W6 Regional Technical Advisory Committee – Minutes

Day 1, July 9th, 2024 (8:00 a.m. to 5:00 p.m. Mountain Time)
Location: USDA ARS Forage and Range Research Unit, Utah State University, 696 North 1100 East, Logan Utah and virtually via Zoom.
Virtual Zoom
The meeting video and recording can be found at:

Day 1: https://www.zoomgov.com/rec/share/HnOc12JIxkeQcG0UesK3mcF1TgXD0238H-8EPWd15Y_kJosX7vO_TLIpyUbDF7yZ.owjDt89w-NmhbWWz
Passcode: TX?2=U@P

Day 2: https://www.zoomgov.com/rec/share/Qz9AUY-aC11en6LsyOIJng9poth-JnXVX0FnXFc6TqYhbxNkDAaCXJ1xWb41ztiO.Lq89JOf7L9_C07ig
Passcode: M2N==^=*

W6 RTAC Officers
Chair – Kevin Jensen; Vice Chair – Amjad Ahmad; Secretary – Donna Harris
WRPIS/PGITRU Station Coordinator/Research Leader – Marilyn Warburton
Local Host – Kevin Jensen

2024 W6 RTAC meeting participants

Ahmad Amjad, U. of Hawaii, Manoa, HI. alobaby@hawaii.edu
Brian Irish, ARS WRPIS, Pullman, WA. brian.irish@usda.gov
Marilyn Warburton, ARS WRPIS, Pullman, WA. marilyn.warburton@usda.gov
Kevin Jensen, ARS FRRL, Logan, UT. kevin.jensen@usda.gov
Naveen Puppala, New Mexico State U., Clovis, NM. npuppala@nmsu.edu
Joseph Kuhl, U. of Idaho, Moscow, ID. jkuhl@uidaho.edu
Lisa Taylor, ARS WRPIS, Pullman, WA. lisa.taylor@ars.usda.gov
Melinda Yerka, U. of Nevada, Reno, Reno, NV. myerka@unl.edu
Michael Giroux, Montana State U., Bozeman, MT. mgiroux@montana.edu
Scot Hulbert, Washington State U., Pullman, WA. scot.hulbert@wsu.edu
Christian Tobias, USDA NIFA, Beltsville, MD. christian.tobias@usda.gov
Per McCord, Washington State U., Pullman, WA. phmccord@wsu.edu
Gayle Volk, Acting as USDA-ARS National Program Leader, ARS NLGRP, Ft. Collins, CO. gayle.volk@usda.gov
Shawn Bushman, ARS FRRU, Logan, UT. shawn.bushman@usda.gov
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Peter Ballerstedt, retired from Barenbrug USA. peter.vallerstedt@gmail.com
Paul Galewski, ARS WRPIS, Pullman, WA. paul.galewski@usda.gov

Opening remarks:

Kevin Jensen (W6 Chair)

Kevin welcomed everyone. This was followed by a brief introduction of everyone attending the meeting. The agenda was approved.

Shawn Bushman (ARS FRRU)

Shawn gave an overview of the FRRU co-located with Utah State University in Logan, UT. There are four main objectives for the unit. These include developing forage and range plant varieties with increased resilience to climate change and environmental stresses, enhanced restoration outcomes and ecosystem services of rangelands, improved forage biomass and quality traits, and the development of genomic technologies for the improvement of reduced input turfgrass varieties.

Christian Tobias (USDA NIFA National Program Leader)

NIFA is in the process of modernizing their grants management systems and processes for internal and external stakeholders. Select programs will be piloted in 2025-2026. In 2024, we have a 3% decrease in discretionary funding and 11% increase in mandatory funding. Overall, the budget was flat. The increase was in urban indoor and emerging agriculture as well as scholarships for students at 1890 institutions. All grants require a data management plan. Manuscripts in their final form must be made freely available to the public within 12 months of being published through PubAg, hosted by the USDA National Agricultural Library.

Gayle Volk (Acting as USDA-ARS National Program Leader, ARS NLGRP)

NPGS has over 600,000 accessions from more than 17,000 species that it currently maintains and this is still growing. NPGS distributes over 200,000 items annually. The budget is not good. For 2023, the budget was $54.5 million spread across all NPGS locations. The budget, when adjusted for inflation, is not going up and yet there are more accessions to maintain. The people and facilities are lacking to continue to regenerate this material and so accessions are aging. There are a lot of personnel changes across the locations. Challenges for NPGS include increased operational costs, personnel transitions, losing accessions due to a backlog of regenerations and viability testing, developing and acquiring cryopreservation and/or in vitro conservation for some species, and acquiring and preserving additional plant genetic resources (especially of crop wild relatives). The NPGS strategic plan was released in 2023, and it describes the status of all the NPGS sites, as well as all the collections with respect to all the responsibilities of NPGS and where they are falling short and what it is going to take financially to meet those needs. There are five headquarter funded 2-year Post Docs that have been promised to NPGS this year. There is also an ARSX $100,000 award for a germplasm project.

The website has been created for educational resources around plant genetic resources conservation and use. Efforts are being made to compile NPGS success stories. These stories will go into an eBook as a chapter.

NLGRP Report: NLGRP does seed research, longevity research, maintains the large long-term collection of the entire NPGS, and also they have clonal programs to determine the kind of preservation and backup methods needed for their clonal collections and implement them.

Scot Hulbert (WSU W6 Administrative Advisor)

WSU upper administration has almost completely turned over including a new President (current president is retiring) and Provost. In the process of looking for more irrigated land for the W6 group. Thinks he has found the land needed. Forage positions both for WSU and USDA open currently in Pullman. Budget explained by Marilyn. Asking for an increase of 5% to give back to Crop & Soil Sciences for administrative support that USDA uses.

- Ahmad Amjad made the motion to approve the budget
- Donna Harris seconded the motion
- Discussion … increase in budget should be supported.
- W6 2024 proposed budget was approved unanimously.

State Reports

California, Lisa Taylor

In 2020, there were 357 unique accessions ordered and in 2023 there were 1456 requested. In 2020, the intended uses for the germplasm included research, education and other while in 2024 the intended uses were research and education. Across both years, research was the top use. The increase in requests in accession for 2023 was largely lettuce. Companies were the largest requester in 2020 and there were 43 unique requestors. In 2023, U.S. state agencies and universities were the largest requesters and there were 48 unique requestors. Lettuce was requested the most in both years primarily for breeding for disease resistance and other stressors. Phaseolus and alfalfa are also requested frequently in California.

Colorado, Lisa Taylor

Colorado had 655 unique accessions ordered in 2020 and 337 in 2023. In both years, the intended use was research, education, and other with research being the top use. Additionally, in both years, US companies were the biggest requester although there were more US state agencies and universities that requested in 2023 than in 2020. There were also 11 unique requestors in both years. The main requests for Colorado was cool season food legumes, dry beans, and sugar beets.

Idaho, Joeseph Kuhl

In 2020, 93 accessions were requested in Idaho from W6 Pullman, WA, from a total of 17 orders. In 2020, federal, state (including universities) and private individuals placed 2, 3 and 12 orders, respectively. The major user group (assessed by the number of items requested) in 2020 were private companies, requesting 12 of the 17 orders (split among 7 private entities). In past

years USDA, ARS scientists have been the major user group, in 2020 only two federal agency orders were made. Among private companies Jennifer Trap requested 40 accessions (43% of total accessions), in 4 separate orders.

A total of 16 orders were placed from Idaho in 2023, close to the 17 orders placed in 2020. In 2023, 221 accessions were requested in Idaho from W6 Pullman, WA. Significantly more accessions were requested in 2023, compared to the 93 requested in 2020. It should be noted, in 2023 one order accounted for 121 accessions, 54% of the total requested. This larger order came from a private company, 25:2 Solutions, LLC, an agricultural technologies company located in Pocatello, Idaho. In 2020, no large orders (over 100 accessions) were placed. Private companies accounted for 9 of the 16 orders placed in 2023. Three state agencies and two federal agencies accounted for the remaining seven orders.

Emails were sent to nine of the 2020 and eleven of the 2023 requestors: 5 emails were not delivered, 5 out of 20 responded

Responses:
Dongying Gao, USDA, ARS, Aberdeen
How was it used?
Response: The germplasm was used for several research areas: 1) Identification of disease and pest resistant resource for barley improvement. Thus far, we have identified three wild barley accessions showing resistance to barley stripe rust and one wild barley accession showing resistance to greenbug; 2) Identification of germplasm with excellent winter survival. Winter barley generally shows high yield and uses less irrigation water than spring barley, however, many regions in USA including North Idaho, North Dakoda and Montana cannot grow winter barley as all current winter barley varieties cannot survive in these regions. We conducted three-year experiments and identified three wild barley accessions which exhibited excellent winter hardiness; 3) Generation of reference genomes of wild barley for new gene discovery and evolution analysis between cultivated and wild barley species. The cultivated barley has been sequenced, but the genome sequences of wild barley is limited. We are sequencing three wild barley species and generating reference genomes for identifying new genes in wild species and for comparative genomics; 4) Understanding genetic diversity of wild barley accessions and establishment of molecular passport of each wild barley accession. The USDA seed bank has collected over 1900 accessions of wild barley (Hordeum spontaneum). However, some of them are genetically duplicates. We genotyped all 1900 accessions with barley 50K SNP array, the genotyping data are being used to establish molecular ID for each accession for removing duplicated accessions, and to investigate the genetic diversity of the collected wild barley accessions.
Reportable results?
Response: The results have not been publicly reported, but some results were shared with the stakeholders such as American Malting Barley Association.
Products developed?
Response: Not yet, but the germplasm is used to transfer desirable traits from wild barley into cultivated barley and to develop molecular markers.
Manuscripts written?

Response: Not yet, but several manuscripts are being planned.

Anthony D. Vaudo, PhD, Forest Serv ice, Rocky Mountain Research Station
Thanks for reaching out. We received seeds for Agastache urticifolia, Lupinus argenteus, Phacelia heterophylla, and Potentilla gracilis. We're currently growing them here in Moscow, ID. They will be used for experiments in collaboration with University of Nevada Reno to determine how heat stress affects floral production and floral rewards for bees (pollen and nectar). Since they are in their first season of growth, we don't have any results/publications to share just yet.

Andrew Wiersma, Archer Daniels Midland Company
How was it used? Currently scaling up one variety for seed sales
Reportable results? Performs well in western seed production region
Products developed? TBD. We don't know how it will scale quite yet.
Manuscripts written? Nope

Anne (Jenny) Knerr, University of Idaho
My name is Jenny Knerr and I am a research associate in the Plant Science Department at the University of Idaho. For the last ten years I have been a part of a team which strives to develop micropropagation protocols for difficult to cultivate native plants. To date, the plants we have selected to work on have either been rare endemic Idaho native plants or plants we consider to have landscape/ornamental potential. The primary beneficiaries of our work are the Idaho horticultural industry and groups actively participating in plant conservation or restoration such as the Idaho Bureau of Land management.
The first step in our work is locating starting plant material to work with, either seeds or stem cuttings. Prior to my discovery of the National Plant Germplasm System (GRIN) database in 2021, this was often a long and difficult process. As an example, in 2021 we began work on an Idaho Specialty Crop Block grant entitled "Micropropagation of *Astragalus* species for nursery, conservation or medicinal uses." The species selected for the project were *A. canadensis* and *A. spatulatus.* I was able to locate a nursery which produced seeds for *A. canadensis* but was unable to find a source for *A. spatulatus*. I contacted the Idaho Botanical Garden, the Rae Selling Berry Seed Bank and the director of the Boise State Herbarium. No one had seeds but the Boise State Herbarium was able to collect a plant and mail it to me. Unfortunately, it was too contaminated to use. Luckily, I came across GRIN and was able to request several accessions of *A. spatulatus* and several other *Astragalus* spp. which have been successfully established and multiplied in culture.
GRIN is now a tool we use frequently. When I am developing research proposals and trying to select which species to work on, I first check GRIN. The ability to easily obtain seeds which have been correctly identified and properly stored greatly facilitates my plant propagation research.
Thank you,

Liz Martin, Associate Professor of Biology, Lewis-Clark State College
The germplasm request from 2023 was for seed to be used in an upper division botany course at LCSC as part of a class research project on seed germination requirements. I'm attaching the results I gave the USDA folks in Prosser at the end of our experiment. We did plant out the germinants and they were transported to Prosser, but I believe survival was too low for further study.
The request in 2020 was part of a larger project. There was an initial germination trial that I did at the USDA facilities in Pullman in 2020. After that, we transplanted seedlings to a research field in Pullman and set up an experiment with different pollinator treatments. Field data were collected for 2 seasons and there is now a manuscript that, I believe, is still in the preparation phase. Bailey Hallwachs at the USDA has taken the lead on it.
I hope this answers your questions. If not, let me know and I can get you additional information.

Effect of Cold Stratification on Germination of *Trifolium macrocephalum*
May 2023
Elizabeth Martin
Conducted by Field Botany (BIOL 450) students at Lewis-Clark State College
Study objectives and methods
The purpose of this study is to better understand cold stratification requirements for germination of *Trifolium macrocephalum* accessions that are part of the Seeds of Success (SOS) germplasm collections in Pullman, WA. We tested four accessions of *T. macrocephalum* (Table 1) at three lengths of 4°C cold stratification: 0, 2, and 4 weeks. Seeds were first scarified with a scalpel to individually nick each seed. For each accession, 10 replicate petri dishes with 10 seeds per dish were set up at each cold stratification level, for a total of 300 seeds per accession. Seeds were lightly sprayed with Captan fungicide at the time of set up.
After cold stratification, seeds were placed in an incubator on a 16-hour night/8-hour day cycle at 15°/25°C. Germination, measured as radicle elongation of 1 mm, was recorded after 7 days in the incubator. Data were analyzed with an ANOVA for differences between accession and cold stratification on germination, and a Tukey post hoc test was used to assess differences amongst the three stratification treatments.
Table 1. Locality and collection data for *Trifolium macrocephalum* accessions used in the study.
Results and conclusion
Cold stratification resulted in significantly higher germination of *T. macrocephalum* seeds compared to those that were not cold stratified (Figure 1, $F=210.6$, $p<0.0001$). Across all accessions, 83% of seeds germinated with 4 weeks of cold stratification and 75% germinated with 2 weeks of cold stratification. This is in comparison to the 18% that germinated without cold stratification. Post hoc statistical tests show there was marginal higher germination in seeds stratified for four weeks compared to those stratified for two weeks ($p=0.06$). When compared to seeds that were not stratified, there was significantly higher germination in seeds stratified for both 2 and 4 weeks ($p<0.0001$ for both comparisons). Anecdotally, we left ungerminated seeds in the incubator for a second week to see if more time resulted in higher germination, particularly for the seeds that had not been cold stratified. However, very few seeds germinated with extra time in the incubator.

Even though all four accessions showed similar results with regards to cold stratification, there were differences in germination amongst accessions (Figure 1, F=7.7, p=0.001). Accession W6 27120 had lower overall germination with 70% germination in seeds that had 4 weeks of cold stratification and 62% germination in seeds that had 2 weeks of cold stratification. Accession W6 27238 had the highest germination levels, with 89% germination in seeds after 4 weeks of cold stratification and 85% germination in seeds after 2 weeks of cold stratification.
Accession number Collection location Collection year
W6 27120 Oregon 2005
W6 27238 Washington 2005
W6 45611 Oregon 2013
W6 54257 Oregon 2018

Montana, Michael Giroux

In 2023, there were six NPGS – W6 orders received from three unique recipients requesting a total of 60 accessions.

NPGS Site	#	Species	Common name	Primary Purposes
W6	59	*Lactuca sativa*	lettuce	Breeding and research
W6	1	*Descurainia pinnata*	tansy mustard	Breeding

User type	# accessions	Primary uses
Private companies	60	Breeding (26 accessions), research (34 accessions)

Recipient

Vladimir Kovalenko (MPG Ranch) – 34 lettuce accessions = research – how do they respond to elevated CO2 and are nutrients diluted under high CO2 conditions
Jessica Staha (Local Bounti) – 25 lettuce accessions – breeding or production
Tavin Wyrick (Sustainable oils) -1 tansy mustard accession

Example publications.

1. Tillett, B. J., Vetch, J. M., Martin, J. M., & Giroux, M. J. (2024). Novel alleles of *MFT-A* and *MFT-B1* appear to impact wheat preharvest sprouting in *Triticum aestivum* and *Triticum turgidum* ssp. durum. *Cereal Chemistry*, 1–9. https://doi.org/10.1002/cche.10789
   Germplasm use: Screen of 54 hexaploid wheats, 32 durums,

   Results: A haplotype analysis suggests that *TaMFT-3A1b* (OQ729929), *TaMFT-3B1b* (OQ729932) and *TdMFT-3B1b* (OQ729937) increase PHS susceptibility. It is expected that functional copies of *MFT* promote seed dormancy. Variant analysis of the novel *MFT-A* and *MFT-B1* alleles in both spring and durum wheat suggest impairment of protein function, therefore a negative impact on seed dormancy.

2. Hale, C. O., Tillett, B. J., Martin, J. M., Hogg, A. C., Cook, J. P., & Giroux, M. J. (2024). The Grain Number Increase 1 alleles GNI-A1-105Y and -105K increase grain number in spring wheat. Crop Science, 1–11. https://doi.org/10.1002/csc2.21267

Germplasm use: Screen of 32 hexaploid wheats, 12 durums

Results: Here, two novel alleles for *MFT*-A and two novel alleles for *MFT-B1* homologs were identified in spring bread wheat and durum wheat. A haplotype analysis suggests that *TaMFT-3A1b* (OQ729929), *TaMFT-3B1b* (OQ729932) and *TdMFT-3B1b* (OQ729937) increase PHS susceptibility. It is expected that functional copies of *MFT* promote seed dormancy. Variant analysis of the novel *MFT-A* and *MFT-B1* alleles in both spring and durum wheat suggest impairment of protein function, therefore a negative impact on seed dormancy.

Nevada, Melinda Yerka

2020 Report:

Summary: Table 1 summarizes NV use of the NPGS in 2020. Fourteen (10 in 2017, 15 in 2018, 13 in 2019) individuals from Nevada placed 26 orders (17 in 2017, 39 in 2018, 30 in 2019) and
received 331 (91 in 2017, 2138 in 2018, 193 in 2019) accessions from the NPGS in 2020. Researchers at UNR continue to be the primary institutional users (215 accessions of 331, 65%). All users were contacted via email and 4 out of 14 responded. Users reported three manuscripts published in total.

Table 1. Summary statistics for NV in 2020.

	Pathology	Genetics	Chemistry	Variety Devo	Education Teaching	Taxonomy	Other
# accessions used for each purpose	15	158	25	84	41	2	6
% accessions used for each purpose	4.5	47.7	7.6	25.4	12.4	0.6	1.8

NPGS USER REQUESTS AND RESPONSES IN NEVADA: (4 of 14 replied)

UNIVERSITY OF NEVADA SYSTEM AFFILIATES (Total of 6)

1. Dylan Kosma, UNR Dept. of Biochemistry & Molecular Biology. Research use notes: To study tuber wound healing; To develop a transient system for the study of gene function related to plant cuticle biosynthesis.

Solanum tuberosum – 1 accession
Nicotiana glauca – 4 accessions

2. Patricia Ferreira Dos Santos, UNR Dept. of Biochemistry & Molecular Biology.

Research use notes: To set up a celery transient transformation system to study the role of polyacetylenes in the disease response of carrots to the fungus *Sclerotinia sclerotiorum*.

Apium graveolens – 1 accession
Apium graveolens var. dulce – 3 accessions

3. Sandy Lee, UNR Dept. of Biochemistry & Molecular Biology. Research use notes: Objective is to study infection of necrotrophic and hemibiotrophic pathogens on different carrot cultivars to better understand the role of falcarins in carrot plant defense.

Daucus carota – 1 accession
Daucus carota var. sativus – 1 accession

4. Won Yim, UNR Dept. of Biochemistry & Molecular Biology. Research use notes: We are working on heat and drought stress related traits resulting from homeologous chromosome exchange.

Brassica carinata - 71 accessions
Brassica nigra - 85 accessions
Brassica rapa - 1 accession

5. Elizabeth Leger, UNR Dept. of Biology. Plant Pathological Investigations. Research use notes: Compare genetic diversity before and after sites burned; half of these sites have burned and we are interested in whether that affects genetic diversity; we are pairing these comparisons with field collections.

Elymus elymoides
Sphaeralcea grossulariifolia
Pseudoroegneria spicata – 2 accessions
Sphaeralcea grossulariifolia
Elymus elymoides
Lomatium dissectum
Monardella odoratissima - 2 accessions

6. Melinda Yerka, UNR Dept. of Agriculture, Veterinary & Rangeland Sciences. Research use notes – Varietal development and genetics studies.

Sorghum bicolor subsp. *bicolor* - 11 accessions

Responses to the four standardized email questions (for all Yerka Lab members):

- What was the quality of the plant materials you received?
  - Excellent.

- Did you release any plant material(s) to the public in 2020 that was partially or fully derived from any NPGS germplasm(s) that you received in 2020 or any time previously? If yes, please provide as much information as possible about the released plant material(s).
    - No.

- If you published an article in 2020 that includes NPGS germplasm that you received in 2020 or earlier, please provide the publication citation (authors, title, journal, etc.).
    - One publication; included below.

- Do you have any suggestions or feedback for the improvement of the NPGS system?
    - No.

7. Anil Kunapareddy, UNR Dept. of Cellular & Molecular Biology (Ph.D. student in Dr. Melinda Yerka's lab). Research use notes – Varietal development and genetics.

Sorghum bicolor subsp. *bicolor* - 19 accessions

Responses to the four standardized email questions: See replies for Melinda Yerka (above)

8. Jeffery Chen, UNLV School of Life Sciences. Research use notes: To study the roles of transcription factors on seed germination and drought stress response.

Oryza sativa - 1 accession

Responses to the four standardized email questions:

- What was the quality of the plant materials you received?
    - Excellent. But I hope that we can order fresh seeds (See my response to Q4 too).

- Did you release any plant material(s) to the public in 2020 that was partially or fully derived from any NPGS germplasm(s) that you received in 2020 or any time previously? If yes, please provide as much information as possible about the released plant material(s).
    - No

- If you published an article in 2020 that includes NPGS germplasm that you received in 2019 or earlier, please provide the publication citation (authors, title, journal, etc.).
    - No

- Do you have any suggestions or feedback for the improvement of the NPGS system? UNLV has very limited greenhouse space for growing rice.
    - It would be fantastic if we could order fresh (<1 year old) seeds for transformation.

9. Denise Stoesser, University of Nevada Cooperative Extension (UNCE). Breeding use notes: I am a Horticulturist with the University of Nevada Cooperative Extension. I'm hoping to find vegetable varieties that grow well in this region, specifically NE Nevada.

Cucumis melo subsp. *melo* – 23 accessions
Amaranthus cruentus – 16 accessions
Amaranthus hypochondriacus – 9 accessions
Phaseolus vulgaris – 15 accessions
Phaseolus acutifolius var. acutifolius – 1 accession
Citrullus lanatus - 1 accession

NON-UNIVERSITY OF NEVADA AFFILIATES (Total of 6)

10. Ailsa Cocanower, No affiliation listed. Research use notes:

Humulus lupulus var. neomexicanus – 1 accession
Humulus lupulus var. lupulus – 1 accession

Responses to the three standardized email questions: SEED REQUEST DENIED

11. Nancy Collins, Rolling Rock Ranches. Use notes: I have been doing research since 2016 in Carson Valley, NV 89821.

Papaver bracteatum – 1 accession
Fragaria vesca subsp. *vesca* – 1 accession
Fragaria vesca – 2 accessions
Fragaria x ananassa – 1 accession

12. Ella Dooley, Homeschool parent. Use notes: I am a homeschooler and I plan to use these plants to study and apply experiments.

Fragaria x ananassa – 1 accession
Vaccinium corymbosum – 1 accession

13. Penny Skelly, Creative Kids Learning Center. Use notes: Preschool garden.

Mentha x piperita – 1 accession
Fragaria x ananassa – 1 accession

PUBLICATIONS:

1. Grimes, L; Busta, L; Malyszka, K; Wahrenburg, Z; Lowe, C; Kosma, D; Yim, WC;

Cahoon, EB; Santos, P. 2019. The role of polyacetylenic lipids during the interaction between Daucus carota and the necrotrophic fungus Sclerotinia sclerotiorum. PHYTOPATHOLOGY 109(10): 160-161.

2. Baggett, John P.; Tillett, Richard L.; Cooper, Elizabeth A.; Yerka, M. 2021. *De novo* identification and targeted sequencing of SSRs efficiently fingerprints *Sorghum bicolor* sub- population identity. PLOS ONE 16(3): e0248213.

3. Wahrenburg, Z; Benesch, E; Lowe, C; Jimenez, J; Vulavala, VKR; Lu, SY; Hammerschmidt, R; Douches, D; Yim, WC; Santos, P; Kosma, DK. 2021. Transcriptional regulation of wound suberin deposition in potato cultivars with differential wound healing capacity PLANT JOURNAL. Early access: MAY 2021. DOI: 10.1111/tpj.15275

2023 Report:

Summary: Table 1 summarizes NV use of the NPGS's Pullman, WA gene bank in 2023 only. Four individuals from Nevada placed four orders and received 75 accessions. Researchers affiliated with the Nevada System of Higher Education (NSHE, includes the University of Nevada System and the Desert Research Institute, DRI) were the only users. All users were contacted via email and 2 out of 4 responded. Users and my own searches on Web of Science reported/determined a total of 12 manuscripts published since 2020, including some that they had not reported previously.

Table 1. Summary statistics for 2023 for the most common historical uses in NV.

	Ento-mology	Genetics	Chemistry	Variety Devo	Education Teaching	Taxon-omy	Anthro-pology
# accessions used for each purpose	0	0	0	0	0	71	4
% accessions used for each purpose	0%	0%	0%	0%	0%	95%	5%

NPGS USER REQUESTS AND RESPONSES IN NEVADA:

UNIVERSITY OF NEVADA SYSTEM AFFILIATES (Total of 4)

1. Cathy Silliman, Graduate Student, UNR. Research use notes: Botanical/Taxonomic Investigations. Plant species are able to respond to changes in the environment through evolutionary changes and/or phenotypic plasticity, however, if climate change is faster than the species are able to adapt, maintaining the genetic variation plants need to persist in a changing world might require the help of humans. Selecting the right seed sources is essential for successful restoration. Empirical and provisional seed zones have been created for Great Basin species, and help identify seed sources that will do well when moved within similar zones. I plan to test assisted population migration by moving populations of *Krascheninnikovia lanata* from their drier, southern range to their wetter,

northern range. The goal of this project is to test whether populations that have evolved in drier, warmer locations will be able to persist and thrive in northern locations where it is projected to become warmer and drier.

Answers to Survey Questions: NONE

Species	Accession Name	Order Request
Krascheninnikovia lanata	CA170-247	346614
Krascheninnikovia lanata	NV052-878	346614
Krascheninnikovia lanata	CA930A-84	346614
Krascheninnikovia lanata	CA650-117	346614
Krascheninnikovia lanata	CA930A-909	346614
Krascheninnikovia lanata	CA170-247	346954
Krascheninnikovia lanata	NV052-878	346954
Krascheninnikovia lanata	CA650-117	346954
Krascheninnikovia lanata	CA930A-909	346954

2. Leah (Lenzo) Prescott, Ph.D. Student, UNR. Research use notes: I was the Seeds of Success National Curator for 3 years and am currently analyzing the SOS dataset for my PhD to identify environmental predictors of seed mass. Assessing the SOS dataset from 2002 to 2019 for over 13,000 native seed collections, we found that restoration priority species seed masses including *Balsamorhiza sagittata* vary from 1.56 mg to 15.42 mg and *Hesperostipa comata* varies from
2.66 mg to 22.92 mg. However, SOS data averages seed size over single populations and it is not possible to know how much variation is due to maternal plant or differences within each population. I have been making local collections of historic SOS populations for the last 2 summers for my second Chapter to look at how seed mass varies among maternal plants over time and space. I am requesting these collections from GRIN for my 3rd chapter which aims to look at how seed mass varies within populations over longer periods of time and how this may influence germination and viability. We plan to weigh all individual seeds, collect shape characteristics, and possibly analyze x-ray images. Finally, we will run germination trials in growth chambers to look at how viability changes across space, time, and seed traits. We will also be using three treatment groups along a temperature gradient to increase chances of successful germination. We will of course credit GRIN and ARS in our work!

Answers to Survey Questions:

1. What was the quality of the plant materials you received? Excellent, all but one accession had a minimum of 100 seeds (it had 95 seeds). The material was clean and free of inert/non-target material. The packets were all well labelled.

2. Did you release or commercialize any plant material(s) to the public in 2022 that was partially or fully derived from any NPGS plants that you received in 2022 or any time

previously? If yes, please provide as much information as possible about the released plant material(s). We used the seeds for a germination trial as part of my 3rd chapter of my dissertation. After the experiment, I transferred seeds from petri dishes to the greenhouse just to see if they would take. About 150 out of 2700 grew to seedling stage. But they started to root out in the smaller containers and die and we had nowhere to transplant them so we gave them away to the local Reno community (free) during an outreach event as part of the UNR Natural History Museum. I've attached a photo of the seedlings. I would have liked to put them in our pollinator garden but it was January, the ground was frozen, and I didn't have enough volunteer help.

3. If you published an article in 2022 that includes information from NPGS plants that you received in 2022 or earlier, please provide the publication citation (authors, title, journal, etc.). I'm still analyzing the data and writing up my chapter but we anticipate submitting in 2025.

4. Do you have any suggestions or feedback for the improvement of the NPGS system? It's such a wonderful resource!! We will be sure to cite NPGS and SOS in our publication.

Name	Accession	Order Request
Balsamorhiza sagittata	WY030-35	348106
Balsamorhiza sagittata	WY930-11	348106
Balsamorhiza sagittata	OR030-223	348106
Balsamorhiza sagittata	OR030-225	348106
Balsamorhiza sagittata	UT933-57	348106
Balsamorhiza sagittata	UT933-58	348106
Balsamorhiza sagittata	UT933-105	348106
Balsamorhiza sagittata	UT931-173	348106
Balsamorhiza sagittata	UT931-222	348106
Balsamorhiza sagittata	WY050-68	348106
Balsamorhiza sagittata	ID931-310	348106
Balsamorhiza sagittata	ID931-311	348106
Balsamorhiza sagittata	OR050-133	348106
Balsamorhiza sagittata	WY040-87	348106
Balsamorhiza sagittata	UT933-104	348106
Balsamorhiza sagittata	ID931-236	348106
Balsamorhiza sagittata	OR130-64	348106
Balsamorhiza sagittata	OR030-96	348106
Balsamorhiza sagittata	UT931-172	348106
Balsamorhiza sagittata	CA370-122	348106
Balsamorhiza sagittata	WY090-54	348106
Balsamorhiza sagittata	WY100-34	348106
Balsamorhiza sagittata	OR030-290	348106
Balsamorhiza sagittata	NV030-560	348106
Balsamorhiza sagittata	NV030-596	348106

Balsamorhiza sagittata	WY080-7	348106
Balsamorhiza sagittata	OR130-86	348106

3. Dave Rhode, Desert Research Institute (DRI). Research use notes: Historical, Cultural and Anthropological Research. Analysis of plant remains from archaeological and paleoenvironmental sites in western North America. My research requires reference specimens for accurate identification of seeds, and these samples are exactly what I need.

Answers to Survey Questions:

1. *What was the quality of the plant materials you received?* Excellent.

2. *Did you release or commercialize any plant material(s) to the public in 2022 that was partially or fully derived from any NPGS plants that you received in 2022 or any time previously? If yes, please provide as much information as possible about the released plant material(s).* No

3. *If you published an article in 2022 that includes information from NPGS plants that you received in 2022 or earlier, please provide the publication citation (authors, title, journal, etc.).* (See below)

4. *Do you have any suggestions or feedback for the improvement of the NPGS system?* I find the NPGS system to be wonderful, responsive and easy to use. Many thanks!

Name	Accession	Order Request
Psorothamnus arborescens	CA170-104	349454
Ladeania lanceolata	WY930-67	349454
Psorothamnus polydenius	CA170-22	349454
Petalonyx nitidus	NV052-942	349454

4. Tsvetelina Stefanova, Researcher at the Desert Research Institute (DRI). Research use notes: Botanical/Taxonomic Investigations. I'm working in Tiffany Pereira's lab. Our research focuses on plant ecology, conservation ecology, and rare plant studies. These seeds will be used for a project that is funded by the BLM Seeds of Success program titled "A Novel Technical Guide for Mojave Plant Species: Using Traditional and Contemporary Scientific Illustration Techniques." The goal of this project is to develop a novel illustrated guide for identifying Mojave native and exotic plant seeds and germinating seedlings. The focus on young seedlings (cotyledons and first leaves) would be one of the first of its kind to assist in soil seed bank analysis, restoration projects, and identifying natural regeneration in the field. The hope is that the artwork of this unique project will not only provide a valuable tool for land managers and fellow researchers but also as a tool for public education for a wider audience.

Answers to Survey Questions: NONE

Name	Accession	Order Request
Stephanomeria exigua	CA930A-143	349277
Phacelia fremontii	NV040-305	349277
Lycium andersonii	NV052-682	349277
Dasyochloa pulchella	NV052-724	349277
Chylismia claviformis subsp. claviformis	CA930A-666	349277
Achnatherum speciosum	NV030-1389	349277
Acmispon strigosus	CA930A-853	349277
Ericameria cooperi	CA930A-907	349277
Lomatium parryi	NV052-801	349277
Scutellaria mexicana	CA650-01	349277
Acmispon rigidus	NV040-20	349277
Stephanomeria pauciflora	CA930A-76	349277
Lycium pallidum var. oligospermum	CA930A-544	349277
Yucca schidigera	NV052-572	349277
Anisocoma acaulis	CA170-176	349277
Sphaeralcea angustifolia	NV052-738	349277
Ambrosia eriocentra	NV052-887	349277
Psorothamnus fremontii	NV052-507	349277
Eremocarya micrantha	NV030-972	349277
Nicotiana attenuata	NV040-235	349277
Eremothera refracta	NV052B-112	349277
Euphorbia polycarpa	NV052-610	349277
Ambrosia salsola var. salsola	NV040-286	349277
Acmispon brachycarpus	NV052-615	349277
Eriogonum inflatum	NV052-923	349277
Gutierrezia microcephala	NV052-955	349277
Hilaria jamesii	CP3-209	349277
Asclepias erosa	CA660-39	349277
Descurainia pinnata	NV052-666	349277
Menodora spinescens	NV052-926	349277
Muhlenbergia porteri	CA930A-995	349277
Euphorbia micromera	CA930A-990	349277
Festuca octoflora	AZ930-338	349277
Phacelia distans	CA930A-884	349277
Pectis papposa	NV052-968	349277

2020 PUBLICATIONS:

1. Sarah C. Barga, Peggy Olwell, Fred Edwards, Leah Prescott, Elizabeth A. Leger. Seeds of Success: A conservation and restoration investment in the future of U.S. lands. Conservation Science and Practice. 2(7):e209 (2020). DOI: https://doi.org/10.1111/csp2.209.
2. Brugger, S.O. & Rhode, D. Impact of Pleistocene-Holocene climate shifts on vegetation and fire dynamics and its implications for Prearchaic humans in the central Great Basin, USA. Journal of Quaternary Science 35, 987-993 (2020).
3. Graf, K.E., Gore, A.K., Melton, J.A., Marks, T., DiPietro, L., Goebel, T., Waters, M.R. & Rhode, D. Recent excavations at Owl Ridge, interior Alaska: Site stratigraphy, chronology, and site formation and implications for late Pleistocene archaeology and peopling of eastern Beringia. Geoarchaeology- an International Journal 35, 3-26 (2020).
4. Rhode, D and Richey, AR. Plant macrofossils from Alta Toquima and starch remains from Alta Toquima and Gatecliff Shelter. Anthropological Papers of the American Museum of Natural History. 104, pp.353-371 (2020).

2021 PUBLICATIONS:

1. Goebel, T., Hockett, B., Rhode, D. & Graf, K. Prehistoric human response to climate change in the Bonneville basin, western North America: The Bonneville Estates Rockshelter radiocarbon chronology. Quaternary Science Reviews 260 (2021).
2. Rhode, D., Louderback, L.A. & Brugger, S.O. Holocene subalpine forest-parkland dynamics in Big Cottonwood Canyon, Wasatch Mountains, Utah, USA. Holocene 31, 502-510 (2021).

2022 PUBLICATIONS:

1. Madsen, D.B., Davis, L.G., Rhode, D. & Oviatt, C.G. Comment on "Evidence of humans in North America during the Last Glacial Maximum". Science 375(2022).
2. Rhode, D., Smith, G.M., Dillingham, E., Kingrey, H.U. & George, N.D. The Nye Canyon Paleo Site: an Upper Montane Mixed Fluted Point, Clovis Blade, and Western Stemmed Tradition Assemblage in Western Nevada. Paleoamerica 8, 115-129 (2022).

2023 PUBLICATIONS:

1. Bailey, LN; Pereira, TJ; Sion, BD; Kobelt, L; Gentilcore, D; Antoninka, A; Bowker, MA. 2023. Providing context for advancements in Arctomecon californica conservation: a comprehensive literature review with case studies. Western North American Naturalist. 83(4):525-549.
2. Mensing, S., Wang, W., Rhode, D., Kennett, D.J., Csank, A., Thomas, D.H., Briem, C., Harper, T.K., Culleton, B.J., George, R.J. & Southon, J. Temporal and geographic extent of the late Holocene dry period in the central Great Basin, USA. Quaternary Science Reviews 300 (2023).
3. Oviatt, C.G., Madsen, D.B., Rhode, D. & Davis, L.G. A critical assessment of claims that human footprints in the Lake Otero basin, New Mexico date to the Last Glacial Maximum. Quaternary Research 111, 138-147 (2023).

4. Thomas, D.H., Rhode, D., Millar, C.I., Kennett, D.J., Harper, T.K. & Mensing, S. Great Basin Survivance (USA): Challenges and Windfalls of the Neoglaciation / Late Holocene Dry Period (3100-1800 cal BP). American Antiquity 88, 402-418 (2023).

New Mexico, Naveen Puppala

There have been three requests in New Mexico.

1. Dr. Charles Havlik from NMSU Ag. Science Center in Los Lunas

Watermelon, Corn & Beans

Purpose: Public education, demonstration and research use

2. Ms. Tara Jernigan – Educator from Lovington

Lettuce – *Lactuca sativa*

Purpose: Class instruction and garden for kids

3. Ms. Kristen Tran – Ledox highland farm from Mora

Alfalfa - *Medicago sativa* sub species *sativa*

Purpose: Research use

Oregon, Shaun Mehlenbacher – Not present and no report.

Utah, Kevin Jensen

In 2023, Utah had 4 requests and a total of 19 accessions distributed. One of those requests was for looking at different species for monarch butterfly habitat at the University of Utah. Daniel Winkler received the most accessions, and they were of bulbous bluegrass and Western wheatgrass. He is with the Forest Service, and they were looking in cup studies to see if these two species could compete with cheatgrass. In 2020, there were 2 request and a total of 39 accessions distributed. These accessions went to BYU and Utah State for research purposes.

Washington, Per McCord

2020 Report

Overview

- Number of requestors: 108
- Number of orders: 191
- Number of items: 9280
- Number of responders: 24 (22%)- No 2nd email sent this year
    - Bad email addresses: 9

Representation:

- US State agencies (1) and all universities (29): (5 responses)
- Federal: 12 (5 responses)
- US Commercial Company: 20 (9 responses)
- Individual/non-profit: 46 (5) responses)

Total publications: 2 (including 1 submitted)

Highlights from 2020:

Solanum microdontum- Two accessions with *Liberibacter* resistance (USDA-ARS TTFVRU, Wapato)

Solanum chacoense, *Solanum tuberosum*- Introgression of self-compatibility, extraction of dihaploids from tetraploid breeding lines (USDA-ARS TTFRVU, Prosser)

Medicago spp. (too many to list ☺)- Development of improved germplasm with *Phoma medicaginis* resistance; development of DArTag DNA marker platform (USDA-ARS NTFLGRU, Prosser)

Phaseolus acutifolius, P. vulgaris- Identification of novel *Pseudomonas* resistance (Storm Seeds)

Malus domestica- Identification of apple cultivars suited for maritime climates (Muscle and Arm Farm, Whidbey Island)

2023 Report:

Overview

- Number of requestors: 108
- Number of orders: 120
- Number of items: 5724

Representation:

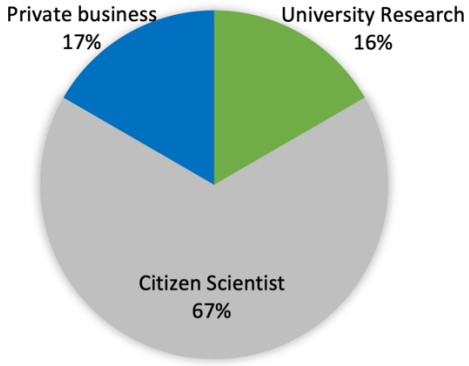
- US State agencies (1) and all universities (29): (5 responses)
- Federal: 12 (5 responses)
- US Commercial Company: 20 (9 responses)
- Individual/non-profit: 46 (5) responses)

- Total publications: 2 (including 1 submitted

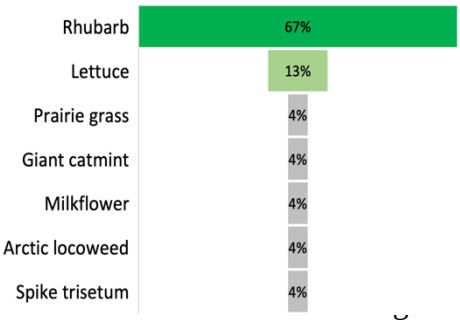
Alaska, Jakir Hasan

Summary

- The Western Regional Plant Introduction Station (WRPIS) received six requests between 2019 and 2022. The majority (67%) of the requests came from citizen scientists. These requestors intend to use the accessions for breeding and research.



- Alaskans received seeds for 24 accessions, which belonged to seven crop types. Rhubarb was the most requested germplasm, followed by lettuce.



Alaska 2019 germplasm requests

In 2019, the Western Regional Plant Introductio germplasm requests from three different Alaskan residents numbers 310564, 313318, and 315475. All three individu germplasm for plant breeding purposes. To fulfill the requests, the WRPIS distributed a total of 12 accessions of rhubarb (*Rheum rhabarbarum* L.), three accessions of *Lactuca sativa*, and one accession of *Sporobolus compositus*.

As part of the yearly reporting procedure, an email was sent to all three recipients of the germplasm with three questions.

- Did you receive the seeds in good condition?
- How did you utilize the seeds in your work or program?
- Do you have any suggestions on how Genebank can improve its services?

Responses from the recipients are below;

Requestor: Dr. Danny Barney, a retired USDA/ARS Scientist Geography: Wasilla, Alaska, USA, 99654
Affiliation: Private plant breeder. US Commercial
Company e-mail: dbarney53@outlook.com, phone: 515-520-9474 Order request ID: 310564; Web Order ID: 31520
Intended use note: Variety development, research use only.
Status on e-mail request for information: Dr. Barney's response is below;

Between 2017 and 2020, Dr. Barney made seven requests for germplasm from Pullman and Corvallis. The requests were for rhubarb (*Rheum* ×*rhabarbarum* L.) and black and red currants (*Ribes spicatum*, *Ribes aureum* Pursh, *Ribes nigrum* L., *Ribes petraeum* Wulfen, and *Ribes rubrum* L.). Dr. Barney also requested a total of 79 items from NCGR, and 70 of them were shipped. Thirty-five of the items were *Ribes* hardwood cuttings from Corvallis, and 44 of

the items were *rheum* cuttings from Pullman.

There was some duplication with the orders due to the failure of some clonal accessions to establish. For the W6 rhubarb collection, 21 accessions were shipped, 19 were established in his breeding plot, and 2 accessions failed to establish. In one case, the NCGR accession failed repeatedly to establish, and Dr. Barney obtained what he believed was the same clone from the original donor. The first *Rheum* shipment from W6 was caught in a mixup with the US Postal Service, and the cuttings were left in a hot mailbox for several days, causing extensive soft rot. A second shipment was more successful, and Dr. Barney established a breeding plot using the cuttings.

The rhubarb cuttings are very susceptible to soft rot, and successful distribution requires close coordination with and excellent communication between the curator and requestor during the shipping. Whether the U.S. Postal Service or a private carrier is employed, the requestor requires the ability to track shipments. In all cases, The W6 curator and technical staff were very helpful and did all that could be reasonably expected of them. Having curated the *Rheum* collection myself, I know the challenges involved in propagation and distribution.

Ribes hardwood cuttings received from Corvallis failed to root. However, Dr. Barney was able to access the NCGR plants from the Arctic and Subarctic Plant Gene Bank, which he had

donated to Dr. Pat Holloway, then professor of Horticulture at UAF. Dr. Holloway maintained the *Ribes* in plots at the Georgeson Botanical Garden in Fairbanks. The softwood cuttings which Dr. Barney obtained established very well and provided 9 black currant and 6 red currant cultivars. Dr. Holloway subsequently provided Dr. Barney with three additional *Ribes* clones, and he was able to purchase 10 additional cultivars from commercial nurseries.

Dr. Barney is attempting to breed highly uniform and vigorous Rhubarb cultivars adapted to Southcentral and Interior Alaska for either or both juicing and/or baking. With *Ribes*, Dr.
Barney is attempting to breed black currant cultivars with improved culinary and horticultural traits and adapted to Southcentral and Interior Alaska. Dr. Barney has elected not to pursue red currant breeding.

Dr. Barney's breeding plots now consist of the following clones/cultivars. Accessions marked with an asterisk (*) are from or derived from NCGR collections.

Rhuem

1. Cawood*
2. Chipman*
3. Crimson Cherry RB5*
4. Crimson Cherry RB39*
5. Penn State #3*
6. Crimson Wine*
7. German Wine morphotype 1*
8. Goliath*
9. Johnson's St. Martin*
10. Kerwin*
11. MacDonald
12. McDonald*

13. North Pole*
14. OR23*
15. Victoria
16. Ruby*
17. Sunrise*
18. Sutton*
19. Sutton Seedless*
20. The Sutton*

Ribes nigrum

1. Ben Alder*
2. Ben Hope
3. Ben Nevis*
4. Ben Sarek
5. Blackdown
6. Black Reward*
7. Boskoop Giant
8. Coronet*
9. Crusader*
10. Daniel's Black September*
11. Goliath*
12. Melelahti
13. Minaj Smyrev
14. Nikkala XI
15. Strata*
16. Swedish Black*
17. Titania

Requestor: Brett Merrow
Geography: Nikiski, Alaska, USA, 99635
Affiliation: US Individual, no affiliation
e-mail: brett.merrow@gmail.com, phone: 907-513-2633
Intended use note: Variety development, research use only
Order request ID: 313318; Web Order ID: 33156

Status on e-mail request for information: No response
Requestor: Mr. Aaron Brothers
Geography: Anchorage, Alaska, USA, 99503
Affiliation: US Individual, no affiliation
e-mail: capttripppp@gmail.com, phone: 907-251-6408
Intended use note: Variety development, research use only
Order request ID: 315475; Web Order ID: 34510

Status on e-mail request for information: No response

Alaska 2020 germplasm requests

In 2022, the Western Regional Plant Introduction Station (WRPIS) received one germplasm request (Order number 322690) for a line of giant catmint (*Nepeta grandiflora*). The requestor intends to use the germplasm in research to find the optimal species for the local rainforest climate.

As part of the yearly reporting procedure, an email was sent to the recipient with three questions.

- Did you receive the seeds in good condition?
- How did you utilize the seeds in your work or program?
- Do you have any suggestions on how Genebank can improve its services?

Requestor: Betty Tsai
Geography: Sitka, Alaska, USA, 99835
Affiliation: US Individual, no affiliation
e-mail: bhdw@hotmail.com, phone: 907-830-5484
Intended use note: Research use only - find the optimal species for the local rainforest climate.
Order request ID: 322690.

Status on e-mail request for information:

The requestor received the seeds in good condition but lost them due to unforeseen circumstances and could not use them in her research.

Alaska 2022 germplasm requests

In 2022, the Western Regional Plant Introduction Station (WRPIS) received two germplasm requests from two Alaskan residents, identified as 341268 and 345080. Both showed an interest in utilizing the germplasm for plant breeding. To fulfill the requests, the WRPIS distributed five accessions, including one for each of *Oxytropis arctica* var. *koyukukensis*, *Angelica lucida*, and *Trisetum spicatum*, and five accessions for rhubarb (*Rheum rhabarbarum* L.).

As part of the yearly reporting procedure, an email was sent to both recipients of the germplasm with three questions.

- Did you receive the seeds in good condition?
- How did you utilize the seeds in your work or program?
- Do you have any suggestions on how Genebank can improve its services?

Requestor: Erika Wolter
Geography: Chugiak, Alaska, USA, 995567-2614
Affiliation: US Individual, no affiliation
e-mail: twoalaskanrivers@gmail.com, phone: 907-390-7139
Intended use note: Variety development, research use only
Order request ID: 341268; Web Order ID: 54175

Status on e-mail request for information:

Ms. Wolter received all seeds in great shape. Ms. Wolter is working with a researcher at the Experiment Farm on a project looking at rhubarb genetics. They are trying to find unique

varieties that can then be sent into the national collection for preservation and further research. The rhubarb crown sections are part of that effort. Ms. Wolter is comparing their performance with 25 or so additional varieties she collected (and are currently being genotyped). The plants Ms. Wolter received are doing wonderfully despite the wild weather.

Ms. Wolter is also heavily involved in the Alaska Native Plant Society - specifically when it comes to seeds and germination of native plants. She was hoping the seeds she received would germinate this Spring so that she could share with others (to expand knowledge and the number of folks growing native plants) sooner. Unfortunately, nothing as of early August 2023. However, she thinks this is not uncommon with native varieties. She may request a second set to try a different growing medium. Ms. Wolter also observed seeds planted in pots 3 years ago germinate but only in one specific medium.

Ms. Wolter is interested in having the option to pay for shipping, as this would allow funds to be allocated towards the important work being done by USDA-GRIN.

Requestor: Jakir Hasan
Geography: Fairbanks, Alaska, USA, 99775
Affiliation: University of Alaska Fairbanks
e-mail: mjhasan@alaska.edu, phone: 907-474-4618
Intended use note: Research use only
Order request ID: 345080; Web Order ID: 58230
Status: A single accession of *Trisetum spicatum was* received from WRPIS. This accession is currently being phenotyped in the greenhouse.

Hawaii, Ahmad Amjad

2020 ORDERS:
Two orders (42 accessions) were placed in 2020 . The two orders were from the University of Hawaii.

Species: *Pisum sativum* and *Phaseolus vulgaris*. The two orders were for genotype evaluation studies.

2023 ORDERS:
Three orders (15 accessions) were placed in 2023. Two were from the University of Hawaii and one order was from the National Tropical Botanical Garden.

Species: *Phaseolus vulgaris*, *Lactuca sativa*, and *Bidens spp*. Two orders are for genotype evaluation and one for morphological studies.

Quality: All orders were received in perfect condition.

Outcomes:
Funds:

- $40,000 Specialty Crop Block Grant to trial melons locally using GRIN genotypes for preliminary data.

Publications:

- Gerry Herbert and Nancy Redfeather. 2023. Growing Table Grapes in Subtropical Hawaii

Using Organic Practices. https://www.kawanuifarm.org/aloha-grape-lovers.

- Ahmad, A.A.; Radovich, T.J.K.; Sugano, J.; Wang, K.-H.; Nguyen, H.V.; Uyeda, J.; Wages, S.; Tavares, K.; Kirk, E.; Kantar, M. Evaluating the Yield of Three Legume Crop Varieties under Hawaii's Micro-Climates. Crops 2024, 4, 242–255. https://doi.org/10.3390/crops4020018.

Issues:

- One small issue was with the request of two accessions listed in GRIN for *Crescentia cujete* (the calabash tree). Requested both accessions for variation. One curator wrote back to say that their tree had never produced fruit and they didn't know why it was listed in NPGS (as of today both are still 'available' in GRIN). The other curator was amicable and sent me seeds but they arrived slightly moist with mold growing and did not germinate - one of the challenges of working with a more unusual species with fewer well-defined protocols for seed handling. As this tree gets harder and harder to find, but remains an important part of the local cultural legacy. It would be great to see a backup of the two accessions to the Repository at PBARC
- A pepper that was believedto be the parent to Ka'ala and Waialua and it came in with a virus. Hesitant to plant it for risk of introducing new virus to Hawaii.

Testimony:
Dr. James Keach: "*I want to emphasize what a critical role the NPGS plays in research and breeding, both for myself and for others I work with. I see accessions from trials later being offered commercially for a range of crops and, as my own small projects indicate, there are vitally important sources of resistance to modern pest and disease threats. This is an incredible scientific resource and truly one of the gems of the US's investment in agriculture.*"

Wyoming, Donna Harris

2020 Orders:

Use: Education

- Smith, Isaiah, Cheyenne Botanic Gardens
  - Winterfat, onion, common bean
  - Showcase unusual species
- Cowan, Sarah, Cowan Flowers
  - 22 different species
  - Pollinator gardens, specifically Monarch Butterfly habitat species
  - Teaches classes to adults and children

Use: Research

- Arrington, Matthew, Plenty Unlimited Inc
  - Bog Bilberry (Blueberry) (2)
  - Potential for indoor agriculture breeding efforts
- Arrington, Matthew, Plenty Unlimited Inc

    - Rubber Dandelion (5)
    - DOD research project
- Temte, John, CO2 Sync Inc.
    - Kentucky Bluegrass (20)
    - SBIR Grant looking at root growth

2023 Orders:

Use: Research

- Harris, Donna, University of Wyoming-Sheridan R&E Center
    - 370 accessions of alfalfa
    - Weevil resistance and quality traits
- Vinarao, Grace, University of Wyoming-Sheridan R&E Center
    - Prairie junegrass, Idaho fescue, Bluebunch wheatgrass
    - Genetic diversity compared to local collections from NE Wyoming
- Akiina, Price, University of Wyoming – Sheridan R&E Center
    - Popping bean parents for RIL population in development
- Barth, Mckenzie, University of Wyoming
    - Intermediate wheatgrass/Kernza
    - Herbicide dose response

Arizona, Glenn Wright

There were nine orders placed in 2020. Twenty-two percent of these orders went to US companies, another 22% went to US state agencies and Universities, and 56% went to US individuals with no affiliation. In 2023, there were 6 orders places with 33% of these orders going to US companies, 50% going to US state agencies and Universities, and 17% went to US individuals with no affiliation. In both years, the largest use of the seeds was for variety development, genetic studies, and plant pathological investigations. In a survey of those that ordered seed it seemed that they are unaware of the limited resources that are available and that it is not feasible to increase accessions every year or every few years.

2023 Meeting Minute Approval

Meeting minutes from 2023 meeting were handed out.

- Joseph Kuhl made the motion to approve the 2023 minutes
- Ahmad Amjad seconded the motion
- No discussion
- 2023 meeting minutes were approved unanimously.

Tara McHugh – ARS PWA Area Director (ARS Pacific West Area Director)

Tara provided the committee with an update around infrastructure within ARS. There are many facilities within ARS that are in need of repair and funding. A new metric is in place for maintenance of infrastructure. There is a new building in Pullman that will be used by ARS and

WSU. A stakeholder meeting was held in Prosser, WA earlier this year and the need for infrastructure improvements there was consistently brought up. In the process of looking into the idea of changing Prosser from a work site to a location. This will give Prosser more opportunity for funding. Tara and Marilyn looking into a geothermal project for next year to help save energy at Pullman.

ARS Site Highlights in Western Region

Five-minute updates were given by Harold Bockelman (NSGC, Aberdeen, ID), Lauri Reinhold (NCGR, Corvalis, OR), Claire Heinitz (NCGR/NALPGR, Davis/Parlier, CA), Gayle Volk (NLGRP, Ft. Collins, CO), Tracie Matsumoto (TPGRD, Hilo, HI), Robert Krueger (NCGRCD, Riverside, CA), and Gary Kinard (NGRL, Beltsville, MD).

Introduction to stakeholders at meeting was made by Marilyn

An introduction of the stakeholders that were present was made. Peter Ballerstedt (retired from Barenbrug USA) and Anna Murphy (Executive Vice President of the Beet Sugar Development Foundation & American Society of Sugar Beet Technologists). A discussion on how the NPGS can gather input from the stakeholder liaison council on meeting their needs followed. Anna mentioned that maybe there is an opportunity for private seed companies to help with increasing accessions. Resources need to be put toward traits that stakeholders need and data collection methods/rating scales need to be standardized.

Discussion of new format for future W-6 meetings

Every other year the W6 meeting will be in Washington. The other year will be somewhere else. There will also be a virtual option every year. Would it be possible to get this meeting down to a day. Maybe one day of meetings and then another half day for tours. Site updates could be recorded, but representatives from each state should be live presentations.

Meeting adjourned for the day and location facilities tour followed at the following places.

Location Facilities tour

1) FRR labs and greenhouses (Shaun Bushman)

2) Compound (Kevin Jensen and Craig Rigby)

3) Evans Farm (Blair Waldron and Dylan Mills)

Day 2, July 10th, 2024 (8:00 a.m. to 12:30 p.m. Mountain Time)

Location: USDA ARS Forage and Range Research Unit, Utah State University, 696 North 1100 East, Logan Utah and virtually via Zoom.

Virtual Zoom

Research Presentations

Research presentations were given by Erin Tullius from Forage Genetics and by Kevin McPhee from Montana State University. The emphasis in both presentations was on the accessions that have been obtained from Pullman and how they have been deployed in the breeding programs.

Business Meeting

WRPIS Station Report, Marilyn Warburton

Highlights

There are 102,127 accessions belonging to 997 genera, 4616 species (5268 taxa) in the WRPIS collection. W6 has 16% of the active NPGS accessions.

• W6 acquired 699 new accessions including 586 native plant accessions collected by the Seeds of Success (SOS) project, 1 accession of *Phaseolus acutifolius*, and 112 expired IPR/CSR accessions from NCGRP. W6 transferred 89 accessions to active curatorial programs at other sites from the SOS native seed collection.

• W6 distributed a total of 39,212 packets of seed samples in 730 orders to 555 unique requestors. These included shipments to 40 foreign countries (representing 44% of the distributions) and 47 US states, Puerto Rico and the District of Columbia. 8,669 of these items went to 12 of the 13 western states (none went to Alaska).

• W6 uploaded 1636 observation data points for 941 accessions and 653 images for 435 accessions into the Germplasm Resources Information Network (GRIN)-Global database.

• W6 entered 1611 seed viability records into GRIN-Global during the reporting period. The National Laboratory for Genetic Resource Preservation (NLGRP) in Fort Collins, CO tested 1282 accessions and 329 were tested by our germination lab.

• W6 shipped 892 seed inventories to the National Laboratory for Genetic Resource Preservation (NLGRP), Fort Collins, CO. As of April 1, 2024: 78% of the W6 Germplasm collection is available to distribute and 80% of the W6 germplasm collection has a back-up inventory.

Personnel

Several few key personnel changes occurred in both the federal and state-funded projects in CY 2023 and the first few months of 2024. The open plant technician position (WSU) in seed storage was filled by KungFang Chiang, and the open position in seed cleaning/seed storage (WSU position) was filled by Madison Hatley. In Prosser, the departure of the W-6 funded temperateadapted forage legume Technician left a vacancy now filled by Adriana Cifuentes. The ARS term Farmer in Central Ferry departed, and the position is temporarily being filled by Wyatt Keller, whom we hope to make permanent soon. The long running vacancy in the Unit's ARS funded IT Specialist position (since 2020) was re-advertised, and candidates were interviewed for a second time. Several offers were made, and one is now pending security check and onboarding. The Horticultural Crops miscellaneous open Technician position (ARS) was replaced by a WSU (W-6) funded person (Sam Charpentier). With the departure of the WRPIS Farm Manager, the position was shifted from a WSU staff person to an ARS staff (Scott McGee), a veteran WRPIS person with the necessary experience. The Farm Assistant is now Griffin Stauffenberg (WSU). The Cool Season Food Legume Curator (ARS, Clarice Coyne) retired, and the position is currently vacant. The Alfalfa Research Geneticist (ARS, Long-Xi Yu) also retired, and the position is currently vacant. The Phaseolus (bean) Technician departed, and

the position is being filled temporarily by Lauren Schutt (ARS). The pathology and laboratory manager position retired, and the position is being temporarily filled by Scott Mattinson (WSU) whom we hope to shift to the permanent ARS position soon.

Program Opportunities and Challenges

- Working with WSU to identify more field space in Pullman to replace that lost to the airport expansion and WSU Grass Ecology farm (2016 and 2019).
- The NPGS Strategic Plan highlighted increased pace of seed regenerations is needed to keep collections from dying; more field, greenhouse and growth chambers would be needed for that.
- Current lab space in our temporary quarters in Clark Hall is too small so some projects put on hold until new building completed in Feb. 2026. Lab space in Prosser need upgraded.
- Cold room and freezer space for collections full and inadequate but new space will be available in the new ARS building.

Research and Service

- Presented research as oral or poster presentations (some virtual) at 7 scientific conferences
- Published 23 peer reviewed scientific journal and/or book chapters.
- Reviewed research proposals for funding agencies and participated as subject matter experts in peer-reviews (grants, hiring committees, manuscripts reviews).
- Hosted 12 groups of students or stakeholders in tours of the farm, seed cleaning, seed storage, laboratory and greenhouse facilities at Pullman, Prosser, and Central Ferry
- Attended 17 meetings with stakeholders including private companies and growers, university scientists and administrators, non-profit, and national and international government groups
- Participated in 5 exchange visits to other facilities or hosted others to ours

Other Accomplishments

- NP215 5-year Project Plan approved by the Headquarters and Office of Scientific Quality, and we are operating on the new plan
- Repair and Maintenance:
    - Replaced cooling pads on Pullman GH14-44 and both Central Ferry GHs
    - Replaced Plant Intro bubble house and Central Ferry GH coverings
    - LED greenhouse lighting for multiple GH bays (slowly replacing all lights)
    - Replaced the irrigation system at the Pullman Plant Intro farm
    - Rebuilt expanded irrigation system in GH 109A
    - Installed new rolling curtains on screenhouse 109B west
    - Replaced Pullman Farm shop lights

Stakeholder Relations

- Have had 9 group stakeholder meetings in FY24 (primarily alfalfa, sugar beets, pulses, grasses, and native species)
- Liaising with WSU and ARS on the 3 former alfalfa research positions at IAREC (vice Yu and 2 WSU positions)
- Planning a field day at the Pullman Plant Introduction Farm in summer 2025
- Unit and program 1 pagers have been created

Outreach

- Eleven groups of students or stakeholders came to tour the farm, seed cleaning, seed storage, laboratory and greenhouse facilities at Pullman, Prosser, and Central Ferry
- Guest lectured for 2 university courses
- Reviewed research proposals for funding agencies and participated as subject matter experts in peer-reviews (grants, hiring committees, manuscripts reviews)
- Planted The People's Garden on the Pullman Plant Intro Farm to benefit local food pantries
- Hosted 1 short term PhD student from IITA in Nigeria
- Hired ~25 undergraduate students and hosted 2 student interns

Facilities Spending Plan

- Of the $1.55 million for the Pullman location:
- In FY24, we expect to spend ~$115,000 on repairs, and in FY25 we could spend over $431,500 if we had it.
- Older greenhouses and screenhouses have benefited from increased attention in recent years. Next year we will concentrate on:
- GH102 in Prosser, WA (reskinning with Lexan)
- Headhouse 114-44, where the pathology screens are set up, inoculated, and scored, and provides storage for the pathology and one bean greenhouse
- Central Ferry farm drying shed HVAC and geothermal heating of greenhouses
- If funding exists, we need to upgrade the security system (cameras, digital locks and service) for the seed storage building (ARS safety and security assessment, March 2024).

RTAC Nominations for Secretary - 2025 meeting date/site

A nomination for secretary of the RTAC for 2025 was made. The representative from Alaska, Jakir Hasan, was nominated. The motion was made by Michael Giroux and seconded by Joseph Kuhl. All voted in favor.

Pullman, Washington was nominated at the site for the 2025 meeting. This motion was made by Joseph Kuhl and seconded by Donna Harris. All voted in favor.

The meeting is planned for the last full week of June (June 23rd) tentatively (Wednesday and Thursday, June 25th and 26th).

Marilyn then discussed the NPGS Plan which was directed by the 2018 Farm Bill and what is in it and where it stands now.

The meeting was adjourned at 12:31 pm.