3	3
Panel 3A – Plant Growth & Development: Signaling	Dr. Stephen Moose, Associate Professor, Dept Crop Sciences, Univ Illinois, Urbana, IL	March 8, 2013	6	5
Panel 3B – Plant Growth & Development	Dr. Shawn Kaeppler, Professor, Dept Agronomy, Univ Wisconsin, Madison, WI	December 17, 2012	4	3
Panel 4A – Plant Metabolism & Pathways: Improvement	Dr. L. Curtis Hannah, UFRF Professor, Horticultural Sciences Dept, Univ Florida, Gainesville, FL	January 17, 2013	6	5

Table 1. Plant Genetic Resources, Genomics and Genetic Improvement Panels (continued)

Panel	Panel Chair	Panel Meeting Date	Number of Panelists	Number of Projects Reviewed
Panel 4B – Plant Metabolism & Pathways: Physiology & Development	Dr. John Cushman, Professor, Dept Biochemistry & Molecular Biology, Univ Nevada, Reno, NV	February 25, 2013	6	5
Panel 4C – Plant Metabolism & Pathways	Dr. John Browse, Charlotte Y. Martin Distinguished Professor, Institute of Biological Chemistry, Washington State Univ, Pullman, WA	February 20, 2013	6	5
Panel 5 – Genomics & Bioinformatics*	Dr. Joyce Loper, SQRO	N/A	2	1
Panel 6A – Grains Superpanel: Maize & Sorghum: Breeding & Germplasm	Dr. Bryan Harvey, Professor Emeritus, Dept Plant Sciences, Univ Saskatchewan, Saskatoon, Saskatchewan, Canada	February 13-14, 2013	6	7
Panel 6B – Grains Superpanel: Small Grains: Breeding & Germplasm	Dr. Bryan Harvey, Professor Emeritus, Dept Plant Sciences, Univ Saskatchewan, Saskatoon, Saskatchewan, Canada	February 11-12, 2013	6	8
Panel 6C – Grains Superpanel: Maize & Sorghum: Genomics & Trait Analyses	Dr. Bryan Harvey, Professor Emeritus, Dept Plant Sciences, Univ Saskatchewan, Saskatoon, Saskatchewan, Canada	February 13-14, 2013	6	6
Panel 6D – Grains Superpanel: Small Grains: Genomics & Trait Analyses	Dr. Bryan Harvey, Professor Emeritus, Dept Plant Sciences, Univ Saskatchewan, Saskatoon, Saskatchewan, Canada	February 11-12, 2013	6	6
Panel 7A – Fruit & Nut Crops	Dr. Dan Parfitt, Pomologist & Professor, Dept Plant Sciences, Univ California, Davis, CA	March 19, 2013	5	4
Panel 7B – Berries	Dr. Ken Richards, Retired Research Manager, Canadian Genetic Resource Program, Agriculture and Agri-Food Canada, Saskatoon, Canada	May 17, 2013	3	4
Panel 8 – Sugarbeets	Dr. Robert Harveson, Associate Professor, Dept Plant Pathology, Univ Nebraska, Scottsbluff, NE	March 1, 2013	7	6
Panel 9 – Vegetables: Potatoes	Dr. Irwin Goldman, Professor & Chair, Dept Horticulture, Univ Wisconsin, Madison, WI	April 2, 2013	5	5
Panel 10 – Vegetables: Beans	Dr. Thomas Michaels, Professor & Department Head, Dept Horticultural Science, Univ Minnesota, St. Paul, MN	May 22, 2013	6	5
Panel 11 – Vegetables: Various	Dr. Rebecca Sideman, Extension Associate Professor, Biological Sciences Dept, Univ New Hampshire Cooperative Extension, Durham, NH	April 1, 2013	5	4
Panel 12 – Fruits: Grape	Dr. K. Helen Fisher, Retired Associate Professor, Univ Guelph, St. Catharines, Ontario, Guelph, Canada	March 22, 2013	4	2
Panel 13 – Cotton	Dr. Randy Wells, Professor & Associate Dept Head, Dept Crop Science, North Carolina State Univ, Raleigh, NC	April 19, 2013	6	5
Panel 14A – Oilseeds: Genetic Improvement	Dr. Silvia Cianzio, Professor, Dept Agronomy, Iowa State Univ, Ames, IA	May 24, 2013	4	4

Table 1. Plant Genetic Resources, Genomics and Genetic Improvement Panels (continued)

Panel	Panel Chair	Panel Meeting Date	Number of Panelists	Number of Projects Reviewed
Panel 14B – Oilseeds: Germplasm	Dr. Silvia Cianzio, Professor, Dept Agronomy, Iowa State Univ, Ames, IA	April 10, 2013	4	3
Panel 14C – Oilseeds: Physiology/Biochemistry	Dr. Jim Orf, Professor, Dept Agronomy & Plant Genetics, Univ Minnesota, St. Paul, MN	April 30, 2013	6	4
Panel 15 – Ornamentals	Dr. John Ruter, Allan Armitage Professor, Dept Horticulture, Univ Georgia, Athens, GA	March 28, 2013	6	5
Panel 16 – Sugarcane	Dr. Maria Gallo, Dean, College of Tropical Agriculture & Human Resources, Univ Hawaii at Manoa, Honolulu, HI	April 18, 2013	3	2
Panel 17 – Genome Databases	Dr. C. Robin Buell, Professor, Dept Plant Biology, Michigan State Univ, East Lansing, MI	April 17, 2013	5	4
Panel 18 – Biotech Risk Assessment	Dr. Allison Snow, Professor, Dept Evolution, Ecology & Organismal Biology, Ohio State Univ, Columbus, OH	April 4, 2013	4	3
Panel 19 – Cacao*	Dr. Joyce Loper, SQRO	N/A	3	1
Panel 20 – Citrus*	Dr. Joyce Loper, SQRO	N/A	2	1

*For these single plans, the SQRO serves as officer and several written reviews are solicited. The officer can, if they deem it appropriate, to convene the reviewers for discussion after their written comments and an Action Class Score are received.

Panel Review Results

Along with the Panel's written recommendations, OSQR sends each Area Director a worksheet that shows each reviewer's judgment of the degree of revision their project plan requires. This judgment is referred to as an "action class." The action classes of the panelists are also converted to a numerical equivalent, averaged, a final action class rating is assigned to the plan, and this determines the procedure to be followed subsequently (as outlined below).

Scientists are required to revise their project plans as appropriate and submit a formal statement to OSQR through their Area Director demonstrating their response to the Panel's recommendations. The project plans are implemented following approval and certification by the SQRO that they have successfully completed review.

Action classes are defined below.

No Revision Required (score: 8). An excellent plan; no revision is required, but minor changes to the project plan may be suggested.

Minor Revision Required (score: 6). The project plan is feasible as written, requires only minor clarification or revision to increase quality to a higher level.

Moderate Revision Required (score: 4). The project plan is basically feasible, but requires changes or revision to the work on one or more objectives, perhaps involving alteration of the experimental approaches in order to increase quality to a higher level and may need some rewriting for greater clarity.

Major Revision Required (score: 2). There are significant flaws in the experimental design and/or approach or lack of clarity which hampers understanding. Significant revision is needed.

Not Feasible (score: 0). The project plan, as presented, has major scientific or technical flaws. Deficiencies exist in experimental design, methods, presentation, or expertise which makes it unlikely to succeed.

For plans receiving one of the first three Action Classes (No Revision, Minor Revision and Moderate Revision) scientists respond in writing to panel comments, revise their project plan as appropriate, and submit the revised plan and responses to OSQR through their Area office. These are reviewed by the Officer and, once he/she is satisfied that all review concerns have been satisfactorily addressed, the project plan is certified and may be implemented.

When the action class is Major Revision or Not Feasible, responses and revised plans are provided as above, but must then be re-reviewed by the original review panel. These provide a second set of narrative comments and Action Class based on the revised plan. If the re-review action class is no revision, minor or moderate revision the project plan may be implemented after receipt of a satisfactory response and Officer certification, as described above. Plans receiving major revision or not feasible scores on re-review fail review. The action class and consensus comments are provided to the Area but there is no further option for revision. Failed plans are terminated, reassigned, or restructured, at the discretion of the Area and Office of National Programs.

Program Review Overview

Upon completion of review, panelists are asked to discuss general impressions of the review process as well as over-arching issues that they feel might enhance future plans. In addition, such perspectives are expressed in a final written summary from panel chairs (these are appended to this report). Two large "super panels" were organized around two major areas of focus: The National Plant Germplasm System, 32 plans with 3 panels, and Grains, 27 plans with 4 panels (Table 1). For each of these super panels 12-14 panelists were divided among their panels with some being assigned more than one. The panels were convened in Beltsville for review. The assessments for these two super panels, along with the combined perspectives of the other panels in this review are presented below.

National Plant Germplasm System (NPGS) Super Panel

The chair of the NPGS super panel was Dr. Kenneth Richards, whose past experience as director of the Canadian germplasm system uniquely suited him to guide this effort. Dr. Richards engaged his panels in extensive discussion of many crucial aspects of germplasm work and provided a comprehensive assessment of issues they felt would be important to continued development of the NPGS. Overall, they found the NPGS plans to be well-prepared and very clear. They noted that in many cases a figure illustrating the work outlined in the plan and the roles of various researchers provided a clear understanding of the work. In addition, a table

providing information on holdings, regenerations, and distributions annually was helpful for assessing effectiveness of the programs…so much so that similar information was requested for plans from which it was absent. They also recommended that greater attention is needed in developing the anticipated milestones and products for various aspects of plans. The development of priorities and linkages within projects and between projects and relevant Crop Germplasm Committees needed greater attention in many plans. Nonetheless they were impressed by the large volume of work proposed; although they urged that some attention be given to establishing priorities should there be constraints.

Panels felt that while the NPGS is a valuable resource, the "good news" of its work is not often known. They recommended greater efforts to bring the successes of this work to the public. Similarly, they found that the importance of state support of NPGS activities seemed often under-appreciated. In a time of tight budgets they were concerned that this would reduce this important support. In particular they noted with some concern the withdrawing of support by the state of Wisconsin for conserving and maintaining the potato collection, as an example of important but declining support.

With regard to the development of methods to preserve clonal crops it was noted that while there are considerable efforts, they are unevenly spread across the NPGS with some sites conducting specific research and others depending upon the small group of researchers at the Fort Collins site. It was felt that a priority setting exercise would better focus the combined efforts and make efficient use of limited resources. This need for priorities looking forward was also noted for the handling of genetic stock and other research-oriented accessions which are expected to become part of collections in the future. As well, priorities will be needed for future expanding of already large collections for which the gaps may be small, but important. With the closure of most countries to outside collecting, traditional plant exploration may no longer be a suitable mechanism for adding to collections.

Management and the development of better understanding of collections were generally applauded. It was noted that the long-standing practice of the NPGS was to regenerate seed accessions when viability fell below 60% while the International standard is 85%. There was question as to the basis for this and the potential for loss by genetic erosion. Evaluation of collections for important sources of resistance (e.g., to UG99 in wheat) was applauded while in some areas it was noted that greater efforts to seek potentially significant sources of resistance to pests and disease are needed. The growth in development of molecular markers was noted and appreciated. Finally, the data management systems development were complimented and it was noted that with the ever-increasing flood of data about germplasm from NPGS and other sources, these systems will continue to need development.

Grain Crops Super Panel

The major large (maize, sorghum) and small (barley, rice, wheat, etc.) crops comprise a significant proportion of the seed-based work of the NPGS. The grains super panel consisted of four panels, two of which addressed the germplasm work and breeding work for maize and sorghum; and two addressing similar areas for the small grains. The chair, Bryan Harvey, has extensive research in small grains and, as well, has a long familiarity with the large and small grains work of ARS. The issues identified were particular to each of these two groups.

For maize and sorghum, the panel felt that genetic information has become important to many research programs. With the exception of maize, however, the panel felt that there is a lack of work to efficiently and rapidly genotype individuals in breeding programs. They urged that the maize efforts be used as a model to extend such work to the other grains. Further, a number of genetic tools have been developed by breeders in the form of genetic stocks. It was felt that a strategy (including policies and procedures) is needed to identify and preserve those most likely to continue to be of use into the future. A further challenge to work with acquired germplasm is the increasing likelihood that it will be subject to international Material Transfer Agreements that could restrict the use of materials derived from it. Some caution in the use of such material in breeding programs is warranted. Finally, while there is continuing work on important lepidopteran insect pests, more work is needed on other emerging pests that have potential to impact production.

For small grains the panels found for several plans that there was an inconsistency in the quality of the plan with regard to individual objectives. This presented some challenges to the need for a single overall score. They were, however, generally congratulatory of the excellent service work provided by these plans, particularly in the operation of genotyping centers, coordination of uniform nurseries, and the screening of genetic materials for resistance. Such efforts while crucial to agriculture might not be accomplished without such support. The panel was further grateful for ARS's contributions to graduate student and postdoctoral training at ARS facilities and universities. They did note, however, the urgency to fill a number of vacancies that existed to fulfill critical areas of the work. The panels were especially appreciative of USDA's crucial work in UG99 in wheat. They did, however, caution that there are many diseases of grains of lower profile but for which important work is needed. Finally, as noted for by the NPGS panel, the increase of molecular technologies presents a significant challenge to managing an increasing flood of data for which adequate bioinformatic resources will be essential.

Other Panels

The major portion of NP301 plans were reviewed through online review panels (Table 1). At the conclusion of each review there was a brief discussion about general issues and the process and each chair was asked to provide a letter summarizing the overall process and any general recommendations for the future. Most of the comments focused on the plans and the review process. The letters appended to this report illustrate the generally strong positive impressions of

the quality of ARS research and of the plans. There were, however, some concerns expressed for select panels. It was noted in one panel that where a plan was, in fact, a set of objectives across four labs, the level of detail (and thus their ability to judge the plans) was compromised.

In general the plans and research were considered to be strong and of high quality. Researchers were complimented for their clearly described and well conceived projects. The science was described as displaying strong scientific and organizational quality and made good use of new and emerging technologies. An exception to this was one panel that found that the plans before it lacked detail sufficient to enable full review. Another panel noted that in some plans there was a need to move beyond traditional technologies to embrace new and emerging genomic methods that would provide greater precision and efficiency. In a few cases there was need to develop more specific hypotheses to focus the work.

While considerable effort is made in the NP301 program to assure that researchers within a crop area are aware of one another's research, this understanding was not always evident in plans. At times panelists were unsure of whether plans with similar goals were working together or, perhaps, were unaware of one another. With regard to plan objectives, panelists often found them clear and focused appropriately, but in other cases expressed concern that these were assigned and redirecting them was not within the purview of reviewers. Similarly, there were occasional concerns that panels could not evaluate the budgets for projects.

One panel (Beans) highlighted what they termed a general need in the scientific community to refocus research on the "whole plan" rather than just the above-ground portions. They were particularly concerned that crop research in general does not address the structure, size, physiology, and genomics of root systems as they support the whole plant and urged that ARS take a lead in refocusing research to include more study of root systems as part of the whole crop plant.

Review Analysis

Projects undergo review once in every five year research cycle in preparation for the next research cycle. ARS has completed two five-year review cycles for all research projects and is presently in a third five-year cycle of review. Table 2 shows the initial and final scores for the third cycle peer review expressed as percentages for the Plant Genetic Resources, Genomics and Genetic Improvement Panels. All panels had a moderate or better average initial and final score. Of the 12 plans that received failing review scores in the initial review, three of them failed re-review and were terminated, the rest completed review satisfactorily and were certified.

The third cycle had a lower percentage of projects failing review than the two prior review cycles (Table 3). It also had the highest average initial score (5.58) as compared to the first (4.73) and second (5.41) cycles. Overall, after re-review of initially low scoring plans the current review

cycle had an overall score slightly below the previous cycle (First Cycle, 5.28; Second Cycle, 5.88; Third Cycle, 5.78).

The potential impact of panel size on review outcome was examined by comparing the number of reviewers to the initial score received (Figure 1). There appears to be no effect on initial score with regard to panel size. This remained true even when the data from previous cycles where panels were larger was included (Figure 2). Similarly, the number of scientists on a plan does not appear to influence the score (Figure 4).

Figure 5 compares the initial review scores for the first, second and third cycles of the Plant Genetic Resources, Genomics and Genetic Improvement Panels. The third cycle had the highest percentage of plans receiving Moderate or higher initial review and the lowest percentage of those receiving Major or Not Feasible scores. In final review the largest proportion of plans received scores of Minor or No Revision, as also seen in prior cycles (Figure 6).

Table 2. Initial and Final Scores for the Third (2013) Cycle Expressed as Percentages for the NP 301 Plant Genetic Resources, Genomics and Genetic Improvement Panels

Third Cycle, 2013	Initial Review						Final Review					
	% No Rev	% Min Rev	% Mod Rev	% Maj Rev	% Not Feas	Avg Initial Score	% No Rev	% Min Rev	% Mod Rev	% Maj Rev	% Not Feas	Avg Final Score
Panel 1A - NPGS Superpanel: Genebanks 1 Technology & Systematics (11)	36.4	36.4	18.2	9.1	0.0	6.18	36.4	45.5	18.2	0.0	0.0	6.52
Panel 1B - NPGS Superpanel: Genebanks 2 Seed (12)	8.3	91.7	0.0	0.0	0.0	5.93	8.3	91.7	0.0	0.0	0.0	5.93
Panel 1C - NPGS Superpanel: Genebanks 3 Clonal (9)	0.0	100.0	0.0	0.0	0.0	5.9	0.0	100.0	0.0	0.0	0.0	5.9
Panel 2A - Plants & Environment: Genetics & Disease Resistance (5)	40.0	20.0	20.0	20.0	0.0	5.77	60.0	20.0	20.0	0.0	0.0	6.61
Panel 2B - Plants & Environment: Abiotic Stress (3)	33.3	33.3	33.3	0.0	0.0	5.33	33.3	33.3	33.3	0.0	0.0	5.33
Panel 3A - Plant Growth & Development: Signaling (5)	0.0	80.0	20.0	0.0	0.0	5.49	0.0	80.0	20.0	0.0	0.0	5.49
Panel 3B - Plant Growth & Development (3)	0.0	66.7	0.0	33.3	0.0	5	0.0	66.7	0.0	33.3	0.0	4.67
Panel 4A - Plant Metabolism & Pathways: Improvement (5)	0.0	20.0	60.0	20.0	0.0	4.28	0.0	20.0	60.0	20.0	0.0	4.35
Panel 4B - Plant Metabolism & Pathways: Physiology & Development (5)	0.0	20.0	60.0	20.0	0.0	4.4	20.0	20.0	60.0	0.0	0.0	5.2

Table 2. Initial and Final Scores for the Third (2013) Cycle Expressed as Percentages for the NP 301 Plant Genetic Resources, Genomics and Genetic Improvement Panels (continued)

Third Cycle, 2013	Initial Review						Final Review					
	% No Rev	% Min Rev	% Mod Rev	% Maj Rev	% Not Feas	Avg Initial Score	% No Rev	% Min Rev	% Mod Rev	% Maj Rev	% Not Feas	Avg Final Score
Panel 4C - Plant Metabolism & Pathways (5)	0.0	60.0	20.0	20.0	0.0	4.87	0.0	80.0	20.0	0.0	0.0	5.59
Panel 5 - Genomics & Bioinformatics (1)	100.0	0.0	0.0	0.0	0.0	7	100.0	0.0	0.0	0.0	0.0	7
Panel 6A - Grains Superpanel: Maize & Sorghum: Breeding & Germplasm (7)	28.6	42.9	28.6	0.0	0.0	6.14	28.6	42.9	28.6	0.0	0.0	6.14
Panel 6B - Grains Superpanel: Small Grains: Breeding & Germplasm (8)	50.0	37.5	12.5	0.0	0.0	6.49	50.0	37.5	12.5	0.0	0.0	6.49
Panel 6C - Grains Superpanel: Maize & Sorghum: Genomics & Trait Analyses (6)	33.3	16.7	33.3	16.7	0.0	5.4	50.0	16.7	33.3	0.0	0.0	6.27
Panel 6D - Grains Superpanel: Small Grains: Genomics & Trait Analyses (7)	85.7	0.0	14.3	0.0	0.0	6.86	85.7	0.0	14.3	0.0	0.0	6.86
Panel 7A - Fruit & Nut Crops (4)	0.0	50.0	50.0	0.0	0.0	5.4	0.0	50.0	50.0	0.0	0.0	5.4
Panel 7B - Berries (4)	0.0	75.0	25.0	0.0	0.0	5.33	0.0	75.0	25.0	0.0	0.0	5.33
Panel 8 - Sugarbeets (6)	16.7	50.0	16.7	16.7	0.0	5.22	16.7	50.0	33.3	0.0	0.0	5.39
Panel 9 - Vegetables: Potatoes (5)	20.0	60.0	20.0	0.0	0.0	6.16	20.0	60.0	20.0	0.0	0.0	6.16

Table 2. Initial and Final Scores for the Third (2013) Cycle Expressed as Percentages for the NP 301 Plant Genetic Resources, Genomics and Genetic Improvement Panels (continued)

Third Cycle, 2013	Initial Review						Final Review					
	% No Rev	% Min Rev	% Mod Rev	% Maj Rev	% Not Feas	Avg Initial Score	% No Rev	% Min Rev	% Mod Rev	% Maj Rev	% Not Feas	Avg Final Score
Panel 10 - Vegetables: Beans (5)	40.0	40.0	20.0	0.0	0.0	6.22	40.0	40.0	20.0	0.0	0.0	6.22
Panel 11 - Vegetables: Various (4)	50.0	25.0	25.0	0.0	0.0	6.15	50.0	25.0	25.0	0.0	0.0	6.15
Panel 12 - Fruits: Grape (2)	0.0	0.0	100.0	0.0	0.0	4.25	0.0	0.0	100.0	0.0	0.0	4.25
Panel 13 - Cotton (5)	0.0	20.0	60.0	20.0	0.0	4.23	0.0	20.0	80.0	0.0	0.0	4.63
Panel 14A - Oilseeds: Genetic Improvement (4)	25.0	50.0	0.0	25.0	0.0	5.5	25.0	75.0	0.0	0.0	0.0	6.79
Panel 14B - Oilseeds: Germplasm (3)	33.3	66.7	0.0	0.0	0.0	6.67	33.3	66.7	0.0	0.0	0.0	6.67
Panel 14C - Oilseeds: Physiology/ Biochemistry (4)	0.0	75.0	25.0	0.0	0.0	7.33	0.0	75.0	25.0	0.0	0.0	7.33
Panel 15 - Ornamentals (5)	0.0	60.0	40.0	0.0	0.0	5.53	0.0	60.0	40.0	0.0	0.0	5.53
Panel 16 - Sugarcane (2)	0.0	0.0	100.0	0.0	0.0	4.33	0.0	0.0	100.0	0.0	0.0	4.33
Panel 17 - Genome Databases (4)	0.0	25.0	50.0	25.0	0.0	3.8	25.0	25.0	50.0	0.0	0.0	5.18
Panel 18 - Biotech Risk Assessment (3)	0.0	33.3	33.3	33.3	0.0	4.17	0.0	33.3	33.3	33.3	0.0	4.33
Panel 19 - Cacao (1)	0.0	100.0	0.0	0.0	0.0	5.33	0.0	100.0	0.0	0.0	0.0	5.33
Panel 20 - Citrus (1)	0.0	100.0	0.0	0.0	0.0	6	0.0	100.0	0.0	0.0	0.0	6
NP 301 (154)	18.8	45.5	27.7	8.1	0.0	5.58	21.3	47.2	28.8	2.7	0.0	5.78

Table 3. Initial and Final Scores for All Cycles Expressed as Percentages for the NP 301 Plant Genetic Resources, Genomics and Genetic Improvement Panels

	Initial Review						Final Review					
	% No Rev	% Min Rev	% Mod Rev	% Maj Rev	% Not Feas	Avg Initial Score	% No Rev	% Min Rev	% Mod Rev	% Maj Rev	% Not Feas	Avg Final Score
First Cycle (n=158)	9.5	38.6	28.5	20.9	2.5	4.73	17.7	42.4	37.3	1.3	1.3	5.28
Second Cycle (n=166)	20.5	43.4	22.9	12.0	1.2	5.41	23.5	48.8	26.5	1.2	0.0	5.88
Third Cycle (n=154)	20.1	47.4	24.7	7.8	0.0	5.58	22.7	49.4	26.0	1.9	0.0	5.78

Figure 1. Panel Size vs. Initial Review Score for the Third Cycle of the NP 301 Plant Genetic Resources, Genomics and Genetic Improvement Panels

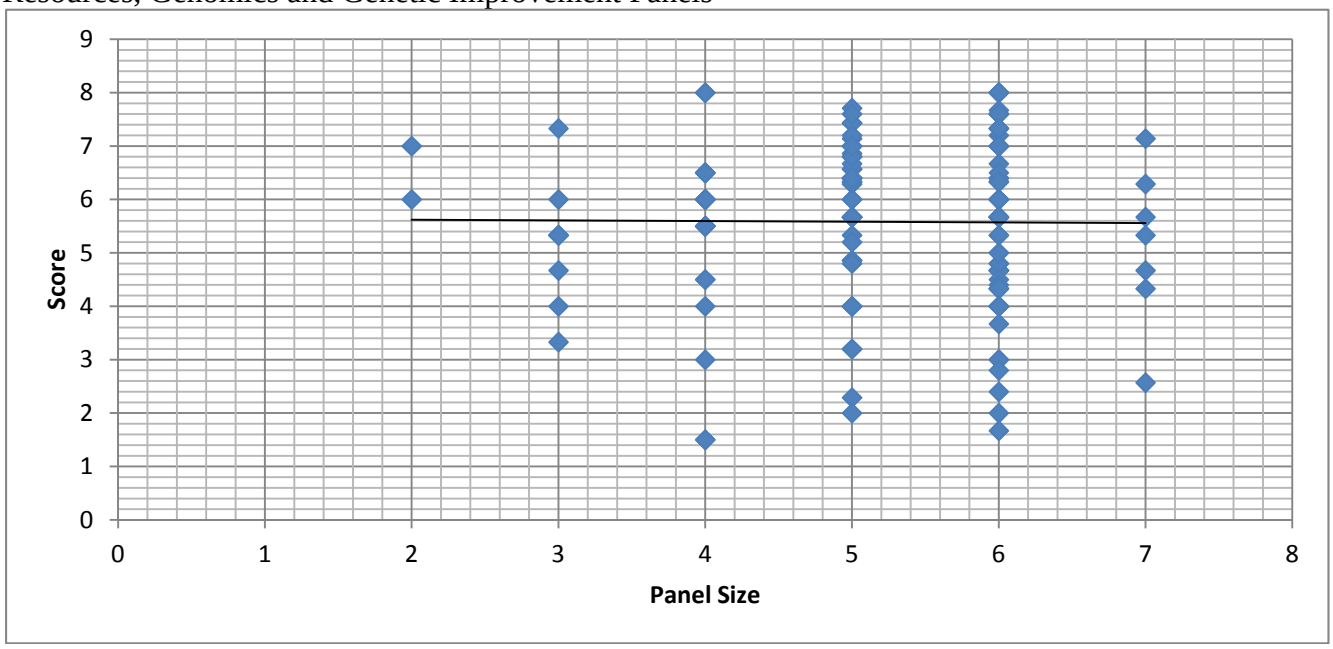


Figure 2. Panel Size vs. Initial Review Score for All Three Cycles of the NP 301 Plant Genetic Resources, Genomics and Genetic Improvement and NP 302 Plant Biological Processes Panels

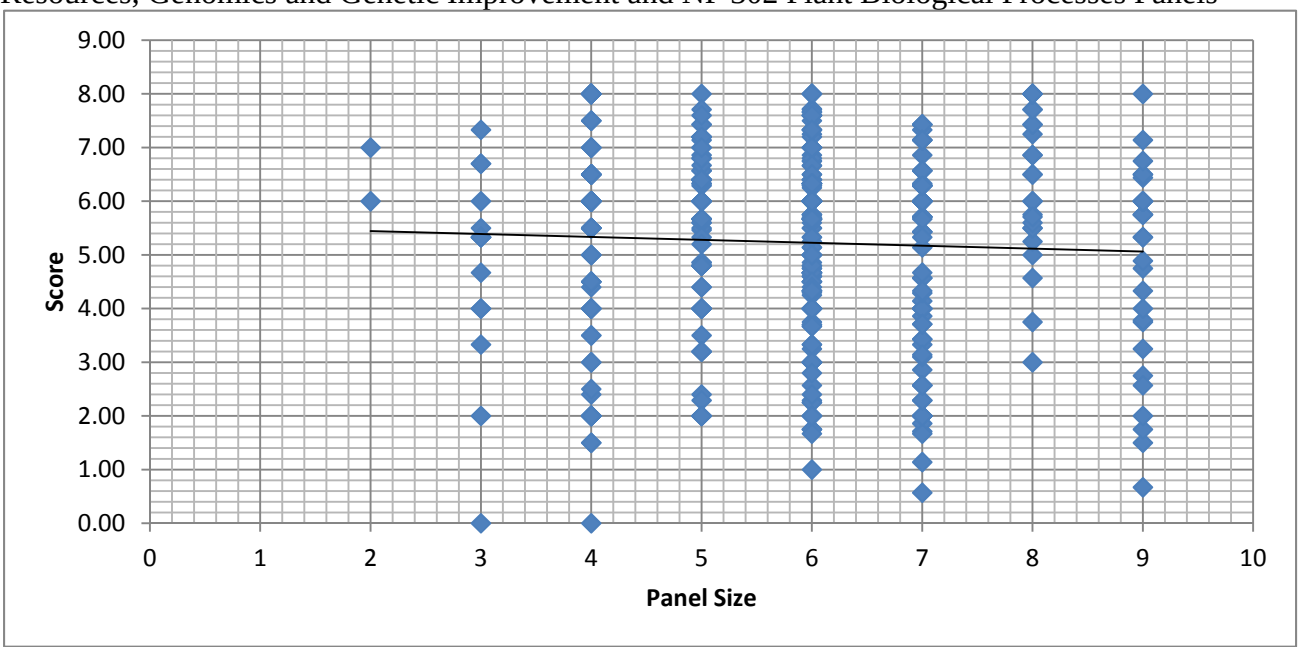


Figure 3. Panel Size vs. Initial Review Score for All Third Circle Panels

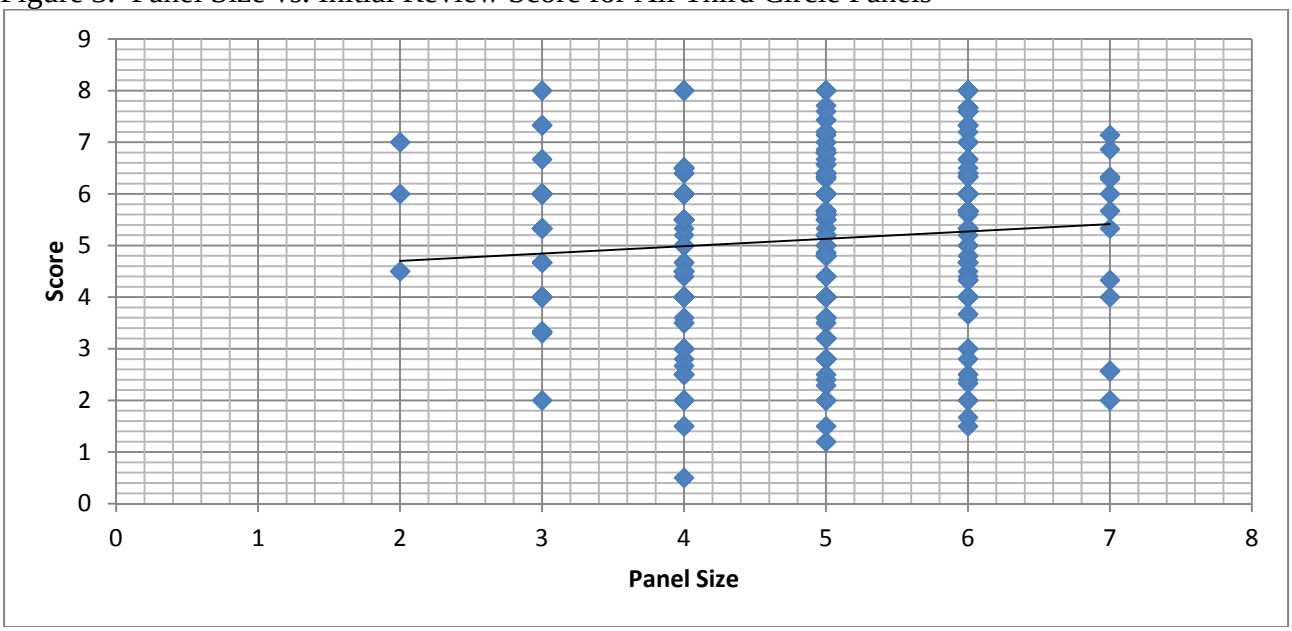


Figure 4. Number of Scientists vs. Initial Review Score for the Third Cycle of NP 301 Plant Genetic Resources, Genomics and Genetic Improvement Panels

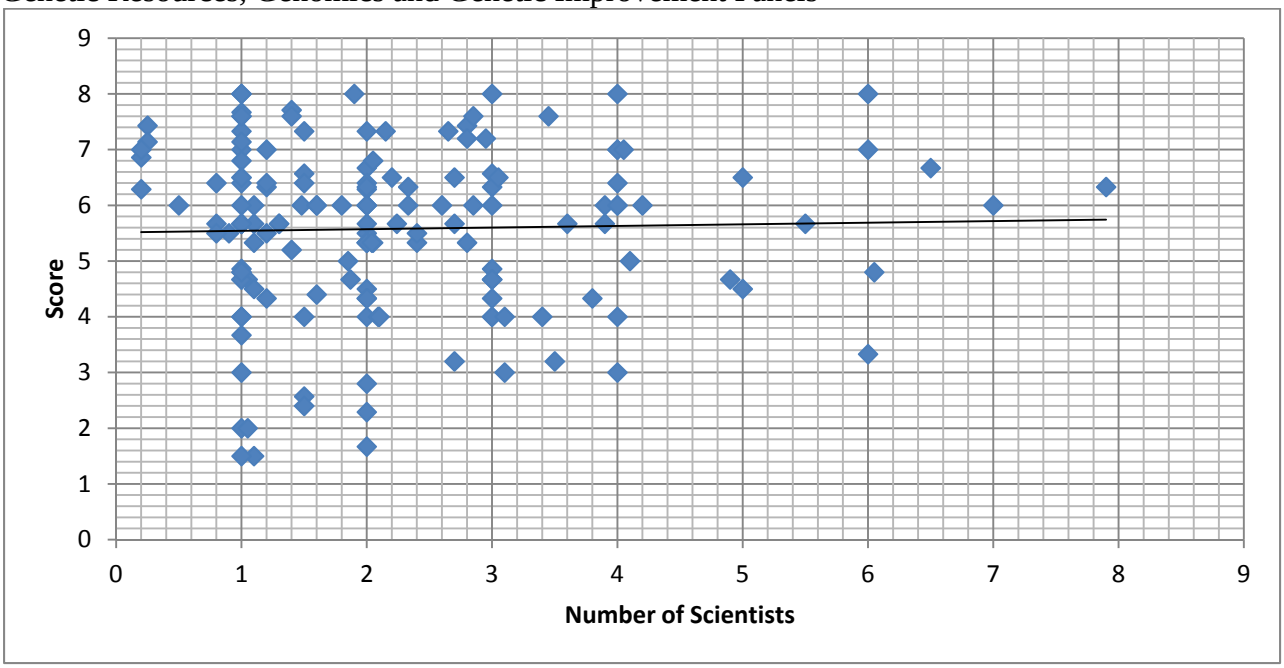


Figure 5. Initial Review Scores for the First (2003-04; 2001), Second (2008; 2006) and Third (2013) Cycle Distribution for the NP 301 Plant Genetic Resources, Genomics and Genetic Improvement Panels and NP 302 Plant Biological Processes Panels (average score 4.73; 5.41; 5.58, respectively). The number of plans reviewed by each cycle is in parentheses. Numbers over columns are the actual number receiving that score.

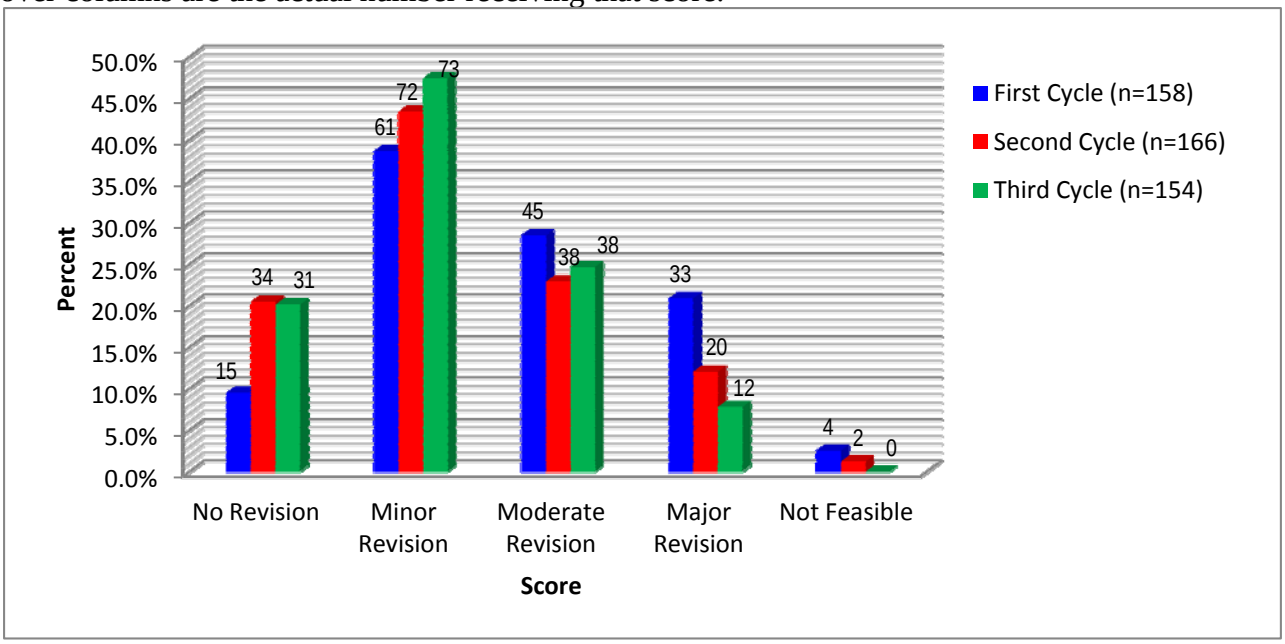
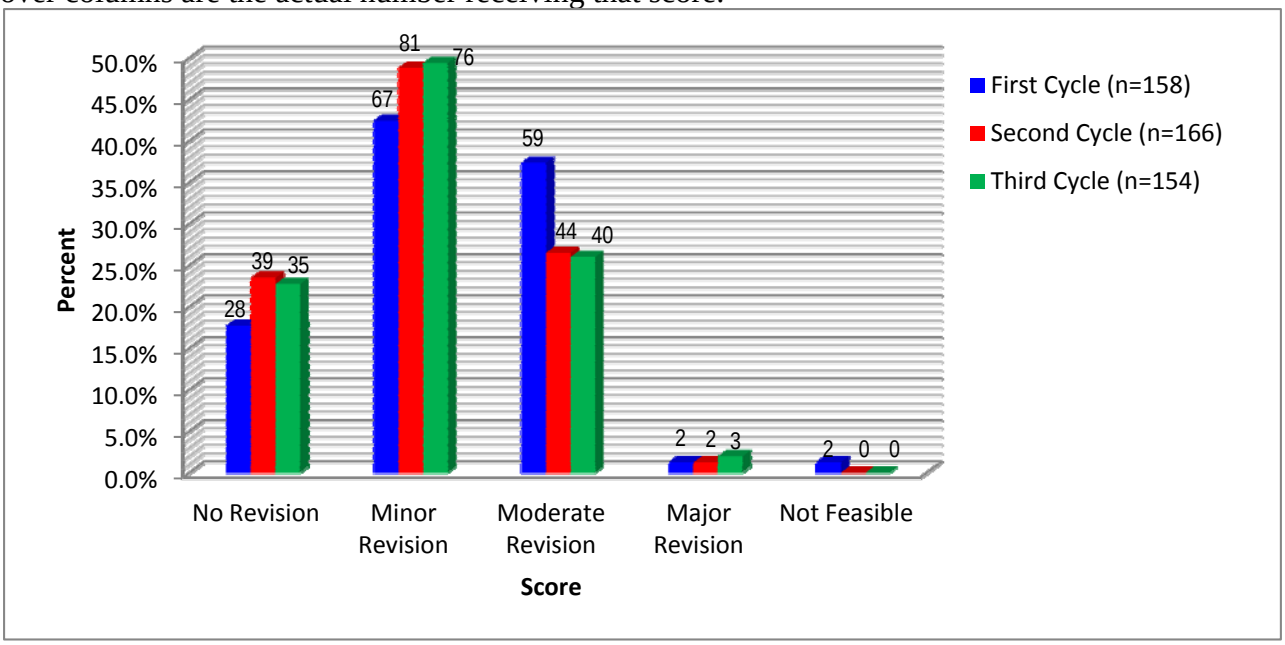


Figure 6. Final Review Scores for the First (2003-04; 2001), Second (2008; 2006) and Third (2013) Cycle Distribution for the NP 301 Plant Genetic Resources, Genomics and Genetic Improvement Panels and NP 302 Plant Biological Processes Panels (average score 5.28; 5.88; 5.78, respectively). The number of plans reviewed by each cycle is in parentheses. Numbers over columns are the actual number receiving that score.



Panel Characteristics

ARS places responsibility for panel member selection primarily on external and independent Panel Chairs. ARS scientists, managers and the Office of National Programs may recommend panelists but the Panel Chair is under no obligation to use these recommendations. Several factors such as qualifications, diversity, and availability play a role in who is selected for an ARS peer review panel. The 32 panels were composed of nationally and internationally recognized experts to review 154 projects coded to the Plant Genetic Resources, Genomics and Genetic Improvement Program (see Table 1, pages 2-4). The information and charts below provide key characteristics of the Plant Genetic Resources, Genomics and Genetic Improvement Panels. It should be noted that panelists participate in these reviews with the understanding that they will remain anonymous to ARS researchers. This information should be read in conjunction with the Panel Chair Statements.

Affiliations

Peer reviewers are affiliated with several types of institutions, especially universities, government, special interest groups, and industry. In some cases, peer reviewers have recently retired but are active as consultants, scientific editorial board members, and are members of professional societies. Also, several government-employed panelists are recognized for both their government affiliation and faculty ranking. Table 4 shows the type of institutions with which the Plant Genetic, Genomics and Genetic Improvement Panel members were affiliated with at the time of the review.

Table 4. Faculty Rank of Panelists Affiliated with Universities and Other Affiliations Represented on the Panels

Panel	Professor	Associate Professor	Assistant Professor	Government	Industry & Industry Organizations	Retired/ Other
1A NPGS Superpanel: Genebanks 1 Technology & Systematics (5)				1	1	3
1B NPGS Superpanel: Genebanks 2 Seed (5)	1			2	1	1
1C NPGS Superpanel: Genebanks 3 Clonal (4)	2		1			1
2A Plants & Environment: Genetics & Disease Resistance (6)	3	2	1			
2B Plants & Environment: Abiotic Stress (3)	1	1	1			
3A Plant Growth & Development: Signaling (6)	2	3	1			
3B Plant Growth & Development (4)	1	2	1			
4A Plant Metabolism & Pathways: Improvement (6)	5	1				
4B Plant Metabolism & Pathways: Physiology & Development (6)	2	1	2		1	
4C Plant Metabolism & Pathways (6)	5	1				
5 Genomics & Bioinformatics (2)	2					
6A Grains Superpanel: Maize & Sorghum: Breeding & Germplasm (6)	3	1			1	1
6B Grains Superpanel: Small Grains: Breeding & Germplasm (6)	2	1		1		2
6C Grains Superpanel: Maize & Sorghum: Genomics & Trait Analyses (6)	3	1			1	1
6D Grains Superpanel: Small Grains: Genomics & Trait Analyses (6)	2	1		1		2
7A Fruit & Nut Crops (5)	5					
7B Berries (3)				2		1
8 Sugarbeets (7)	1	3			3	
9 Vegetables: Potatoes (5)	2	2				1
10 Vegetables: Beans (6)	6					
11 Vegetables: Various (5)	1	4				
12 Fruits: Grape (4)	2	1	1			
13 Cotton (6)	3	2			1	
14A Oilseeds: Genetic Improvement (4)	1	1		1	1	
14B Oilseeds: Germplasm (4)	3			1		
14C Oilseeds: Physiology/Biochemistry (6)	3	1	2			
15 Ornamentals (6)	4		2			
16 Sugarcane (3)	2		1			
17 Genome Databases (5)	1	4				
18 Biotech Risk Assessment (4)	3	1				
19 Cacao (3)		2		1		
20 Citrus (2)	2					

Current and Previous ARS Employment

The Research Title of the 1998 Agricultural Research, Education, and Extension Reform Act 105-585, mandated ARS's requirements for the peer review of ARS research projects: 1) panel peer reviews of each research project were mandated at least every five years and 2) the majority of peer reviewers must be external (non-ARS scientists). Table 5 shows how many panelists were formerly employed by ARS. If panels contained a reviewer who is currently employed by ARS this is also noted.

Table 5. Affiliations with ARS

Panel	Formerly Employed by ARS
1A NPGS Superpanel: Genebanks 1 Technology & Systematics (5)	
1B NPGS Superpanel: Genebanks 2 Seed (5)	
1C NPGS Superpanel: Genebanks 3 Clonal (4)	1
2A Plants & Environment: Genetics & Disease Resistance (6)	1
2B Plants & Environment: Abiotic Stress (3)	1
3A Plant Growth & Development: Signaling (6)	
3B Plant Growth & Development (4)	
4A Plant Metabolism & Pathways: Improvement (6)	
4B Plant Metabolism & Pathways: Physiology & Development (6)	1
4C Plant Metabolism & Pathways (6)	
5 Genomics & Bioinformatics (2)	1
6A Grains Superpanel: Maize & Sorghum: Breeding & Germplasm (6)	1
6B Grains Superpanel: Small Grains: Breeding & Germplasm (6)	1
6C Grains Superpanel: Maize & Sorghum: Genomics & Trait Analyses (6)	1
6D Grains Superpanel: Small Grains: Genomics & Trait Analyses (6)	1
7A Fruit & Nut Crops (5)	
7B Berries (3)	
8 Sugarbeets (7)	2
9 Vegetables: Potatoes (5)	
10 Vegetables: Beans (6)	
11 Vegetables: Various (5)	1
12 Fruits: Grape (4)	1
13 Cotton (6)	2
14A Oilseeds: Genetic Improvement (4)	
14B Oilseeds: Germplasm (4)	
14C Oilseeds: Physiology/Biochemistry (6)	
15 Ornamentals (6)	
16 Sugarcane (3)	
17 Genome Databases (5)	1
18 Biotech Risk Assessment (4)	
19 Cacao (3)	
20 Citrus (2)	

Accomplishments

The peer review process is intended to be rigorous and objective, striving for the highest possible scientific credibility. In general, panelists are expected to hold a PhD unless the norm for their discipline does not require a doctorate level education to achieve the highest recognition and qualification (e.g., engineers and modeling specialists). Panelists are also judged by their most recent professional accomplishments (e.g. awards and publications completed in the last five years). Finally, the panelists who are currently performing or leading research to address a problem similar to those addressed in the National Program are preferred. Panelists are provided a brief questionnaire with regard to several elements of their activities and their responses are summarized in Table 6.

Table 6. The Panels' Recent Accomplishments

Panel	Published Articles Recently?	Received Recent Professional Awards?	Having Review Experience?	Currently Performing Research?
1A NPGS Superpanel: Genebanks 1 Technology & Systematics (5)	5	2	5	2
1B NPGS Superpanel: Genebanks 2 Seed (5)	5	3	5	5
1C NPGS Superpanel: Genebanks 3 Clonal (4)	4	2	4	3
2A Plants & Environment: Genetics & Disease Resistance (6)*	5	3	5	4
2B Plants & Environment: Abiotic Stress (3)	3	2	3	3
3A Plant Growth & Development: Signaling (6)	6	3	4	5
3B Plant Growth & Development (4)	4	1	3	4
4A Plant Metabolism & Pathways: Improvement (6)	6	3	6	6
4B Plant Metabolism & Pathways: Physiology & Development (6)*	4	3	4	4
4C Plant Metabolism & Pathways (6)*	5	5	5	5
5 Genomics & Bioinformatics (2)	2	2	2	2
6A Grains Superpanel: Maize & Sorghum: Breeding & Germplasm (6)	6	4	6	6
6B Grains Superpanel: Small Grains: Breeding & Germplasm (6)	6	5	6	5
6C Grains Superpanel: Maize & Sorghum: Genomics & Trait Analyses (6)	6	6	6	6
6D Grains Superpanel: Small Grains: Genomics & Trait Analyses (6)	6	5	6	5
7A Fruit & Nut Crops (5)*	4	2	5	4
7B Berries (3)	3	1	2	2
8 Sugarbeets (7)	6	5	7	7
9 Vegetables: Potatoes (5)	4	4	5	5
10 Vegetables: Beans (6)	5	5	5	5
11 Vegetables: Various (5)	4	5	5	4
12 Fruits: Grape (4)	3	2	4	3
13 Cotton (6)	5	3	5	5
14A Oilseeds: Genetic Improvement (4)*	3	2	3	3
14B Oilseeds: Germplasm (4)*	3	1	2	2
14C Oilseeds: Physiology/Biochemistry (6)*	5	2	6	5
15 Ornamentals (6)	5	4	5	5
16 Sugarcane (3)	3	3	3	3
17 Genome Databases (5)	5	3	5	5
18 Biotech Risk Assessment (4)	4	4	4	4
19 Cacao (3)	3		3	2
20 Citrus (2)	2	2	2	2

*Data not available.

Plant Genetic Resources, Genomics and Genetic Improvement Panel Chairs

Ken Richards, Ph.D., ARS Panel Chair

Panel 1 National Plant Germplasm Systems Super Panels and Panel 7B Berries

Retired, Agriculture and Agri-Food Canada

Education: B.Sc. & M.Sc. University of Alberta; Ph.D. University of Kansas

Former Research Manager, Canadian Genetic Resource Program, Plant Gene Resources of Canada, Agriculture and Agri-Food Canada, Saskatoon, Saskatchewan, Canada. Research interests include genetic resource management (plant, animal, microbes, and virus), native pollinators, pollination, forage crops, insect ecology.

Anne Sylvester, Ph.D., ARS Panel Chair

Panel 2A Plants and Environment: Genetics & Disease Resistance

Professor, Department of Molecular Biology, University of Wyoming, Laramie, Wyoming

Education: B.S. M.S. & Ph.D. University of Washington

Research interests include bioinformatics, maize, leaf development, genetics, genomics and corn.

Thomas Juenger, Ph.D., ARS Panel Chair

Panel 2B – Plants and Environment: Abiotic Stress

Associate Professor, Section of Integrative Biology, University of Texas, Austin, Texas

Education: B.S. University of Illinois; Ph.D. University of Chicago

Research interests include ecological and evolutionary genetics of natural populations; phenotypic evolution; identification and characterization of genes underlying variation in drought adaptation among Arabidopsis thaliana ecotypes; ecology and evolution of plant-animal interactions; pollination biology and herbivory in natural scarlet gilia (Ipomopsis aggregata) populations; physiological genomics and evolution in C3 (Brachypodium) and C4 (Panicum) grasses.

Stephen Moose, Ph.D., ARS Panel Chair

Panel 3A – Plant Growth and Development: Signaling

Associate Professor, Department of Crop Sciences, University of Illinois, Urbana, Illinois

Education: B.S. Case Western Reserve University; Ph.D. North Carolina State University

Research interests include genomics, gene regulation, bioenergy and maize genetics.

Shawn Kaeppler, Ph.D., ARS Panel Chair

Panel 3B- Plant Growth and Development

Professor, Department of Agronomy, University of Wisconsin, Madison, Wisconsin

Education: B.S. University of Wisconsin; Ph.D. University of Minnesota

Research interests include maize genetics.

L. Curtis Hannah, Ph.D., ARS Panel Chair

Panel 4A – Plant Metabolism and Pathways: Improvement

UFRF Professor, Horticultural Sciences Department, University of Florida, Gainesville, Florida

Education: B.S. and M.S. Purdue University; Ph.D. University of Wisconsin

Research interests include the molecular-genetics of starch biosynthesis in higher plants; the effects of introns and transposons on gene expression and on the organization of the genome.

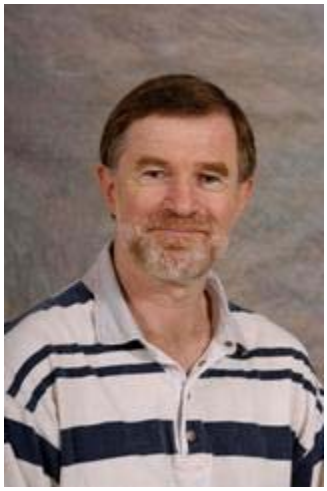
John Cushman, Ph.D., ARS Panel Chair

Panel 4B – Plant Metabolism and Pathways: Physiology and Development

Professor, Department of Biochemistry and Molecular Biology, University of Nevada, Reno, Nevada

Education: B.S. Ursinus College; M.S. and Ph.D. Rutgers University

Research interests include drought tolerance, abiotic stress and crassulacean acid metabolism.



John Browse, Ph.D., ARS Panel Chair

Plant 4C – Plant Metabolism and Pathways

Charlotte Y. Martin Distinguished Professor, Institute of Biological Chemistry, Washington State University, Pullman, Washington

Education: B.Sc. and Ph.D. University of Auckland

Research interests include plant biochemistry, lipids and plant oils.

Bryan Harvey, Ph.D., ARS Panel Chair

Panel 6 – Grains Super Panels

Professor Emeritus, Department of Plant Sciences, University of Saskatchewan, Saskatoon, Canada

Education: Ph.D. University of California (Davis); M.Sc. & B.S.A University of Saskatchewan

Research interests include cereal production, barley production, barley breeding and genetics, malting barley breeding, malting and brewing quality evaluation, intellectual property management, germplasm conservation utilization, research management and international development.

Dan Parfitt, Ph.D., ARS Panel Chair

Panel 7A – Fruit and Nut Crops

Pomologist and Professor, Department of Plant Sciences, University of California, Davis, California

Education: B.S., M.S. and Ph.D. University of Wisconsin

Research interests include plant breeding, genetics, fruit crops and nut crops.

Dr. Robert Harveson, Ph.D., ARS Panel Chair

Panel 8 – Sugarbeets

Associate Professor, Department of Plant Pathology, University of Nebraska, Scottsbluff, Nebraska

Education: B.A. Trinity University; B.S. Tarleton State University; M.S. Texas A&M University; Ph.D. University of Florida

Research interests include plant pathology, etiology/ management of disease of specialty crops, soil borne diseases of sugar beet and dry-edible beans, sugar beet diseases, soilborne root diseases, genetic resistance and multiple disease complexes.

Dr. Irwin Goldman, Ph.D., ARS Panel Chair

Panel 9 – Vegetables: Potatoes

Professor and Chair, Department of Horticulture, University of Wisconsin, Madison, Wisconsin

Education: B.S. University of Illinois; M.S. North Carolina State University; Ph.D. University of Wisconsin

Research interests include plant breeding and genetics and vegetable crops.

Dr. Thomas Michaels, Ph.D., ARS Panel Chair

Panel 10 – Vegetables: Beans

Professor and Department Head, Department of Horticultural Science, University of Minnesota, St. Paul, Minnesota

Education: B.A. Wittenberg University; M.S. and Ph.D. University of Wisconsin-Madison

Research interests include plant breeding, plant genetics, phaselous, interspecific crosses and marker assisted selection.

Rebecca Sideman, Ph.D., ARS Panel Chair

Panel 11 – Vegetables: Various

Extension Associate Professor, Biological Sciences Department, University of New Hampshire Cooperative Extension, Durham, New Hampshire

Education: B.A. Dartmouth College; Ph.D. Cornell University

Research interests include plant disease resistance management, sustainable agriculture, vegetable crop production, low-input agriculture, organic practices and plant breeding genetics.

K. Helen Fisher, Ph.D., ARS Panel Chair

Panel 12 – Fruits: Grape

Retired, Associate Professor, University of Guelph, St. Catharines, Ontario, Guelph, Canada

Education: B.Sc. and M.Sc. University of Guelph; Ph.D. Cornell University

Research interests include grape production, new cultivars, trellis/spacing geometry, fertigation and rootstocks.

Randy Wells, Ph.D., ARS Panel Chair

Panel 13 – Cotton

Professor and Associate Department Head, Department of Crop Science, North Carolina State University, Raleigh, North Carolina

Education: B.S. State University of New York; M.S. University of Delaware; Ph.D. University of Georgia

Research interests include plant physiology, photosynthesis, growth, yield, light, environment, cotton, soybean and peanut.

Silvia Cianzio, Ph.D., ARS Panel Chair

Panel 14A – Oilseeds: Genetic Improvement and
Panel 14B – Oilseeds: Germplasm

Professor, Department of Agronomy, Iowa State University, Ames, Iowa

Education: B.S. Universidad del Uruguay; M.S. and Ph.D. Iowa State University

Research interests include soybean breeding, germplasm improvement, disease resistance, pest resistance and abiotic factors resistance.

Jim Orf, Ph.D., ARS Panel Chair

Panel 14C – Oilseeds: Physiology/Biochemistry

Professor, Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul, Minnesota

Education: B.S. University of Wisconsin; M.S. and Ph.D. University of Illinois

Research interests include research and education; soybean genetics and breeding, molecular marker selection, mapping, plant breeding and genetics, soybean, soybean composition and soybean production

John Ruter, Ph.D., ARS Panel Chair

Panel 15 – Ornamentals

Allan Armitage Professor, Department of Horticulture, University of Georgia, Athens, Georgia

Education: B.S. California Polytechnic State University; M.S. University of Tennessee; Ph.D. University of Florida

Research interests include nursery production, plant breeding, plant introduction, polyploidy, germplasm, woody plants, herbaceous plants, conifers, Ilex and Hibiscus.

Maria Gallo, Ph.D., ARS Panel Chair

Panel 16 – Sugarcane

Dean, College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa, Honolulu, Hawaii

Education: B.S. Cornell University; M.S. and Ph.D. North Carolina State University

Research interests include gene expression, sugarcane, peanut, genetics, molecular biology and biotechnology.

C. Robin Buell, Ph.D., ARS Panel Chair

Panel 17 – Genome Databases

Professor, Department of Plant Biology, Michigan State University, East Lansing, Michigan

Education: B.S. University of Maryland; M.S. Washington State University; Ph.D. Utah State University

Research interests include genomics and bioinformatics.

Allison Snow, Ph.D., ARS Panel Chair

Panel 18 – Biotech Risk Assessment

Professor, Department of Evolution, Ecology and Organismal Biology, Ohio State University, Columbus, Ohio

Education: B.A. Hampshire College; M.S. and Ph.D. University of Massachusetts

Research interests include plant ecology, gene flow, hybridization, weed science, genetic resources and biotech risk assessment.

Panel Chair Statements

All Panel Chairs are required to turn in a statement that describes how their Panel was conducted and possibly provide comments on the review process that might not otherwise be found in the individual research project plan peer reviews. Panel Chairs are given some minimum guidelines for writing their statements, but are nevertheless free to discuss what they believe is important for broad audiences.

National Program 301 – Plant Genetic Resources, Genomics and Genetic Improvement

Super Panel: National Plant Germplasm System (NPGS): Cycle 3-2013

Chair report: Dr. Ken Richards

Retired; Research Manager, Canadian Genetic Resources Program, Agriculture and Agri-Food Canada, Saskatoon, Saskatchewan, Canada

Submitted: January 31, 2013

General

About 30 NPGS-related Project Plans were reviewed by four different NP 301 review panels 5 yrs ago (second cycle). In general, the overall quality of the second cycle Project Plans was improved as compared to the first review cycle. The following is a rough comparative summary of the review results for the 2nd and 3rd cycles (current):

Rating Category	2nd cycle	3rd cycle
– No Revision:	5	5
– Minor Revision:	16	24
– Moderate Revision:	5	2
– Major Revision:	3	1
– Not Feasible:	0	0
– "Double-failure" (project re-formulation):	1	0

In 2013 (third cycle) 32 NPGS-related Project Plans (NP 301) were reviewed by three sub committees, namely: Genebanks 1 Technology and Systematics, Genebanks 2 Seed, and Genebanks 3 Clonal. As predicted the overall quality of the 3rd cycle project plans increased compared to the 2nd cycle plans. More plans received a Minor revision and fewer plans required a Moderate or Major revision in the 3rd cycle. Some of the minor revision projects received a considerable number of comments/questions/suggestions. These suggestions were usually of a minor nature and the number of them did not reflect the overall positive impressions of the review panels. This was particularly noticeable in the seed gene bank panel which provided detailed comments.

Overall the 3rd cycle plans were well written, well formatted, relatively clean and concise with comprehensible detail. Large projects used their available space wisely with little repetition. Considerable new research was proposed and service functions for gene banks ambitiously

expressed. Panellists expressed appreciation for the considerable effort made to develop the project plans.

A number of Plans presented a figure integrating the objectives with anticipated outcomes, principal clients, and in a few cases name of researchers responsible for the objective(s). These efforts were applauded as demonstrated the PI and staff understood their responsibilities. The content included in figures and tables was significantly improved over the previous cycle. Many of the gene bank plans had a table presenting the taxa in collections, the status of the collections (number and percent of accessions regenerated or in need of regeneration or back-up), the number of requests received for each taxa, and sometimes those being given priority in plans. Panellists found the tables very helpful and were requested upon revision, if not presented in the original plan.

The achievement section frequently and briefly described research successes and what activities were completed (i.e. number of accessions regenerated, distributed, viability tested). The section did not express what failed or if previous milestones were met or not. Impact of successes was lacking. Not all achievement sections were consistent in content leading to the comment that clarity in instruction on content was needed leading to better consistency of report. Panellists recognized the retrospective report usually includes more detail on past progresses, but none of the panellists read the past retrospective report. They only get an appreciation of past successes and likelihood of future success from the project plans they reviewed.

Panellists commented that the NPGS and ARS could be doing more to publicize successes or "good news" stories. Many examples exist including initiatives on climate change and human health issues, biotic and abiotic stresses, vulnerability to new diseases and how these are being addressed (wheat: UG99 race of stem rust and role landraces or wild species may play). Perhaps request each site to submit two stories per year (in rotation; one story per week for NPGS) to national communication group for wide national distribution. Possible agenda item for Plant Germplasm Operations Committee (PGOC) to discuss.

Panellists were concerned that the State of Wisconsin was withdrawing resources to help conserve/maintain the potato collection. Panellists were concerned that ARS site managers and maybe even NPLs not take for granted the resources provided by state agencies. They suggested an internal ARS review to determine how solid working relationships were with each state and especially budget allocations considering all government levels are facing budget tightness. Are gene banks still an issue of priority with states? This may be an area where NPLs should be proactive.

Milestones and Products (Tables): Generally these were inadequately completed for many of the projects as they tended to lack detail (e.g. quantify the amount to be completed) and for a number of projects the milestones and products were similar across years or incomplete. Similarity among years might be expected for some of the service related activities such as amount of

germplasm to be regenerated or tested for germination rate, but the amount could vary by year and also by species. Confusion at times appeared in what constitutes a product – this likely requires better clarity in the instructions. One common misunderstanding was to consider a research publication a milestone rather than a product. Also too few publications were noted across projects, yet it is recognized many publications will appear as evidenced by the number cited in the past achievements section.

The Milestones and Products section appears to be in need of review for instruction and clarity with examples as to what constitutes acceptable and realistic Milestones and Products. Perhaps a meeting/workshop could be held between the NPLs and OSQR staff to clarity what is expected. Milestones and Products should reflect accountability, yet also respect flexibility for change. Two of the European Panellists suggested ARS examine European Commission Proposal formats for working examples. These are available on the internet under Framework Program 7, project proposal requirements.

Priorities and linkages

Unfortunately, in many cases, it was again not clear how priorities or time allocations/FTE among objectives/subobjectives were set (or not expressed clearly), or if the crops assigned to sites were optimal from the standpoints of curatorial capacity, and biological/agronomic similarities. This was especially true for sites such as PI stations or some clonal sites that curate many crops compared to sites which curate one or a few crops. Reference to Crop Germplasm Committees was made, but the link to their involvement in priority setting was frequently missed. Priority setting is especially needed for: germplasm acquisitions, new character descriptors, new or choice of molecular markers, choice of one basic function over another (regeneration vs. characterization) related to time and resource use. Priority setting was an issue during the last review.

Again reviewers were impressed by the large volume of research proposed in some cases, and they were unconvinced that all of it would be accomplished. Panelists expressed a desire for objectives or subobjectives within Plans to be priorized or at least an indication of what objectives/subobjectives had priority. Nevertheless, aiming high is better than aiming low or missing altogether.

In comparison there were many more service-oriented objectives compared to hypothesis-driven research. And again many of the “service objectives” might have been formulated as hypothesis-driven research. Peer reviewed research manuscripts will be written so why not indicate the research as hypothesis driven rather than service? There almost appeared to be a stigma to express hypothesis-driven objectives. Perhaps expressing an appropriate hypothesis was the issue – as was evident in a couple of cases.

Compared to the second cycle the customers/stakeholders for many projects were more clearly and effectively identified. The Crop Germplasm Committees (CGC) were frequently mentioned,

but their roles in the projects were still not always specified, or were their precise names. Panelists noted the importance of the CGC input, and that these committees must be active and effective. The roles, responsibilities and mandates of all CGCs should be reviewed periodically, retaining those which are functional, and terminating those which are ineffective (e.g. not meeting in two years).

During the second cycle, coordination and project linkages represented a challenge for a large, geographically diverse research program such as the NPGS. During cycle 3, a significant improvement was noted; great effort and detail was taken in acquiring collaborator letters spelling out who is doing what and acknowledgement of the reciprocal activities and responsibilities. Well done – staff should be commended as this took considerable effort to acquire letters, especially for some staff (those at Ft. Collins and the Plant Exploration Office) involved with most gene bank projects. Some of the individual projects (e.g., the sub-tropical /tropical clonal crops projects) again emphasized cross-project coordination more than did others. They enhanced their coordination acting as back up sites for others or more actively by conserving germplasm from pathogens. Again well done, demonstrating the strength of the NPGS. Coordination among some sites for some crops (e.g., forage and annual clovers, other forage legumes, cucurbits) still remained unclear and needs improvement.

During the previous cycle, panels noted that many clonal crops required techniques for secure backup (cryopreservation, in vitro techniques, etc), and the lack of such was a bottleneck to progress. Many current Project Plans are attempting to address this shortcoming and efforts were applauded.

However, the criteria for setting research priorities for developing in vitro or cryopreservation methods for clonal crops were still not clear, and seem to be initiated by the individual site researchers. Consultation/active involvement with the Ft Collins staff frequently was mentioned, however, this may leave the Ft Collins staff overwhelmed with requests and lacking sufficient time or resources, yet with an expected commitment. A specific priority-setting workshop to address this issue would be, perhaps useful, could be associated with a future curatorial or PGOC meeting.

An issue noted in the previous cycle was that crop collections were still expanding, although the rate of expansion appears to have slowed. For some crops, relatively little diversity remained to be acquired or was being acquired. The genetic stock collections (e.g. maize, soybean) are an exception to this trend, where significant new accessions will likely be donated in the next five years as sequencing and mapping population projects are completed as funded by other agencies (NIH, NSF). Additional resources and facilities may be needed to conserve, regenerate, back up and distribute this valuable germplasm as research tools. Other crops may develop genetic stock collections as well, impacting their future needs.

A slowly evolving mechanism appears to have been developed for switching emphasis from germplasm acquisition to adding value to the collection through more characterization / evaluation. It was unclear how the mechanism may determine which crops will be more thoroughly characterized.

Will any protocols or priorities be established? Who will establish the priorities? It was recognized many more primary objectives addressed the issue through the use of molecular markers for priority descriptors. Some sites without molecular capabilities were forced/encouraged to seek external collaborators (within ARS or nearby universities).

Staffing vacancies (in particular the curator at NCGRP collaborating on all Project Plans) are noticeably affecting project progress at some sites. Hopefully, these positions will be filled soon.

IP issues were a concern to panels for almost all projects, but were rarely discussed in Plans. Possibly provide panels with a brief description of ARS policies as to IP and germplasm in the orientation for the next reviews.

Panelists appreciated the breakdown of methodology by sub-objective, as one can go to sleep reading all of the methods when together and not linked to experimental questions. Also suggest substitute "Approach" for Experimental section because not all Plans were experiments (e.g. gene bank proposals). Also relates to service vs. hypothesis driven research objectives.

Related CRIS projects were always mentioned (a requirement), yet some panelists sought more clarity/detail on the interactions between/among projects.

Acquisition

As a continuing basic activity all NPGS Project Plans were to acquire new/priority germplasm. The rationale/criteria as to how priority, strategic germplasm or specific gaps in collections were identified were consistently still not clear and lacked detail for many panelists. Gene banks proposed to use molecular or phenotypic data while the PEO was using GIS technologies to identify gaps in collections. Mention of comparative data sets was frequently not made. Also who makes the final decision on priority gaps? Presumably site curators?

Assignment of priorities for germplasm (filling gaps) is particularly challenging for sites with large collections with many genera/species. How are such priorities set? Mention of the respective CGC's was not always made and crop vulnerability reports, which themselves may be out of date, were never mentioned (this remains an issue from the second cycle). Specific crops or species to be targeted for exchange were frequently unspecified, although explorations were described at the level of country to be visited (collaborating letters included as well). The PEO was frequently mentioned with assisting curators with acquisition (exploration and exchange). Perhaps a workshop, overarching guidance or discussion at PGOC meeting on the best

approaches for gap analysis – geographic, taxonomic, cultivar, molecular vs. phenotypic criteria may be needed.

A couple of panelists expressed concern that the plant exploration program may no longer be the best approach now that more countries (still a minority percent) have closed borders to exploration. A point to consider may be to enhance programs encouraging the effective use of collaborative research take research funding/researchers to host countries to acquire germplasm (in the form of a benefit sharing package)? The few examples which exist suggest these collaborative projects have a higher chance of acquiring relevant germplasm from host countries.

Moving high-priority germplasm through quarantine continued to be challenging because of the cost of quarantine for some crops, and lack of capacity at some quarantine sites. This is partly outside the control of the NPGS, residing within the jurisdiction of APHIS. Reducing the requirements (resources, quota) for processing clonal crops through quarantine via acquiring seeds versus whole plants still needs further evaluation and assessment although this approach is described in some clonal project plans.

The responsibilities (who, what, where, when) for acquiring heirloom germplasm from within the US was better defined by a number of Plans looking to acquire such germplasm. Collaborative arrangements with NGOs, Plant Material Centers, US Forest Service, National Parks and private industry was identified to help with acquiring unique, including *in situ* germplasm in some cases.

Project plans rarely mentioned the FAO International Treaty on Plant Genetic Resources for Food and Agriculture, the Convention on Biological Diversity or the Nagoya Protocol.

Some project plans and in particular the tropical clonal plans, commented on the difficulty of acquiring germplasm through expedition and collection in a number of countries. One plan went as far as to imply the terms and conditions of the FAO International Treaty was to blame for country reluctance to share germplasm. Or is it the Convention on Biological Diversity? This issue needs better documentation than presently available and should be treated carefully. However, it was recognized that some countries will deny access, but this should not be taken as a generality. Scientists may not fully understand the acquisition/expedition process or the FAO Intellectual Transfer fully and are consequently discouraged from proceeding, even in cases where importation may be possible. Overall, some of the scientists appeared daunted by the prospect of importing germplasm from other countries through exploration or exchange.

On the other hand, several repositories (i.e. Corvallis, Davis) have had considerable success conducting international exploration and acquisition trips especially from previous Soviet countries with friendly access policies. Could the scientists at Corvallis and Davis serve as a resource or provide a systematic set of guidelines/suggestions that would help other clonal curators with this issue? Staffs at the PEO office already help, but for some reason some ARS scientists still appear daunted by the problem.

Interspecific hybrids have value, but were rarely mentioned in the conservation plans of gene banks. This omission, coupled with the emphasis on species in project plans, led to panel's assumption that hybrids are not being conserved, and are not given priority commensurate to their value. Challenges related to their regeneration integrity may exist and should be investigated.

Maintenance

Panellists appreciated the efforts of some site to conserve germplasm at -18C vs. +4C and a policy of split sample storage for distribution and long-term preservation. Sites were encouraged to invest in colder storage facilities such as chest freezers for core collections as a start. In the long term this will likely save resources through increased regeneration intervals and maintain genetic integrity of samples longer. This may be a viable option when +4C storage facilities are reaching maximum capacity (Pullman site).

Improvements were made in a number of Project Plans for sites with "active collections" in declaring milestones describing the amount (percent) of germination testing actually occurring. Efforts were noted that the increased germination testing at active site may help the NCGRP develop management models and may also reduce the amount of testing at NCGRP and at sites.

De-accessioning: Again relatively few Project Plans discussed this important topic in-depth. The criteria and priority for de-accessioning should be stated clearly in Plans, because this process is likely to become increasingly prominent as molecular marker data accumulates (current Plans), and the cost of maintaining materials rises. One site (Geneva) described activities to identify vegetable duplicates.

All the following questions still remain: When does it become worthwhile to devote substantial time and resources to identifying true duplicates, via passport data, phenotypes, and genetic markers? Is this more challenging for large collections? Is it worth the time/resources to identify true duplicates by genetic markers, if the accessions don't cost much to maintain?

Panelists asked about the NPGS/ARS policy on backing up germplasm. Is 83% high enough? Why not 100%, which is close to the level attained at some sites? How much (what percent) germplasm should also go to the Svalbard Global Crop Diversity Trust Seed Vault as a third back up site?

Panelists applauded the efforts of clonal genebanks seeking alternatives to duplicate local orchard plantings for backing-up their collections, e.g., via developing cryopreservation or *in vitro* maintenance in collaboration with the National Center for Genetic Resources Preservation (NCGRP) or by establishing duplicate orchard plantings at other sites. Some research for developing techniques for conserving clonal crops from seed were noted (an improvement). Although this approach may not be feasible for biologically sound reasons (recalcitrant versus

orthodox seeds, genetic integrity issues) for some crops, panelists encouraged further activities to investigate the possibility for other species or populations.

Panelists suggested the use of bar coding or especially QR codes for specimens at the National Arboretum and at clonal repositories for educational (connected to hand held devices providing accession passport or other information) and research purposes. Panelists provided a reminder to not to forget backing up these files as well.

Regeneration

Some Project Plans continued to state that one "trigger" for regeneration is when seed viability drops to or below 60%. But the international recommendation for regeneration is 85% viability (FAO 1995, 2010) because below this level some degree of genetic erosion is believed to occur. Why is the 60% threshold level used? Is there any research that supports this lower level? Should the NPGS with input from NCGRP issue a clear statement on this issue, or discuss it at PGOC?

In some plans, regeneration appeared to be estimated by taking the whole collection and dividing by 5 years. In the majority of plans, the regeneration plan was based on viability data and seed numbers for the collection. Consistency among seed gene banks may be an asset, with the needs for regeneration clearly known and stated.

It was noted that the Parlier site still appears underutilized. A proactive approach by Parlier staff is suggested in soliciting germplasm for regeneration and assessing needs and expected depositions. A presentation at PGOC on the strengths of the Parlier site may help. Gene banks were encouraged to use the Parlier site for drought tolerance evaluations.

Characterization

The use of the words characterize ("genotype") and evaluate ("phenotype") were consistently used in major objectives in all project plans. This is an improvement since the last cycle.

Panelists applauded efforts to review and update descriptor lists with input for the relevant CGC, as was industry involvement in regeneration and characterization for some crops.

Again considering its global importance, it was striking that climate change was not mentioned in most Project Plans. Curators should assume a proactive role in preparing for this, via a longer-term strategy for the NPGS. Relevant germplasm should be acquired, new descriptor criteria (e.g. resistance to drought, salinity, identification of stress tolerant genes) should be developed, and germplasm evaluated for those factors. Techniques for effective evaluation of germplasm likely need development and they are not expected to be easy. Water shortage is a reality for some sites already and will become an increasing issue for US agriculture. Development of appropriate molecular markers for the above traits would be ideal. The

foresight of ARS in establishing the Parlier site for evaluation of germplasm related to climate change issues was noted by panelists.

Reviewers were again enthusiastic about the increased emphasis on digital imaging, especially when images of different organs (seed, flower, roots, and cross sections) are captured.

For some crops (beans, canola, sorghum, etc.), information about photoperiod sensitivity was added to some descriptor lists. More crops could be included.

Panelists applauded efforts that more core (or sub-core) subsets are being planned and wanted even additional ones for more crop species. Core subsets combined with molecular marker information provide rational mechanisms for managing the genetic diversity within collections.

Characterization with genetic markers

A substantial increase in the number of projects planning germplasm characterization with molecular markers is applauded. The trend started during the last 5yr cycle and has increased even more in this cycle. Genetic marker information provides new insights into intrinsic genetic variability, yet the analyses and application of genetic markers involve many challenges. These challenges are better addressed than last time in many Project Plans. The efforts were applauded by panellists.

There still remained some uncertainty in the use of molecular markers especially associated with types of markers, strengths/weaknesses for specific purposes, the appropriate number of markers, etc. Use of restriction fragment length polymorphisms (RFLP) and too few markers were commonly noted as weaknesses. Markers including SNP determinations associated with identifying valuable agronomic phenotypic traits were applauded.

The major objective appearing in many gene bank Project Plans to “develop novel genetic marker systems” was questioned by panellists. Does a system need to be new or unique to be workable or good enough?

It was noted/commended that for some crops and sites, it was more efficient to involve industry or university partners or to farm-out genetic marker analyses rather than to develop the expertise “in-house.” This approach may increase interaction, take advantage of existing expertise, reduce “in-house” acquisition of expensive equipment and expertise, and increase utilization of collections.

Evaluation

Curators must be aware of germplasm users’ (especially breeders) needs for information required to register new cultivars. Agronomic and horticultural data are high priorities, but quality traits and disease-resistance data are also highly desired. New data frequently fit into the highly desired category, indicating interactions with the user community (CGC).

Curators were applauded for being well-aware of new diseases and responding quickly with evaluations for host-plant resistance. This was particularly noted for the response to the rust UG99 (wheat) and laurel wilt (avocado).

Some plans were criticized for still not devoting enough time/resources on evaluating germplasm for disease resistance or product quality, sometimes because a standard set of differential lines (isolates) for certain pathogens are lacking or quality standards are not available. Efforts focused on quality factors related to human health were encouraged. The details provided on quality evaluations using analytical instrumentation were applauded and could be used as a model for other NPGS sites if appropriate.

"Highly heritable horticultural and morphological traits" were cited as priorities in a number of plans; much more evidence for how these traits will be determined was provided in this cycle of plans compared to the last set of plans.

It was still not clear how germplasm would be evaluated for reclamation/re-vegetation needs, however the mechanisms for establishing priorities and testing for viruses present in clonal germplasm was much better defined in the plans.

Panellists recognize that phenotyping is critical (especially for commercialization), and yet variation sometimes makes it difficult to phenotype germplasm for critical factors. Reliance on markers for genotyping and breeding has some problems, especially for clonal crops (most are hybrids), because there is considerable interaction among genes and because spatial aspects of the genome are really important in determining phenotype. It was recognized that mapping populations and markers may change with different crosses/cultivars, making such efforts a real challenge for repositories where considerable diversity exists. All phenotyping should be done in a rigorous manner with the aim of obtaining the highest quality data possible for all accessions in a collection – with the ultimate data repository being GRIN-Global.

Some panellists expressed the idea that the program may have greater impact by looking for more major QTL effects across species rather than seeking many minor ones in a single species.

Core collections from every germplasm collection could to be evaluated utilizing high throughput-automatic phenotyping greenhouse as made by Lemna Tec. These high tech greenhouses can record a staggering array of robust phenotypic data that is completely automated and extremely efficient. The information, coupled with DNA markers or genotype-by-sequencing, or whole genome sequencing data, could facilitate powerful association mapping studies in the future, which ultimately might lead to greater usage of accessions by stakeholders. Although these greenhouses are expensive to build (millions), at least one greenhouse should be acquired or leased by ARS so that appropriate tests can be conducted on one or two genera and the results compared with field grown plants.

Documentation

Efforts to update GRIN to GRIN-Global were applauded. Clearly the system users are looking forward to the availability of GRIN-Global on the internet. However, there still seems to be a lack of understanding, especially from non-ARS people of what GRIN-Global will be like. More information is needed by the scientific community.

- Excellent website for the Maize Genetics COOP Stock Center – can GRIN-Global link/capitalize on these?

- How will molecular data be incorporated into GRIN-Global? Linkage to GenBank, etc?

The major effort to incorporate genetic marker data into GRIN-Global remained a major concern of the panelists. Incorporating the already accumulated and proposed massive quantities of genetic marker data managed in local site databases into GRIN-Global will be challenging

Data management back-logs already exist and, with the new data being generated over the next five years, the capacity of GRIN-Global staff and data management staff throughout the NPGS will be taxed. The user-friendly format will help sites load genetic marker, characterization and other data, but the potential for bottlenecks are evident. Loading linkage map data may be particularly challenging.

No mention was again made as to how information submitted/collected from germplasm users will be analyzed and disseminated. Where will the information be collated and stored, at the respective sites? Will it be incorporated into GRIN-Global and, if so, where? If only in "comment fields" these tend to be limited and are not easily searchable or data are not comparable among accessions.

Although a Technical Steering Group for GRIN-Global has been formed, there was little mention of the group. Importantly there appeared to be little mechanism for acquiring information from countries already using Version 1 of GRIN-Global.

Do individual sites get reports on GRIN hits related to their germplasm to improve their management of collections? This is an important component of their impact, as distribution of information on their germplasm is a stated objective/sub objective of each Plan. Information delivery was not typically presented in the past accomplishments section of the plans. Use of GRIN is traceable and user information is generated. Database Management Unit could provide the information to sites if they are unable to do so. How is the information used? Issue relates to one of the two basic deliverables of any gene bank – quality germplasm and relevant information.

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March 10, 2014

Dr. Joyce Loper, Scientific Quality Review Officer
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Re: Final Report for National Program 301 Panel 2A

Dear Dr. Loper:

I served as the chair of an ARS National Program 301 Panel 2A – Plants and Environment: Genetics and Disease Resistance. I recommended panel reviewers and participated in an online meeting to discuss the five plans. A follow-up meeting was held to consider responses to the panelist's recommendations. In this letter, I provide a close out report on the review process.

Due to the breadth and high caliber of the selected panel, the panel discussion held in March 2013 was particularly lively and focused on evaluating the methods, goals and long term vision of each proposed plan. The panelists reviewed whether these plans represented cutting edge research that would fulfill the mission of ARS. Recommendations for improvement were offered with the goal of improving the research potential of individual plans.

The panel met in mid-March 2013 via a web-based meeting. The panelists were well prepared for this meeting in part because Dr. Strauss and his team provided detailed and timely information about the panel. Documents explained the review process and the USDA ARS mission clearly; thus the panelists were fully apprised of their review role. Logistics of the meeting were exceptionally well handled so the meeting ran smoothly and efficiently. Panelists had been selected based on expertise and conflicts of interest resolved prior to the panel meeting. Written reviews were compiled and available to all panelists prior to the meeting, which facilitated discussion among the group. Final recommendations by the panel were reached by consensus.

The ARS review format helps to ensure that high quality projects continue to be funded by USDA. An important feature of the review process is including an outside chair and review team. Panelists

bring in broad expertise from practicing scientists to supplement the internal USDA review. Feedback from the panel to project PIs is a constructive way to communicate recommended improvements. The web-based format of the meeting is very effective because it minimizes travel time without compromising discussion as a group. I have no additional suggestions to improve the process, but encourage continued use of outside panelists and I fully support the online meeting format. Please don't hesitate to contact me if I can provide additional information or be of further service.

Sincerely,

Anne W. Sylvester, PhD
Professor of Molecular Biology
Director of Wyoming's Experimental Program to Stimulate Competitive Research

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Panel Chair Statement for NP 301 Panel 2B

Dear Dr. Loper:

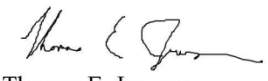
This short note acts as my Panel Chair Statement concerning the peer review and evaluation process associated with USDA projects through the Plants and Environment: abiotic stress panel (NP 301 2B, 2013). I acted as Panel chair and interacted with two outside academic reviewers to evaluate three project plans. Each panel member read the entire complement of proposals, but focused specifically on two (acted as primary and secondary presenters). The panel reviewers spanned a broad swath of plant abiotic stress biology, from detailed molecular biology to quantitative genetics and field agronomic trials. The reviews centered on a discussion of the scientific and technical merits of the projects and the panel had sufficient experience and knowledge to evaluate the project plans. The discussion for each project was led by the primary reviewer, supported by the secondary reviewer, with general discussion by all panelists through the discussion process. Careful notes were collected during the process and these formed the basis of our recommendations. Overall, the panel was impressed by the project plans and felt they were relevant to the goals of the USDA program.

The review was extensive - each project was under discussion for as much as an hour. I was impressed by the time and energy the reviewers contributed in terms of preparing for the review session. Each project was adequately discussed, both in terms of conceptual goals and technical details. One positive aspect of the panel was the good coverage of topic material and the genuine interest of the reviewers. One challenge was the lack of familiarity of the academic researchers to USDA procedures and the mentality of reviewing project plans as a “grant proposal”. It was also challenging in some cases to evaluate whether the resources, in terms of funds and personal, were adequate for the completion of project plans. In general, a better presentation of timelines, benchmarks, and clearly

articulated milestones would likely help review teams assess the likely success of project proposals.

In summary, this was an effective peer review panel that made substantive comments on project plans. Overall, I'm confident that the process has helped to improve the science stemming from the USDA research grops.

Please let me know if I can be of further assistance.
Sincerely,



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June 11, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
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Dear Dr. Loper:

I am writing to summarize the positive experience of serving on program review panel for the NP 301 3A- Plant Growth and Development: Signaling, within the USDA, ARS National Program for Plant Genetic Resources, Genomics, and Genetic Improvement. Myself and the other panelists conducted a thorough evaluation of submitted project plans and provided a number of detailed recommendations for further improvement of proposed research. Our efforts were made easy by the well-conceived and clearly described project plans that were developed by USDA ARS scientists, but the collective expertise of our panel did offer some additional perspective that may help the project teams. In particular, we emphasized the importance of strengthening links between basic discovery research and potential applications to improving U.S. agricultural productivity.

The orientation sessions offered by Michael Strauss from National Programs Staff were very helpful and effective in achieving an efficient process. Each of the panelists provided careful reviews of their assigned project plans and were well-prepared to present concise summaries of their assessments during the scheduled teleconference session. Only one panelist had a potential conflict with one of the projects, and it was easy for that paneliss to leave that specific discussion and return for a group wrapup. This was the first time any of us conducted such a peer-review process through a fully "virtual" process. There was consensus that this approach worked very well and would be preferred in the future over traveling to Washington, D.C. for face-to-face meetings. All panelists agreed that they would serve again as a panelist if requested.

Sincerely,

Stephen Moose

Stephen Moose
Professor, Maize Genomics

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17 December 2013

Dr. Joyce Loper, Scientific Quality Review Officer
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Panel NP 301 3B – Plant Growth and Development (2013) conducted the review of 3 research proposals. The written reviews prepared in advance of the on-line meeting were thorough and comprehensive, and addressed important considerations that will improve the success and impact of the research projects. Examples of suggestions from the review process include the use of new genomic technologies including whole genome resequencing for mutant identification and RNA-seq to expand the precision and scope of expression measurements. Overall, high quality proposals were presented which allowed the review process to address ideas and alternative approaches to enhance the success of those projects.

The overall process was positive and well-refined. The external reviewers prepared comprehensive written reviews in advance of the online discussions. These reviews were compiled effectively by the USDA staff which facilitated a productive discussion. The discussion was focused and effective.

A notable positive of this panel was the high quality of work that is being conducted by the USDA scientists at the Plant Gene Expression Center. The excellence of their accomplishments gave confidence that the proposed research would lead to important outcomes. It was a pleasure to have the opportunity to understand their research more thoroughly and a useful exposure to the excellent research in USDA.

The overall experience of the panel process was also positive. The written documents that were provided were very helpful, and the entire process was managed very well. The clearly detailed scoring system, found in Appendix 1 of the guide provided, was helpful in ranking the proposals.

Not having to travel to conduct the reviews is a highlight.

Having 3 proposals is a good number and having one as primary and one as secondary allows thorough review.

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I don't have any suggestions to improve the process. The software used to conduct the process worked well, the instructions were thorough and easy to understand, and the workload required allowed time for a thorough review and discussion.

I have served on multiple NSF and USDA grant panels. Given the context of those experiences, I believe this was an effective panel and will lead to improved quality of research.

Sincerely,

Dr. Shawn Kaeppler
Rothermel-Bascom Professor of Agronomy

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January 17, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
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Dear Dr. Loper,

Concerning our review today of the NP 301 Panel 4A - Plant Metabolism and Pathways: Improvement preplans, I would like to make the following comments.

One of the panel members voiced the opinion – and virtually all other members agreed – that these pre-plans generally lack the detail found in a typical NSF/USDA/NIH/DOE grant proposal. This was particularly the case of one pre-plan that involved FOUR laboratories. We would suggest that future pre-plans contain enough detail so that the reviewers can determine precisely what is proposed. It is impossible to judge the probability of success, novelty, and importance when it is not clear what is being proposed.

Concerning the panel itself, I was quite impressed with the level of detail in panel members' preparation for today's meeting, their comments during the panel, their understanding of the process and the ability to come to consensus. We spent approximately 30 minutes on each proposal, although the "4 in 1" proposal did require more time simply to try to ascertain what was being proposed. The website connection required some adjustments but nothing was too serious. Overall, I believed that the review today was a success and had the appropriate amount of rigor.

I think there was general agreement that the panel members preferred this system to traveling to Washington DC especially with today's inclement weather.

If I can be of further assistance, please let me know.

Sincerely,

L. Curtis Hannah
Professor

University of Nevada, Reno
Statewide • Worldwide

Department of Biochemistry
and Molecular Biology

June 6, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
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Dear Dr. Loper,

Here are my responses to the four queries required for the Chair's Statement.

1. Yes, I can confirm that the NP 301 Panel 4B – Plant Metabolism and Pathways: Physiology and Development panel had discussions that reflected a sound and credible scientific peer review. The referees supplied many novel ideas and alternative approaches, which should improve the quality of research, that were not necessarily considered by Agency scientists and staff. One example of the creative thinking on the part of the referees was on one project plan, which did not review well, wherein the PD did not propose direct testing of allergenicity of a particular protein(s) when such an approach was obvious and would have improved the impact of the project. Other suggestions reflected the lack of embracing modern technological innovations such as using real-time PCR instead of northern blotting for accurate quantitation of steady-state mRNA abundance changes and the use of 2D-DIGE instead of traditional staining methods of accurate quantitation of proteins being resolved by 2D-PAGE. Other general comments including hypotheses that were actually hypotheses, increasing the specificity of hypotheses being proposed, and suggestions of using specific germplasm that would be more commercially relevant for a particular project.

2. The most notable (positive or negative) characteristics of the discussion process and explanations are summarized below:
a) I found that the level of preparation for the discussion by the panelists was excellent.
b) The average time spent discussing each project was 25 min (range was 18-37 min).
c) The logistical arrangements for the panel were executed by program staff and officers extremely well except for the telecommunications system (see below).
d) The panel manager and chair paid close attention to peer reviewers who might have had a conflict with the project and these were excluded from the panel, so conflicts of interest were not an issue with this panel.
e) All of the referees exhibited a clear understanding of the review criteria and their roles as peer reviewers.
f) The scoring and critique writing procedures were conducted smoothly. In the case of one project plan, the panel voted on it twice with the same recommendation outcome.

3. Here are a few suggestions to improve the peer review process:
a) The review panel experiences major problems with the AT&T teleconferencing system, and therefore, the panel started 10 minutes late. There was severe echoing within the system if participants used both the telephone and the computer to participate in the panel and did not mute their microphones. While this is a common problem with such telecommunication systems, the problem was a major setback to the timely start of the panel.
b) No video capability was possible. In this day and age of modern telecommunications, a videoconference should have been possible to better mimic an "in person" panel. In my experiences, products from Adobe Systems (Adobe Connect), Cisco (WebEx), and Citrix (GoToMeeting) work extremely well (See reviews at: http://www.pcmag.com/article2/0,2817,2388678,00.asp). I would abandon the AT&T system as soon as possible.

c) Several of the panelist felt that the organizational format of many of the project plans was awkward and that the required structure did not provide an optimal format to allow researchers to effectively and concisely convey the content of their research plans. For example, hypotheses or research problems were sometimes not stated early enough in the plans or were not stated well or clearly. In some cases, the rationale for objectives within the project plans was not well developed and the work plans were presented as "to do" lists instead of a well-integrated and cohesive plan where objectives fit well with the hypotheses to be tested and fit well together. To overcome these problems of ineffective project plan writing and preparation, I would recommend that the researchers be provided with a more defined framework within which to present their project plans. For example, one might ask that the researchers subscribe to fixed wording such as the following example:

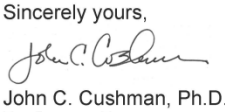
- The first sentence of each aim MUST start with one of the following phrases and sound "doable"
  - The _____will be determined…
  - Determine _____...
  - Identify _____...
- The second sentence MUST start with one of the following phrases
  - This will be done by _____...
  - The approach will be to _____...
- The third sentence MUST start with one of the following phrases
  - The hypothesis to be tested is _____...
  - The question to be answered is _____...
  - The purpose is _____...

While such a recommendation might sound extremely elementary, I have found that this simple step helps to focus the organizational thinking of researchers (and our graduate students) when it comes to preparing their research plans. The reasons for requesting the use of these wording formula are i) that it prevents convoluted or vague research aims within the project plan, which might lead to a less than competitive plan, and ii) it makes it much easier for the reviewers to understand the goals of the project, the approaches being taken, and the rationale behind the proposed research. When this structure in reiterated within each aim, it also avoids the project proposal from becoming a "to do" list with cryptic objectives.

4. Overall, despite the telecommunication issues outline above, I found that we convened a very effective peer review panel and there was good consensus among the panelist with regard to the project plan ratings.

Please do not hesitate to call me of you have any specific questions about this panel.

Sincerely yours,



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WASHINGTON STATE UNIVERSITY
Institute of Biological Chemistry

June 6, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
Agricultural Research Service, USDA
5601 Sunnyside Avenue, MS 5142
Beltsville, MD 20705

Dear Dr. Loper,

The members of the OSQR panel NP 301 4C (Plant Metabolism and Pathways) for 2013 were chosen to provide expertise covering the diverse set of proposals submitted. As a result, the primary and secondary reviews contained very pertinent and considered comments. In many cases, these complemented the ideas and creative thinking of ARS scientists and staff that contributed to the proposals, and I believe this will benefit the research projects. Our discussions during the panel meetings were wide-ranging and helpful.

Careful planning and logistics by OSQR staff ensured that panel members were well prepared for our discussions, and that writing our summaries and voting on the proposals was easy. All the panel members enjoyed participating and appreciated the smooth organization of the process. I believe the peer review process was effective and most likely helpful to the ARS scientists whose proposals were reviewed.

I recommend that the review process and organization of the panel meeting be maintained.

Sincerely,

John Browse
Professor

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February 19, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
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5601 Sunnyside Avenue MS 5142
Beltsville MD 20705, USA

Dear Joyce:

Re: NP301 Panels 6A and 6C Grains Superpanel: Maize and Sorghum

The maize and sorghum panel members had wide ranging discussions which demonstrated their in depth knowledge of maize and sorghum and of the science relevant to the projects under review. Creative suggestions were made for improvements and alternative approaches. Discussions were conducted in a timely fashion and in two cases conflicted reviewers were excluded from the discussions of the projects for which they had conflicts. Unfortunately one reviewer was unable to be in Beltsville for the face to face discussions due to an unanticipated commitment at his home institution. This reviewer was connected by computer and phone and was able to make significant, positive contributions to the project discussions. Panel members were prepared for the discussions although it would have facilitated even better discussion if all the primary reviewers had incorporated the secondary reviewer's comments and distributed these prior to the meeting as they were requested to do. It may be useful in future reviews to more emphatically stress the importance of doing this.

Logistical arrangements were very good as were the briefings which preceded the reviews and discussions. Generally the project write-ups were well done which facilitated the process. The panel did suggest that PI's could improve their discussion of similar work underway by going beyond the CRIS database which is USA based.

Overall this was a good panel and they conducted an effective review which provided a great deal of commentary which will be useful to the scientists.

Appended to this letter are several recommendations on cross cutting issues.

I want to thank the OSQR staff for the professional and friendly assistance provided. I also thank the panel members for their for quality inputs.

Yours truly,

Bryan Harvey,
Professor Emeritus, Plant Sciences

General and Crosscutting Issues, Maize and Sorghum Panel

Need for Core Genotyping Centers for Maize and Other Species

Genetic information has become a very routine part of many research programs however the panel has identified a consistent inability for many of these projects to move the use of genetic information beyond the discovery stage to the application stage in their proposals. It is the panel's belief that the main hurdle that many of these programs are facing is the inability to efficiently and rapidly genotype large numbers of individuals in the breeding programs, which is the key to deployment and application of the knowledge. Wheat is one crop species that has been able to overcome this hurdle by the establishment of Core Genotyping Centers. It is the consensus of this panel that this model needs to be extended to maize, sorghum and other crop species to be able to fully benefit from and implement the more basic knowledge.

Need for Development of Strategies for Germplasm "Tool" Preservation

Genomics based projects have spent the past decade developing strategies for packaging genetic variation in the form of novel genetic materials for use by public and private researchers. Many of the earliest versions of these "tools" are in danger of disappearing or losing their integrity as useful "tools". The development of these "tools" represents a major investment of tax-payer resources and a novel form of genetic diversity. While the prevailing thought around this material is to distribute a limited amount of seed to the community through the Maize Genetics Stock Centre, there may need to be a mechanism for preserving the most novel and useful forms of these "tools" well beyond the initial seed supply. Some of these "tools" may be more useful to the community in 10 to 20 years than they are today. It is the consensus of this panel that USDA needs to develop a strategy, including policies, and processes to determine when and how to maximize the return on the investment that has been made in these genetic "tools", maintain their integrity, and ensure their availability well into the future.

Impact of the ITPGRFA sMTA.

The reviewers have noticed that several research plans use genetic material originated from CGIAR centers, in particular CIMMYT. Any material obtained by these scientists after 2007 would have been covered by the ITPGRFA sMTA. There needs to be a full awareness of what this entails and of their obligations under the terms of this agreement. Any germplasm they derive from these aquisitions is likely to be bound by the sMTA as well, and there is an obligation to make individuals or institutions that are recipients of that germplasm aware of the sMTA conditions. The fact the germplasm is sMTA-bound may severely restrict its uptake and utilization by private sector breeders in some crops and geographies (in particular maize in the US), thus reducing or delaying the chances that discoveries made in that germplasm make it into a commercial products. Thus caution should be used in incorporating such germplasm into tools intended to be widely used especially by the private sector.

Non Lepidopteran Insect management

The ARS has a historic research focus on lepidopteran insect pests such as Fall Armyworm and South Western Corn Borer and many of the projects build on this experience and expertise by continuing to focus on these pests in the next five years. There are however multiple sources of high levels of resistance now available and being utilized in commercial hybrids, whereas other insect pests have emerged or persisted without a good commercial solution. The Panel acknowledges that basic studies on the mechanism of resistance to FAW and SWCB can add to fundamental knowledge however it recommends that some efforts be directed to these other insect pests which are also very important to production.

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February 19, 2013

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Dear Joyce:

Re: NP301 Panels 6B and 6D Grains Superpanel: Small Grains, Breeding and Germplasm 2013)

This was an excellent panel, very knowledgeable in their fields and experienced in reviews. Panel members conducted their reviews in a timely manner and distributed them to the full panel prior to the face to face meeting. This facilitated a focused discussion which gave rise to a number of suggestions for improvement and for alternative approaches to addressing the problems. All of the reviewers have an international reputation and thus gave sound, credible, science based reviews.

Professional briefing of the panel by OSQR staff and the panel's experience meant that there was a high level of understanding of the process and the criteria. The panel was thoroughly prepared and there was adequate time for project discussion. There was one case where the PI and a reviewer were both authors on a large multi-author paper and while this did not constitute a serious conflict of interest the reviewer was excluded from discussion of that project.

OSQR staff were very helpful and logistical arrangements were thorough and very good. Minor problems created by the vagaries of winter weather were handled with dispatch.

The panel felt that the process may be improved if the scoring was conducted on an objective by objective basis as well as overall. Recommendations on this on several cross cutting issues are appended to this letter.

In summary this was a blue ribbon panel which did an excellent job of reviewing the projects.

On behalf of the panel I wish to thank the OSQR for their courteous, quality assistance. I also wish to thank panel members for the effort that they put into providing such an excellent review.

Yours truly,

B Harvey

Bryan Harvey
Professor Emeritus, Plant Sciences

General and crosscutting recommendations Small Grains Panel

The panel found that while the scientists did a good job of describing similar work underway in the USA which is facilitated by access to the CRIS database and of course personal contacts, they did a relatively poor job of identifying similar work in other countries. Corollary to that, less than desirable levels of collaboration appeared to be occurring beyond the USA. Perhaps a more realistic approach to travel would facilitate the establishment of personal contacts which are invaluable in facilitating such essential collaboration.

The panel congratulates the USDA for the excellent service work that they are doing which has enormous benefits for not only USDA scientists but also others in other sectors. Examples include operation of the genotyping centers, the coordination of uniform nurseries and the screening of genetic materials for resistance to several insects at Stillwater Oklahoma. We encourage the USDA,ARS to continue to support such activities and note that if they do not there is a high probability that suc valuable work will not be done. The panel also reminds administrators to be aware that scientists who perform such work need appropriate recognition in their career development since often it does not lead to scientific publications in which they are recognized.

The panel congratulates the USDA, ARS for the contributions they are making to graduate and post-doctoral training especially where they have scientists located at universities. Thus contributing to the development of the next generation of scientists. It is a win, win relationship with educational institutions.

The panel noted that in a number of projects vacant positions were assigned to important aspects of the work. The panel encourages the USDA, ARS to fill these positions expeditiously. In the event that they are not filled adjustments will have to be made to the scope, the objectives and the milestones of the affected projects.

The panel noted that the logical shift to utilizing the molecular and other technologies to increase the effectiveness of genetic and breeding research will result in the generation og enormous amounts of data. It is essential that adequate bioinformatics resources be made available to process, interpret, curate and store this data. At the same time it is recognized that the critical data which supports this is generated in laboratories and experimental field plots and thus support for these activities should not br diminished. Otherwise it will be easy to attain a 'garbage in garbage out' scenario.

The panel congratulates the USDA, ARS for the work it is doing on UG99 in rapidly responding to this potential threat. The panel further recognizes the important progress being made on a number of diseases. The panel expresses concern however that work on lower profile diseases such as powdery mildew and virus diseases is suffering. It is important that such work be done and that this work be done in close collaboration with plant breeding programs.

The panel noted that there was apparent overlap of effort in the mapping and sequencing of disease and insect resistance genes e.g. Hessian fly resistance, and fusarium head blight resistance. Coordination needs to occur to ensure that unnecessary duplication is not occurring.

The panel noted that a large amount of effort continues to be directed at solving the problems created by fusarium head blight. To date none of the resistance genes provide zero toxin production. The reduced infection and toxin levels are valuable advances however there is a need to investigate new approaches which may eliminate toxin production.

The panel encountered several projects in which some objectives were addressed very well while others were not. This gave rise to some difficulty in deciding on an overall rating. OSQR may wish to consider ways to modify the process so that panels could rate on the basis of each project as well as overall.

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COOPERATIVE EXTENSION

04/22/2013

Dr. Joyce Loper, Scientific Quality Review Officer
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The following is a summary of the panel review for USDA NP 301 Panel 7A - Fruit and Nut Crops Panel as answers to the following questions in italics.

1. Did the NP301 7A Fruit and Nut Crops Panel panel have discussions that reflected:

-sound and credible scientific peer review *Yes. All of the reviewers were familiar with the scientific concepts and procedures being reviewed. Several of the reviewers also had extensive experience with the specific crops being reviewed and were also familiar with the research programs being reviewed.*

- ideas, creative thinking, and alternative approaches to improve the quality of research that may not have been considered by Agency scientists and staff. *The review process did not ask us to comment on the objectives, just on the procedures used to carry out the objectives. The reviewers were well qualified to comment on the objectives themselves, and in fact the overall quality of the reviewed programs could be improved if the objectives were adjusted to reflect the current needs of the user communities and the current state of fruit crop science.*

2. What were the most notable (positive or negative) characteristics of the discussion process and why:

-level of preparation for the discussion *OK. All of the reviewers had reviewed the project descriptions prior to the meeting and were able to comment on key and ancillary points.*

-time spent discussing each project *OK.*

-logistical arrangements *OK.*

-exclusion of peer reviewers who had a conflict with the project *To some extent this limited our ability to get the best experts, although I should note that the majority of the reviewers were very familiar with the programs being reviewed.*

-understanding of the review criteria and roles as peer reviewers *This was clear, but please see the comment in section 1 concerning objectives.*

-scoring and critique writing procedures *OK.*

3. What suggestions do you have to improve the peer review process? *I think that the scope of the review is too narrow. We should be able to comment on objectives and resources, eg. are resources in these projects appropriate for the proposed work to be conducted.*

4. Overall, was this an effective peer review panel? *Yes, but the ability to address additional aspects of the projects, would have been helpful.*

Dan E. Parfitt

Dr. Dan E. Parfitt, Pomologist and Lecturer in the Agricultural Experiment Station

Panel Chair Statement

Date: June 6, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
Agricultural Research Service, USDA
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The NP 301 Panel 7B Berries (2013) was formed to review four research project outlines during March and April 2013. It took considerable effort to find qualified panel members for a number of reasons including: many of the North American berry breeders in Universities, Colleges or as state/provincial employees were already actively involved in the research projects and hence had conflicts of interest; this reflects the berry breeding community is not large in population and is particularly well connected and cooperative. Some potential reviewers declined due to already heavy workload or in one case the person (retired) believed he was now too far out of touch with modern berry breeding to provide a relevant and realistic review and two people failed to return phone calls after an initial approach. However, in the end two excellent reviewers agreed to serve on the panel, one an existing berry breeder with emphasis on blueberry and other berry crops and a molecular genetics scientist who emphasized strawberry in his research. This combination was particularly worthy considering the strong mixture of practical plant breeding methodology integrated with the use of molecular techniques in the four projects to be reviewed. Part of the chairs background in plant genetic resources and entomology/crop protection helped fill in some of the gaps.

The panel met via phone/tele conference after having received the project plans about three weeks earlier. This was sufficient time to review projects the four projects. The two subject experts served as principal reviewers while the chair acted as secondary reviewer for each project. Very good initial drafts of reviews reflected on the positive aspects of each project and also provided some areas for improvement. Detailed discussions on each project were held which highlighted the positive and areas for improvement. During the discussion all reviewers provided worthy and relevant comments in addition to the written reviewer's comments.

The project plans were very well written with little repetition reflecting the lengthy expertise of three of the four principle research leaders. The need and rationale for each research plan was well explained. The past impacts (delivery of new berry cultivars) were impressive and the anticipated products looked promising, relevant and should deliver good commercial impact. The customers/producers appeared to be kept in mind at all times during the design and delivery of the research.

The plans integrated various practical plant breeding methodologies such as classical selection of germplasm, introduction of foreign germplasm, evaluation and attempted interbreeding with secondary gene pool species, evaluation of plants tolerant to environmental changes or extremes and genetically

and phenotypically characterized germplasm designed for elucidating gene function and superior cultivars. The plans also effectively used a number of molecular techniques such as high-resolution genetic maps and sequences, new phenotyping approaches for quantitative trait analysis, dissecting the genetic structure of complex traits and functional characterization of their constituent genes, genome-assisted breeding approaches for dealing with complex traits, and identifying and introgressing exotic alleles into adapted backgrounds.

Each project had a crop protection component for either resistance to a diversity of important plant diseases, IMP requirements for insect pests or characterization and development of management strategies to minimize plant viruses. This integration of research disciplines was applauded by the panel. However, panel members provided a number of very worthy suggestions for each project leader to consider for improving the quality of the research. For example, increased use of the berry genetic resource collections may provide greater genetic diversity within the breeding programs or more specifically for cranberry, the gene pool is currently very narrow and the panel suggested collaboration with the genetic resource people to acquire new and relevant germplasm. Suggestions to continue to enhance the human nutritional aspects of berries was encouraged as was attempts to evaluate berry germplasm for climate change pressures (drought or heat tolerance).

Panel members had sufficient time to receive and prepare for the teleconference discussion. In fact panelists requested an earlier meeting date to facilitate other commitments. The time for discussion of each project was adequate and more time was available if required. The providing of appropriate documents to panelists was timely and reminders of submission dates and time/date for the teleconference were appreciated. The computer/phone connection worked as expected. The panelists understood the review criteria and their role in the process; they undertook this role seriously. There was little duplication of comments between the primary and secondary reviews hence little editing of final text required. Some additional comments were added reflecting the discussions held. This enhanced the overall quality of the reviews and provided worthy feed back to the researchers.

The chair very much appreciated the efforts and patience of the OSQR office in vetting the names of potential panel members. He also appreciated the flexibility demonstrated by the OSQR office in arranging the logistics of the meeting.
Overall, I believe this was an effective peer review panel composed of highly qualified researchers representing appropriate disciplines of plant science.

Sincerely
Ken Richards, Research Manager (retired)
Canadian Genetic Resources Program
Agriculture and Agri-Food Canada

University of Nebraska Lincoln

INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES
PANHANDLE RESEARCH AND EXTENSION CENTER

April 16, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
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Dear Dr. Loper,

This report will summarize the results of the ARS review for 6 sugar crop projects (NP 301 Panels 8A and 8B - Sugarbeet: Germplasm, Physiology, and Molecular) that I recently chaired. The subject matter of the projects was diverse, spanning from very basic to one with some practical applications. The final reviews were likewise variable with ratings ranging from major revision to no revision. Despite the difference in scientific content, I feel strongly that the panel was also composed of qualified individuals who thoroughly understood the subject matter and thus competently reviewed the projects, making sound recommendations for strengthening them overall.

The makeup of the panel was also very diverse with individuals from both University and industry backgrounds. The fields of expertise among this group also varied from plant breeders to pathologists to agronomists. There was a tremendous degree of experience with the sugar beet industry, which further strengthened the final reviews for the ARS investigators. They understood the implications of the research and the importance of the continuation of the projects. There was also several reviewers with no sugar beet experience, but who I knew were excellent scientists knowledgeable in their fields, but also able to judge the scientific merit of these projects without any preconceived bias. This combination of individuals provided a very solid foundation for reviewing the varied projects.

I was very pleased with the dedication and professionalism exhibited by the reviewers throughout this entire process. It was obvious to me they took this seriously, and thoroughly and earnestly read the projects. They were well prepared, resulting in excellent discourse from all panel members when we had the phone conference. All completed their major assignments, yet were also prepared to discuss and contribute to the other projects as well. Comments and recommendations by panel member were also appropriate and sound, resulting in what I feel will be useful information for the investigators for inclusion in their revisions.

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In terms of the actual meeting, it went very smoothly. We started with the one that I felt would take the greatest amount of time due to some limitations, yet still finished the 6 projects in slightly more than 3 hours. No corners were cut; and all reviews and discussions were comprehensive, resulting in very accurate and fair scores for the projects. Compared to similar panels I have served on in the past, this one was more efficient and things just seemed to effortlessly fall into place.

I have only one criticism in this particular instance and it was simply the number of projects to be reviewed. It was not so bad that we were unreasonably overwhelmed it was just very difficult to logistically assemble 6 very busy people for a single meeting. I suspect that this entire process went on much longer than you originally desired, but it took this long to get everyone together. My only suggestion for improvement would be to perhaps divide the projects into groups and evaluate separately.

However, I must also say that the new format for the phone conference made this entire process easier and more feasible. I also liked receiving the combined reviews shortly before the meeting date. This helped substantially to streamline and focus the discussions on the more important aspects. From my perspective, it was not quite as satisfying as other panels I have participated in where we met face-to-face in the same room. However it was much less distracting and time-consuming with the avoidance of coordinating travel accommodations for this number of people. I also suspect we would have had much more difficulty in acquiring reviewers had they been required to travel to Beltsville for several days to complete the review process.

In summary, I feel that this panel has provided excellent council and advice for improvement of these projects. This was an effective group due, in part, to their diverse makeup and experience. They were also knowledgeable and professionally dedicated in the completion of their assigned tasks to the best of their considerable abilities. I was very proud of their efforts, which also obviously reflected their passion and desire to assist in keeping the ARS a vibrant and relevant agency for carrying out its mission. Thank you again for the opportunity to participate in this. I would be happy to do this again for you in the future if requested to do so.

Sincerely,

Robert M. Harveson
Professor of Plant Pathology and Extension Specialist

April 8, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
Agricultural Research Service, USDA
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1. Did the [NP 301 Panel 9, Vegetables: Potatoes] panel have discussions that reflected:
-sound and credible scientific peer review
- ideas, creative thinking, and alternative approaches to improve the quality of research that may not have been considered by Agency scientists and staff.

Yes. The panel discussions operated according to standard scientific peer review norms. Panelists presented and discussed strengths and weaknesses of each project and, where appropriate, suggested areas for improvement in both the project presentation and the scientific approach. The primary and secondary reviewers provided a majority of the input for each project, but other panelists contributed to each review as well. Panelists suggested alternative approaches to certain aspects of certain projects, and in particular sought to encourage collaborations among USDA-ARS scientists and other potential collaborators where appropriate. These suggestions were offered to improve the approach and potential impact of the projects. It should be mentioned that the project proposals were quite strong to start with, and that many of the comments would fall under the heading of "fine tuning."

2. What were the most notable (positive or negative) characteristics of the discussion process and why:
-level of preparation for the discussion
-time spent discussing each project
-logistical arrangements
-exclusion of peer reviewers who had a conflict with the project
-understanding of the review criteria and roles as peer reviewers
-scoring and critique writing procedures

The discussion proceeded much as we expected it would after being briefed by Michael Strauss and others at USDA. We spent approximately 20 minutes on each project, with the more well-written projects requiring a bit less time than others that were less well-written. Primary and secondary reviewers were well-prepared to handle the review process. All but one reviewer had provided his comments to the entire panel, making it easier for

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everyone to be involved. The individual whose reviews were not provided had indicated that he had sent them via email, and even though we didn't have those in hand, he was able to provide his comments verbally and they were easy to follow. Several of the panel members were well-acquainted with the investigators or collaborators of the projects, however this mainly increased their understanding of the projects and did not present any important conflicts of interest. The review criteria and scoring criteria were well explained by USDA staff and we quickly mastered that aspect of the process. The simultaneous editing accomplished by Michael Strauss made it easy on the panel members, as we did not have to simultaneously discuss and edit project proposals. Overall, the logistics, software, phone lines, and related technology did not hinder our review process and it went quite smoothly.

3. What suggestions do you have to improve the peer review process?

I think this process is a very reasonable way to review the project proposals. One of the elements that is not clear to reviewers is what potential the investigators have to modify their objectives. We learned during the panel that these are, to some extent, fixed, though some degree of modification may be possible. Another element that isn't entirely clear to the panel is to what extent each investigator knows about other USDA-ARS investigator's research plans, because some of them are overlapping and some are complementary. I am not sure the best way to approach this issue, but I think there may be ways for national program staff to share potential collaborative opportunities among scientists. I think the peer review process was good for this panel and I think the outcome was fair and hopefully helpful to the investigators.

4. Overall, was this an effective peer review panel?

I think it was. I should say that the quality of the science proposed was high, and nearly all of the project proposals were extremely well-organized and well-written. Most of them needed only minor or moderate review, which is a sign that the scientific and organizational qualities were strong and that the panel was able to focus on the key questions being proposed. I think the reviewers picked up on key aspects that needed to be mentioned, and in most cases these should be helpful for the investigators. Overall, I think the panel was efficient and effective and all of the reviewers felt it was a good use of their time.

Sincerely,

Irwin Goldman
Professor and Chair

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28 June 2013

Dr. Joyce Loper, Scientific Quality Review Officer
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Dear Dr. Loper:

I am writing to provide you and other directors and managers at ARS with comments following my service as chair of the National Program Panel MP 301 Panel 10 – Vegetables: Beans (2013).

This is my second opportunity to chair such a panel and this one was substantially more difficult to convene than the first due to 1) the high degree of interaction among public sector bean researchers leading to co-authorship and possible conflict of interest of candidate panel members and 2) tight schedules of those panel members that were eventually identified. I found Dr. Strauss, Ms. Daly-Lucas and Ms. Woods very patient and helpful throughout the process.

I was particularly pleased with the flexibility shown by Dr. Strauss in allowing the committee to adopt a novel, 2-day split meeting strategy to accommodate the inability of panel members to all attend one common conference call. Instead we held two calls. A panel member was required to participate in the call where we discussed the plan for which he or she was primary reviewer. We considered the primary reviewer's written comments to be sufficient to represent his or her views and solicited comments during the call from the secondary reviewer and the remainder of the panel. This split meeting strategy was essential for the panel to complete the review process in May.

While one might initially expect that the discussion would be shorter due to fewer panelists on the call, instead the discussion on the first day ran a bit over one hour per plan. We were more focused on the second day, likely because many of the general comments about the research plans had already been voiced, and we were able to proceed at a more favorable rate of about 40 minutes per plan.

In my estimation the panel conducted a sound and credible scientific review and provided comments that should be considered by the Agency scientists to improve the research. While I would prefer to convene a meeting at which all panel members could attend, I believe that this

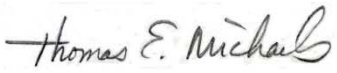
split session approach for this panel was satisfactory and resulted in the same quality of review as if we had met concurrently. More difficult for me as a chair was to manage time and understand the nuances of how deeply a panel member held a particular opinion when I could not see facial expressions and body language. I understand the financial and time savings that mandate a switch from face-to-face meetings to conference calls, but for me at least they offer new challenges to efficiently and effectively chairing a detailed discussion.

There was a good match between panel members' areas of expertise and plan objectives except perhaps for plant pathology. One panel member noted that we might have been able to more effectively consider some of the project objectives dealing with plant pathogens if we had a plant pathologist on the panel. Since I was responsible for assembling the panel I'll take the responsibility for that shortcoming. Still, as I noted above, I believe we did a sound job.

One "big picture" message that the panel would like to send you and other ARS directors and managers can be summed up by a panelist's review comment, "In the 21st century we need to engineer the whole plant, not just the above-ground parts". The panelist was pointing out that all of the program plans we reviewed marginalized the study of roots except for a limited number of traits such as nitrogen fixation, drought tolerance and specific root pathogens and pests. This is not really a specific shortcoming of these ARS scientists, but rather an observation about the types of research pursued by public sector agricultural researchers in general regardless of crop. Few researchers working with any crop are asking the general questions that lead to a better understanding of optimum sizes for root and shoot systems for particular environments, or studying alternative root morphology ideotypes. It can't be because roots aren't important, but more likely that they are out of sight and more difficult to study than above-ground plant parts. The panel suggested that the ARS could take the lead in the public sector by emphasizing the study of roots across a wide range of crops, including the application of molecular techniques to understanding the inheritance of size and structure of root systems and the optimum balance of root and shoot biomass for particular environmental conditions.

Thank you for the opportunity to review such a fine group of program plans.

Sincerely,



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Professor

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May 1, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
Agricultural Research Service, USDA
5601 Sunnyside Avenue, MS 5142
Beltsville, MD 20705

Dear Dr. Loper:

I recently served as chair of NP 301 Panel 11 – Vegetables: Various (2013). It was a pleasure to be a part of the OSQR review, and I appreciate very much having been asked to participate in this important process.

In my assessment, the panel discussion was efficient, and the panelists provided sound scientific peer review of the project plans. The panel provided thoughtful suggestions that, if not previously considered by the scientists, may improve the quality of the research.

Although the time spent on the conference call reviewing the plans was relatively brief (less than 2 hours), reviewers were all extremely well prepared for the discussion and we were able to make progress quite quickly. This was partly due to the very effective orientation that took place ahead of time, which described the peer reviewer role and process very clearly. The logistics, including the online reviewing system and conference call process, worked very well.

As a panel chair, I found the staff very helpful in checking for conflict of interest of potential reviews, and following up with reviewers once they were identified. I was a little unclear on the role of the panel chair initially, but it was clarified. All in all, I enjoyed participating in this process, and felt that the panel provided a sound scientific review. I would especially like to acknowledge the reviewers for their very thorough reviews and the program staff for their assistance throughout the process.

Sincerely,

Rebecca Sideman

Rebecca Grube Sideman
Extension Professor, University of New Hampshire

UNIVERSITY of GUELPH

ONTARIO AGRICULTURAL COLLEGE
Department of Plant Agriculture

March 22, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
Agricultural Research Service, USDA
5601 Sunnyside Avenue, MS 5142
Beltsville, MD 20705

Dear Dr. Loper,

The panel mustered for NP301 Panel 12 Fruits: Grape (2013) met today in a successful conference call lead by Dr. Michael Strauss. All reviewers, both primary and secondary, were well prepared and presented their views and recommendations in a clear, succinct manner. Discussions reflected excellent knowledge of the subjects being discussed (breeding of Prunus and Vitis), from a rigorous academic standpoint but with practical, field experience and industrial relevance. Both projects will encounter challenges in the near future because of the loss of primary research membership in both teams. Although a very serious concern, the review group concentrated on making suggestions to improve both projects in their original context.

The review suggestions came from experts in both fields and should be viewed as sound and credible. Quite a number of ideas were presented to improve focus of the wide ranging [redacted] proposal and concentrate on portions considered the strength and relevant expertise of the active research members. Computational methods of gene/trait association normally applied to homozygous lines of annual crops are proposed as an investigative objective for Vitis. The panel members were quite excited about this phase, being very challenging in a perennial like grape, but requiring this level of expertise/resources while still at the proof-of-concept stage. Whether or not this objective is successful will greatly advance knowledge of this facet of molecular genetics in Vitis. The reviewers also had several excellent, very practical suggestions about increasing the scope and relevance of the [redacted] Prunus programme, again taking in to account the original project but with the present research scientist complement. This project, in particular, could be extremely valuable to the California/US Prunus industry. Several disease/pest resistance facets of this breeding programme are, and definitely will be, necessary for the continued success of commercial Prunus in the future.

The discussion process on the whole was quite successful, due to the preparedness and background expertise of the panel members, in addition to the services provided by the in-house members of ARS present (leadership, scribe, ARS review context). Time was not an issue in completing the reviews and both projects were thoroughly discussed. Comments were collected

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throughout the discussions by Dr. Strauss and viewed/corrected/expanded/agreed upon simultaneously by the panel members.

Some discrepancies did arise in the level of final scoring, but the logistics of revisions/refocus/redirection of the projects were essentially resolved through additional discussions and subsequent voting. All reviewers were quite clear on the ramifications of their opinions/critique of the two project proposals and the import of the scoring procedure to the research scientists concerned. Conflict of interest was appropriately resolved prior to the final choice of reviewers and/or the distribution of review materials.

On the whole, this panel was successful in its review of the [redacted] proposals, in part because of the relatively low workload (only two projects) and the ample time between receipt of materials and the actual review discussion. Also, of critical importance, was the panelists' very valuable background knowledge of both the Vitis and Prunus industries. Their comments are embedded in these reviews and reflect their collective interaction with both the academic and industrial communities. This connection to both academic rigour and industrial reality is paramount to the successful panel review of these national projects.

These two, very important horticultural commodity segments are economic drivers, mainly for California (Prunus and Vitis), but also for Washington, Oregon and much of eastern United States (Vitis). The panelists' comments reflect their concern/support for the ARS research programmes directed to enhance/solidify the future economic and success of these valuable agricultural sectors.

Thank you for the allowing me to participate in the process.

K. Helen Fisher,
Grape physiology and breeding
Associate professor (retired)
University of Guelph/Vineland

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Department of Crop Science

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September 20, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
Agricultural Research Service, USDA
5601 Sunnyside Avenue, MS 5142
Beltsville, MD 20705

Dear Dr. Loper:

I am writing you to convey my statement as panel chair of the NP 301 Panel 13 Cotton. Choosing panel members was fairly seamless and the staff in Beltsville was extremely helpful and expedited the process very well. Subsequently, the discussions were sound and credible with regards to scientific theory and experimental design. All plans were reviewed robustly and thoroughly. Each plan was critiqued and improvements were put forth to improve the quality of research.

The panel members were all well prepared whether as primary reviewer, secondary reviewer, or panel member. There was adequate discussion for each plan and the on-line / conference call format worked extremely well. I was very impressed with the quality of the reviews and the professionalism shown by the panel.

I served on a panel in 2005 and we travelled to Beltsville to discuss the plans. The present on-line approach is a great improvement over that system. I cannot suggest any changes to improve the process. I found it to be an efficient, thorough and rigorous review of scientific merit.

Sincerely,

Randy Wells

Randy Wells, Professor
Associate Head and Ext. Leader
Director of Graduate Programs
Department of Crop Science
North Carolina State University
Raleigh, NC 27695

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Date: February 12, 2014
Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
Agricultural Research Service, USDA
5601 Sunnyside Avenue, MS 5142
Beltsville, MD 20705

Dear Dr. Loper,
Below is my Panel Chair Statement corresponding to NP 301 Panel 14A- Oilseeds: Genetic Improvement (2013).

1. Discussions in the Panel Oilseed 14A have discussions that reflected.
- sound and credible scientific peer review;
- contributed ideas, creative thinking, and alternative approaches to improve the quality of research that may not have been considered by Agency scientists and staff.

2. The most notable positive characteristics of the discussion process were
- the level of preparation for the discussion;
- the time spent discussing each project;
- the logistical arrangements;
- the exclusion of peer reviewers who had a conflict with the project (done prior to the panel selection members)
- the understanding of the review criteria and the roles as peer reviewers
- the appropriate scoring and the positive critique of the writing procedures.

3. What suggestions do you have to improve the peer review process? On the basis of this experience, I do not have any suggestions to make. It was very satisfactory from my personal point of view.

4. Overall, was this an effective peer review panel? Yes. The panel members were all knowledgeable and experts in their fields, and each of them contributed to the process at a high level of intellectual creativity and ethical professionalism.

Sincerely,

Silvia R. Cianzio, Professor
Department of Agronomy

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Date: February 12, 2014
Dr. Joyce Loper, Scientific Quality Review Officer
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Agricultural Research Service, USDA
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Beltsville, MD 20705

Dear Dr. Loper,

Below is my Panel Chair Statement corresponding to NP 301 Panel 14B – Oilseeds: Germplasm (2013).
1. Discussions in the Panel Oilseed 14B have discussions that reflected:
- sound and credible scientific peer review;
- contributed ideas, creative thinking, and alternative approaches to improve the quality of research that may not have been considered by Agency scientists and staff.

2. The most notable positive characteristics of the discussion process were
- the level of preparation for the discussion;
- the time spent discussing each project;
- the logistical arrangements;
- the exclusion of peer reviewers who had a conflict with the project (done prior to the panel selection members)
- the understanding of the review criteria and the roles as peer reviewers
- the appropriate scoring and the positive critique of the writing procedures.

3. What suggestions do you have to improve the peer review process? On the basis of this experience, I do not have any suggestions to make. It was very satisfactory from my personal point of view.

4. Overall, was this an effective peer review panel? Yes. The panel members were all knowledgeable and experts in their fields, and each of them contributed to the process at a high level of intellectual creativity and ethical professionalism.

Sincerely,

Silvia R. Cianzio, Professor
Department of Agronomy

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May 13, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
Agricultural Research Service, USDA
5601 Sunnyside Avenue, MS5142
Beltsville, MD 20705

Dear Dr. Loper:

The panel NP301 Panel 14C-Oilseeds: Physiology/Biochemistry (2013) had extensive discussions on the project plans that reflected sound and credible scientific reviews. The panel members were able to draw upon their areas of knowledge and expertise to make suggestions for improving the project plans. Their ideas included additional and/or alternative approaches to improve the quality of the research proposed that may have not be considered by the USDA-ARS scientists and staff. These suggestions reflected creative thinking by the panel members about the proposed research.

The panel members were well prepared for the discussions although some of them did not send their reviewer comments until the day of the discussion. We spent adequate time discussing each project plan and were able to come to a consensus regarding our recommendations. The logistical arrangements were fine. It worked out well that we were able to discuss the projects where there were no conflicts of interest first and save the project plan with conflicts until last. Most panel members had not previously participated in a panel but did a good job of writing the critiques. They understood the review criteria and their roles as reviewers. The scoring system worked well once we understood the system.

The review process worked well. There was adequate time for reviewers to read the project plans and check referenced scientific articles. The instructions were clear and the preparation session helpful. I have no suggestions for improvement. I felt the panel was effective in the review and made very helpful comments for project plan improvements.

Sincerely,

James H. Orf

James H. Orf
Professor

The University of Georgia

College of Agricultural and Environmental Sciences
Department of Horticulture

June 4, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
Agricultural Research Service, USDA
5601 Sunnyside Avenue, MS 5142
Beltsville, MD 20705

1. Did the NP 301 Panel 15 have discussions that reflected:
   -sound and credible scientific peer review - yes
   - ideas, creative thinking, and alternative approaches to improve the quality of research that may not have been considered by Agency scientists and staff – these discussions were limited as the reviewers thought the process was very good.

2. What were the most notable (positive or negative) characteristics of the discussion process and why:
   -level of preparation for the discussion – all reviewers did a good job of preparation, thus discussions flowed and did not get bogged down.
   -time spent discussing each project – due to reviewer preparation the entire process took much less time than all anticipated.
   -logistical arrangements – a few glitches had to be worked out but overall the system used worked very well.
   -exclusion of peer reviewers who had a conflict with the project – this system worked very well and helped me as chair pick appropriate reviewers.
   -understanding of the review criteria and roles as peer reviewers – the reviewers had very few questions which leads me to believe the training was very effective.
   -scoring and critique writing procedures – national staff did a wonderful job summarizing the reviews, and the way we were able to make corrections on the going while discussing each project was wonderful, certainly made the chair's job easier

3. What suggestions do you have to improve the peer review process? No suggestions, I thought the system worked very well.

4. Overall, was this an effective peer review panel? I thinks this was a very good review panel. Selection of appropriate reviewers by the chair makes a big difference, especially during the discussions. Mike Strauss did a very good job of leading us through the process.

John M. Ruter, Ph.D.
Allan Armitage Endowed Professor of Horticulture

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April 22, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
Agricultural Research Service, USDA
5601 Sunnyside Avenue, MS 5142
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Dear Dr. Loper:

I found the panel discussion by the reviewers of NP 301 Panel 16 – Sugarcane to be thorough and extremely valuable to the improvement of the projects. These expert reviewers pointed out sections that needed more clarity, and defined ways to strengthen the research while decreasing redundancy and increasing efficiency.

The discussion process was effective and utilized everyone's time well. The panel was appreciative of the use of the web as a mechanism to have meetings and conduct the review. If the review had to be conducted in-person and on-site, the same group would not have been able to contribute.

My only suggestion is to make sure that the program or vendor used to display the information on one's personal computer works well for everyone on the panel. So, a practice run would be advisable.

Overall, this was a very effective peer review panel. Thank you for the opportunity to be the panel chair. Kudos to everyone involved.

Sincerely,

Maria Gallo

Maria Gallo, Ph.D.
Dean and Director

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September 25, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
Agricultural Research Service, USDA
5601 Sunnyside Avenue, MS 5142
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Dear Joyce,

As you know, I recently chaired the Agricultural Research Service's Plant Genetic Resources, Genomics, and Genetic Improvement National Program review of proposals focused on genome databases. The panel had discussions of the proposals that were sound and appropriate to the peer review process. The panel members were constructive and able to provide the investigators with positive suggestions on improvements to their research plans.

The positive aspects of the discussion/review process were that since it was a remote panel, there was a high degree of success in soliciting reviewers who were well qualified to review the proposals. Also, since the number of proposals per reviewer was few, the reviewers were well engaged in the process. Personally, I felt we discussed each proposal to an adequate length. Mike Strauss was great at keeping us on-track and bringing the discussion to a close; however, he did not force us to finish any discussion if there was contention. The re-rating of the proposals at the end of the review was also a good mechanism to ensure we were fair and balanced throughout the review process.

I feel that it would be helpful in the future to have a short call with the reviewers, yourself, and Mike prior to the actual review. I think this would have established a bit more rapport between the reviewers, myself, and the USDA staff. In addition, it would have raised (and answered) questions that we had to address on the call of the actual review.

I feel the panel understood the review criteria and their role in the process. The iterative nature of the review for one proposal was a concern as we got the revised proposal with a short turnaround time needed for review and comment. It would have been helpful for at least myself, to have had more time to review the revised proposal. Also, there should be a page limit for any rebuttal or response to reviewer's comments. It would also have been helpful if the altered portions of the research plan were noted/highlighted such that it was easy to find what revisions the PI made. This is standard at NIH for revised, resubmitted proposals and it really helps focus the panel on the revised parts of the proposal.

Overall, this was an effective review process. Suggestions for future research plan reviews include provision of detailed uniform metrics on past productivity such that

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reviewers can unequivocally determine if the PD was productive with previous funding. With respect to this set of research plans, documentation of stakeholder use and surveys should be required from all projects such that the reviewers can be informed about the use and utility of the databases for their target research community. I realize that USDA-ARS does not want to provide budget information for these proposals, but it is impossible to judge the real efficiency and productivity of these plans without knowledge of funds and personnel made available to the PDs for the work. It could be that the project is grossly under-funded and this would compromise the ability of the PD to deliver the objectives as anticipated. Conversely, the project could be over-funded such that it was out of the normal scale for the requested work and the PD may not be using federal funds efficiently.

Sincerely,

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January 6, 2013

Dr. Joyce Loper, Scientific Quality Review Officer
Office of Scientific Quality Review
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RE: NP 301 Panel 18 Review – Biotech Risk Assessment

Dear Dr. Loper,

As Panel Chair, I am providing this brief summary of our deliberations on this panel. Overall, I felt that the reviewers did an excellent job of evaluating the scientific merit of the proposals and offered many useful suggestions for the project directors. In my view, one of the reviewers was not qualified to judge one of the proposals (and had very negative opinions about it). However, this reviewer's comments did not affect our final evaluation of the proposal because another reviewer with very relevant expertise also had major criticisms of this particular proposal. I felt that we had good discussions about the strengths and weaknesses of each proposal.

In retrospect, I would not recommend one of our reviewers for future panels in this program. He/she is not an active researcher, has a poor publication record, and does not appreciate the need for ecological studies of genetically modified crops. I regret that I approved including this person as a reviewer, but I did not fully anticipate the lack of understanding that he/she exhibited. Regarding the proposal that was judged to be quite weak, we were surprised that the project director did not do a better job of addressing our concerns in the revised proposal. Perhaps the need to address all of the panel's concerns very carefully could be emphasized more strongly in the future.

The OSQR staff did an excellent job of facilitating and explaining the review process, without influencing the independence of our evaluations. I greatly admire the professionalism of the staff and I think the review process was fair and rigorous. My only suggestion for future panels is to try harder to identify peer reviewers who are well-qualified to understand and evaluate the proposals at hand. This is challenging because the proposals are quite diverse and require expertise in very different disciplines, ranging from ecology to molecular genetics. Nonetheless, I think it should be possible to find reviewers who are not likely to be overly critical of research that is outside their area of expertise.

The logistics of the review process were excellent – very clear and efficient. There was no need to meet in person, which was appreciated by all.

Sincerely,

Allison A. Snow

Allison Snow
Professor

Projects Reviewed by the Plant Genetic Resources, Genomics and Genetic Improvement Panels

Beltsville Area

Marcial Pastor Corrales

Discovery and Introgression of Disease Resistance Genes into *Phaseolus Vulgaris*

Perry Cregan

Development of Rhizobium and Bradyrhizobium Germplasm, Determining Host Plant-Microbe Symbiotic Interactions, and Management of the Rhizobium Collection

Donna Fare

Genetics, Genetic Improvement and Improved Production Efficiency of Nursery Crops

Edward Garvey

Plant Genetic Resource Acquisition and Conservation Strategies, International Germplasm Exchange, and Taxonomic and Nomenclatural Support for the U.S. National Plant Germplasm System

Kathleen Haynes

Potato Genetic Improvement for Eastern U.S. Production

Kathryn Kamo

Biotechnology Applied to High Value Ornamental Plants

Gary Kinard

Develop, Deploy, and Operate GRIN-Global, the Information Management System for Plant Genetic Resources

Kimberly Lewers

Strawberry, Raspberry, Blackberry: Crop Improvement through Genomics and Genetics

Benjamin Matthews

Developing Soybean and Other Legumes with Resistance to Pathogens and Assessing the Biosafety of Transgenic Soybean

Autar Mattoo

Molecular Approaches to Enhance Plant Nutrient Content, Shelf-Life and Stress Tolerance

Richard Olsen

Management and Evaluation of Woody Landscape Plant Germplasm Resources and Associated Information

Margaret Pooler

Evaluation and Genetic Improvement of Woody Ornamental Landscape Plants for Disease and Pest Tolerance, Non-Invasiveness, and Ornamental Traits

Lisa Rowland

Genetic Improvement of Blueberry and Cranberry: Utilization of Genomic Resources and Phenotypic/Genotypic Characterization

Amy Rossman

Curation of the U.S. National Fungus Collections and Associated Information Resources

Anna Smigocki

Molecular Technology for Developing Durable Pest and Pathogen Resistance in Sugar Beet

John Stommel

Quality Enhancement and Disease Resistance Development in Tomato and Pepper

Alan Whittemore

Taxonomy of Landscape Tree and Shrubs

Karen Williams

Acquisition of Plant Genetic Resources through Domestic and International Plant Explorations and Associated Capacity-Building Partnerships

Dapeng Zhang

Genetic Diversity Assessment of Cacao and Other Tropical Tree Crop Genetic Resources

Mid South Area

David Burner
Genetic Improvement of Sugarcane for Temperate Climates

David Fang
Molecular Approaches for More Efficient Breeding to Improve Cotton Fiber Quality Traits

Timothy Rinehart
Small Fruit and Ornamental Genetic Research for the Mid-South

Brian Scheffler
Genomic and Bioinformatics Research in Agriculturally Important Organisms

William P. Williams
Genetic Improvement of Maize with Enhanced Resistance to Aflatoxin and Insects

Mid West Area

Yong Qiang An
Functional Genomics for Evaluating Genes and Gene Regulatory Networks of Soybean Quality Traits

John Bamberg
Potato Genetic Resource Management, Characterization, and Evaluation

Michael Blanco
Genetic Enhancement of the U.S. Maize Genepool with Unadapted Maize Germplasm

Johanne Brunet
Agricultural Landscapes, Pollinator Behavior and Gene Flow Risk

Karen Cichy
Genetic Enhancement of Dry Bean Nutritional and Processing Qualities

Steven Clough
Characterization, Management, and Utilization of Soybean Genetic Resources

Patrick Dowd

Identification and Validation of Insect and Disease Resistance Mechanisms to Reduce Mycotoxin Production in Midwest Corn

Candice Gardner

Management of Crop Genetic Resources and Associated Information

David Garvin

Genetics and Genomics for Improving Spring Wheat with Disease Resistance

Cynthia Henson

Physiology and Biochemistry of Carbohydrate Metabolism in Cereal Tissues

Karen Hudson

Identification, Characterization, and Deployment of Genes Important During Seed Development in Legumes

Shelley Jansky

Resources for the Genetic Improvement of Potato

David Labeda

Genomic Analyses and Management of Agricultural and Industrial Microbial Genetic Resources and Associated Information

Carolyn Lawrence

Maize GDB: Enabling Access to Basic, Translational, and Applied Research Information

Mitchell McGrath

Genetic Dissection of Traits for Sugar Beet Improvement

Jan Miernyk

Modification of Soybeans for Food, Feed, and Industrial Applications

Melvin Oliver

Genetics and Genomics of Complex Traits in Grain Crops

Donald Ort

Identifying and Manipulating Key Determinants of Photosynthetic Production and Partitioning

John Preece

Management of Genetic Resources and Associated Information for Grape, Tree Fruit, Tree Nut, and Other Specialty Crops Adapted to Mediterranean Climates

Martin Sachs

Maize Genetic Stock Management and Utilization

Paul Scott

Innovative Genetic Approaches for Improving Maize Germplasm for Product Quality and Adaption to Diverse Production Systems

Randy Shoemaker

SoyBase and the Legume Clade Database

Richard Shukle

Identification and Analysis of Host Resistance and Hessian Fly Response in Wheat

Ronald Skadsen

Identification and Analysis of Malting Quality Genes in Barley

David Spooner

Genetic Characterization, Taxonomy, and Acquisition of Genetic Resources for Carrot, Potato, and their Related Wild Species

Carroll Vance

Functional Genomics for Improving Nutrients and Quality in Alfalfa and Soybean

Mitchell Wise

Analysis of Phytochemical Metabolism in Oat and Barley

Roger Wise

Disease Resistance Signaling in Cereal Crops

Juan Zalapa

Cranberry Genetic Improvement and Insect Pest Management

Francis Zee

Pacific Tropical/Subtropical Fruit and Nut Genetic Resource Management and Sustainable Production Systems

North Atlantic Area

Edward Buckler

Development and Application of Genetic, Genomic, and Bioinformatic Resources in Maize

Gennaro Fazio

Breeding Apple Rootstocks Tolerant to Abiotic Stresses and Resistant to Pests and Diseases

James Giovannoni

Genetic and Genomic Basis of Vegetable and Fruit Biology, Quality and Nutrient Content

Owen Hoekenga

Dissection of Maize Grain Quality Traits Using Biochemical Genetic and Genomic Approaches

Jean-Luc Jannink

Enhancing Breeding of Small Grains through Improved Bioinformatics

Leon Kochian

Genomic and Genetic Analysis of Crop Adaptation to Soil Abiotic Stresses

Larry Robertson

Management of Genetic Resources and Associated Information for Selected Vegetable Crops

Ralph Scorza

Genetic Improvement of Fruit Crops through Functional Genomics and Breeding

Philipp Simon

Genetic Enhancement of *Allium*, *Cucumis* and *Daucus* Germplasm

Doreen Ware

Enhancing Plant Genome Function Maps through Genomic, Genetic, Computational and Collaborative Research

Michael Wisniewski

Improving Stress and Disease Resistance in Tree Fruit Crops

Gan-Yuan Zhong

Improving Fruit Quality, Disease Resistance, and Tolerance to Abiotic Stress in Grape

Gan-Yuan Zhong

Management of Apple, Cold-Hardy Grape, and Tart Cherry Genetic Resources and Associated Information

Northern Plains Area

William Belknap

Host-Specific Molecular Genetic Tools for Development of Disease-Resistant Crops

Robert Bowden

Genetic Improvement of Hard Winter Wheat to Biotic and Abiotic Stresses

Lynn Dahleen

Genetic Improvement of Barley

David Dierig

Plant and Microbial Genetic Resource Preservation and Quality Assessment

Justin Faris

Genetic Improvement of Durum and Spring Wheat for Quality and Resistance to Diseases and Pests

Karen Fugate

Physiological and Genetic Approaches to Improving Extractable Sugar Yield in Sugarbeet

Robert Graybosch

Genetic Improvement of Winter Wheat for End-Use Quality and Disease Resistance

Prem Jauhar

Cytogenetic Manipulation of Durum Wheat for Resistance to Biotic and Abiotic Stresses and Enhanced End-Use Quality

Leonard Panella

Multidisciplinary Approaches to Enhanced Sugar Beet Germplasm

Scott Sattler

Genetic Improvement of Sorghum for Non-Grain Energy Uses

Christina Walters

Innovations that Improve the Efficiency and Effectiveness of Managing and Preserving *ex situ* Plant Germplasm Collections

Pacific West Area

Susan Altenbach

Molecular Analysis of Proteins Involved in Wheat Flour Quality and Allergenic Potential in Response to Environmental and Nutritional Stress

Olin Anderson

Enhancement of Wheat through Genomic and Molecular Approaches

Olin Anderson

Small Grains Database and Bioinformatic Resources

Ann Blechl

Improvement of Wheat Quality through Molecular Genetics

Ann Blechl

Molecular Tools for Improved Crop Biotechnology

Harold Bockelman

Genetic Resource Management of National Small Grains Collection and Associated Information

Phil Bregitzer

Genetic Improvement of Barley and Oats for Enhanced Quality and Biotic Stress Resistance

John Dyer

Molecular Genetic Analysis of Abiotic Stress Tolerance and Oil Production Pathways in Cotton, Bioenergy and Other Industrial Crops

Chad Finn

Genetic Improvement and Virus Management of Small Fruit Crops

Jennifer Fletcher

Signaling Pathways Regulating Plant Architecture

Dennis Gonsalves

Molecular Resources for the Improvement of Tropical Ornamental and Fruit Crops

Stephanie Greene

Temperate Forage Legume Genetic Resource Management, Characterization, and Evaluation

Sarah Hake

Identification and Analysis of Plant Architectural Genes in Maize

Frank Harmon

Characterizing Circadian Regulatory Networks in Grain Crops to Establish their Role in Development and Abiotic Responses

John Henning

Reducing the Impact of Diseases on Hop Production

Jinguo Hu

Management of Plant Genetic Resources and Associated Information

Kim Hummer

Management of Temperate-Adapted Fruit, Nut, and Specialty Crop Genetic Resources, and Associated Information

Craig Ledbetter

Genetic Improvement of *Prunus* and *Vitis* Scions and Rootstocks for Fruit Quality and Pest Resistance

Richard Lee

Management and Characterization of Citrus and Date Genetic Resources and Associated Information

Jennifer Lewis
Molecular Mechanisms of Plant Defense Signaling

Sheila McCormick
Molecular Biology of Pollen and Pollen-Pistil Interactions in Crop Plants

James McCreight
Genetic Enhancement of Lettuce, Spinach, Melon and Related Species

Phillip Miklas
Enhanced Disease and Abiotic Stress Resistance in Edible Legumes

Duroy Navarre
Potato Germplasm Improvement for Disease Resistance and Superior Nutritional Content

Richard Novy
Potato Genetic Improvement for Western U.S. Production

John Preece
Management of Arid Land Plant Genetic Resources and Associated Information

Peter Quail and Sarah Hake
Molecular Mechanisms of Photoperception, Signaling and Gene Regulation by the Phytochrome Family

Victor Raboy
Analysis of the Biochemical Pathway and Genetics of Seed Phytate in Barley

Kelley Richardson
Sugar Beet Germplasm Enhancement, Breeding and Genetics

Camille Steber
Genetic Improvement of Wheat and Barley for Resistance to Biotic and Abiotic Stresses

Carl Strausbaugh
Improved Sugar Beet Germplasm and Innovative Disease Management Approaches to Increase Yield and Reduce Product Losses

Thomas Tai
Generation and Characterization of Novel Genetic Variation in Rice for the Enhancement of Grain Quality and Agronomic Performance

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OSQR sets the schedule of National Program Review sessions. The OSQR Team is responsible for:

- Panel organization and composition (number of panels and the scientific disciplines needed).
- Distribution of project plans.
- Reviewer instruction and panel orientation
- The distribution of review results in ARS
- Notification to panelists of the Agency response to review recommendations
- *Ad hoc* or re-review of project plans

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