

# National Genetic Resources Advisory Council (NGRAC)

## MINUTES

of the

### MARCH 31-APRIL 1, 2015, MEETING

George Washington Carver Center, Agricultural Research Service  
5601 Sunnyside Avenue, Room 1255, Beltsville, MD 20705

#### Table of Contents

<b>Day 1: Morning—March 31, 2015 .....</b>	<b>2</b>
<b>Day 1: Afternoon—March 31, 2015 .....</b>	<b>7</b>
<b>Day 2: Morning—April 1, 2015 .....</b>	<b>10</b>
<b>Day 2: Afternoon—April 1, 2015 .....</b>	<b>12</b>
<b>Recommendations and Action Items .....</b>	<b>15</b>
<b>Recommendations and Action Items Specifically Related to the AC21 Recommendations Document .....</b>	<b>16</b>
<b>Administrative Business .....</b>	<b>16</b>

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The National Genetic Resources Advisory Council (NGRAC) advises the U.S. Department of Agriculture (USDA) as a subcommittee of the National Agricultural Research, Extension, Education, and Economics (NAREEE) Advisory Board. The meeting was attended by NGRAC members and ex officio members, as well as by speakers and interested members of the public.

#### Meeting Participants

*Members:* Manjit Misra, Jane Dever, Matthew Dillon, Karen Moldenhauer, Stephen Smith, Allison Snow, Terry Williams, Millie Worku

*Ex-Officio Members:* Catherine Woteki, Charles Boyer, Peter Bretting, Gary Pederson

*Others:* Harvey Blackburn, Kelly Day-Rubenstein, Preston Hardisson, David Lambert, Simon Liu, Steve Schaeffer, Michael Schechtman, Jeffrey Schloss, Roy Scott, Michael Sligh, Bernice Slutsky, Elizabeth Stulberg, Ann Marie Thro

*NAREEE Advisory Board:* Michele Esch, Shirley Morgan

#### DAY 1: Morning—Tuesday, March 31, 2015

Meeting began at 8:00 am.

#### Welcome and Introductory Remarks

**Manjit Misra** (Chair, NGRAC) welcomed meeting participants. He mentioned that he had just returned from India, where one out of seven people is hungry (often in the same family). “Our work on agricultural resources can make a difference.”

**Peter Bretting** (USDA/ARS) then introduced Simon Liu, Associate Administrator of ARS and recently Director of the National Agricultural Library; and Roy Scott of ARS.

**Simon Liu**, in his introductory remarks, mentioned working on the genebank and the relationship of genotyping to phenotyping. He said resources were critical and noted that FY 2016 could see a \$3.5 million increase in the USDA budget.

**Roy Scott**, whose particular interest is in cotton and seeds, gave a second welcome. He is working on the plant road map and researching genetic resources.

**Michelle Esch**, with the NAREEE Advisory Board, also made brief introductory remarks.

## **USDA Updates**

### **1. Peter Bretting** (National Program Leader, ARS)

Bretting gave a slide presentation on “The National Plant Germplasm System (NPGS): 2015 Status, Prospects, and Challenges.” He noted that the 19 U.S. locations of the NPGS conserve and distribute the germplasm to researchers and breeders both nationally and internationally. Growth in germplasm accession is slow but steady, approximately one percent per year. The focus is on filling gaps in the collection. Demand for NPGS information is high, as is the demand for the germplasm itself, which has doubled between 2005 and 2014. Most of the demand is from domestic requesters. In drought years, the demand for samples is higher, especially for soy and sorghum samples.

After the high budget years of 2010-2012, FY 2013 saw severe cutbacks in ARS’ NPGS budget. (Particularly cut were the number of people available to do regeneration and data collection.) ARS’ FY 2014 budget saw some recovery. The President’s FY 2016 proposed budget for USDA/ARS seeks increases of approximately \$3.475 million for the NPGS. In addition, the proposed budget seeks money for developing high-value crops that would grow in urban environments (which could help less prosperous areas of American cities that lack healthy food choices at local markets); and for providing Native Americans with training/information on conserving and improving traditional crops (a \$500,000 increase).

Key challenges to the NPGS’s budgetary resources include fulfilling the demand for additional germplasm characterizations/evaluations; acquiring and conserving germplasm of crops’ wild relatives; and developing and administering best management practices (BMPs) for accessions (and breeding stocks) with genetically-engineered (GE) traits and occurrence of adventitious presence (AP). It was noted that most germplasm samples have some characterizing information, but it’s not known how many have complete horticultural characterization; only a small number have no characterizing data. Bretting is not sure how much money, especially for testing, would be needed to fill out the germplasm characterization picture. Breeders are particularly eager for characterization. The subject of regeneration came up: there is grave concern about corn regeneration (“corn morgue”). It was suggested that it would be effective, in seeking money, to use this kind of language: “We were able to regenerate W percent of the collection with X amount of money. If we had Y amount of money, we could regenerate Z percent of the collection.”

The Advisory Committee on Biotechnology and 21st Century Agriculture (AC21) asked ARS to tackle Plant Variety Protection (PVP), or “breeders’ rights.” Most of the breeding programs use plants with proprietary GE traits. In the case of a “breeders exemption,” PVP gives a seed owner a monopoly for a period of time. Some of the plants now protected will see that protection expire in 2015 and plants with public-domain varieties that have GE traits will be distributed.

In response to the question of whether any collections are held “in trust” (germplasm not available for distribution), it was noted that there is a kind of “black box storage” at the NPGS genebank at Fort Collins, Colorado, in case of disaster. However, seed materials given to Fort Collins must also be kept available at the originating site. Approximately 20 crops include varieties with deregulated GE traits. These are about to move into the public domain and get distributed.

Bretting has the latest draft (still under revision) of the document “ARS Procedures and Best Management Practices for Genetically-Engineered Traits in Germplasm and Breeding Lines,” which he would like kept private. He asked the members of the NGRAC committee, which he considers the most important audience for the report, to review the draft and give him feedback.

The problem for seed genebanks is that there are usually just a few seeds, which makes testing difficult. It’s also very challenging to make all the seeds true to type when they are duplicated. The compromise focuses on the best possible BMPs to perform mandatory testing for GE traits before release of the varieties, to mitigate the effects of AP off-types. The critical question is what should be the threshold for trueness to type? A threshold of less than one percent was suggested.

## **2. Michael Schechtman** (Biotechnology Coordinator, USDA)

Schechtman discussed AC21 and the March 12-13, 2015, stakeholder workshop at North Carolina State University. The AC21 committee was reestablished on February 27, 2015 (the old charter expired), to go through 2017. In 2012, the USDA received a report on coexistence between the organic/non-GE agricultural community and the GE agricultural community. One recommendation was that the USDA should spearhead recommendations on coexistence between the communities. USDA Secretary Tom Vilsack convened the North Carolina meeting to reemphasize the importance of consensus and coexistence. Even so, there was considerable tension at the meeting between the sectors. The period of formal input from the public was extended two weeks beyond February 27, 2015. Schechtman discussed two major documents: “Key USDA Activities Already Underway in Response to Recommendations from the USDA Advisory Committee on Biotechnology and 21st Century Agriculture (AC21)” and “New Proposed USDA Activities in Response to Recommendations from the USDA Advisory Committee on Biotechnology and 21st Century Agriculture (AC21).” Both documents feature concerns about coexistence prominently. Schechtman requested as much feedback as possible from the NGRAC group on the second document. New studies are also underway on the economic implications of coexistence activities. Another conflict that surfaced at the workshop concerned the withdrawal by the Animal and Plant Inspection Service (APHIS) of its proposed rule on animals. APHIS wants to start over, conduct webinars, because there have been many new developments since 2008.

## **3. Ann Marie Thro** (Senior Advisor, Office of the Chief Scientist)

Thro gave a slide presentation on the “USDA’s Plant Breeding Roadmap.” Before discussing the slides, Thro discussed her role in the Office of the Chief Scientist. Her term ends in August 2015 and a search has begun for nominees. Ideally the person/people selected would have experience

in marketable areas and serve for rotations of 6-12 months. Thro pointed out that breeding of plant genetic resources is needed for all USDA strategic goals. Plant breeding is “human-aided development of new plant cultivars with needed characteristics.” Since 2007, there has been increasing stakeholder attention to plant breeding. In March 2014, the USDA’s Chief Scientist charged the Plant Breeding Working Group with drafting a Plant Breeding Roadmap to develop a vision for the future. The Roadmap is available on the internet. An increasing number of stakeholders, including the organic sector, are engaging with USDA officials to present plant breeding needs and priorities.

In the view of stakeholders, the USDA’s core contributions to plant breeding consist of the NPGS and funding for education of future plant breeders. Stakeholders said what they most needed from the USDA was assistance from the Natural Resources Conservation Service (NCRS) with germplasm characterization and pre-breeding; cultivar varieties in public-goods situations; and new tools and methods that would be available to any breeder (public or private). Five internal agencies will help the USDA take the next steps in plant breeding: the Agricultural Research Service (ARS), the Forest Service (FS), the Natural Resource Conservation Service (NRCS), the Economic Research Service (ERS), and the National Institute of Food & Agriculture (NIFA).

Beyond the USDA, the following measures must move forward in order for plant breeding to prosper: more young people need to become interested in plant breeding; the best balance of public-private investment in plant breeding needs to be determined; understanding and use of intellectual property (IP) rights and technology transfer mechanisms must be promoted; and the training pipeline needs to be funded through a mixture of public/private mechanisms. The USDA cannot make decisions on these topics, but it can convene discussions across sectors and stakeholders.

#### **4. Elizabeth Stulberg (White House Office of Science and Technology Policy)**

Stulberg was asked to speak by Thro; the two are working together on a summit to be held in Summer 2015. Plant breeding is the focus of the White House Office for which she works, specifically how to spur public-private partnerships in support of breeding and elicit more feedback from the public. The summit will focus on public-private partnerships to foster fellowships and matching funds for students to work in the plant-breeding field. Stulberg suggested the possibility of securing grants for students to work on uncharacterized seeds. How about a freshman research course that would focus on agriculture (rather than microbes, etc.), the phenotyping of seeds, and so forth. One person commented that there are not many jobs in academe for plant breeders. Such courses would have to be linked to non-academic career paths.

### **Learnings from the Seeds and Breeds National Seed Summit and Report**

#### **Michael Sligh (Program Director, Rural Advancement Foundation International-RAFI)**

Sligh presented a slideshow on RAFI, a nonprofit that focuses on family farms. RAFI works on a wide range of issues, including farm credit and crop insurance, food and land access, public seeds and breeds development, federal and international policy, food labels, market

development, emerging technologies, and best practices. RAFI has undertaken a project with North Carolina State University, Breeding for Organic Production Systems (BOPS), whose goal is to develop organic field crop varieties for production in the Southeast. The context for BOPS is that currently most breeding is done by private industry and employs GE technology. Germplasm availability for organic or non-GE producers is limited. Thus, there is a great need to expand public breeding programs to address the regional needs of non-GE and organic producers in the Southeast USA.

The goal of the 2014 National Seed Summit, whose full name was “Seeds and Breeds for 21st Century Agriculture: Meeting the Challenges of Food Security,” was to reinvigorate public plant and animal breeding capacity; ensure that regionally adapted public cultivars are readily available to provide greater farmer choice; and prioritize support for and train the next generation of public cultivar developers. (The context for this activity is that over the past 20 years, 33 percent of public plant breeding programs have been lost and salaries have dropped dramatically at land grant university breeding programs.)

Key summit findings identified significant threats to the resilience of agricultural systems and a loss of farmers and breeders rights. The findings included the genetic uniformity of major crops; overly short crop rotations; abandonment of margins; the need for “long-arc” public cultivar development; the lack of minor crop support; reduced access to improved germplasm; seed ownership concentration; loss of public seed investment; loss of biodiversity; climate change; and increased use of proprietary seeds.

New trends in U.S. seed development identified at the 2014 National Seed Summit include: federal funding for public cultivar development is increasing slightly; there are regional clusters of seeds and breeds adaptation; regional seed companies are reemerging; a new generation of plant breeders exists, but they have no home in the land grant university system (that would change if there were a federal signal of commitment); strong demand for seeds for intellectual property (IP) markets has developed—non-proprietary orientation is needed; and public seed awareness is growing.

The recommendations produced by the National Seed Summit include: develop a national plan to restore access, full funding, and capacity for public cultivar development; strengthen and support the Public Germplasm System; encourage regional seed summits; host a national summit to address intellectual property (IP) issues and Best Management Practices (BMPs) for public cultivar development; deepen relationships to the climate-change scientific community; and support and encourage seed literacy campaigns to further raise public awareness.

A question was asked about how to revitalize native species. More than 50 percent of Native Americans have diabetes, due to a maladjustment to processed foods that are widespread in the traditional American diet. The question of how to restore native plants, which would result in a diet less dependent upon processed foods and therefore greater health, is especially urgent for tribal groups.

Discussion brought out that much corn is now proprietary, so it is difficult to examine. At present, there is discord among the main actors: farmers, large seed companies, seed breeders,

and seed savers. It was suggested at the NGRAC meeting that bringing the American Seed Trade Association (ASTA) into the picture could help the discordant groups work together and increase the likelihood of success. There would even be ways to protect private breeders' proprietary concerns and still move forward. ASTA has a history of interest in gene diversity and the NPGS. The USDA Secretary wants NGRAC to put in a request for an assessment process and recommendations for a way to overcome IP hurdles. It was suggested at the meeting that the way to get more money is to submit specific dollar numbers and a description of what the money is needed for in detail. "This is a bipartisan issue." One participant noted the need to get companies to agree that they won't block it.

In the presidential budget process, all of the elements presented by the USDA need to be coordinated so that Congress realizes that gene diversity is a matter of national security as well as health. Put things in terms of this bigger picture in order to get support for biodiversity.

One participant pointed out however that that would result in smaller budget lines for other USDA needs.

Another participant expressed concern about underserved markets in relation to the plant breeding Roadmap. The same concern has existed in terms of a lack of teachers and doctors in underserved rural areas. The solution has been loan forgiveness programs for students who want to serve in these and, for example, tribal communities. Something like that is needed in order to incentivize students who want to help in parts of the country that are underserved in terms of food/crop choices. What is needed is a "Plant for America" movement.

It was pointed out that climate change would seem to dictate a change in crops, but the tribes are attached to certain crops. The question is how to maintain particular crops and cultivars in order to support tribal lifeways. Because crops and pollinators are going elsewhere, it may be necessary to modify the genetics of certain crops, by X percent. An in-situ adaptation should be attempted. The participant thought that tribal colleges, tribal cooperatives, and land grant colleges are now interested in these matters. Tribal interest is increasing. In treaties with the U.S. government, the tribes never gave up their species, which were central to them for medicine, cultivation, and food sources. It is imperative to bring this knowledge back for the sake of the tribes' food security.

## **DAY 1: Afternoon—Tuesday, March 31, 2015**

### **American Seed Trade Association (ASTA): Updates and Collaborations**

**Bernice Slutsky** (Senior VP Domestic & International Policy, ASTA)

Slutsky gave a slide presentation on ASTA, an industry organization whose 700 members include seed companies of all kinds. The organization's committees address biotechnology, organics, and research. Much of ASTA's activity focuses on innovations in plant breeding. The trade organization lobbies for NPGS on Capitol Hill and has been very successful in getting increases for the system. A major program of ASTA is the Genetic Enhancement of Maize (GEM). Another high priority is PVP for seed deposits, which is a form of intellectual property

protection. ASTA informs the NPGS if any PVP seed deposits contain biotech traits. The PVP holder must declare six months before the certification expires: a) the identity of the “events” contained in the seed; and b) the regulatory status in the United States at the time of PVP expiration. A third major effort is the International Treaty on Plant Genetic Resources for Food and Agriculture (known as the Seed Treaty), which ASTA hopes that Congress will pass this year. Ideally, Slutsky would like to see elements in the Nagoya Protocol (the Nagoya Protocol on Access to Genetic Resources and . . . Sharing of Benefits) added to the International Treaty.

ASTA has an Organic Committee, which wants organic farmers to use organic seed. But the farmers can also use untreated regular seed if organic seed is unavailable. The industry group is concerned about the unavailability of non-GE and organic seed, particularly with regard to corn. An ASTA survey of its member companies regarding the availability of non-GE and organic corn seed is due to be completed in a couple of weeks. A participant asked whether the seed availability survey will be expanded beyond corn, specifically to soy, beets, alfalfa, and so forth. The response was that alfalfa could be the next seed surveyed. Soy doesn’t seem to have availability problems. Corn was focused on first because it has many availability problems.

The availability of non-GE and organic seed is key to licensing and breeding that seed. Seed companies need to be able to estimate seed demand at least a year in advance in order to have appropriate varieties available. Similarly, farmers need to know far ahead how much non-GE and organic seed to produce, so as not to over-produce. Communication between the farmer and the seed company is key.

Participants discussed a past controversy over the contamination of seeds from canola plants in the Willamette Valley in Oregon. Certain zones were designated as acceptable for growing canola. California maintains a very detailed crop map, showing what is being grown where. Perhaps government-regulated production zones are a solution. But ASTA prefers a voluntary solution—seed growers just working it out among themselves.

The discussion of PVP and IP led to the observation that Native Americans may want some new category, something between “sovereign” and public, for their germ resources. Tribal resources may need to be treated differently in the IP context. Tribal groups may not want to disclose the origins of their seeds, nor make them publicly available. What do tribal colleges want?

Slutsky requested NGRAC’s help in getting ASTA “money to help maintain what we have.”

### **Working Session: Finalize Recommendations and Response to AC21 Charge**

It was explained that the subcommittee that drafted the Recommendations document began with the exercise of looking at uncharacterized germplasm (farthest from the farmer), then characterized germplasm (the farmers), and then new lines. In Table 1, all the recommendations are present except for those regarding seed purity. With regard to the category “Access to uncharacterized germplasm for breeding,” reservation was expressed as to whether the USDA has the resources to check up on, for example, squash germplasm everywhere in the world. Perhaps a global approach is too broad (see pp. 5-6 of draft: “. . . USDA should facilitate

collection of and access to uncharacterized germplasm currently outside of its management and control”).

It was suggested that the recommendations be prioritized because USDA resources are not unlimited. It might be useful for NGRAC committee members to provide input on what is most important and why the USDA should undertake it.

The emphasis of the document is on USDA filling the gaps. The gaps that need to be filled are in connection with the eight priority focus crops: corn, soybean, cotton, canola, alfalfa, sugar beet, papaya, and squash. *Everything in the Recommendations should be understood as applying to all eight major crops.* The committee wants to ensure that all eight have a non-GE alternative. The report should clarify that six of the eight major crops aren't perceived as having value. That misperception needs to be corrected in the report.

The document needs to add explanations for specialized terms and concepts, e.g., “characterized” and “uncharacterized” germplasm, “passport information,” etc. Similarly, the committee needs to clarify in the report why there is a seed availability problem (because of IP law), make clear that the Bayh Dole Act has had unintended negative consequences, and so forth.

The Bayh Dole Act has caused land grant universities to focus on economic opportunity and neglect research on the six crops without GE traits. Thus the act has had an unintendedly chilling effect on essential crop research.

The document should comment on funding for the Foundation for Food and Agricultural Research (FFAR), and on Hatch formula funding to increase the capacity for public plant breeding. Long-term, consistent funding is needed, for example, for endowed chairs. It was determined to add to the document “FFAR should prioritize funding for public plant breeding. . . . Hatch, McIntire-Stennis, and Evans-Allen funds have been critical.” Then: “Initiate a 10 percent increase in Hatch. . . .”

It was requested that the word “tribes” be added after “industry” everywhere in the report, including in the tables. Also, all report statements about “public and private” should include “and tribal.” Thus: “public, private, and tribal.”

A request was also made to add to the Recommendations a request for funding for tribal DNA labs.

Meeting adjourned at 5:05 pm.

## DAY 2: Morning—Wednesday, April 1, 2015

Meeting began at 8:25 am.

### Welcome and Overview

**Steve Schaeffer** (USDA/ARS at the Carver Center)

Schaeffer welcomed everyone and explained what ARS does, touching on plant and animal research and food resources research. He expressed particular satisfaction with the President's FY 2016 proposed budget because it contains an increase for ARS (the NPGS). He singled out a platform in the budget for long-term testing on the land to evaluate germplasm in different environments and under different management systems.

**Manjit Misra** (Chair, NGRAC) also welcomed participants and provided an overview of Day 1. He noted that they reviewed the AC21 Recommendations of the drafting subcommittee "so that the whole committee could own them." He noted that \$3.475 in increases is slated to go the NPGS in the President's FY 2016 proposed budget, which he described as "very welcome." He referred to the stakeholder contention at the last meeting on coexistence, which was summarized yesterday, as something expected to be "temporary." The USDA wants all agricultural sectors to prosper. He touched briefly on the 2014 Seed Summit presentation by Michael Sligh yesterday. And he noted that the committee had agreed fully to the request that language in the report referring to genetic resources be modified to say, "public, private, *and tribal*." He then introduced Dr. Woteki.

### Comments from REE (Research, Education, and Economics) Leadership

**Catherine Woteki** (USDA Under Secretary and USDA Chief Scientist)

Woteki outlined three broad areas of her talk: the President's FY 2016 budget request; the role of FFAR; and things that have been implemented based on recommendations of AC21, particularly in the area of furthering coexistence among different germplasm approach advocates.

**President's Budget:** She noted that the President's budget request is particularly supportive of USDA research and education programs and of infrastructure. If the budget passes, four USDA agencies would see a total increase of \$4.2 billion: the Agricultural Research Service (ARS), the National Institute for Food and Agriculture (NIFA), the National Agricultural Statistics Service (NASS), and the Economic Research Service (ERS). The Agriculture and Food Research Initiative (AFRI) would receive a \$125 million increase for grants to universities.

Included are initiatives on pollinator health and antimicrobial resistance (antibiotic-resistant bacteria). The initiatives involve both USDA agencies and outside agencies. This coordinated or "portfolio approach" is very welcome. The budget request also includes money for developing high-value crops that would grow in urban environments (urban gardens), which could help less prosperous areas of American cities that lack healthy food choices at local markets.

Woteki noted that traditionally Agriculture's bill has been one of the less controversial. But when the USDA testified on the proposed budget before Congress last week, it was warned that finances are very tight. Authorization of the President's proposed USDA increases is not guaranteed.

**FFAR:** This new USDA entity was authorized by the 2014 Farm Bill with a transfer of \$200 million to spend on projects, to be matched by funds from outside the federal government. The emphasis is on creating public-private partnerships that will boost the agricultural economy. FFAR has a board of 15 members, initially to be appointed by 5 ex officio members. Eight of the Board members were recommended by the National Academy of Sciences, seven by the private sector. In July 2014, FFAR was incorporated as a nonprofit. Individuals, corporations, or even parts of USDA may either present projects to FFAR for funding or be approached by FFAR to undertake projects, so long as they do not duplicate or continue USDA projects already underway. The overall goal is to create new partnerships to accomplish things that the USDA cannot do on its own. FFAR is currently entertaining ideas from external entities that want to partner with the foundation. Daniel Glickman, formerly head of the USDA, recently became Chairman of the Board. At present, the foundation is searching for its first Executive Director, which it hopes to find by Summer 2015. They will need a strong fund-raiser, to get projects started.

**Overview of AC21 Recommendations:** Woteki mentioned increased farmer access to services and data; the elimination of the surcharge on crop insurance premiums paid by organic farmers; help developing the Organic Seed Finder database; gene flow risk mitigation; an investigation of seed dormancy; a study of inexpensive methods to monitor GE organisms in the environment; and a study of "trueness to type" holdings in USDA/ARS. One participant mentioned a large alfalfa producers study of what it would take to reduce interference between different types of alfalfa ("Control Gene Flow in Alfalfa"). Another participant discussed a study of a similar kind with corn.

Misra, Chair of NGRAC, noted that genetic resources are not just a matter of food security, but also a matter of national security. NGRAC is willing to approach private sources to help raise the matching funds that FARR needs to do its work.

In her parting comment, Woteki emphasized that USDA Secretary Vilsack feels that issues of coexistence *must* be worked out.

### **Working Session: Finalize Response to AC21 Recommendations**

The session started out with the suggestion that the report should explain why the committee is recommending what it is recommending and why the USDA should implement the recommendations.

Add language that says that all recommendations are holistic and must be understood together.

Snow and Dever will work on language about the eight priority crops. One participant suggested that the report emphasize that the eight priority crops are just placeholders. Other crops may become priority once GE versions of them exist.

The seed purity issue is not yet a part of the report. It needs to be added and integrated with the rest. A working subcommittee was formed—consisting of Dillon, Moldenhauer, Sligh, and Dever—to write a short paragraph on seed purity and the need for a seed “threshold” to be used to protect against contamination from GE plants. This paragraph will be added to the Recommendations document, in conjunction with discussions underway with ASTA. It should appear in the introduction and needs to be realistic, acknowledging the extreme difficulty of reaching a zero percent contamination threshold.

Add language about access for farmers to seed in appropriate form.

A suggestion was passed along from the NAREEE Advisory Board that the report not contain so many recommendations. Try to consolidate the Recommendations, then show sub-recommendations. Should some recommendations go in the report Appendix? Are they less important? Dever and Smith will do the consolidation. It was ultimately determined that Smith and Dever will reorganize the recommendations under the three parts of the “charge” from AC21.

It was suggested that the following points be added to the Recommendations document: coexistence; testing required; will benefit all players, including industry and universities. Some of industry’s detection technology is proprietary and most of the genes are proprietary. The participant asked whether there is anything out there on developing assays. The answer: see Appendix 2 in Peter Bretting’s text, given to meeting participants (p. 32, first paragraph).

The NGRAC chair recommended that we add a section of Other Recommendations, beyond those that appear in the AC21 charge.

New tribal groups will probably want to start to be involved in the seed and breed activities covered by the meeting. Should there be a separate recommendation on this for convening workshops?

## **DAY 2: Afternoon—Wednesday, April 1, 2015**

### **Status and Activities of Animal Genetic Resources Program within ARS**

**Harvey Blackburn** (Animal Geneticist, ARS)

Blackburn presented a slide show on the animal genetics project at the Fort Collins repository in Colorado (an ARS lab). Gene samples representing more than 25,000 animals from all over the world are held in the Fort Collins genebank, ranging from bison, many kinds of cattle, pigs, sheep, chickens, goats, and elk, to fish and even nematode worms. Most of the samples in the collection go for DNA studies, to supply breeding programs, or to reintroduce genetic variation

back into the gene pool. Having the early samples enables breeders to correct abnormalities caused by inbreeding or overbreeding (e.g., Holstein cows).

The Fort Collins program does not want to provide a mechanism for genomic analysis, only for long-term storage of genomic data. It wants the breed associations and others to do the analysis. An animal genomic database, called the Germplasm Resources Information Network (GRIN), version 2, should be available in Summer 2015. The network will enable global genomic information exchange and benefit-sharing. GRIN version 2 will be live, meaning that it will be continuously updated and can be viewed (including by the public) in real time.

Next on the wish list is a discovery-type conference that will foster interaction between the public and private sector; stimulate the research community to give more samples to the database; and provide a forum for input on new problems, such as climate change. As NIFA researchers obtain grants, it would be very helpful if they could give genomic samples to the program's database.

Aquatic species make up 12 percent of the collection and a publication on the world's aquatic genetic resources will be published in December 2015. The publication will help with species that are used for aquaculture and their wild relatives.

A participant asked about the salmon controversy and whether NGRAC should step in. The salmon are raised in confinement and supposedly therefore cannot contaminate wild salmon. But there are questions about whether the wild salmon supply is safe. The Nez Perce Indians in the Pacific Northwest are a source of uncontaminated salmon.

The FY 2014 budget for his program is better than the FY 2013 budget was, by \$400,000. That will last them three to four years; then they will need more money for salaries and database user interfaces. Chairman Misra suggested that NGRAC request more money to bring Blackburn's program to the next level (his current budget is \$900,000).

A participant asked about genetic breeding and animal rights. Blackburn said that the major chicken breeders are now interested in shifting to cage-free methods of raising chicken. And many of the requests he receives for live animal regeneration are motivated by an awareness that overbreeding has caused problems in the animals.

## **Working Session: Identify Next Steps and Critical Topics for Discussion**

### **Tribal Issues**

Request: Change language in the Recommendations document from "public and private" to "public, private, and tribal."

Request: Move tribal concerns out of the report appendix back to the main body of the report. Give more prominence to tribal issues.

The tribes would like to get tribal accessions into the national system. Should there be special protections for native species? (since Native Americans are their own “sovereign” country) Is a black box possible? GE adventitious trait contamination is a particular challenge for tribal spiritual beliefs that are connected with native plant species.

Because of climate change, the species associated with Native Americans’ food and spiritual beliefs are migrating away from them. What should the tribes do? They put \$50 million into preservation, but aren’t seeing results. That’s because plants can’t survive climate change. The question is how to stabilize the tribes’ lifestyle in a changing climate. They need a roadmap for the rate of change and the type of change, so that they can project into the future. They asked for help from the government.

The tribes need help from NGRAC/USDA because there are no committees in the Department of the Interior or the EPA that are working on native plant viability or native genetic resources. The crops that the tribes cultivate are not mainstream crops. The tribes have nowhere else to go in the federal government except the USDA.

One conference participant suggested that U.S. treaty obligations might offer the basis of help. The tribes have observed that there is no tracking among the federal agencies to be sure they keep their commitments to the tribes. Some keep their commitments, some do not keep their commitments, and others don’t offer any commitments. A system of agency enforcement and funding is needed to help the tribes prepare for the time of change. It was suggested that perhaps something called the Federal Consistency Act might be helpful. The tribes would hope to work with the National Oceanic and Atmospheric Administration (NOAA), in conjunction with state and local agencies, on the coastal management protection that the Federal Consistency Act provides for.

But the participant who made the suggestion questioned whether the tribes want assistance from the federal government. The answer to questions about whether the tribes want to accept assistance from the federal government cannot fully be known until the process is started. But some tribes are starting their own genebanks now. How can they be brought into the national system?

The tribal participants at the meeting noted that Puget Sound is in trouble. The salmon’s food supply, plankton, is terrible endangered. Acidification of the water has hurt the shellfish. The tribes hope to counteract the damage with breeding programs/germplasm.

The tribes asked how they can work with the NPGS. The lab of one of the Native American meeting participants is doing gene sampling now, of both plants and animals, including far North of where the tribe is located. The tribe is seeking education and training to take the next step.

It was noted that the President’s FY 2016 proposed budget includes \$450,000 for this kind of assistance, through ARS. There is no way to tell whether this line item will be kept in the budget. But even if it is partially funded, a tribal strategy plan will have to be ready quickly to take advantage of it. The tribal participants asked the committee to help the tribes develop the strategy quickly.

## **Finetuning NGRAC's Recommendations to the USDA Advisory Committee on Biotechnology in the 21st Century (AC21)**

It was decided that the 15 or so recommendations would have a greater impact on Congress if they were consolidated under the three overarching categories that appear in the language that the Secretary of the USDA used in 2012 in charging NGRAC with responding to AC21. The categories appear in bold in the Recommendations document, with the relevant sub-recommendations following beneath each main category. It was determined that the language of the main categories in the Recommendations document would be most effective if it repeated the language in the charge and also that the main categories would come across more strongly if they took the form of verbs, for example: Provide for, Identify, Ensure. [For instance, rather than “Ongoing evaluation of the pool of . . . varieties,” perhaps begin with the verb “**Provide for** ongoing evaluation of the pool of . . . varieties,” etc.]]

Since the report and recommendations that NGRAC is about to submit to AC21 are intended for Congress, it was decided that terms and concepts possibly unfamiliar to members of Congress and their staff should be clarified. Examples of such terms are “characterized” and “uncharacterized” germplasm, “cultivar,” and “passport information.” Similarly, it was decided that the report needs to explain why there is a germplasm availability problem (i.e., because of IP law). And the report should explain that the original seed bank (containing a very small quantity of seeds) is pure, but that impurities inevitably enter the picture when those few original seeds are multiplied for distribution.

### **RECOMMENDATIONS AND ACTION ITEMS**

- Provide feedback on private report (not for distribution) that Bretting made available—“ARS Procedures and Best Management Practices for Genetically Engineered Traits in Germplasm and Breeding Lines.” NGRAC is the most important audience for the report. Deadline for submitting comments: April 15, 2015.
- Weave elements of this report into NGRAC's Recommendations document. (Smith)
- Provide feedback on the coexistence report that Schechtman made available—“New Proposed USDA Activities in Response to Recommendations from the USDA Advisory Committee on Biotechnology and 21st Century Agriculture (AC21).” Schechtman requested that every NGRAC committee member submit comments.
- Nominate possible candidates to succeed Dr. Ann Marie Thro as Senior Advisor to the USDA's Office of the Chief Scientist. Dr. Thro's term ends in August 2015. The search is on for nominees to come in for 6-12 month rotations, ideally people with experience in marketable areas.
- Submit a request to the USDA for an assessment process and recommendations to overcome IP hurdles. (The USDA Secretary has requested that NGRAC do this.)
- Support the USDA Plant Breeding Roadmap (available in draft on the internet).
- Recommend that funding for the Animal Genetic Resources Program at Fort Collins be increased. (Chairman Misra put this forward.)
- Chairman Misra said: “Let the record show that we are resolved” that Native American needs and concerns will be included prominently in the Recommendations document. He further noted: “Let's say [in our report] that NGRAC strongly endorses this part of the

President’s budget.” Michele Esch, chair of NAREEE’s Advisory Board, asked the tribal members present to send their comments, in writing, to Dr. Stephen Smith by Wednesday, April 8.

### **Recommendations and Action Items Related Specifically to the AC21 Recommendations Document**

- Reorganize the recommendations so that they are in line with the three parts of the AC21 charge. (Smith and Dever)
- Add to the document comments from NGRAC committee members about why they think the recommendations are important and why the USDA should undertake the recommended actions. If possible, prioritize the sub-recommendations because of limited resources.
- Consider putting some of the recommendations in the appendix, to comply with the suggestion to prioritize. Are some less important? Explain in the text of the Recommendations document what the appendix is. Explain that the tables represent a step in the process.
- Consider adding “Other Recommendations” beyond those that appear in the AC21 charge language. (Misra suggested this.)
- Form a working group within NGRAC to write a short paragraph on the need to specify a seed threshold for GE contamination, to be inserted in the Recommendations document. The paragraph on seed purity needs to be realistic and acknowledge the extreme difficulty of reaching a zero contamination level. The working group will consist of Dillon, Moldenhauer, Sligh, and Dever.
- Add these points to the Recommendations document:
  - Coexistence
  - Testing required
  - Note that testing will benefit all players, including industry and universities (even though some of industry’s genes and detection technology are proprietary, they want to participate and will benefit from doing so)
- Form a working group within NGRAC to develop language about the eight priority crops for the Recommendations document. The group will consist of Snow and Dever.
- Make clear in the report that the Bayh Dole Act has had unintended negative consequences.
- Change the order of the recommendations—begin with the farmers, not the breeders.
- Add language to the report that says that all the recommendations are holistic and must be understood together.

### **Administrative Business**

NGRAC will finalize the Recommendations document according to the following timeline:

April 3 – NAREEE Executive Committee meeting (Charles Boyer will relay NGRAC’s recommendations for approval to move the report to the NAREEE Board meeting)

April 6 – Jane Dever submits draft/Matthew Dillon works concurrently

April 8 – Michele Esch to send draft to Stephen Smith

April 10 – Stephen Smith submits comments

April 13 – Michele Esch sends report to NGRAC for comment

April 15 – Deadline to submit comments on report AND the ARS-Best Management Practices document (from Peter Bretting)

April 17 – Report finalized and transmitted to NAREEE

April 27-29 – NAREEE meeting, at which the report will be presented

The next meeting of NGRAC will take place in September 2015, possibly on the West Coast.

Meeting adjourned at 4:40 pm.