Current Membership

Terrence Tiersch (Chair), Louisiana State University Agricultural Center

Paul Gepts, University of California, Davis

Tim Johnson, Smith College Botanic Garden

Sarada Krishnan, Denver Botanic Gardens

Kevin McCluskey, Fungal Genetics Stock Center, Kansas State University

James McFerson, Washington State University Tree Fruit Research and Extension Center

Plus 4 upcoming appointments

THE NATIONAL GENETICS RESOURCES ADVISORY COUNCIL (NGRAC)

NPGCC Meeting

May 30, 2018

USDA

What We Do

- **Advise the Secretary of Agriculture and Director of the National Genetic Resources Program (NGRP) on the activities, policies, and operation of NGRP.**

- **Scope includes acquisition, preservation, access, evaluation, characterization, distribution, and exchange of genetic resources of life forms important to American agriculture; plants, forest species, animals, aquatics, insects, and microbes.**

What We Do

- **Currently focusing on crops, animals including aquatic species, tribal issues, and moving into microbial issues.**
- **NGRAC shall make recommendations to ensure that these essential resources are adequately conserved and appropriately accessible in order to address current and future agricultural needs.**
- **NGRAC is also to advise on research needs for genetic resources, on coordination of NGRP with similar domestic activities, and on policies–both international and domestic–regarding access and exchange of genetic resources for the public's benefit.**

Meetings and recommendations

1st meeting after reconstitution of NGRAC, March, 2013.

Monthly teleconferences and 1 or 2 in-person meetings annually

- Identified major issues and needs in plant genetic resources
- Strongly encouraged the Secretary of Agriculture to seek ratification of the International Treaty for Plant Genetic Resources for Food and Agriculture by the U.S. Senate
- At the request of Secretary of Agriculture, identified the principal players, problems and solutions at different stages of the seed development process **for response to AC21 recommendations**

Systems Approach for response to AC 21 recommendations

We examined issues at each of the following stages of germplasm use:

- Uncharacterized germplasm for breeding
- Characterized germplasm for breeding
- New inbred lines and varieties in the appropriate form including Foundation seed, which is the first generation multiplication of breeder's seed
- Seed for farmers
- Harvested products for processors and consumers

Crop Focus

We focused on 8 major crops that currently have GE varieties available in the U.S.:

- Corn, Soybean, Cotton, Canola, Alfalfa, Sugar Beet, Squash, and Papaya
- Similar issues apply to future GE crops

Area 1. Ongoing evaluation of the pool of commercially available non-GE and organic seed varieties.

Recommendation 1 – *USDA should encourage and facilitate seed producers to provide information on the available pool of appropriate organic and non-GE seed.*

Recommendation 2 – *USDA should work with plant breeders and other seed providers to increase the availability of organic and non-GE germplasm.*

Area 1. Ongoing evaluation of the pool of commercially available non-GE and organic seed varieties.

Recommendation 3 *– USDA should commission a study on the release and availability of inbred lines and varieties developed at public universities in order to determine the extent to which they deliver well adapted 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.*

Area 2. Identify market needs for producers serving GE-sensitive markets.

Recommendation 4—*USDA should conduct an ongoing economic assessment of non-GE and organic seed markets to allow stakeholders to better understand the value and plan investment opportunities in the seed sector. Market demands for organic and non-GE should be identified by crop for each of the crops affected by commercial GE trait adoption by region, acreage, maturity and adaptation.*

Area 3. Ensure that a diverse and high quality commercial seed supply exists that meets the needs of all farmers.

Recommendation 5—*USDA should convene regular roundtables with balanced representation by all stakeholders on extending GE trait stewardship to encompass prevention and mitigation of adventitious presence in non-GE breeding programs and gene banks.*

Recommendation 6 – *To facilitate coexistence and maintain stewardship, USDA should work with and encourage industry to develop and provide low cost assays of GE traits.*

Area 3. Ensure that a diverse and high quality commercial seed supply exists that meets the needs of all farmers.

Recommendation 7—*The NGRAC encourages USDA to promote diversity in agriculture by devoting additional resources to genotyping, phenotyping, evaluation, breeding and/or pre-breeding. 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. Further assessment is needed for developing, characterizing, and evaluating tribal genetic resources.*

Area 3. Ensure that a diverse and high quality commercial seed supply exists that meets the needs of all farmers.

Recommendation 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.*

Recommendation 9—*USDA should communicate to State seed foundations and the American Seed Trade Association (ASTA) members the importance and need for inbred lines and foundation seeds that are not treated with chemicals prohibited by USDA National Organic Program.*

After response to AC21, the Council has been engaged in thinking broadly about supporting genetic resources infrastructure needs and benefits to users in the following major issues:

- Crop Genetic Vulnerability
- Animal Genetics Conservation
- Aquatic Species Genetic Resources
- Tribal Issues and Genetic Resources
- Microbial Resources

Summary: Actions for addressing crop vulnerability and supporting genetic resources infrastructure.

The NGRAC Crop Vulnerability Subcommittee was formed to recommend how to enhance the baseline crop genetic vulnerability data.

The subcommittee is soliciting input from the respective Crop Genetic Committees in the short-term form of Quad Charts, and in the long-term as traditional reports.

Crop Vulnerability Update for Potato

Vulnerabilities &Threats

- Susceptibility to many current, evolving and emerging pathogens and pests.
- Narrow US genetic base for commercial varieties.
- US production is input-intensive.
- Changing climates: hotter, drier—reducing yields.
- Some crop wild relatives (CWR) endangered in situ.
- Reduced budgetary support and operational capacity for breeding and plant genetic resource (PGR) management.

NPGS PGR Status & Impacts

- **Status:** Large collection (ca. 6000 accessions) with superior representation of CWR, managed as tubers and seeds in cold storage and greenhouses at Sturgeon Bay, WI. Accessions backed up at Ft. Collins and internationally.
- Rigorous disease and quarantine protocols in place, but add time and expense to germplasm import.
- **Impacts:** Protects and genetically improves top US vegetable with ca. $4 Billion/yr production value, and up to 25 tons/acre state average yields.
- NPGS source of base germplasm for most new US potato varieties; host-plant resistance to many diseases and pests; base genetics for specialty potato varieties.

Genetic research & breeding capacities

- ARS breeding and genetics programs at Beltsville, MD/Orono, ME & Madison, WI. Prosser, WA & Aberdeen, ID collaborative breeding with CO, MI, MN TX, WI state projects; OR, ID, and WA state projects as NW Variety Development Program.
- Very high quality requirements for 30+ traits.
- Cultivar selection lengthy (10+ yr); need rapid reliable disease-free propagation methods.
- Pepsico-Frito and Michigan State provide genetic marker and genotyping-by-sequencing (GBS) data.
- Germplasm evaluations by public & private sectors.

Priority Issues

- **A**dditional budgetary support crucial for expanded NPGS potato PGR management capacity, handling high PGR demand (80% of collection distributed/yr.), and additional PGR evaluations and genomic characterizations.
- Additional budgetary support crucial for expanded potato breeding capacity, especially for host-plant resistance to biotic stresses, tolerance to abiotic stresses, and input use efficiencies.
- Additional CWR should be acquired.
- See https://www.ars-grin.gov/nr6/tac/CGC_PotatoVuln2014.pdf for more info.

Summary: Actions for addressing other areas and supporting genetic resources infrastructure.

The Animal Genetics Subcommittee was formed to address a larger view of the program and its needs. The subcommittee has developed a national summary and set of recommendations addressing the needs and opportunities for animal and aquatic genetic resources. These are scheduled to be reviewed for approval by the NAREEE Board.

NEXT MEETING Proposed to be held in August 2018 to finalize recommendations of these and discuss other major emerging issues

Excellent support is provided by *Ex-Officio* members, additional experts and NAREEE Board:

Michele Esch, Executive Director, NAREEE Advisory Board

Shirley Morgan-Jordan, NAREEE Board Program Support Coordinator

Peter Bretting, National Program Leader, USDA Agricultural Research Service

Preston Hardison, Watershed Resource Analyst, Office of Treaty Rights, Tulalip Tribes

Harvey Blackburn, Coordinator, National Animal Germplasm Program, USDA Agricultural Research Service

Ann Marie Thro, Senior Advisor, Office of the Chief Scientist

National Genetics Resource Advisory Council (NGRAC)

USDA

Thank you! Questions?