

2023 NC-7 RTAC Meeting
July 31-August 1, 2023
Hybrid meeting; Scottsbluff, NE

Participants in attendance

In person: Thomas Lübberstedt, David Brenner, Steve Cermak, Dipak Santra, David Peters, Jonathan Fresnedo Ramirez, Erik Sacks, Carolyn Lawrence-Dill, Laura Marek, Michael Stamm, David Baltensperger, Addie Thompson

Online: Gayle Volk, Jessica Shade, Burton Johnson, Charlie Fenster, Peter Brenning

July 31, 2023

Welcome and Call to Order: The meeting was called to order at 1 pm, and Deepak welcomed everyone to the area. It was noted that this was the second time the meeting was held in this location, with a previous meeting organized by David Baltensperger.

Agenda Review: Dave reviewed the meeting agenda to provide an overview of the topics that would be discussed during the meeting.

Review and Approval of 2022 Minutes: The minutes from the 2022 meeting were reviewed. David Baltensperger moved to approve minutes as presented and Dipak Santra seconded the motion. Members voted to approve the 2022 minutes.

Carolyn Lawrence-Dill, NC-7 Administrative Advisor and Iowa State University Associate Dean for Research and Discovery in the College of Agriculture and Life Sciences, discussed the importance of innovation and how today's innovations become tomorrow's traditions. She provided a history of PI stations and explained how NC-7 is managed. Carolyn reviewed the roles of NCRA, AA, and participants of NC-7. She reported on changes at ISU, including Lübberstedt's administrative role and organizational changes. Carolyn mentioned a new project called "CALS Academy for Team Science" (CATS) focused on Amaranth improvement for Uganda. She also mentioned a visit from Steph Carlson, a staffer for Senator Joni Ernst, and upcoming news articles.

Peter Bretting (USDA-ARS-ONP) provided an update on National Plant Germplasm System (NPGS), with limited new developments, including some personnel updates. Questions were asked about best practices for GMO management and preparing germplasm for climate change.

Gayle Volk (USDA-ARS-NLGRP) reported on courses she teaches with Geoff Morris on plant genetic resources, including genomes, genebanks, growers, and genomics/phenomics.

Gary Kinard (USDA-ARS-NGRL) was unable to attend but submitted a report.

Steven Cermak (USDA-ARS-NCAUR) discussed new crops CRIS and bio-oils research, focusing on agricultural product development. He mentioned their work with various oilseeds and industrial hemp.

Jessica Shade (NIFA) provided updates, including information about funding opportunities and the Grants Modernization Initiative. She encouraged individuals to serve on grant review panels.

Break: There was a break from 3:00 to 3:15 pm.

David Peters (NC-7 Project Coordinator and NCRPIS Research Leader) discussed the history and mission of NCRPIS. He shared information about staffing, collections, and distributions. David talked about challenges such as labor availability and infrastructure maintenance. He also mentioned the 75th-anniversary celebration and the importance of stakeholder feedback.

Guest Speaker:

Courtney Schuler, Trinidad Benham Corporation. Courtney discussed pulse crops in western Nebraska. She talked about the history, production, challenges, and innovations related to dry beans. Courtney also mentioned the importance of beans as a healthy food source.

NCRPIS Curator Reports:

Vivian Bernau, NCRPIS Maize Curator, discussed maize curation project status. The maize collection's total size remained steady, but the number of available accessions increased. Distributions, particularly of expired PVP and inbreds, saw a significant increase. The collection's goal is to balance stakeholder needs for elite inbreds with maintaining diversity for crop security, all while facing reduced labor availability and tech support. Plans include increasing mechanization of processing activities.

Laura Marek, NCRPIS Oilseed Curator, provided an oilseeds project update, highlighting challenges in regenerating seeds, particularly for brassicas and flax, due to low viability and vernalization requirements. She also discussed ongoing evaluations of *Brassica rapa* and the assessment of a sunflower population landrace collection from Spain for height and flowering characteristics. Additionally, she mentioned various interactions, activities, and directed regenerations within the oilseed program.

David Brenner, NCRPIS Emerging Crops Curator, shared insights into his work on amaranthus and new crops, including his participation in the International Year of Millets conference in India. He discussed amaranth pre-breeding efforts, crossbreeding experiments, and the discovery of a quinoa wild relative. David also mentioned a MARANSI grant for Uganda with ISU and the challenges of temperate quinoa seed set due to heat.

Jeffrey Carstens, NCRPIS Horticultural Curator, reported on woody plants, noting an increase in collection holdings by 20% due to the emerald ash borer. He highlighted the completion of a monarda evaluation, an Agastache crossbreeding project, and exploration for new species of

monarda in Kentucky knobs. Additionally, he mentioned that Hypericum, echinacea, monarda, Agastache, and potentilla have the largest numbers of accessions in his program.

Kathy Reitsma, NCRPIS Vegetable Crop Curator, reported on vegetables, including 8,000 accessions across seven genera. Regeneration plans for 2023 are similar to the previous year, with a focus on replacing older or declining seed lots. Challenges with vernalization were discussed, with three options considered. She described sharing of the International Melon Powdery Mildew Differential Set, a collaboration with SCRI on CucCAP2, as well as a NIFA grant for salt-tolerant cucumber, mustard green, and tomato research in collaboration with Clemson University, University of Florida, and USDA.

August 1, 2023

NC7 Representative Reports:

Burton Johnson, North Dakota State University: The presentation from North Dakota covered management practices for various crops, including sunflowers, industrial hemp, canola seeding date, sorghum grain, and others. Intercropping studies were discussed, focusing on combinations like field pea and canola, soybean and flax, and camelina and canola. Considerations included planting, tending, and harvesting these crops together. Factors such as seed size and shape, maturity timing, and harvest methods were examined. Some intercropping combinations were found to be overyielding.

Charles Fenster, Oak Lake Field Station, South Dakota State University: Charles Fenster presented an idea related to quantifying the contribution of tall-grass prairie genetic provenance to ecosystem services. The discussion emphasized the need to understand the role of genetic adaptation in tall-grass prairie restoration, especially in the context of climate change. The Oak Lake Field Station (OLFS) in South Dakota was proposed as a center for this research. The mission of OLFS was to promote sustainable ecosystem stewardship through research, education, and service. The presentation touched on the relationship between genetic provenance of domestic crops and ecosystem services provided by tall-grass prairie communities. A proposal suggested using a mix of common grasses and forbs with a history in restoration to quantify ecosystem services.

Addie Thompson, Michigan State University: University initiatives were presented, followed by brief annual project reports from MSU, including Wang, Cichy, Douches, Weebadde, Patterson, Thompson, Grumet, VanBuren, Haus, Jiang, Josephs, Rhee, and Lowry. Common threads included screening germplasm including wild relatives for resistance to various diseases, plant breeding and variety development, and plant genetic research using diversity panels. There was a discussion on plant genetic resource curation for non-crops of genetic interest, in this case, monkeyflower and switchgrass (D Lowry). It was noted that Rebecca Grumet, the head for this project at MSU, is retiring.

Erik Sacks, University of Illinois Urbana-Champaign: Various updates on miscanthus research were presented, including studies on genomics, metabolites, and genetic prediction. Screening for freeze tolerance and other traits was discussed, along with genomic prediction efforts. Wheat (Rutkoski) and amaranth (Riggins) projects have been utilizing NPGS accessions in their research as well.

Jonathan Fresnedo Ramirez, Ohio State University: The Ornamental Plant Germplasm Center (OPGC), a joint effort between USDA-ARS and Ohio State University, aims to conserve germplasm, conduct research, and promote use. Dr. Yu Ma was announced as the new director starting in August 2023. Jonathan provided updates from several breeding programs at OSU, including barley, chili peppers, soybean, tomato, and wheat, as well as germplasm characterization and use in almond, apple, black raspberry, grapevine, pawpaw, pennycress, rubber dandelion, and sugar maple. Pennycress research was highlighted, including its potential as a biofuel cover crop. Various topics were covered, such as genetic resources, genome sequencing, and cold tolerance.

Sherry Flint-Garcia - USDA-ARS-PGRU at University of Missouri-Columbia: Sherry discussed projects related to heirloom maize, craft whiskey, and pigmented corn. These projects involve phenotyping, genotyping, and collaborations with local businesses. She also outlined “Circular Economy that Reimagines Corn Agriculture” (CERCA) aiming to reduce environmental impacts from corn agriculture by diverting and rerouting nitrogen. The project also includes research on reducing grain protein and lowering acrylamide-forming compounds in food.

Mike Stamm, Kansas State University: Mike discussed the variability in winter canola yields, the decline in planted acres, and the challenges in finding end markets. He also mentioned the EPA's approval of canola oil as a feedstock for Renewable Diesel and Sustainable Aviation Fuel. Operations are set to begin in fall 2024, and a Scoular crush facility in Goodland, KS, was highlighted. Mike emphasized the impact of seed sales of cultivars with KSU genetics on acres and royalties.

Dipak Santra, University of Nebraska: Dipak's work focuses on climate-resilient food and feed production in Nebraska through breeding and biotechnology. He works on various crops, including ancient grains, oilseeds, pulses, beans, and more. His research includes the genetic analysis and genomic studies of proso millet and its potential uses in animal feed, human food, and industrial applications.

David Baltensperger, Texas A&M University - Plant Breeding Education: David has been involved in education, providing presentations to various commodity groups in Texas on topics related to plant breeding. He emphasized the importance of using the GRIN database and increasing its use among plant breeding graduate students. He also discussed his role in addressing gene editing rules and funding for plant breeding programs.

D. Baltensperger made a motion to ask P. Brenning to work with the EPA to ensure that gene editing is available for use in minor crops, so they are not shut out of opportunities for improvement. D. Santra seconded the motion and it passed.

Thomas Lubberstedt, Iowa State University - Doubled Haploids (DH) Update: Thomas provided an update on optimizing DH production, including improving inducers, automated selection, and Spontaneous Haploid Genome Doubling (SHGD) to avoid colchicine. He discussed the identification of major QTL for SHGD and shared insights from maize mapping studies and crop evaluations. Tom also discussed NC7's activities, which include enhancing interactions between PI stations and CALS, organizing seminars and funding opportunities, and participating in the National Association of Plant Breeders (NAPB) meetings, along with ideas for future engagement.

Guest Speaker:

Dr. Cody Creech, Associate Professor and Fenster Professor of Dryland Agriculture, University of Nebraska-Lincoln - Dryland Crop Production: Cody Creech talked about dryland crop production in the Panhandle and the challenges and opportunities in the region. He discussed various crops, rotations, conservation tillage, and the importance of managing residue. Cody highlighted the role of crop diversity in addressing challenges like drought and pests.

Future Meetings: A Lorenz from the University of Minnesota may be able to host the meeting in 2024, and Melanie from South Dakota State University (SDSU) in 2025. The timing of these meetings will be coordinated with Aaron Lorenz. It was agreed that the decision regarding the meeting's location was left to David Peters' discretion (Motion: D. Baltensperger, Second: A. Thompson).

Meeting in Ames: It was mentioned that Ames would be hosting the Plant Germplasm Operations Committee (PGOC) meeting in 2024, scheduled for early July. There was a suggestion to potentially have the backup meeting coincide with this event shortly after the Fourth of July.

Appreciation: A motion was made by D. Baltensperger to thank Dipak Santra for organizing the meeting, which was seconded by T. Lubberstedt and passed.

Annual Report: It was emphasized that the annual report should document the needs and issues related to corn processing equipment, personnel, and other initiatives to ensure that priorities are represented and can be funded.

Report Submission: David Peters was requested to submit his report within 60 days, and attendees were encouraged to keep in mind what should be highlighted in their summaries.

Engaging Deans: The importance of engaging deans from institutions, particularly at the host site, was discussed. It was suggested that deans could be included in the program to provide brief talks.

Closing Remarks: Dipak Santra expressed his gratitude to everyone for attending and sharing their activities.

The meeting concluded with plans for lunch and carpooling to field trips, with the aim of reaching the first location at 1pm.