

# National Plant Germplasm Coordinating Committee Meeting Notes

Ft. Collins, CO

June 14, 2016

**Attendees:** Jim Moyer, Chair, Peter Bretting, Gan-Yuan Zhong, Eric Young, Larry Chandler, Rachel Melnick, Ed Kaleikau, Anne Marie Thro (by phone), Susan Brown (by phone), and David Baltensperger

1. Regional Plant Introduction Stations and NRSP-6 - Gan-Yuan Zhong ([presentation](#))
  - Plant Germplasm Operations Committee (PGOC) met in Davis, CA in October 2014
  - Functions of the Plant Introduction Stations
    - Acquire, conserve and distribute plant genetic diversity and associated information
    - Encourage use of germplasm (user-focused)
    - Conduct research to improve genetic resource management programs
    - Evaluate and characterize germplasm to facilitate targeted research objectives
    - Prebreeding activities to facilitate utilization
  - Issues discussed included
    - Balancing conservation of the germplasm with characterization research
    - Better outreach and public awareness of the collections
    - Documenting economic impact of the collection and acknowledgement of the material's contribution to agriculture
    - Guidelines for decommissioning NPGS samples
    - Handling and distribution of genetically-engineered, off-PVP germplasm lines in NPGS
    - Keeping crop vulnerability statements up to date
  - 120,000 accessions and genetic stocks have been distributed annually domestically and internationally by the four PI Stations and the NRSP-6 National Potato Germplasm Collection in past 5 years
  - NRSP-6, National Potato Germplasm Collection (potato and related species)
    - Preservation, evaluation and distribution of 5,000 botanical seed accessions of about 100 species; 1,000 in vitro clones are also preserved
    - Collected 17 new germplasm collections from Arizona and received 3 new cultivars and breeding clones from cooperators in 2015
    - Increased 231 accessions as botanical seed populations and 2,928 accessions as clones
  - NE-9, Northeast Regional Plant Introduction Station (vegetable and clonal fruit crops)
    - Distribution of 36,850 clonal and 36,463 seeds = 73,313 germplasm samples (13,992 in 2015) from 2011-2015
    - Established 2,126 regeneration plots (420 in 2015) for seed production of vegetable germplasm to distribute and replenish stocks from 2011-2015
    - Plant exploration in southern US added 37 seed accessions of *Malus angustifolia* and two seed accessions of Muscadine grape
  - NC-7, North Central Regional Plant Introduction Station (ornamentals, annuals, grasses, maize, oil seeds, medicinals)
    - Continued collection of wild *Helianthus* (sunflower) across native distribution; ornamental focus on *Fraxinus*, *Cornus*, *Gymnocladus* and, and other native plants; expired PVP maize and tropical x temperate introgression lines; and vegetable crop wild relatives
    - Conservation of Ash germplasm threatened by the emerald ash borer for future re-establishment; comprehensive collection of all native species across their range for the past 11 years
  - W-6, Western Regional Plant Introduction Station (grasses, beans, cool season food legumes, temperate forage legumes, horticultural crops)
    - Collection contains 97,263 accessions belonging to 1,131 genera, 4,994 species and 5,689 taxa
    - Acquired 1,908 new accessions including 1,631 native plant accessions from the Seeds of Success (SOS) project.
    - Distributed 28,031 packets of seed samples to 1,171 requestors
    - W-6 was approved for a five year term after completing a term approved for only two years.

- S-9, Southern Regional Plant Introduction Station (sorghum, warm season grasses, chili pepper, peanut, beans, vegetables)
  - Collection has 92,215 accessions of 1,579 species with 90% available for distribution
  - 98% of the collection is backed up at Ft. Collins, CO, and 14% is backed up at Svalbard, Norway
  - 35,376 accessions were distributed in 940 orders to users in 45 states and 40 countries in 2015

Major barriers for the Plant Introduction Stations are increasing number of accessions to manage with flat budgets. Major scientific hurdle is to better characterize traits in the accessions.

2. NIFA and AFRI Update - Ed Kaleikau and Rachel Melnick ([presentation](#) , [breeding handout](#), [bioenergy handout](#))

- Total NIFA budget ~ \$1.5 Billion
- AFRI is NIFA's primary competitive funding program at \$350 Million
  - Probably will go up to \$375 Million in 2017
- High throughput phenotyping tools are a new priority area in Breeding, Genetics, and Genomics area
  - Joint funding with NSF, DOE, and ARS (RFA handout)
- Pollinator health is also a high priority area
- Differences between Foundational grants versus Challenge Area grants
  - Foundational
    - single function research
    - fundamental research
    - doesn't change markedly from year to year
    - smaller grant size, \$500,000 maximum
    - individual investigators or small teams
  - Challenge areas
    - mostly integrated programs
    - research component is more applied
    - often change markedly from year to year
    - larger grant size, typically >\$1 million
    - multiple investigators or large teams
- Commodity Board provision in 2014 Farm Bill
  - 2014 Farm Bill (Section 7404) directs USDA to solicit AFRI topics from eligible commodity boards for co-funding (at least a one-to-one match)
  - 19 proposals received and 8 proposals were accepted and will be in RFA's in 2016
    - Kansas Wheat Commission (2)
    - National Pork Board (1)
    - Iowa Corn Promotion Board (1)
    - Washington State Potato Commission (1)
    - National Peanut Board (2)

3. Office of Chief Scientist and National Plant Breeding Working Group Update - Ann Marie Thro (by phone, [handout](#) )

- USDA Office of the Chief Scientist (OCS)
  - Created by the 2008 Farm Bill
  - Designates incumbent REE Undersecretary as USDA's Chief Scientist (currently Dr. Catherine Woteki)
  - Creates rotational Senior Advisor positions in each of the six Farm Bill areas
  - Now has a permanent Director who reports to Chief Scientist
  - OCS has developed an REE Action Plan that is linked to USDA Strategic Plan with the objective of creating a shared vision for USDA science and education across the Department
- Plant Breeding Working Group
  - Chartered through the OCS
  - Focus area this year has been "big data" in plant breeding
  - Messages presented at the PBWG-organized briefing on big data
    - massive growth in volume, velocity, and variety of sequencing and phenotyping data
    - new capabilities needed to sample and collect data, both temporally and spatially (from single cell, whole organism, underground, geospatial)
    - biology has shifted from observational science to an informational science; needs to move into a predictive science
    - public sector resources needed to support this shift have not kept pace with the demand
- Key to future success of public plant breeding

- Attracting young people and training them in basic and applied aspects
  - Work with private sector to articulate why we need public breeding
  - Better identity impact of public breeding on agriculture
  - What might be the impact of continuing consolidation of private sector breeding?
    - Could there be only three large global plant breeding corporations?
    - How can this few serve the site specific needs of agriculture effectively?
      - Corporations will continue to have satellite, site-specific operations, but might not cover a lot of US agricultural niches.
      - Potentially opens more opportunity for small private and public programs.
  - Public breeding programs need access to private technology for training breeders through partnerships, internships, and other creative cooperative agreements
  - Public sector can do a lot of important work in pre-breeding that private sector is probably not interested in doing
4. National Genetic Resources Advisory Council (NGRAC) Report Recommendations and Response - Peter Bretting ([report](#))
- General ARS/NIFA responses to Recommendations relevant to their missions
    - Rec 2, *USDA should work with plant breeders and other seed providers to increase the availability of organic and non-GE germplasm.*
      - most ARS work is with non-GE lines and there has been a significant increase in research on organic agriculture
    - Rec 3, *USDA should commission a study of the release and availability of inbred lines and varieties developed at public universities in order to determine the extent to which they deliver optimal crop genetics for different agricultural systems. This should include an assessment of the unintended impacts of the Bayh-Dole Act on public sector capacity to serve all agriculture.*
      - it's not clear if royalty income has shifted the focus of public breeding, but this will be studied
    - Rec 5, *USDA should convene regular balanced roundtables on extending GE trait stewardship to encompass prevention and mitigation of adventitious presence in non-GE breeding programs and genebanks.*
      - USDA convened a workshop in March 2015 in Raleigh, NC regarding coexistence of different crop production systems. ARS developed procedures and best management practices for managing GE materials and AP.
    - Rec 6, *To facilitate coexistence and maintain stewardship, USDA should work with and encourage industry to develop and provide low cost assays of GE traits.*
      - coexistence and stewardship procedures are being discussed with industry, but progress has been slow
    - Rec 7, *USDA to promote diversity in agriculture by devoting additional resources to organic and non-GE agriculture in the areas of genotyping, phenotyping, evaluation, breeding and/or pre-breeding. And USDA should facilitate more public, private, and/or tribal partnerships in developing, characterizing, and evaluating genetic resources from the NPGS and non-U.S. sources adapted to U.S. growing conditions*
      - organic breeding support is increasing in ARS and NIFA
      - USDA is having discussions with tribal nations, some want to partner, some don't
    - Rec 8, *USDA should identify gaps in genetic diversity and/or passport information, including samples or accessions with known use restriction issues, and remedy those omissions by additional collection or documentation.*
      - this is a continuing effort, through the crop vulnerability statements written by Crop Germplasm Committees
  - USDA official response has not been released yet
    - USDA does recognize the importance of NPGS
    - Coexistence is a high priority discussion and action item for USDA
    - ARS and NIFA are committed to supporting crop agriculture by providing germplasm and diverse crop varieties, most of which are non-GE
  - The NPGCC noted that unfortunately the NGRAC report, finalized in 2015, does not address the new gene editing technology, which is expanding rapidly in use
  - APHIS, FDA, and EPA have been charged by the Administration with reviewing the whole genetic engineering regulatory framework and this should include determining how gene editing will be handled
5. ARS procedures and best management practices for genetically-engineered traits in germplasm and breeding lines - Peter Bretting ([handout](#))
- Currently determining how GE material off-PVP will be distributed by NPGS
  - Likely that ARS labs will adopt these procedures, but will only be a suggested procedure for non-ARS entities

- Document is final, but not ready for external circulation until ARS has implemented it
  - Document may change in future as ARS learns more about how effective procedures are
  - Currently the protocol covers alfalfa, cotton, maize, soybean, and sugar beets, crops with widely-grow deregulated GE varieties, and which ARS breeds non-GE varieties.
  - Canola, papaya and plum procedures will be covered by the BMPs in the near future
6. National Association of Plant Breeders Liaison Report - David Baltensperger
- NAPB has gone to a dues structure, which is managed by the Tri-Societies
  - Registration for the annual meeting is open -- August 15-18 in Raleigh, North Carolina. Tour on Monday and Thursday mornings
  - Last meeting was in Washington State, which had good attendance
    - One discussion centered on encouraging everyone to recognize funding sources that contribute to development of cultivars and improved germplasm
  - Developed a plan for collaboration with Crop Science Society of America on policy, so the two groups remain tightly linked
  - NAPB is very appreciative of NIFA's increased investment in plant breeding
  - Concerned about ongoing support for germplasm preservation and public plant breeding efforts
  - Gene editing is a game changer and guidelines and policies need to be developed rapidly and deserve increased emphasis from USDA
  - Graduate and undergraduate students are heavily involved in NAPB annual conference and in running the association
7. Plant Breeding Coordinating Committee (SCC 80) - Pat Byrne ([handout](#))
- This multistate project founded NAPB in 2007 and meets with them annually
  - Germplasm preservation and distribution is a high priority
  - Interested in making National Plant Germplasm System more relevant to breeding
    - Increase the amount and consistency of evaluation data in GRIN Global
    - Improve interconnectivity between different types of databases, e.g., GRIN Global with genome databases
    - Consider how to integrate high through-put phenotyping platforms into their operations and how to manage the resulting data deluge
    - How and by whom should pre-breeding be done to make the NPGS accessions more attractive germplasm sources for breeders?
8. Database Resources for Crop Genomics, Genetics and Breeding Research (NRSP 10) Update - Jim Moyer ([presentation](#) )
- Project is working to expand online community databases currently housing high quality genomics, genetics and breeding data for Rosaceae, citrus, cotton, cool season food legume and Vaccinium crops
  - Other objectives include
    - Develop a tablet application to collect phenotypic data from field and laboratory studies
    - Develop a Tripal Application Programming Interface for building breeding databases
    - Convert GenSAS, the community genome annotation tool, to Tripal
    - Develop Web Services to promote database interoperability
9. Next Meeting
- June, 2017 in Geneva, NY
  - Dates to avoid will be sent to Susan Brown and Gan-Yuan Zhong
10. NPGS and International Treaties Updates (during PGOOC general session) - Peter Bretting ([presentation](#))
- NPGS acquisitions continue to increase, currently the NPGS includes around 575,000 accessions.
  - The International Treaty on Plant Genetic Resources for Food and Agriculture has moved a little closer to being ratified, the Senate Foreign Relations Committee held a hearing on treaty ratification on May 19, 2016. It's awaiting further Senate action.