W6 RTAC Annual Meeting Minutes Report

Day 1: July 11, 2023

Attendee list:

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Day 1: July 11, 2023
8:00 am: The meeting started by introduction of meeting attendees.

8:05 am: The attendees were asked regarding any issues with the current proposed agenda for the meeting: No issues were raised by the meeting attendees.

8:06 am: The USDA leadership reports - Peter Bretting
Peter Bretting presented the annual update of the national centers and the home-office work continuous situation. Peter acknowledged the new state representatives, thanked them for serving on the W6-RTAC advisory committee, and emphasized on the importance of this committee.

The presentation emphasized the large number of genebanks in Western Region and the large number of accessions they preserve. Also, that the genebanks they cover most of the growing regions in the US. The location of the genebanks in association with the location of different land-grant universities in the Western Region for over 80 years.

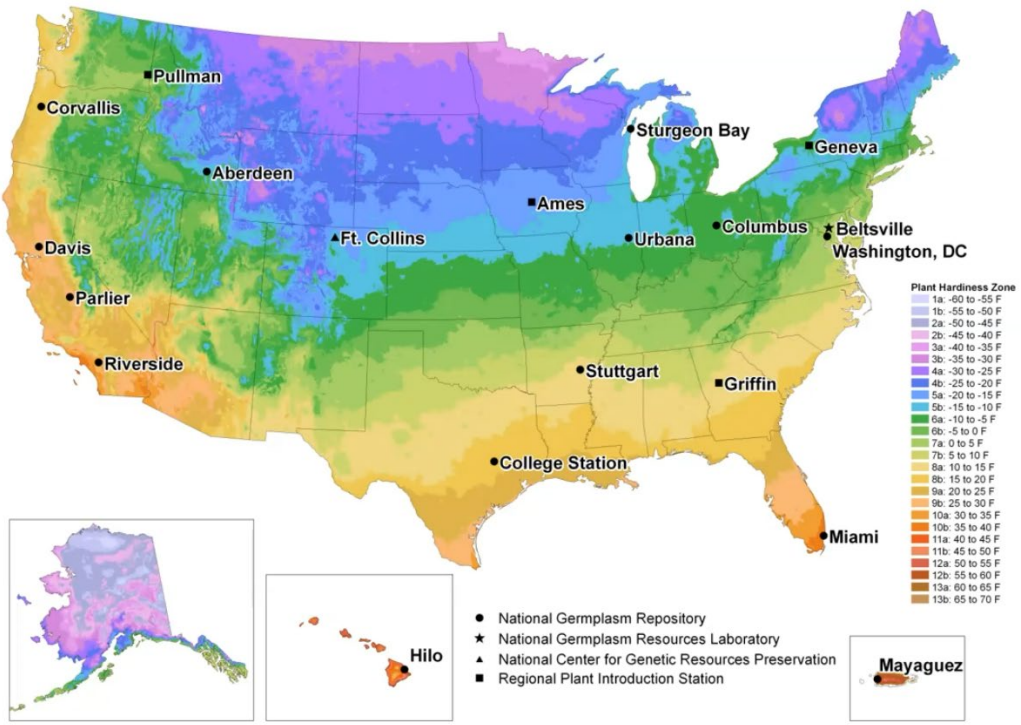

Figure (1): Map of the USDA National Plant Germplasm System (NPGS) locations nationwide

The location is part of the connection between genebanks, land-grant universities, USDA, and agricultural producers. This connection is important for the long-term care of the germplasm collections. No one institution or organization can do it alone. As of December 2022, over six hundred and five thousand accessions are held by the NPGS. The growth rate over the last few years has been relatively modest, due to the focus on taking care of the existing collection.

There's also been some new collections that have been started in the last few years, including coffee and hemp. The average number of samples distributed annually is between 225,000-250,000. The distribution was down in 2020 due to the COVID Pandemic and currently distributions are back to normal as before pre-Pandemic.

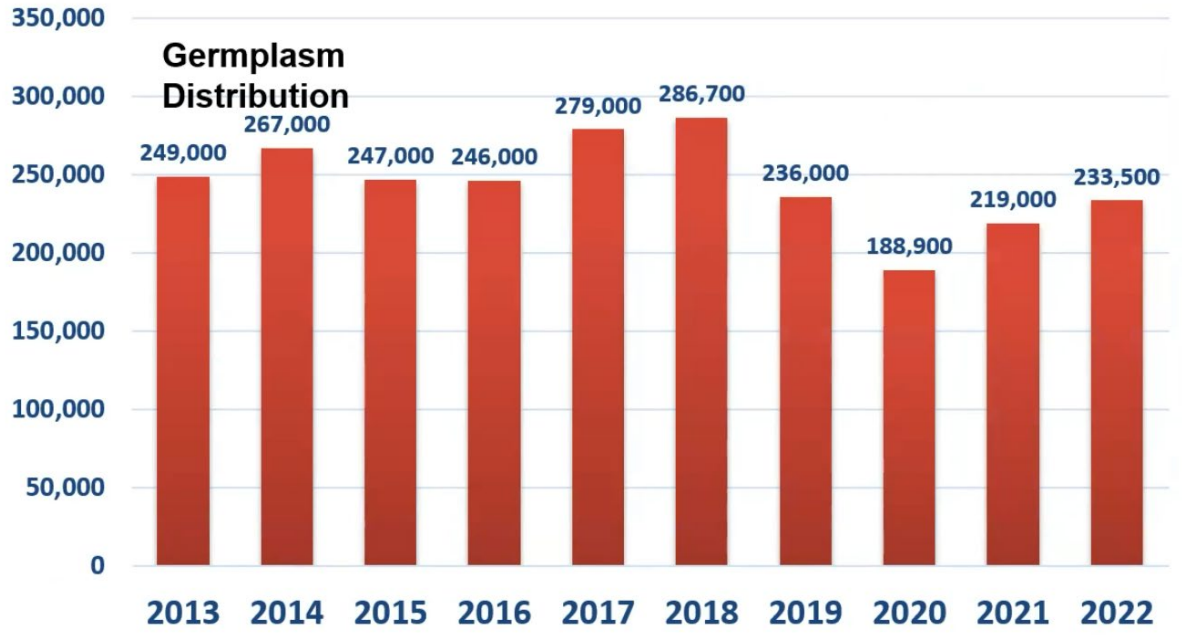

Figure (1): The Demand for NPGS Germplasm 2013-2022

The number or percentage of the germplasm that's distributed to the US depending upon the crop is usually between two-thirds to three-quarters, and that really depends on international interest in the crop. In the US, the largest recipients are the faculty and students at land-grant universities, then public sector organization, such as ARS. Depending upon the crop, two-thirds, or three-quarters of the domestic distributions are for the public sector, and the remainder are to the private sector. Again, a this is a long-term average not a quota and not surprisingly those crops where there's a very strong private sector support are the ones with the lowest public sector distribution.

Regarding the budget: The ARS portion of the NPGS has been growing slowly over the last few years, just over 50 million dollars. At present the NPGS is grateful for this level of support. However, the purchasing power of the dollar in comparison to the budget increase, the situation looks less rosy. The key challenges are expanding the operational capacity and the infrastructure to meet the backlogs in some of our management operations. Additionally, the operational costs, laborers, more expensive inputs, fuel, and equipment (just the overall inflation).

An article by an Economic Research Service member stated that the investment in US public sector in real dollars has fallen by a third over the last twenty years. The NPGS budget is following same trend, with a generational turnover, as baby boomers continue to retire, and the need to hire new staff. Hiring new staff members come with challenges of training them in order to provide the same high-quality services expected from the NPGS and for different crops based

on the storage conditions (liquid nitrogen, in-vitro, tissue culture, propagated materials in the form of buds, embryos, etc. Efficiency in the process and having more information about the accessions, will make them more valuable for breeding, research, and production.

Rehiring of vacant positions, at the genebanks, is on-going but slow. Some have been vacant for over 4 years now. Training new hires is led by ARS and NIFA grant to design and develop a training program for plant genetic source management. Due to the large-scale international interest in such training, it was decided in 2018 it really needed to be distance learning/online. Currently, there is a three module, three credit course at Colorado State University. Additionally, climate change and its impact on current crops and varieties productivity and the need for more adapted crops and varieties. Recent research funds been focusing on commodity crops, such as pecan, coffee, and pulses. A question was raised from the audience regarding the expectations for the coming annual budget as its expected to be released sometime in September or October 2023.

- **Pecan PGR (ca. $600,000): College Station, TX.**
- **Coffee PGR (ca. $250,000): Hilo, HI**
- **Pulse PGR (ca. $100,000) Pullman, WA**
- **Pulse PGR (ca. $100,000) Urbana, IL**

Figure (3): FY22 ARS NPGS budgetary increases for specific crops

8:33 am: Tara McHugh, Area director for the Pacific West Area
Tara McHugh started her presentation by thanking Kevin, Marilyn, and everyone contributed to putting the meeting together. Thanking Peter for the thorough detailed presentation.

8:37 am: Kevin, as the Acting Associate Area Director, was asked to provide a presentation. Kevin gave an overview of the area, including that there are 21 locations spread across eight States (Arizona, California, Hawaii, Idaho, Nevada, Oregon, Utah, Washington) and many of those are not located or co-located with land-grant universities. There are 49 research units, there are 401 Ph.D. Scientists, and approximately 1,400 employees. There's a new shellfish breeding program in Newport, OR. The research includes crops, animals, human nutrition, and program utilization and being around different areas show the impressing work put there to keep the centers running. The relations with the stakeholder (internal and external) are crucial to keep the support continuous. Focusing on the stakeholders need and their input is important for this work to continue and thrive.

Congressional appropriation (233 million annually) and soft funds of 22 million (10% of the total budget) and are the source of funds for the centers. The soft funds have been helpful in supporting post-doctorate associates and other positions. ARS are encouraged to apply for soft funds. The leadership is committed to fulfill the stakeholders needs. Anna Murphy of the Beet Sugar Development Foundation asked about the weed resistance budget. Tara Hughes mentioned that the fund is being used to fund some positions to work on these issues.

8:45 am. Jessica Shade and Christian Tobias from the USDA NIFA Division of Plant Systems Production introduced themselves and Jessica started the presentation outlines including NIFA programs updates, plant breeding roadmap, and some specific funding opportunities. Jessica is on the Urban Indoor and Emerging Ag Program team, the Specialty Crop Research Initiative team, and the Data Science for Ag Systems team, while Christian AFRI programs, Breeding for Agricultural Production, and Plant Breeding or Conventional Plant Breeding for Cultivars Development and on some non-AFRI Programs.

The available funding programs are for food and Ag-sciences related topics. NIFA goal and mission of investing in and advancing agricultural research, education, and extension to solve societal challenges, and the vision of transformative discoveries, education, and engagement to address our challenges. NIFA covers a broad array of program areas. The Ag Food Research Initiative has a total funding of 455 million dollars for its multiple programs, as well as other competitive grants outside of AFRI, like the SCRI program, which gets 80 million dollars annually.

Jessica provided information about recent leadership changes within NIFA. A new director (Manjit Misra) was appointed on May 6, 2023. Dionne Toombs is the Associate Director. They also updated the committee regarding the Grants Modernization Initiative, which is focusing on updating the outdated current grant management system. The new system is based on the NIH system and there are some issues might cause delays. The USDA Plant Breeding Roadmap 2021-2026, which was based off extensive stakeholder engagement and needs and focused USDA plant breeding priorities.

The roadmap has a focus on crops and markets that impact public pulse of ours and ensure genetic resources for specialty crops that meet the economic, cultural, and nutritional needs of Americans, and it includes the entire breeding cycle in a very integrated way, and it's focused on developing and modeling novel and optimal methods for breeding. And it connects education and workforce development programs with startup and established businesses with a focus on building human and decision-making skills and on simulation, modeling, and forecasting future plant breeding skills.

It also focuses on developing and scaling up new methods for things like rapid development of plant breeding, education programs, faculty and research professionals to meet future plant breeding needs and increase access to program participation among underserved communities. It also builds out a plant-breeding emphasis and stakeholder feedback integration for crops that are important to tribal groups and underserved communities.
More information about the new roadmap can be found on at the following link (http://www.usda.gov/topics/plants) and provide feedbacks to (PBRoadmapComments@usda.gov).

Christian highlighted some recent funding from different programs related to the W6 committee, including available funds, crop specific information, and it did not include funding from programs for post-doctoral fellowships, or plant protection or plant production systems area. The

presentation included an overview of AFRI and non-AFRI programs and included information on the most beneficial points of focus (e.g., deadline, letter of intent, program priorities.
There are three requests for applications associated with the AFRI program, the Foundation and Applied Science, Education and Workforce Development, and Sustainable AgSystems.

The AFRI SAS (Sustainable Agricultural Systems) RFA was published in February. These are integrated grants. There is one program emphasis on mitigating methane emission in ruminants and other than that there is a call to address areas that are administration priorities (such as climate change, the bio-economy, and nutrition security). These, again, can address all six AFRI farm bill areas, and they are expected to implement a systems-based approach, including research, education, and extension. There are other programs listed but application deadline has passed for this year. Programs vary in their requirements, including two-step application that include letter of intent, pre-proposal, and if invited, a full application to follow (e.g., SCRI). Other programs might be of interest including AFRI FAS with the below priorities and a link to previously held technical assistance webinar:

Figure (4): AFRI FAS priorities areas.

Crop	Award Amount	
alfalfa	$	9,625,022
annual bluegrass	$	2,447,180
barrel medic	$	649,997
bean	$	1,449,259
lettuce	$	7,122,355
lima	$	3,331,053
ND	$	16,781,013
pulses	$	1,227,675
table beet	$	500,000
tepary bean	$	299,764
thinopyrum	$	1,776,905
Grand Total	$	45,210,223

Program	Total Funding	
Organic Agriculture Research & Extension Initiative	$	12,881,193
Plant Breeding for Agricultural Production	$	2,734,495
Physiology of Agricultural Plants	$	1,696,824
Specialty Crop Research Initiative	$	18,922,670
Alfalfa Research Program	$	8,975,040
Grand Total	$	45,210,223

ND = Not crop specific.

Figure (5): W6-relevant competitive funding 2019-Present.

9:13 am: Kevin thanked the presenters and mentioned the last year minutes and the states reports for 2022 and what they are used for regarding the amount, use, benefits, and impact of germplasms requested from the genebanks.

9:15 am: California Report: Charlie Brummer
Charlie started the state report by thanking Brian Irish and all other curators at the genebanks for their outstanding and hard work in keeping the germplasm available and the importance of these germplasm for many funds and fulfillment of objectives, since they are not available commercially. Charlie also mentioned the importance of doing a better job at reporting to show how impactful this germplasm is in new cultivar development for various purposes, which could be the difference between getting or not getting grant awards. Charlie will be submitting the state report separately.

Kevin asked a question about the implication of the germplasm availability or lack of availability impact on the expected results of the work when it comes to the alfalfa or other crops in the industry. Some discussion was about viruses in sugar-beet and the difficulty in regenerating germplasm as it requires large isolation distances order to maintain genetic integrity. The requirements make it harder to produce more seeds for the local industry.

9:25 am: Idaho State Report: Joseph Kuhl:
Joseph gave a report for 2 years (2019 and 2022) set of orders form WRPIS. From Idaho requested about twenty orders for a total of 107 accessions. There was a total of 10 different

groups placing the 20 orders, with 10 of them placed by private companies followed by 2 universities, 2 private individuals, and 1 from a state agency. A total of ten emails were sent out to the groups. In these orders, the five companies placed half of the orders. Idaho State seed lab have placed 4 orders, and so they're requesting several different plant species as controls in their evaluation. Private company requests are for lines used in breeding programs.

Kevin asked about the responses from 2019 orders. Joe explained that the replies if, if any, were generally thanking the W6 genebanks for providing the lines, with no specific results or publications to report.

9:30 am: Montana State Report: Norman Weeden
There was 1 request with over 60 accessions of faba bean from Montana State. The research is for variety evaluation and development effort. The evaluation started last in the 2021 and it continuous for FY22. Most recent work on crops and varieties selection have been focusing on the selection for certain characteristics, including heat tolerance and disease resistance. Some new findings have been reported including the "Stay Green Intron" cotyledon color gene in dry peas and how it may or may not exist in other species and how important such characteristics for other species.

Taxon	Number examined	Number of alleles
P. sativum	129	69
P. s. subsp. *elatius*	51	44
P. s. subsp. *abysinnicum*	2	1
P. s. subsp. *sativum*	63	32
Modern cultivars	13	5
P. fulvum	82	57

Alleles usually differed by indels and ranged in size from 550 to 1400 nt.

Figure (6): Results of the STAYGREEN Intron in dry peas species and sub-species

9:40 am: New Mexico State Report: Naveen Puppala
The report was compiled by Ian Ray. In FY22, there was 4 orders with 59 total accessions received. 70% of the orders were from the New Mexico State University, followed by the University of New Mexico with 27% and 3% was ordered by the Highlands University. The main purpose for the orders was for breeding and genetics, ecological uses, and field demonstrations.

9:45 am: Nevada State Report: Melinda Yerka
In FY22, four orders, for 57 accessions, were placed from the genebanks. 33.3% of the accessions were used in entomology, 19.3% in Taxonomy, and 47.4% in anthropology. Recently there was a reported published manuscript using NPGS plant materials. The University of Nevada affiliates are the most significant users of the NPGS system. Generally, the users are very

happy with the materials quality, no recent release of any of the ordered materials. Responders gave detailed information about the purpose for the orders.

9:50-10:30 am Break

10:30 am: Oregon State Report: Shawn Mehlenbacher
The requested accessions were used for disease-resistance and yield selection. New variety of hazelnut will be released under the name "The Beast". *Allium* accessions were ordered for research related to DADS (diallyl disulfide) analysis. This is an oil-soluble organosulfur compound found in garlic, tested for suppressing human non-small cell lung carcinoma. A Journal article was published with the Journal of Agricultural and Food Systems. The accessions were ordered by the University affiliates and USDA-ARS fellows. Members of the private (seed companies and nurseries) sector placed orders as well for identification purposes, field evaluation, seed increase, and other purposes. A variety of bean "Ruby Dwarf Horticultural" is currently growing for seed increase. Three journal articles were published.

10:55 am: Utah State Report: Kevin Jensen.
In 2022 there was four NPGS-W6 orders received from 3 individuals (3 from government agencies and 1 from the university). One of the points presented was regarding hybrid validity and other interesting information from the tested lines. Bad email addresses reduced the percentage of responses received.

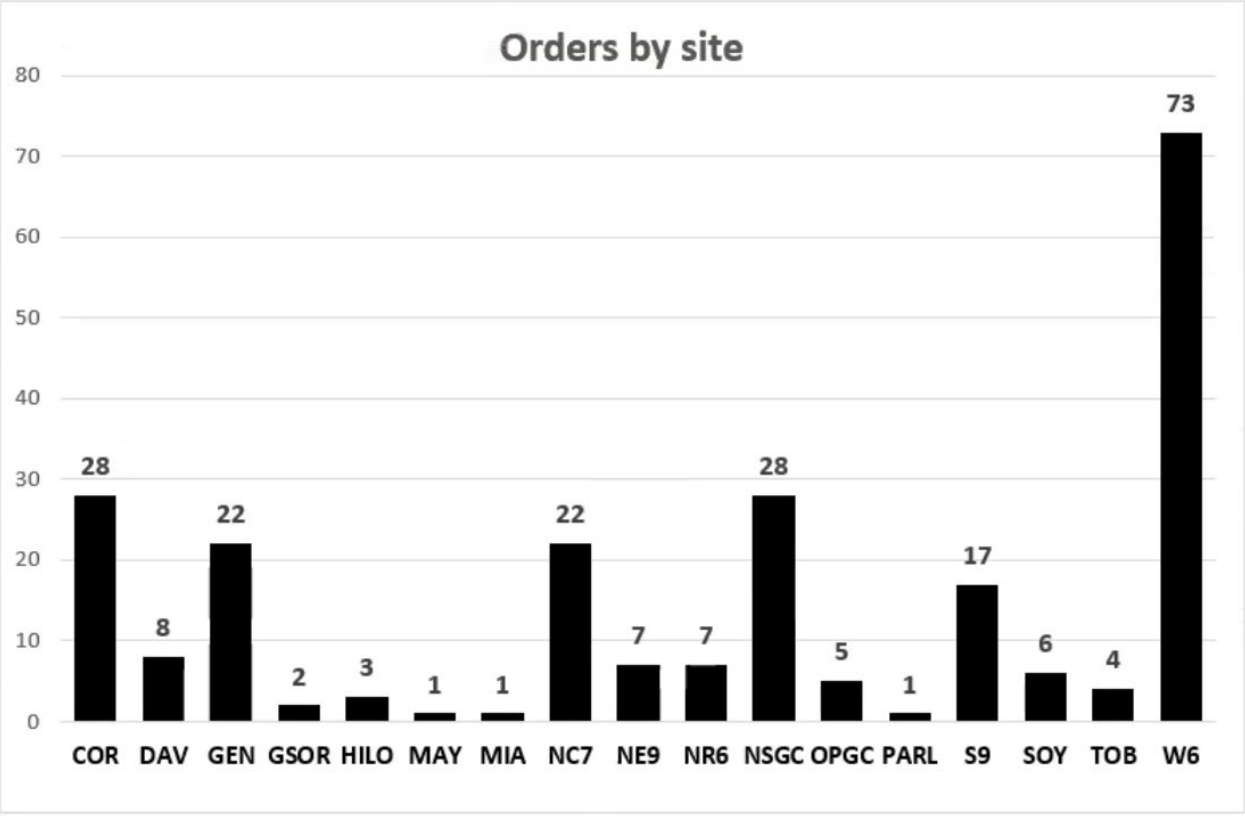

Figure (7): Orders by NPGS site received in the state of Washington in 2019.

11:05 am: Washington State Report: Per McCord
There were 130 requests in 2019, received responses from 42% of total emails sent, with 11 bad email addresses. Total of 8 publications, including a PhD thesis and a 1 non-referral publication. The accessions requests were placed for various reasons, including pest resistance, variety evaluation, gene-mapping, and other purposes. For 2022, there were 73 requests, with a total of 3,668 accessions received by various entities.

11:15 am: Alaska State Report:
There 3 individuals requested accession from the genebanks. Since the individuals were contacted but didn't reply, a reminder email will be sent again, and the final report will be submitted via an email later. A question came up about climate change impacting the growing season in Alaska and how that will impact the future of crop production in the state.

11:25 am: Hawaii State Report: Amjad Ahmad
The report started by mentioning the importance of the NPGS W6 as a crucial resource for Hawaii, mainly due to limited options of breeding program focused on the state with its tropical/sub-tropical condition, the state micro-climates, and how having access to the accessions allowed for improved crop diversity and variety selection for the state. There was 1 request for accessions from the state in 2022 for forage crop seeds. The Hawaii (Big Island) Island is known for its livestock, but climate change and droughts cycles have impacted the availability of grass in sufficient amount. The request was from a private ranch to evaluate for faster growing grass for animal feed. The ranch owners were very pleased with the accessions they received and are very thankful for the genebanks.

11:35 am: Wyoming State Report: Donna Harris:
In 2022 there was four orders placed by individuals from the University of Wyoming with a total of 98 accession received. The accessions were used for research purposes in variety evaluation, bio-remediation, mapping of popping bean, studying genes related to far red light sensitivity.
In 2019 there was 8 orders for accessions and total of 51 accessions were received. The requests were mainly from the University and used for research purposes in variety evaluation, crop development, and demonstration/educational purposes.

11:45 am: Arizona State Report: Glenn Wright
In 2019 there were 10 orders mostly by state agencies and they were used for various purposes in research, genetics, demonstration, and variety evaluation. In 2022 there was 11orders and they were placed mostly by state agencies. There were 3 responses to the survey sent regarding the received accessions with general satisfaction.

A discussion among the meeting participants was initiated and ensured regarding ways to improve response rate from the germplasm recipients and better communication ways between the genebanks and the accessions recipients, especially when there are issues with an order (e.g., germination rates of seed).

11:55 am: ARS UPDATES:
NGRL Update: Gary Kinard

GRIN-Global database system had not been affected significantly with the Pandemic and over the past 3+ years, new functions have been introduced, including GRIN-U (https://grin-u.org/) as an open access site for education, training, and outreach information. There's also a companion YouTube-channel that houses some interesting cool, relatively short videos on a whole range of topics related to plant genetic resources. Karen Williams retired at the end of 2022 after 39 years of services at the ARS. However, Karen is coming back for 10-12 hours a week through an agreement to facilitate the transitioning until the new scientist in her role is more adequately trained. Peter Abrahamian will join NGRL as a Research Plant Pathologist. New functions were added into GRIN-Global, including seasonal availability and the ability to request multiple form types (e.g., seed, cuttings, pollen, etc.) of an accession. These are mostly relevant to the clonal collections. New taxonomy regulations were incorporated during the search of images of plant parts, and others related to accessibility with the Americans with Disabilities Act (ADA) requirements. NGRL is also work on a request to allow orders from multiple genebanks to be processed as well.

NSGC Update: Harold Bockelman
The National Small Grains Collection (NSGC) is currently rehiring a vacant position to add into the small group of people at the NSGC. The team has a new research leader, Noelle Anglin, who is now working on potatoes and will be working part time with the NSGC. The NSGC has reached a milestone of 150,000 total accessions conserved this year. About 10,000 of those accessions are mapping populations and temporary accessions which are valuable for a period, as part of various research projects that were funded by NIFA and other organizations. There is a large collection of the small grains, and most are grown in Idaho. An exception is rice, which the Dale Bumpers Rice Research Center in Stuttgart, AR grow and evaluate. 37,000 accession were distributed last year. A change in emphasis on the wild accessions through new projects by studying methods to validate accessions in terms of taxonomy and looking at ways to get viability data on the wild accessions.

NCGR-Corvallis Update: Lauri Reinhold
There are about 13,000 different accessions, including Hazelnut, Pear, Strawberry, Raspberry, Blueberries, and Hops. As well as wild relatives for all these crops. The NCGR has two sites about a quarter a mile apart. There were some staff changes over the past couple of years, with current vacancies for research leader and field manager positions. Caroline Scagel is the Acting Research Leader, with challenges not having a permanent staff in those roles for over a year now. Additionally, renovation project that has been in the works for many years, has started recently, including the greenhouses and screenhouses renovation. Temporary structures have been established to accommodate for the renovation efforts. The renovation caused some delays in accessions distribution and reduced the total number of distributions for 2022 compared to previous years, with priority were given to research purposes orders. Current projects at the NCGR are related to evaluation of fruit quality, identification characterization, and technology related topics. Questions from the meeting attendees were regarding the timeline to rehire the current vacancies.

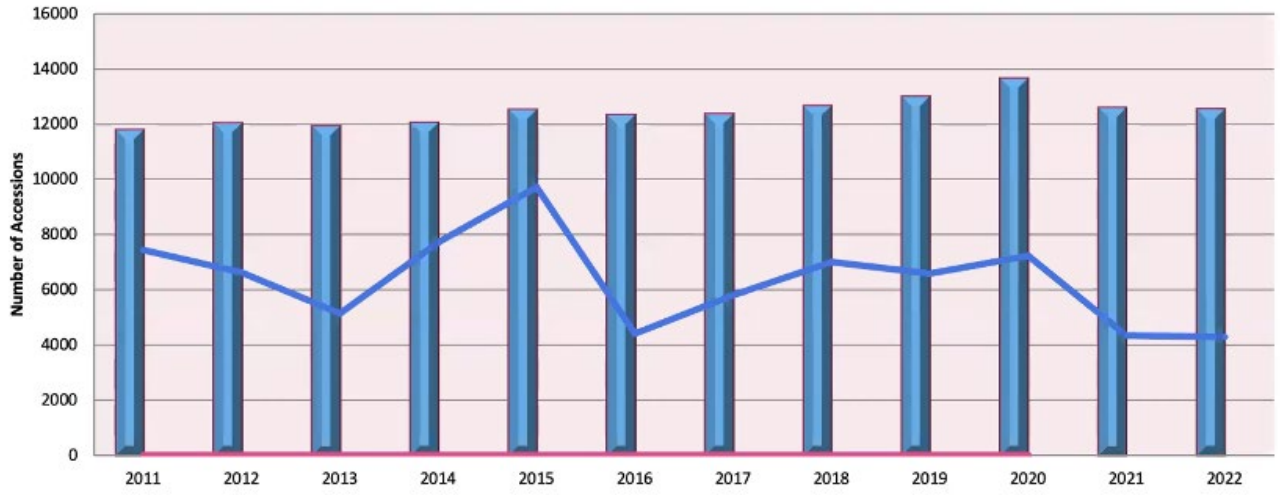

Figure (8) Total accessions and distribution line from the NCGR-Corvallis site 2011-2022.

NCGR-Davis Updates: Claire Heinitz

Claire Heinitz is the recently hired Research Leader for two units, the NCGR at Davis and NALPGRU-Parlier and gave updates for both locations. The NCGR-Davis maintains 14 different crops that are all Mediterranean adapted tree fruit crops and grapes. They are maintained as a fully clonal collection on ~70 acres of land that is leased from UC-Davis. The land ownership situation impacts the management decisions at the site. An irrigation well, serving about half of the research plot, was lost the summer before last, and the procurement process to drill a new well is on-going. Another well shared with UC-Davis also went down and around the same time. Drought issues in California and research plots are realities the unit is facing. Recently, there was two major retirements, and the positions are still vacant. The vacancies have caused overload on other employees and unit is relying on some stakeholder support. The NALPGRU-Parlier has a dual mission of serving as a service regeneration and backup site for many other NPGS sites in the system. It also has its own germplasm collections of emerging arid lands crops. The site has a collection of new or emerging crops, mostly with industrial uses. There are a few staff changes, including an interim curator, Daniel Packer from Washington State University. The vacancies have increased load on the technicians in doing more.

NLGRP Update: Gayle Volk

The USDA-ARS NLGRP has over 600,000 accessions representing over 2500 genera at 20 locations. The NLGRP serves as a safe secondary backup for the NPGS materials. 93% of the materials are seeds propagated and 7% are vegetative propagated materials. Fort Collins site have ~82% of the NPGS seeds accessions and ~15% of the clonal accessions backed up. Securing these accessions is a huge amount of work and labor due to the specific storing conditions needed to secure these materials. A GRIN-Global programmer, hired a few years ago, is working with both the seed and the clonal group to improve documentation process and standardizing information collection process. He is also working on to improve the GRIN-Global system interfaces. The updates will improve reporting process, materials condition, and materials availability. There was a mention on a new publication on safeguarding plant genetic resources during climate change. Updates on the new GRIN-U website and e-book chapter publications about genebanks and other topics through Colorado State University. Also, GRIN-U and

YouTube-channel content and 1-credit classes provided by the Colorado State University regarding plant genetic resources conservation.

NCGR-Hilo: Tracie Matsumoto:
The site is one of 3 sites for tropical/subtropical crops (Florida, Puerto Rico, and Hawaii). The site has crops important for Hawaii Agriculture. There have been few retirements and new hires at the site recently. Coffee has been added to the germplasm collection with a new person studying at the University of Hawaii to become a curator. Lisa Keith a pathologist working on the new Macadamia quick decline disease and the coffee leaf rust that was first reported in Hawaii in 2020. Shortage in Rainbow Hybrid papaya seed is on-going in Hawaii and the effort working with the University of Hawaii to produce the hybrid seeds for local use. In collaboration with the genebanks in Florida, 'Sharwil' avocado varieties was approved for export from Hawaii to 13 US states. New DNA Fingerprinting tool is being developed to ensure quality and detect contamination in avocado. Testing for the mild mosaic virus in cacao is ongoing and variety trials have been conducted statewide by the University of Hawaii faculty.

NCGR-Riverside: Robert Krueger
Robert Kreuger is the currently research leader at the Riverside genebank. The site is located at UC-Riverside campus. The site leases 2-acres owned by the USDA and utilizes 12,000 sq. ft of land owned by UC-Riverside. A new plant pathologist position that's currently being recruited and a curator position to be recruited soon. The site depends on student workers, undergraduate student workers for a lot of the day-to-day activities. 90% of the activities are on citrus and 10% on date palms. Additional field sites are located at Irvine, which is in the coastal part of Southern California, and the other is a Thermal, CA which is in the low desert area. A long-term cryopreservation trial for Citrus spp. project with Fort Collins is on-going. 541 accessions were done out of 609 total, with some are pending viability assessment. When it comes to stakeholders, there are some institutional stakeholders, including commodity groups, research boards, Research and Development Foundation, and California Date Commission. There are domestic and international collaborating scientists and other national genebanks in genetic resource conservation programs.

Location	Accessions	Inventory
Riverside: Givaudan Citrus Variety Collection	1,065	1,939
Riverside: Field Not GCVC	118	201
Riverside: Protected Sanitized	603	1,197
Riverside: Protected Unsanitized	808	1,754
Riverside: Quarantine	69	71
Irvine: UC SCREC	46	79
Thermal: UCR CVARS (Citrus)	78	232
Thermal: UCR CVARS (Dates)	169	666
Total	2,956*	6,139

*Unique accession = 1,687.
Figure (9): Germplasm holdings at the NCGR-Riverside genebank, 2023.

LUNCH BREAK

2:00 pm: Scot Hulbert: Budget Updates
Participating remotely, Scot provided updates on the budget and funding sources, including the Farm Bill, NIFA, and others. Scot also brought up the possibility that WSU will be working under a new funding allocation model in the future, which could cause charges for space allocation in WSU buildings and fields. This would have big implications on the functioning and funding of the W-6 and Pullman genebank activities, so we will be watching this development closely. A discussion regarding the budget annual 3% increase percentage over the 5-year budget regarding current inflation rate ensued. After the discussion the budget was agreed to and approved by the committee.

2:10 pm: Naidu Rayapati:
The Director (Naidu Rayapati) of the Irrigated Agriculture Research and Extension Center (IAREC) in Prosser, WA, and site o of the, and hosting site for the annual meeting gave an overview of the host site (Prosser-IAREC) with close to 100-acresactivities. It has 16 WSU faculty, 11 USDA-ARS, and 1 WSDA scientists. It has three research farms with close 300 acres of land. It is considered the one of the largest research centers within the WSU system. The center is equipped for all research and extension activities.

2:30 pm: Facilities Tour (only for onsite participants)
A tour of the W6 (Plant Germplasm Introduction and Testing Unit) USDA ARS local Prosser worksite programs facilities in Prosser was led. This included laboratories greenhouses and field sites for the two local programs led by Long-Xi Yu and Brian Irish.

4:30 pm:
Day 1 meeting adjourned.

Day 2: July 12, 2023

Day 2, July 12, 2023

Research Presentations:

8:00 am: Charlie Brummer: **Impact of NPGS on Alfalfa Cultivar Development**
Historically, breeders talk about 9 historic introductions periods into the Americas. Some of these introductions were immediately added into the NPGS collection, while others, were not included immediately or never at all. Examples of these folks, Wendelin Grimm (1800s) and N.E. Hansen (1900s). Looking at the collection for both the purple and yellow flowers and how their availability in the NPGS system helping in the development of new cultivars. Old publications talking about all the early varieties of alfalfa. Then it was very clear where everything came from between the 50s and 70s. Registration of the early varieties were published, including Washoe, Florida 66, WL 214, and Desert. Indian germplasm was used in developing varieties as well. Currently, we know less and less about the role of NPGS germplasm in cultivars development because pedigrees are not a requirement in releases. Potato leaf hopper resistant cultivars were developed in the 1980 and were released in the 1990s by USDA/Kansas State University and

Purdue University. In conclusion, early alfalfa introductions into the US involved germplasm that was/is in the NPGS collections. Most cultivars description do not indicate specific PIs used. The role on NPGS in supplying germplasm, including old cultivars, that ultimately leads to a new cultivar is unfortunately murky. Some clear examples exist of the value of the collection. A question about the system tracking of materials going back to the origin from they were collected or originated from.

8:30 am: Kevin Jensen: **Impact of NPGS on Grass Cultivar Development**
Grass is in every history of the country. The first collections came in from N.E. Hansen and there were 3-5 of them that went to Florida to be evaluated and they were included in the NPGS. In early 1900s with the Carey Act, Newlands Act, and others allowed the people to move into the Midwest and the West to utilize the lands there. About 100 million acres. Dust Bowl caused big losses in the 75% of topsoil loss. “Fairway” wheatgrass was released by N.E. Hansen and others, selected from original PI 19536. The entire west was seeded with the wheatgrass, which saved the west from drought and bringing it back to normalcy. In 1969 ‘Parkway’ cultivar was developed and the plant breeders started looking for traits. Then ‘Ruff’ was developed in 1974 with 3-cycles of selection. ‘Hycrest’ was developed in 1984 in response to other issues facing agriculture production in the west, including obnoxious weeds. Overtime, new varieties were developed using other plant introduction (PI) parents. Recent impact includes ~8,000 lbs stock seeds sold for ~$5,888,970 worth. A collection of varieties/accessions that was used in Kazakhstan for trials there in a region receives less than 5 inches of annual rainfall. Recent Impact of this work 11,313 lbs ‘Vavilov II’ and 1,463 lbs ‘Stabilizer’ stock seeds sold for ~$8,011,624. If you look at grasses, that was how many pounds it cost. I showed you what our grasses did as we went through, and more of a masses or natives, so they're not necessarily an PI system. The presentation focused on how the improvement and development of wheatgrass and Russian wildrye was linked to the NPGS. Also, how the meadow brome cultivar development is linked to the NPGS and its impact/importance in the Western Region grazing pastures. A discussion ensured regarding having a value for beef produced from these pastures, wildfires prevented and other benefits from having these breeding lines developed for the area.

Business Meeting:
8:55 am: WRPIS: Marilyn Warburton
The presentation started with basic introduction of the experiment stations of 13 land-grant universities in the Western region supply the funding from their Hatch (Federal) funding and the committee members as representatives of the land-grant universities + an advisory (Scott Hulbert) and WRPIS station coordinator (Marilyn Warburton). The presentation talked about the genetic resources management, mission related to PGR research/support and the budget breakdown (federal, W6 in-kind, and extramural funds). The presentation gave an overview of the major genetic resource programs (e.g., Agronomy, Phaseolus, Cool-season Food Legumes, Horticultural Crops, and Temperate-adapted Forage Legumes). The presentation highlighted the pathway program working with graduate students and their path for a permanent position after their graduation. The number of accessions for the 5 major curatorial programs and the assigned major crops at the WRPIS as June 2023 is presented in Figure (10). Staff availability have affected the ability to keep up with the large number of accessions and to keep them available for orders all the time.

Program	Main Crops	Number of Accessions
Agronomy	grasses and safflower	25,193
Cool Season Food Legume	peas, chickpea, lentils, vetch	23,110
Phaseolus	beans	17,754
Horticulture Crops	lettuce, beets (mostly sugar), ornamentals, alliums	13,810
Temperate Forage Legumes	alfalfa, clover, trefoil	13,343
Seeds of Success	Native seeds	9,174 *

*SOS seeds are not actively curated.

Figure (10): The five curatorial programs and assigned major groups at WRPIS as June 2023.

The total holdings currently stand at about 102,000 accessions in the genebanks, and they are increasing over the years. Over the last 12 years, 424,555 accessions were distributed out of 14,515 orders. A question to Peter Bretting was raised regarding the support needed from the W6 committee to ensure an increased financial support from the legislators in Washington, DC to the genebanks to continue the critical work they are doing, ensure expansion to include all accessions availability, and clear the backlog due to low staffing availability. Peter explained the effort in 2019 and 2020 (Farm Bill mandated NPGS Plan) and how the National Genetic Resources Advisory Committee (NGRAC) had reviewed the plan and provided significant input, which is appointed by the Secretary of Agriculture to advise him on it. Peter explained the process that the request has been going through so far. When the final review will happen was not clear yet, but there was hop for it to be made public soon. Peter also explained that they are following up on the process almost every-other-week to ensure its still in the pipeline. Additional discussion was about the Stakeholder Liaison group started from stakeholders from each state in the region to act as advocates. A question regarding the liaison groups best time to reach out to congress and advocate on behalf of the committee. The answer was that the committee job is to provide them with information only. Peter provided additional information about the best ways to approach the issues. A question was raised regarding what's needed from the W6 committee annual meeting and what needs to be accomplished. Additionally hearing from the curators regarding their needs and how the committee can help. A decision was made to start the discussion via an email and plan for future Zoom meeting in about 6 months from now.

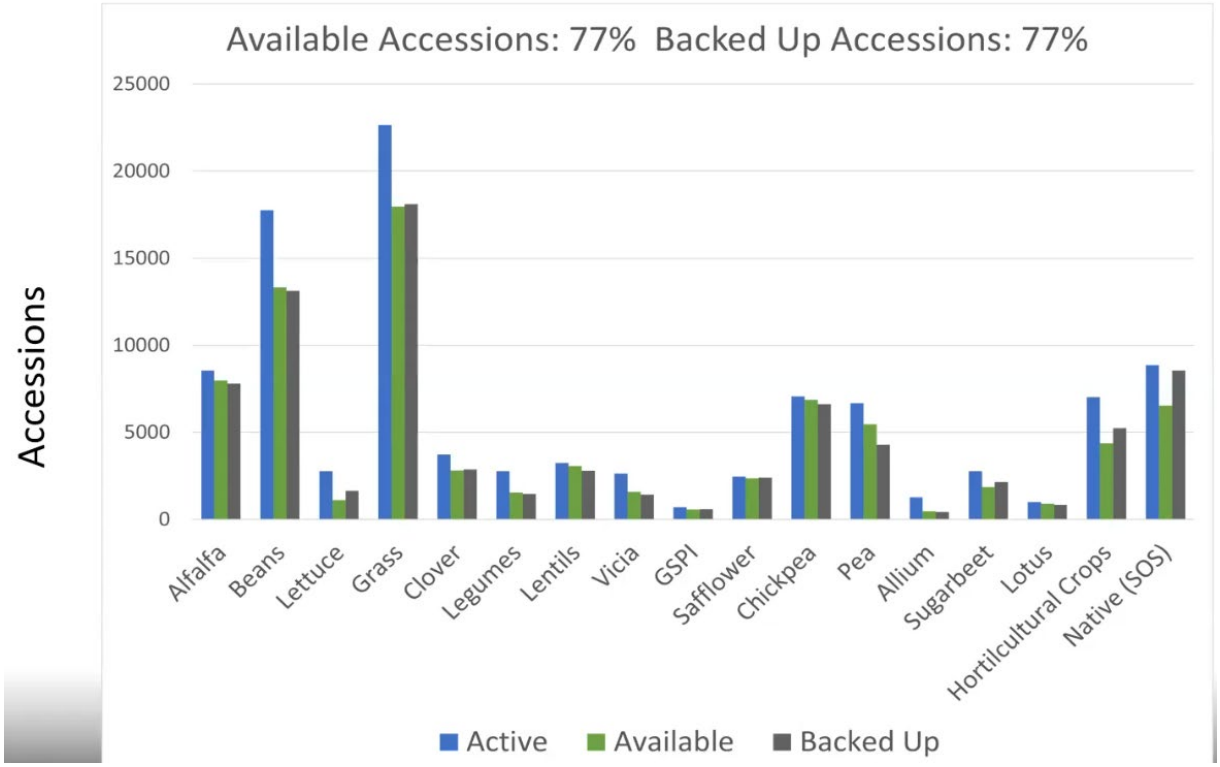

Figure (11): Statistics on WRPIS germplasm backed up at NLGRP (2022 data)

9:15 am: The topic of making the W6 project more sustainable and impactful was initiated. At this point, the discussion deviated from the agenda. The RTAC did not get to the discussion of the W6 Stakeholder Liaison group, the efforts of the WRPIS, the NLGRP in Fort Collins, and the National Program Leader for the NPGS to demonstrate impact of the genebank, and/or how the western genebanks could work better with the Agriculture Experiment Station Directors and others in the states of the Western Region. Instead, the question was asked about the efforts to create and present to Congress a Plan on what would be needed to fully fund and staff all the USDA ARS genebanks to avoid any backlogs in our core mission activities of collection, curation, regeneration, evaluation, characterization, and distribution of plant genetic resources of economic importance to the US. The "NATIONAL STRATEGIC GERMPLASM AND CULTIVAR COLLECTION ASSESSMENT AND UTILIZATION PLAN" was requested by Congress in the 2018 Farm Bill, and it was an effort led by Peter Bretting, National Program Leader for the NPGS, and colleagues from the NPGS. It has been approved by various scientific and stakeholder groups, and the necessary offices within the USDA and the federal government. Peter reports it has been given to the Secretary of Agriculture, who will be the one to present it to Congress. This will hopefully happen soon, and the full copy of this Plan (and its abbreviated version), once public, can be provided to the RTAC. If this Plan is fully resourced, the genebanks will be able to modernize, remove current risks to the collections and the curation activities; increase activities on phenotypic evaluation and genetic characterization; and initiate pre-breeding activities when needed. All this will be done in conjunction with US public and private institutions with an interest in seeing the genebanks and all associated data become more freely available. If funding from the Plan is not available, or not to the level requested, we can begin discussing our alternative strategies for increasing funding and resources at our December meeting, or next summer.

9:53 am: Elections of Vice Chair and Secretary

- Kevin Jensen - agreed to continue serving as the W6 RTAC Chair
- Amjad Ahmad - was nominated and elected to serve W6 RTAC Chair-Elect
- Donna Harris - was nominated and elected to serve W6 RTAC Secretary

10:10 am: 2024 W6 Committee Meeting Location
A discussion regarding the location for 2024 committee meeting was initiated. Honolulu, HI, Prosser, WA and Logan, Utah were suggested as locations for the next meeting. Availability of stable internet connection to ensure the ability to have hybrid in-person and online meetings possible was important. Some discussion on reformatting the meeting was also initiated, but it was realized that we didn't have time to complete the discussion and make decisions. Thus, it was decided at this point that we would hold another meeting towards the end of the year (probably in December 2023) to decide the location, format, and attendees of the 2024 meeting.

10:45 am: Adjourn business meeting.

"Field Tours" – for those on site

Dr. Per McCord, WSU IAREC Horticulture Department Stone Fruit Breeder and RTAC WA State Representative, provided the group a tour and overview of the cherry breeding program, the modern and recently installed computerized (AI) automatic fruit sorter, and fruit tasting, which was delicious.

During the lunch break a short presentation was provided by Research Geneticist (breeder), Kayla Altendorf of the USDA ARS Forage Seed and Cereal Research Unit worksite in Prosser. Presentation involved describing an introduction to the crop, importance of the local/regional growing area, about the plant and pollination biology, the breeding process and cycles and what traits the program is working with specifically. After lunch, the group visiting the Golden Gate hop farm facilities, part of the larger Hopsteiner Inc. farms. We met hop breeder Ryan Gregory, who provided some background on the history of the family-owned farm, some of the breeding objectives and a detailed tour of the hop processing facilities.