

**Minutes of the August 6-7, 2019 NC-007 RTAC Meeting**  
**Department of Crop Sciences, University of Illinois, Turner Hall, 1102 S. Goodwin Ave.,**  
**Urbana, IL 61801**

**Participants:**

Administrative Advisor: Joe Colletti (not able to attend this year)

RTAC members present: Aaron Lorenz (2019 secretary), Melanie Caffé-Treml, Thomas Lübberstedt, David Baltensperger, Erik Sacks (2019 chair); by teleconference, Amy Iezzoni, Sherry Flint-Garcia, Pablo Jourdan

Regular ex-officio members: Candice Gardner; by teleconference, Peter Bretting, Stephanie Greene, Anne Marie Thro

NCRPIS staff: Laura Marek, Vivian Bernau; Mark Millard (by teleconference)

Other: Esther Peregrine

Invited presenters: German Bollero, Adam Theodore Hymowitz

**Tuesday August 6**

**Welcome by Dr. German Bollero, Associate Dean for Research**

Turner Hall has been newly renovated, creating a fresh and exciting plant for the U of I Crop Sciences Department. U of I has transitioned to new budget model based on value centers. This will change things on how they do research and will require creativity in terms of attracting funding and finding ways to reduce costs. The college has hired many new faculty. New biomass facility will initiate new collaborative projects with private industry/startup companies. Crops in Illinois primarily consist of corn, soybean, wheat (500K acres), and pockets of other crops such as pumpkins.

**Welcome by Dr. Adam Davis, Department Head**

Dr. Davis expressed his belief in the value of meetings like this that help to facilitate multi-state collaborations to conserve germplasm and provide resilience. He expressed the need to better communicate what we do so the public is more aware. Interest and desire for cropping diversification to provide more resilience to agriculture in face of changing more extreme climate was discussed, along the need for a more comprehensive strategy to accomplish this goal. There is value in long-term experiments and gaining value from old germplasm.

The department recently hired two small grains breeders to replace Fred Kolb.

Budgets placing pressure on tuition, and costs are increasing. Right now, the Crop Science department consists of 33 tenure line faculty, eight specialized faculty, and seven USDA-ARS scientists as adjunct. Maintaining this size is a goal.

**Peter Bretting**

Gave overview of NPGS. Current status can be described as reduced growth in collection size, and focus on trying to fill gaps and address Crop Wild Relatives. There are just under 600K accessions in the collection currently. Distribution of horticultural crop collections has particularly increased, likely due to interest in genomic investigations and breeding initiatives to address challenges to production. Before (15-20 years ago), there were 125,000 accessions

distributed per annum on average; now more than 280,000 accessions are distributed per year. Eight-five percent of all accessions are backed up in Fort Collins, but there are challenges for clonal germplasm and cryopreservation.

The NPGS budget has been declining in terms of purchasing power and 2004. Key challenges include managing and expanding NPGS operational capacity and infrastructure to meet increased demand for germplasm and association information, upcoming retirement challenges, developing and applying cryopreservation and/or in vitro conservation methods for clonal germplasm, and acquisition and conservation of crop wild relatives. Funding for a plant genetic resources management training initiative is being pursued via a NIFA Higher Education Challenge proposal to develop university coursework and practical training, potentially with certificates of completion. This is of keen interest internationally as well as within the USA.

New funds have been appropriated for coffee, citrus, and hemp genetic resources at Hilo, Hawaii and Mayaguez, PR, Riverside, CA and Geneva, NY, respectively. All areas are in needs of funds and timely given devastating pests, for citrus and coffee especially.

### **Candice Gardner**

The NC-007 Project is currently in its 72<sup>nd</sup> year. General overview and brief update on NCRPIS station activities: NC7 funds have been flat for 15 years and Hatch funds are now insufficient to support the nine Iowa State University personnel at the NCRPIS; an increase in Hatch fund allocations will be necessary to retain expertise. A long-term challenge is keeping the germplasm center staffed without increases in ARS or Hatch funding, which has been flat. In addition to USDA-ARS and Hatch funding sources, Iowa State University provides ~\$400,000 per year of in-kind support. New federal personnel include a Plant Pathologist, Maize Geneticist/curator, and a technician to support oilseeds; five vacancies remain. A -20C cold storage building is needed to improve longevity of viability in cold storage and reduce frequency and cost of regeneration. Two climate-controlled rooms were developed for utilization in vernalizing Brassica and other taxa. Two optical sorting instruments are being used to sort and improve quality of seed lots. The Ames collection now holds 54,774 accessions of more than 1700 taxa. A record number of accessions was distributed from the NCRPIS station last year to 1,000 requestors. Dr. Gardner noted that staff have continually increased their efficiency, but that maintaining this level of productivity with vacancies is stressful on staff.

### **Stephanie Greene**

Provided overview of extensive activities of Center for Agricultural Resources Research (CARR) and the National Lab for Genetic Resources Preservation. Details on provided slides. Extra work and research is being conducted on storing pollen in trees to gain efficiencies. A question was raised regarding the desired number of seed analysts, given many recent retirements. Dr. Greene stated it is desirable to have five analysts. Preserving clonal crop accessions is a major challenge. Backup of clonal collections at an additional site continues, but preservation of clonals at any site

always comes with risk. The Center is looking into pollen preservation as a possible partial solution, and strategically storing them at multiple locations.

### **Candice Gardner for Gary Kinard's National Genetic Resources Lab Update**

Details in report provided by Dr. Kinard include updates on the Plant Exploration and Exchange Program's 2018 explorations, collaboration between ARS and the U.S. Forest Service to conservation crop wild relatives in USFS lands, GRIN taxonomy, and the PEO partnership with USDA-APHIS to facilitate germplasm exchange. The ERS completed a survey of 5300 recent global recipients of major crops from the NPGS and will publish their findings. Dr. Baltensperger noted that the Project needs to strike a balance selling and overselling priorities. The urban population needs to recognize the importance and value of collections of main commodity crops. A documentary on seeds on YouTube is a powerful example of communicating importance of genetic resource collections. Dr. Baltensperger suggested the possibility of exploring grants for special explorations, for example. Dr. Lübberstedt brought up Nihls Stein's concept of a "biological digital resource center" as an example of a way to add value to collections by adding layers of research information through genotyping and making associations. Discussion proceeded on ways to leverage funds from research activities associated with collections.

### **Anne Marie Thro**

Emphasized communicating to NIFA regarding needs. Small budget increases from Hatch, and AFRI. Thanked all NC7 members for their participation and support to the NCRPIS.

### **Invited speaker: Theodore Hymowitz**

Dr. Hymowitz shared information from his research on the introduction of soybean to North America through Samuel Bowen, early interest in forage use, and subsequent crop history.

### **NC7 Representatives' Presentations**

**Details on all NC7 presentations were in provided slides**

**Eric Sacks, Illinois:** Gave overview of research activities of many faculty members at University of Illinois using plant genetic resources.

**Thomas Lübberstedt, Iowa:** Discussed study on spontaneous doubling of haploid plants in exotic maize germplasm. Goal is to use this variation and knowledge gained from experiments leveraging this variation to increase accessibility of DHs in these exotic genetic backgrounds.

**Aaron Lorenz, Minnesota:** Discussed identification of alleles from plant genetic resources that have been used to improve soybean tolerance to IDC.

**Melanie Caffé, South Dakota:** Provided overview of SDSU Oat Breeding Project, and traits where plant genetic resources can be useful.

**Amy Iezzoni, Michigan:** Provided overview of programs using plant genetic resources at Michigan State University, including common bean, soybean, maize, cherry, and potato.

**Sherry Flint-Garcia, Missouri:** Provided overview of her research on maize diversity. Major questions include whether or not favorable alleles that can improve modern elite hybrids can be found in exotic germplasm, including teosinte. Diversity for food corn applications is sought.

**Nithya Subramanian, Texas:** Provided overview of future research plans on wild germplasm collections and development of resistance to herbicides by weedy species.

**David Baltensperger, Texas:** Provided overview of activities at Texas A&M related to plant genetic resources.

### **Wednesday August 7**

#### **Laura Marek, NC7 Oilseeds Curator, NCRPIS**

Provided overview of NCRPIS Oilseeds Project. Discussed sending out lists of people who have requested seeds. Genotyping on collection is limited except for some Brassica and sunflower accessions. Discussed history of sunflower domestication and spread through Europe and Russia, and use of crop wild relatives in breeding for sources of resistance. Some seed companies have requested the entire collection for evaluation. Question regarding size of camelina collection size, approximately 70 accessions, some were recently acquired from Europe and Armenia.

#### **Vivian Bernau, USDA-ARS Maize Curator, NCRPIS**

Provided background on self as an introduction since she is new to NCRPIS. Several statistics on maize collection were provided, and discussion on recent activities related to importing new materials into the collection. Pointed out the number of orders has not increased in last few years but number of packets doubled because of very large orders from foreign countries for phenotyping projects. Dialogue with curators is undertaken for such large projects. Discussion on maintaining and increasing wild relative collections.

Dr. Bernau is working on adding phenotypic data to the database. A meeting participant suggested sharing names of those who have requested seed to enable RTAC representative contact and reporting. Also, at same time, NC7 reps will ask for data on those accession to send to curators for inclusion in the GRIN-Global database.

**Field tours were provided by U of I and USDA-ARS researchers Tony Studer, Jack Juvick, Esther Peregrine, Brian Diers, D.K. Lee, and Erik Sacks and graduate students.**

## **Future business**

Dr. Gardner will send a “WhenToMeet” calendar invite to all NC7 participants to gauge availability for the 2020 meeting to be held in St. Paul, MN. Dr. Gardner will also ask academic adviser about availability.

2020 Chair: Aaron Lorenz, UMN

2020 Secretary: Melanie Caffe-Treml, SDSU

2021 Chair: Melanie Caffe-Treml, SDSU

2021 Secretary: Vivian Bernau

Meeting locations: St. Paul 2020, Brookings 2021, Ames 2022

## **NC-7 Resolutions**

1. Recipients of plant genetic resources are encouraged to provide more information on their use upon request, and to contribute results of their research findings and impacts back to curatorial personnel for inclusion in the GRIN-Global database system for public access.
2. The NC-007 RTAC members strongly support construction of a -20 C freezer building at the North Central Regional Plant Introduction Station to extend the longevity of viability of plant genetic resources stored. In turn, this will reduce long-term germplasm maintenance costs and enable more germplasm to be made available.
3. The NC-007 RTAC is concerned about the extent of genomic characterization information associated with the NC-7 collections and encourages curatorial personnel to continue to pursue opportunities to obtain genomic information on the accessions held in the collection, either directly or in collaboration with NC-007 participants and others.
4. Thanks are extended to Erik Sacks for his superb efforts in organizing and hosting the 2019 NC-007 RTAC meeting, to German Bollero and Adam David for their contributions, and especially to Emeritus Professor Ted Hymowitz for his participation and excellent seminar on the history of how the soybean came to the United States. Thanks to all of the faculty and students who contributed to the excellent field research tours, including Erik Sacks, Martin Bohn, Esther Peregrine, Brian Diers, Tony Studer, Jack Juvick, Chance Riggins, and Laura Chatham.
5. The NC-007 RTAC encourages the development of a web vehicle to automatically request information and data on accessions requested from the system. This will facilitate the flow of data into the system, and better document the impact of the collection.
6. Hatch Multi-State NC-0007 funds provided to support operations at the NCRPIS are no longer sufficient to cover employee salaries. ISU provides for their benefits and retirement costs. NCR AES Directors are urged to consider increasing Hatch support to the NC-007 Project; \$10,000 per institution would ensure retention of expertise.

## **Adjourn**

Motion to adjourn by Dr. Lorenz. Seconded by Dr. Bernau. Passed unanimously.