

Minutes of NC7 meeting, July 9 and 10, 2024 by Thomas Lübberstedt

Participants: Carolyn Lawrence-Dill, Aaron Lorenz (host), Thomas Lübberstedt, Laura Marek, Christian Tobias, Burton Johnson, David Baltensperger, Addie Thompson, Gayle Volk, Bill Tracy, Melanie Caffé, Qi Mu, John Park, Yu Ma, Vivian Bernau, Jode Edwards, Margaret Smith, Kendall Lamkey, Krishna Bhattari, Gary Kinard, Wenwei Xu, Steve Cermak, William Behling, Roque Evangelista, PI Station room (curators: Mark Millard, Vivian Bernau, Laura Marek, Jeff Carstens, Kathleen Reitsma)

NC7 Meeting Agenda

Tuesday, July 9th

1:00 – 1:05 Welcome and call to order: Aaron Lorenz, host and emcee; Thomas Lübberstedt, Secretary

1:05 – 1:10 Review & approval of 2023 minutes

1:10 – 1:25 National Plant Germplasm System: Gayle Volk, USDA-ARS

1:25 – 1:40 Nat. Lab for Genetic Resources Preservation (NLGRP): Gayle Volk, USDA-ARS

1:40 - 1:55 National Genetic Resources Lab (NGRL): Gary Kinard

1:55 – 2:10 NIFA Update: Christian Tobias

BREAK

2:30 – 3:00 Carolyn Lawrence-Dill, Associate Dean, Iowa State University CALS, NC-7 Administrative Advisor "What is NC-7? How do we manage NC-7 in a sustainable way as a Hatch Multistate with regional off-the-top funding?"

3:00 Aaron Lorenz: discussion and closing remarks for the day

Wednesday, July 10:

1:00 – 1:30 NC-7 Project & Budget Update, Laura Marek, NC-7 Project Director and Jode Edwards, PIRU Acting Research Leader

1:30 -2:30 Curator Reports & Staff Updates (*curators supported by NC-7)

*Laura Marek, NC-7 Oilseeds Curator

Vivian Bernau and Mark Millard, USDA-ARS Maize Curators

Jeffrey Carstens, NC-7 Woody Plants Curator

*Kathy Reitsma, NC-7 Vegetable Crops Curator

*David Brenner, NC-7 Amaranth, Millets, and Umbels Curators (recorded)

2:30 – 3:00: Silphium Breeding @ University of Minnesota – Kevin Smith

BREAK

3:15 – 4:00: Honduras Maize Collection student guest speaker – Andrew Hokansen

4:00 2025 meeting planning and final discussion

Day 1

- 1) Minutes from 2023 NC7 (prepared by **Addie Thompson**) meeting – approved
- 2) **Gayle Volk**, National Germplasm System (NGS): 2024 Status, Prospects and Challenges
 - New Plant Hardiness Map available from 2023
 - USDA Natl Plant Germplasm system: acquire, maintain, document, regenerate, secure, distribute, characterize & evaluate
 - 621000 accessions in NGS, 93% seed accessions, 7% clonally propagated
 - 230000 items distributed annually (largest provider globally), 2/3 nationally. Numbers slightly down, more stringent, who can receive accessions
 - 2023 Budget: \$54.5 million; when adjusted to 1999 \$, then budget has declined over past 20 years: need to increase funding level
 - FY23 budget increases in a few cases (pecans, Natl arboretum)
 - NPGS personnel transitions: quite a few retirements; but also new employees
 - Key challenges: increased operational costs, personnel transitions; backlog in regenerations; development of cryopreservation; acquiring and conserving additional PGR
 - Increase operational costs: labor, land, rent, inflation, budget levels hard to meet (loss of key staff), new funding is targeted, CGC evaluation fund will be eliminated in FY25
 - NPGS plan release in 2023 and available via web-site (<https://www.ars.usda.gov/crop-production-and-protection/plant-genetic-resources-genomics-and-genetic-improvement/docs/npgs-plan/>), including an infographic
 - 5 headquarter funded 2-year post doc positions become available
 - NPGS-wide zoom calls
 - Align Breeding Insight Fieldbook to GRIN-Global
 - Increased -18C storage
 - Report features on GRIN
 - GRIN-U Educational Resources: <https://grin-u.org/> from completed USDA HEC project, including videos, ebooks, success stories
 - Center for Ag Resources Research in Fort Collins, has 2 floors of cold storage, largest cryo-storage place for plant genetic resources in the world
 - Holdings: 450000 seed, >4000 clonal materials, 213 pollen
 - Fort Collins site serves as back-up site for the other gene banks in USDA system, receives PVP materials and also stores materials from other organizations (e.g., Journal Plant Registration); does germination tests
- 3) **Gary Kinard** - NGRL
 - One current vacancy (GRIN team)
 - Recent GRIN-Global enhancements and changes:
 - o new taxonomy regulations under taxonomy menu
 - o Images under advanced search
 - o Improved user experience for submitting and following requests

- Citations of accessions interconnected
- 150 minimum characters for enforce explanation on purpose of request
- SMTA required for international users
- NGRl decline in funding: 2009 22.5 FTE; 14 2025. Funding 4.2 Mio in 2008, 3.9 Mio in 2025 not adjusted by inflation => distress situation; need to communicate to stakeholders

4) **Christian Tobias, USDA NIFA**

- 75 years old NC7 project, support NPGS system
- Future projects: co-PDs should be able to step in as PD, thus fewer co-PDs more collaborators in future projects
- NIFA Grants Modernization Initiative – eRA (same system used by NIH), includes also a different evaluation system, more similar to NSF/NIH
- NIFA Funding overview (FY24): 1,66 billion, 3% decrease; AFRI decrease more significantly
- Total Plant Science and Plant Breeding funding: 250 Mio in 2023
- NIFA Support for Major Taxa covered by NCRPIS, and different programs within AFRI
 - Maize is in 92 active projects, next big ones are sunflower, brassicas (15 each)
- Upcoming deadlines (AFRI)
 - Foundational and Applied Science, e.g. Plant Breeding, Oct. 13 (but only 13% success rate)
 - Other calls have higher success rates, such as crosscutting program areas – could be considered.
 - Commodity Board co-funded topics (e.g., cotton, dry pea, ..)
 - Education and Workforce development (coming up)
- Non-AFRI opportunities:
 - Various, such as SCRI; see funding opportunities site (<https://www.nifa.usda.gov/grants/funding-opportunities>)
- Data management plant & Post award policies presented (<https://www.nifa.usda.gov/grants/lifecycle/post-award>): policy guide

5) **Carolyn Lawrence-Dill, What is NC-7 ?**

- Hatch Multistate project with regional off-the-top funding
- 1946: Research and Marketing Act was passed (4 state-federal regional PI stations – but ceased except NCRPIS)
- 1948 NCRPIS began operations in 1948
- 1998 Multistate Research Fund was established
- Roles in Multistate projects:
 - NCRA: reviews offer input, authorizes for NC7, funds off the top
 - Administrative Advisor, linkage between NCRA and multistate faculty
 - Participants, provide scientific leadership, one RTAC per state

- Budget 23-27:
 - o Federal (flat: 2,3 Mio)
 - o Regional/Multistate (522k flat)
 - o ISU Capacity (Increases annually): ca. 1/3 of total project
- Multistate projects; Participant benefits – not all of those utilized
 - o Cultivate collaborations
 - o Use resources across entities
- Share research objectives should be highlighted, objectives should be developed together
- Next project proposal to be submitted 2026 – strive for shared research objectives
- Discussion needed, how shared objectives may look like, how to engage members
 - o David Baltensperger: main connection is via utilization of germplasm – however, reporting has been neglected.
 - o Qi Mu: how to participate from outside the region – possible, but not part of RTAC
 - o Bill Tracy: structure antiquated
 - o David: NC7 existed before Multistate projects existed. Before that, it was about advising curators, not so much about participants and their research
 - o Christian Tobias: National rather than regional management/support of germplasm necessary ?
 - o David: Historically, when Multistate projects came into being, Ag Education directors at LGUs decided to put the off-the top funding into research

Day 2

6) **Laura Marek and Jode Edwards** – Budget update

- 26 Full time staff
- Various open positions
- Collection is getting bigger and older
- Budget has been flat over time, with real value decreasing
- Reduced budget affects temporary labor – getting cut > crisis, because work cannot get done to renew collection
- Budget FY25: 572,000 NIFA, 614,000 ISU CALS NC7, 2,245,000 USDA CRIS
- Importance of stakeholder support to retain line item in federal budget
- Christian Tobias>reduce redundancies in collection; Vivian – data to do this not available
- TL: charging fees ? USDA-ARS difficult, ISU could potentially be done – but what are administrative costs to handle it ?
- Jode: in kind support from stakeholders/collaborators
- Jode: need to get substantial funding increase, which was built by Peter Bretting into the new germplasm plan (<https://www.ars.usda.gov/crop-production-and-protection/plant-genetic-resources-genomics-and-genetic-improvement/docs/npgs-plan/>), which needs to be appropriated

7) Curators: **Jeff Carstens**, woody and other species

- His collection grew to >3000
- Notable acquisitions for *Monarda*, *Pediomelum argophyllum*

- Activities: Fraxinus tetrazolium testing
- Woody Plant Trials: 21 site distributions in 2023, 16 in 2024
- Deer and rabbit damage: 25% of Hort time spent on fencing
- No student support
- Storage needs partially covered by using Fort Collins

8) **Laura Marek**, Oilseeds

- Sunflower (>5000 accessions) largest, several other genera, >13,000 accessions total
- No technician, position open
- Reduced regeneration activities, but: increased distributions
- More -18C storage space needed
- Brassica rapa evaluation completed: 80% do not need vernalization

9) **Vivian Bernau**, maize

- 20300 total accessions; 15000 available; 50% of distributable seed reached life expectancy
- Duplicate accessions identified, low priority accessions inactivated
- 31 PVPs added each year, substantial increase expected over time: 1778 PVPs expiring 2024-2043
- 4% of collection are PVPs, but they represent 50% of distributions
- Ca. 15000 packets shipped per year
- Challenge: Balance PVPs with diversity

10) **Kathleen Reitsma**, vegetables

- 1 full-time, 1 half-time position, both vacant
- 8000 accessions
- Biggest distribution numbers: Cucumis, Daucus (10-20k / year)
- Activities: hiring, seed cleaning with VMEK, load images, PI number assignments, data loading, digitizing files
- Special projects:
 - o Carrot SCRI follow-up in Phil Simon's lab
 - o Melon differential sets for mildew
 - o CucCAP2 – core set development
 - o NIFA grant for salt tolerant cucumbers

11) **David Brenner**, Amaranth etc

- Amaranth, Millets, Spinacia, Chenopodia,...
- Grant proposals: new thing, motivating
- Maransi was funded – increase grain amaranth diversity / and do breeding in Uganda – goal: increase quality of baby food (add lysine)
- Amaranth imported mostly from India; increased interest in U.S. produced amaranth
- Rodale Institute has ongoing efforts to increase and sell grain amaranth
- Non-shattering ornamental types as well as short stature types with cms, for release by ISU developed
- Seminar about amaranth experience presented at ISU Plant Breeding seminar series

12) Invited seminar: **Kevin Smith**, U Minnesota - Silphium (Silflower) Crop Research and Development

- Perennial oil seed effort, motivated by Forever Green initiative
- Forever Green initiative at UM for winter-annual and perennial crop development, ecosystem services, cover crops,..
- 15 new crops including Kernza
- 16 Silphium species (Asteraceae), related to sunflower
- *S. integrifolium* and *S. perfoliatum* most important, also worked at by The Land Institute (TLI)
- *S. integrifolium* flowers in 2nd year
- Attractive feature: large seed size
- Breeding efforts to obtain flowering plants within 1 year, to speed up breeding cycles
- Diploid, $2n = 14$, outcrossing, self-incompatible, 9 Gbp
- GBS markers available
- Why domesticate Silphium: TLI evaluate various species – Silphium show good drought tolerance, good seed size, oil content and composition, pollinator friendly, perhaps easier approach compared to perennializing sunflower (from TLI perspective)
- Oil contains 5% squalin, which is high value compound (pharmaceutical, nutraceutical)
- 386 genotype domestication panel: trait variation, mapping
- Program was started at TLI, and materials provided to UM
- 3 genetic clusters: West, South, East

13) Invited seminar from ISU undergraduate student **Andrew Hokansen**, regarding his experiences on maize germplasm collection in Honduras, which was done in collaboration with Vivian Bernau.

14) **Addie Thompson** proposed, that the NC7 project should apply for and lead (with multiple co-hosts) an in-person side-event during the 2024 World Food Prize events in Des Moines (<https://www.worldfoodprize.org/>). Application deadline is August 1 (https://docs.google.com/forms/d/e/1FAIpQLSdt1yCnhoYkG78VqoYReP1uKXxnPwJ2n8xEqNxFE_29_oNmKQ/viewform?pli=1). Addie's suggestion was based on the following: the two 2024 World Food Prize winners received their prizes for their efforts in relation to plant genetic resources (“doomsday vault” in Norway); graduate students are underrepresented at the World Food Prize events; and proximity to Ames. Addie mentioned, that the costs would be \$8,800 (for 100 participants). The NC7 group voted unanimously to move forward with Addie's proposal. The next steps are, to (1) receive feedback from Dan Robison (Dean at ISU CALS) and Gayle Volk (USDA National Program leader), how to best move forward with this proposal (among others: who should officially host it), and (2) to seek financial support. Regarding financial support: David Baltensperger (TAMU) promised to sponsor this effort with \$2,500. Another suggestion was to involve ASTA and the Seed Science Center at ISU.

15) **Next meeting** in 2025 will be hosted by South Dakota State University (**Melanie Caffé**). It was discussed, how often these annual meetings should be virtual versus in-person. David

Baltensperger suggested to have in-person meetings every 3-4 years, perhaps in connection with meetings held in Ames. Melanie will need to decide on a date, and whether the 2025 will be held in person in Brookings, be virtual (or hybrid).

16) The **general discussion** revolved around the annual report. **Laura Marek** will lead preparation of the report for a first time and was asking about guidance:

- What was useful in past reports ?
- Help needed (RTAC and other members) with survey on germplasm use;
- Could graduate students be involved in determining publication status of germplasm;
- Should the report be curator driven ?
- Reports go to NIFA => mention accomplishments, which should be gene bank- / germplasm-driven, not accomplishments of RTAC members unrelated to PGR.
- Laura will generate a list about germplasm orders for each of the organizations in NC7, so that it is possible to follow up with germplasm users on their activities / accomplishments.

Meeting summary for Aaron J Lorenz's Personal Meeting Room (07/09/2024) –

Generated by Zoom-AI (Day 1 only)

Quick recap

The team discussed the National Plant Germ Plasm System, its challenges, and the ongoing efforts to secure funding for its strategic plan. They also reviewed updates on the Nefa project, the upcoming deadlines for fellowships, and the readiness of the team for potential changes in funding priorities. Lastly, they explored the history and current state of the plan introduction system, the importance of advising curators, and the potential utilization of NRSSP funds for nationwide support.

Next steps

- All participants to consider potential shared research objectives for the NC-7 project renewal in 2026.
- All participants to reflect on ways to better align their work with NC-7 objectives and improve reporting.
- Carolyn to share the template for success stories with the group.
- Regional Technical Advisory Committee members to discuss NC-7's importance with their respective Ag Experiment Station directors.
- Aaron and Melanie to discuss their participation in NC-7 with their Ag Experiment Station directors, given their work with crops not managed by the Ames station.
- All participants to consider how to improve the distinction between the project meeting and the Regional Technical Advisory Committee business meeting.
- Carolyn to explore the possibility of developing NC-7 as a nationwide support project under NRSP funding.
- All participants to brainstorm ways to better demonstrate the utilization of germplasm from NC-7 in their work and reporting.
- Carolyn to coordinate with other regional plant introduction stations on potential changes to multi-state project structures.
- All participants to prepare for further discussion on NC-7's structure and objectives at the next day's meeting.

Summary

NPGS Collection Growth and Challenges

The team discussed the National Plant Germ Plasm System (NPGS), a distributed system across 20 locations in the US. Gayle Volk from the USDA ARS presented that the NPGS collection has grown to over 620,000 accessions and distributes around 200,000 items annually. Gary highlighted the financial and staffing challenges faced by the NPGS, including budgetary constraints for individual locations and staffing transitions due to retirements. She introduced the NPGS Strategic Plan developed in 2018 to address backlogs and other challenges, but noted it required stakeholder support for implementation.

Gayle Volk's Updates and Initiatives

Gayle Volk discussed several important updates and initiatives. She highlighted the funding opportunity for postdoctoral researchers to work on genetic resources, the plans for a hybrid Pgov meeting, and the importance of improved reporting features from the Grin database. She also shared the extensive resources available through the Higher Education challenge program's Grin project and the success stories of accessions in the Npgs. Lastly, she reported on the National Laboratory for Genetic Resources Preservation and their vast cryogenic seed storage facilities, which serve as a backup for the national plant germ plasm system and received over 432 PVP materials and 125 seed vouchers for the Journal of Plant Registration last year.

NPGS Strategic Plan and Funding Efforts

Gayle Volk discussed the Npgs strategic plan and the ongoing efforts to secure funding for it. She highlighted that the funding request was in the FY25 budget and currently under review by Congress. David Baltensperger queried about potential support from the Farm Bill, which Gary agreed to investigate further. Carolyn suggested a collaborative effort among federal relations offices to maximize funding opportunities. Gary also encouraged the team to share success stories and engage with their contacts to push forward the Npgs strategic plan. Lastly, Gary gave an overview of the National Germ Plasma Resources Laboratory's projects and its role as a general support site for the entire Npgs.

Gary's NPGS Budget Review and Updates

Gary reported a reduction in vacancies from four to three and discussed adjustments to presentation view settings. He highlighted the value of the Grand site and recent updates to the Grin global database, including new features for taxonomy regulation searches and improved user experience. He also presented a comparison of actual and spendable dollars for the Npgs budget over the past 15 years, noting a decrease in full-time equivalents, scientists, and projects. Gary expressed hope for increased investment in the National plant germ plasm system and promised to return later for a similar presentation to another audience.

Nifa Project Modernization and FY 2024 Budget

Christian.Tobias discussed the ongoing grants modernization initiative for the Nefa project, which involves transitioning to a new grant management system called Era. He also presented the organization's flat budget for FY 2024, noting a \$10 million decrease in funding but an increase in funding for certain programs, including indoor and urban agriculture, and scholarships. Christian.Tobias highlighted opportunities in plant health production and plant products, indicating a 20% increase in applications and funding for plant production and plant protection last year. He encouraged input on the new RFA cycle and suggested potential areas for future funding, including critical agricultural research and extension, and commodity board co-funding topics.

Deadlines, Fellowships, and Corn Growth

Christian.Tobias discussed the upcoming deadlines for pre-doctoral and post-doctoral fellowships, as well as the National Needs Fellowship program, emphasizing the importance of a well-prepared data management plan. Aaron inquired about the static funding for plant breeding, to which Christian.Tobias attributed it to changing administration priorities. Imarek and William shared updates on corn growth and heavy rainfall in their respective areas, with William expecting yield suppression due to cloudy conditions. Carolyn and Aaron confirmed their readiness, and Carolyn presented, receiving feedback from Addie and David.Baltensperger.

NC-7 Project Overview and Renewal Planning

Carolyn, an administrative advisor, provided a comprehensive overview of the NC-7 project, a multi-state initiative funded by federal and state resources, and its unique budgeting process. She emphasized the importance of the project in developing leadership skills, advancing research, and facilitating new collaborations. Carolyn also encouraged the team to review the NCRPIS website and develop shared research objectives for the next five-year renewal of the project. The discussion also touched upon the historical significance of the germ plasm from NC-7, the role of Nifa in approving multi-state projects, and the need for clear budget usage in project proposals.

Plan Introduction System and Resource Allocation

The team discussed the history and current state of the plan introduction system, highlighting its evolution and the challenges that have arisen. They debated whether the system should be coordinated at a national level and discussed the potential for utilizing NRSSP funds for nationwide support. The team also emphasized the importance of advising curators and the need for efficient utilization of resources. Future discussions were planned for further exploration of these issues.