**Agenda**

**Western Regional Committee Meeting (WERA027)**

Thursday, February 3, 2022

Chair: Isabel Vales

Vice-Chair: Zach Holden

Secretary: Solomon Yilma (acting secretary Vidyasagar Sathuvalli)

Online moderator: Jeewan Pandey

* Call to order
* Introductions
* Approval of Agenda
* Approval of minutes from the 2021 committee meeting
* State Reports
  + Idaho, Oregon, Washington (covered in Tri-State meeting)
  + California
  + Colorado
  + Texas
* Administrative Report
* WERA027 administrative roles and responsibilities
* Break
* Regional early/late Russet results
  + Field, post-harvest, and clone disposition
* Regional specialty results
  + Field, post-harvest, and clone disposition
* Regional chipping trial
  + Field, post-harvest, and clone disposition
* Databases
* Related proposals
* Proposed variety releases - discussion
* Seed supplies and shipping lists
* Election of new Secretary
* Discussion of location for 2023 committee meeting
* Adjourn meeting

**2022 - Western Regional Committee Meeting (WERA027) Minutes**

**(Online meeting via Zoom)**

Chair Isabel Vales (Texas A&M) called the meeting to order at 1:00 pm (PST).

Introduction: The Chair requested all participants to provide their name, institution, e-mail address for attendance recording. Dave Holms (Colorado) introduced Colorado State University’s newest potato breeder Jessica Chitwood-Brown.

Approval of Agenda: A motion to approve the agenda was brought by the Chair. Motion to accept the agenda moved by Rhett Spear (University of Idaho) and seconded by Sagar (Oregon State University): vote was unanimous.

Approval of minutes from the 2021 meeting: The Chair requested a motion to approve the minutes. Dave Holm moved to accept the minutes and it was seconded by Mike Thornton (University of Idaho).

**State Reports:**

The Chair asked the Tristate group if there were changes to the tristate reports submitted earlier in the tri-state meeting. The tristate representatives from Idaho, Oregon & Washington confirmed no changes in their reports. The minutes of the tristate meeting are included at the end of this report.

**California** report was requested by the chair. No written reports submitted. Rob Wilson (California) informed to the group that both Tulelake & Kern sites will continue to collaborate with southwest regional trials.

**Colorado:** Dave Holm presented the following written report.

**Colorado Potato Breeding and Selection Program - 2021**

* **Breeding and Selection Program**

The Colorado Potato Breeding and Selection Program intercrossed 98 parental clones in 2021 in two separate crossing blocks. The emphasis of the first crossing block was russet (fresh and processing) and yellow cultivar development with emphasis on PVY resistance. The second crossing block also emphasized russet (fresh and processing) and chip cultivar development again with an emphasis on incorporating PVY resistance. Seed from 136 combinations was obtained.

A subset of 226 crosses from 2020 were planted in the greenhouse in 2021 to produce seedling tubers. These progenies are currently being harvested. These seedlings will undergo initial field selection in 2022. These families represent crosses segregating primarily for russets, reds, along with PVY resistance. Second- through third-size seedling tubers will be distributed to Idaho (USDA-ARS), Maine, Oregon, Texas, Minnesota, and Agriculture Agri-Food Canada.

Colorado grew 87,966 in the field representing 529 families in 2021, with 600 selected for subsequent planting, evaluation, and increase in future years. A portion of these seedlings were obtained from the USDA-ARS (Aberdeen, Idaho), Texas A&M University, Oregon State University, and the University of Maine.

Another 713 clones were in 12-hill, preliminary, and intermediate stages of selection. At harvest, 192 were saved for further increase and evaluation in 2022.

Thirty-eight advanced selections were saved and will be increased in 2022 pending further evaluation. Another 257 selections and cultivars were maintained for germplasm development, breeding, and other experimental purposes including seed increases/maintenance.

Field trials conducted in 2021 included: Preliminary Trial, Intermediate Yield Trial, Intermediate Yield Chip Trial, Intermediate Specialty Yield Trial, Advanced Yield Trial, Advanced Fingerling Yield Trial, Southwestern Regional Russet Trial, Southwest Regional Chip Trial, Southwest Regional Specialty Trial, Western Regional Russet Trial, Western Regional Red Trial, Western Regional Specialty Trial, Western Regional Chipping Trial, and the San Luis Valley Chipping Trial. All trials are grown under “low input” conditions, primarily for reduced nitrogen and fungicide.

Based on pedigree analysis, 100, mostly 2nd selections were screened for sto, adg, and chc markers associated with PVY resistance. Results are pending.

A total of 147 samples are in the process of being evaluated for two or more of the following postharvest characteristics: blackspot susceptibility, storage weight loss, dormancy, enzymatic browning, specific gravity, French fry color, French fry texture, and chip color. Advanced red selections were screened for red color retention in storage.

Several advanced selections were evaluated in the Southwest Regional Trials, Western Regional Trials, or by potato growers in 2021 representing russets, yellows, specialties, and chipping selections. Advanced Colorado selections evaluated in the Southwest Regional Trials and Western Regional Trials were six russets (AC12080-4RU, AC12090-3RU, CO10085-1RU, CO11009-3RU, CO12378-1RU, CO13003-1RU), two yellows (CO11250-1W/Y, CO11266-1W/Y), and seven chippers (AC11494-6W, CO11023-2W, CO11037-5W, CO12235-3W, CO12293-1W, CO13232-5W, CO13232-25W). Status of these selections will be determined at upcoming meetings with regional collaborators and growers.

PVP for six selections are pending. They are CO00277-2R (Canada Rose), CO97087-2RU (Maritime Russet), CO98067-7RU (Nonpareil Russet), AC05175-3P/Y (Columbine Gold), CO05068-1RU (Rocky Mountain Russet), and CO05037-3W/Y (Vista Gold).

We are also considering naming and protecting two russet selections soon. They are CO05189-3RU and CO08231-1RU.

* **Publications**

Emragi, E., Holm, D. G., Jayanty, S. S. 2021. The effect of field heat reduction methods on fresh and processing qualities of red and russet potato cultivars. Journal of Food Science and Technology 6:345-355 (online).

Hamed, M., Holm, D. G., Bartolo, M., Raigond, P., Sathuvalli, V., and Jayanty, S. S. 2021. The bioaccessibility of phenolics, flavonoids, carotenoids, and capsaicinoid compounds: A comparative study of cooked potato cultivars mixed with roasted pepper varieties. Foods 10:1849. https://doi.org/10.3390/foods10081849

Jansky, S. H., De Jong, W. S., Douches, D. S., Haynes, K. G., and Holm, D. G. 2021. Cultivar improvement with exotic germplasm: An example from potato. In The Wild Solanums Genomes. Compendium of Plant Genomes, eds. Carputo D., Aversano R., Ercolano M.R. 215-230. Springer, Cham.

Pandey, J., Scheuring, D. C., Koym, J. W., Coombs, J., Novy, R. G., Thompson, A. L., Holm, D. G. Holm, Douches, D. S., Miller, J. C. Jr., Vales, M. I. 2021. Genetic diversity and population structure of advanced clones selected over forty years by a potato breeding program in the USA. Scientific Reports 11: 834

**Texas:** Isabel Vales presented the following written report

TEXAS A&M UNIVERSITY POTATO BREEDING PROGRAM – 2021 REPORT SUMMARY

(Full Report: <https://potato.tamu.edu/reports/>)

* First year seedlings tubers (68,071), resulting from 448 different full-sib families, were grown for selection on the Barrett Farm (17,889) near Springlake and on the CSS Farm (50,182) near Dalhart. Some 534 original selections were made (0.9% selection rate). Out of 538 second-year clones, 46 were selected (8.6%).
* We received seedling tubers from the Idaho (20,194), Colorado (15,384), and North Dakota (11,157) breeding programs.
* We produced 59,925 tuberlings in the greenhouses at College Station and Lubbock from true seed. We planted 22,213 in Texas and shared second and third sizes with Idaho (5,034), Colorado (17,609), North Dakota (10,338) and Minnesota (5,731).
* In the 2020-21 crossing block we included 80 parents with a 23.7% crossing success rate which produced 219 families. Approximately 61,368 true seed were produced (average family size was about 280).
* Trials were conducted at Springlake (summer crop – planted March 30-April 2 harvested July 19-29) and Dalhart (fall crop– planted May 2-6 and harvested September 14 and 15) - 1,270 advanced selections/new cultivars were evaluated in 15 trials.
* Southwestern and Western Regional Trials were conducted at both Springlake (Russet, Red/Specialty, and Chip) and Dalhart (Chip, Russet, and Red/Specialty).
* We entered two selections (AORTX09037-1W/Y and COTX10118-4Wpe/Y ) in the Western Regional Red/ Specialty Trial and one selection in the Western Regional Russet Trial (TX13590-9Ru). The Program also entered one selection in the Southwest Regional Russet Trial (COTX08063-2Ru). The SW meeting was celebrated on January 27, 2022.
* The Texas Program had nine entries (NDTX14263BC-3W, TX17846-1W, ATTX10333-1W/Y, COTX16054-1Ru, NDTX14247CAB-1W, NDTX14247CAB-2W, TX12484-3WZC, ATX13134-3W/Y, and NDTX1482YB-1W) in the Potato USA National Chip Processing Trial. Nine entries (ATX15325-3W/Y, COTX16013-5W, COTX17286-6W, COTX17288-1W, COTX17288-3W, COTX17288-4W, TX18042-1Ru, TX18119-1Ru/Y, and TX18170-4W) were entered in the Early Generation Southern Selection Trial.
* One clone, COTX08063-2Ru, was evaluated in National French Fry Processing Trials.
* The Texas Potato Field Day was held on July 28, 2021, on the Barrett Farm near Springlake (37 participants). The 2021 Field Day Handbook eEdition is available at potato.tamu.edu
* Zebra chip (ZC) tolerant clones were used as parents in the crossing block. A trial including eighteen advanced chipping clones was conducted in Weslaco to test ZC tolerance under natural (no insecticide used) field conditions. The hard Winter freeze negatively impacted this trial.
* Emphasis on virus testing and clean-up continued. We introduced 32 new potato clones in tissue culture in 2021.
* We had three Ph.D. students: Jeewan Pandey working on genetic diversity and GWAS, Sanjeev Gautam on heat stress, and Ao Jiao on dormancy. Jeewan was selected as NAPB Borlaug Graduate Scholar and finished his Ph.D. in July. A new Ph.D. student, Amaka Ifeduba, received an international Borlaug Fellowship and was accepted into the Program.
* We had four undergraduate students. One of them, Brianna Cheek was selected as NAPB Borlaug Undergraduate Scholar.
* The Texas Russet Norkotah strains continue to be the prevalent varieties planted in Texas. Potato yields in Texas remain among the highest in the nation (440-465 cwt/a) in the summer crop producing states.
* Texas varieties entered in seed certification, in 2021, comprised 9% of the total US seed acreage. Out of them, the Texas Russet Norkotah selections (TXNS112, TXNS223, TXNS278, and TXNS296) collectively ranked third (in acreage) among all varieties accepted for seed certification in 2021 and represented 70.2% of all US Russet Norkotah seed acreage.
* Reveille Russet continues gaining rapid acceptance in the US (23 licensees in eight US States and Canada). Research areas related with this variety include acceleration of skin set and management of long dormancy to improve seed germination.
* The Vanguard Russet manuscript was submitted in December and is in review. Certified seed is building up. There are five licensees in the US, and it is being promoted in Canada.
* COTX09022-3RuRE/Y manuscript (exclusive release) and PVP for NDTX059759-3RY/Y Pinto are under preparation.

**2021 Publications**

Peer review articles:

Gautam S., N. Solis-Gracia, M.K. Teale, K. Mandadi, J.A. da Silva, and M.I. Vales. 2021. Development of an in vitro microtuberization and temporary immersion bioreactor system to evaluate heat stress tolerance in potatoes (Solanum tuberosum L.). Frontiers in Plant Science 12: 700328.

Pandey, J., D.C. Scheuring, J.W. Koym, J. Coombs, R.G. Novy, A.L. Thompson, D.G. Holm, D.S. Douches, J.C. Miller Jr., and M.I. Vales. 2021. Genetic diversity and population structure of advanced clones selected over forty years by a potato breeding program in the USA. Scientific Reports 11: 8344.

Farber, C., L. Sanchez, S. Pant, D. Scheuring and I. Vales, K. Mandadi, and D. Kurouski. 2021. Potential of spatially offset Raman spectroscopy for detection of Zebra Chip and Potato Virus Y diseases of Potatoes (Solanum tuberosum). ACS Agricultural Science and Technology 3: 211-221.

Posters at professional meetings:

Gautam, S., D.C. Scheuring, J.W. Koym, and M.I. Vales. 2021. Search for potatoes sustaining high marketable yield under heat stress. Oral presentation. 105th Potato Association of America (PAA) Annual Meeting. July 26-29th 2021, Virtual conference.

Pandey, J., D. C. Scheuring, J. W. Koym, and M. I. Vales. 2021. Detection of genomic signatures of recent selection in advanced potato clones. Oral presentation. 105th Potato Association of America (PAA) Annual Meeting. July 26-29th 2021, Virtual conference.

Reports: <https://potato.tamu.edu/reports/>:

Vales, M.I., J.W. Koym, and D.C. Scheuring. 2021. Texas Potato Breeding Report, 2020. Texas A&M AgriLife Research, College Station and Lubbock, TX. 165p.

Koym, J.W., D.C. Scheuring, Jaspeet Sidhu, Robert Wilson, Samuel Essah, David Holm, and M.I. Vales. 2021. Southwest Regional Potato Variety Trial Report 2020. Texas A&M AgriLife Research, College Station and Lubbock, TX. 25p.

Koym, J.W., D.C. Scheuring, and M.I. Vales 2021. Western Regional Red/Specialty Variety Trial Report 2020. Texas A&M AgriLife Research, College Station and Lubbock, TX. 29p.

Vales, M.I., J.W. Koym, and D.C. Scheuring. 2021. 2021 Annual Potato Field Day Handbook E-Edition. Texas Potato Variety Development Program. Texas A&M AgriLife Research, College Station and Lubbock, TX. 226p.

Other Presentations:

Invited national seminar: Vales, M.I., S. Gautam, J. Pandey, J. Da Silva, K. Mandadi, D. Kurouski, S. Toinga-Villafuerte, A. Jiao, D.C. Scheuring, and J.W. Koym. 2021. Development of climate-change-ready potato varieties to overcome heat stress. Institute of Plant Breeding, Genetics and Genomics, University of Georgia, Athens. October 21, 2021.

Invited national seminar: Vales, M.I., S. Gautam, J. Pandey, D.C. Scheuring, and J.W. Koym. 2021. Heat tolerance in potatoes -Texas A&M Potato Breeding Program- NCCC215 Breeding and Genetic Technical Committee Meeting, Chicago, IL, December 7, 2021.

Impact statement:

The Texas A&M Potato Program developed 18 Potato varieties since its inception. Potato varieties developed by the Texas A&M Program benefit Texas growers, processors, and consumers but also have an impact nationwide. Certified seed of TAMU released potato varieties was planted in 9,568 acres in the USA in 2021, representing 9% of the national seed production. There are 66 licensees of TAMU Potato varieties in the US and Canada.

**Administrative Report & WERA027 administrative roles and responsibilities**: Mark McGuire (UI) WERA administrator was absent. The chair requested a report to be included in this report. Mark sent the following report:

The chair is in charge of hosting the meeting, finding the venue, setting the agenda, running the meeting, and notifying me to approve a meeting in NIMSS before it occurs. The secretary is responsible for collecting the station reports, compiling them into the project’s annual report, and taking additional minutes from the meeting for any business conducted (e.g., election of officers). The secretary shares the information with the chair for review. Once the two agree these elements, the materials are sent to me for review and ultimately loading into NIMSS. The report needs to be submitted to me within 60 days of the annual meeting.

**Regional early/late Russet results:** Rich Novypresented the results of regional early and late trials.

Total highest yield early harvest: TX13590-9Ru, OR12133-10 and AOR10204-3

Lowest total yield: early harvest: CO12378-1RU, CO10085-1RU and POR12NCK50-1

Total highest yield late harvest: AOR10204-3, OR12133-10, and TX13590-9Ru

Lowest total yield: late harvest: R. NORKOTAH, POR12NCK50-1, and TX13590-9Ru

US#1 highest yield early harvest: TX13590-9Ru, OR12133-10, and AOR10204-3

Lowest US#1 yield: early harvest: SHEPODY, CO10085-1RU, and CO12378-1RU

US#1 highest yield late harvest: OR12133-10, TX13590-9Ru, and AOR10204-3

Lowest US#1 yield: late harvest: R. BURBANK, CO12378-1RU, and RANGER R.

Fresh Merit standouts: POR12NCK50-1, CO11009-3RU, and Clearwater Russet

Process market standouts: CO11009-3RU and CO12378-1RU

The disease part was presented by Brian Schneider (USDA-ARS).

Moderate resistant to early die: CO10085-1RU,

Moderate resistant to early blight: OR12133-10

Moderate resistant to late blight: AOR10204-3 and OR12133-10

PVY resistant: CO10085-1RU

Common Scab resistant: Clearwater Russet and COA11013-2

Corky Ring Spot resistant: Clearwater Russet, AOR10204-3, CO10085-1RU and CO12378-1RU

Metribuzin resistant: AOR08540-1 and COA11013-2

Post-harvest data was presented by Jake Blauer (Washington State University.

Overall postharvest ratings: highest Scoring: CO11009-3RU, CO12378-1RU and Clearwater R.

Lowest Scoring clones: AOR08540-1 and R. BURBANK

Clone disposition:

Graduated entries: OR12133-10, POR12NCK50-1 and TX13590-9Ru

Returned entries:

|  |
| --- |
| AOR08540-1 |
| AOR10204-3 |
| CO10085-1RU |
| CO11009-3RU |

Discarded entries:

CO12378-1RU and COA11013-2

New entries:

|  |
| --- |
| A09086-1LB |
| A10594-4sto |
| A12305-2adg |
| AFA5661-8 |
| AC12090-3RU |
| CO13003-1RU |

Regional Specially results were presented by Jeff Koym (Texas A& M).

Highest total yield scored: Red LaSoda, COTX10118-4Wpe/Y, and AORTX09037-1W/Y

Highest less than 4oz.: A08120-4Y, CO11250-1W/Y, and AORTX09037-1W/Y

Highest yield from 4-10 oz.: AORTX09037-1W/Y, COTX10118-4Wpe/Y, and Yukon Gold

Metribuzin very resistant: Yukon Gold and A08120-4Y

Corky Ring Spot resistant: Chieftain, NDA8512C-1R, andA08120-4Y

Fresh Merit: Modoc, A08122-12Rsto, and NDA8512C-1R

**Clone disposition**:

Graduated clones: CO11250-1W/Y and CO11266-1W/Y

Returned clones: A08122-12Rsto, NDA8512C-1R, A08120-4Y, AORTX09037-1W/Y and

COTX10118-4Wpe/Y

New entries:

|  |
| --- |
| A08122-9RY |
| A11573-5RYsto |
| AC10376-2012-1W/Y |

Regional chipping trials were presented by Caroline Gray (Colorado State University).

Highest total yield entries: NYOR14Q9-9 and NYOR14Q9-5

Highest US#1 yield: NYOR14Q9-5 and Atlantic

U.S. No. 1's > 10 OZ: NYOR14Q9-5 and CO12293-1W

Highest Yield < 4 OZ: NYOR14Q9-5

Highest Specific Gravity Entries: NYOR14Q9-9, Lamoka, and Atlantic

Lighter chip color: CO12293-1W and Lamoka

Early die resistant: COOR13270-2, AOR12197-4, and NYOR14Q9-5

Corky Ring Spot resistant: CO11037-5W, COOR13270-2, and Atlantic

Pecto-bacterium soft rot moderate resistant: NYOR14Q9-5, AOR12197-4 ,and NYOR14Q9-9

Metribuzin very resistant clones: AOR12197-4, CO11023-2W, CO11037-5W, NYOR14Q9-9, and NYOR14Q9-5

High Fresh merit: NYOR14Q9-5 and Lamoka

High Process merit: NYOR14Q9-5 and Lamoka

**Clone disposition**:

Returned Clones:

|  |
| --- |
| AOR12197-4 |
| CO11037-5W |
| CO12235-3W |
| CO12293-1W |
| COOR13270-2 |
| NYOR14Q9-5 |

Discarded clones: AC11494-6W and CO11023-2W

New Entries: CO13232-25W and NYOR14Q9-9 (these two clones were planted in 2021 in few locations)

**Databases:** Since the databases were discussed in the tristate meeting, the Chair asked if there were additional comments. Isabel Vales mentioned if there is possibility to expand the database proposal to include the southwest group. Rhett Spear mentioned that there is possibility to expand the proposal depending on funding situations. Max Feldman (USDA-ARS) requested if anyone interested in participating in drone data collection project. He mentioned that the test to obtain a drone pilot permit is easy and cheap. Jake Blauer & Rhett Spear showed interest to participate in the project.

**Related proposals:**

The Chair mentioned that there are several opportunities to write USDA grants to address abiotic stresses particularly related to climate change affecting potato production.

**Proposed variety releases – discussion**

Since proposed variety releases were discussed during the tristate meeting this discussion was skipped. Dave Holm (CSU) indicated in his report he included proposed variety releases.

**Seed supplies and shipping lists:**

Brian Charlton (OSU) informed that seed inventory was distributed to all with deadline for seed request.

**Election of new Secretary**:

Jessica Chitwood Brown unanimously elected secretary for 2023 regional meeting.

Zack H - Chair for 2023

Solomon Yilma - Vice Chair

Jessica Chitwood Brown – Secretary

W. Regional meeting 2023 location: Boise, ID (hybrid format), Idaho will host the 2023 meetings

Meeting was adjourned at 5:41pm (PST)

**Western Regional Committee Meeting (WERA027) attendees**

|  |  |  |
| --- | --- | --- |
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**Tri-State Potato Variety Development Technical Committee Meeting – Minutes**: (Chaired by Rhett Spear and minutes recorded by Jake Blauer)

February 3, 2022. 8:00 am PST Virtual Meeting via Zoom due to COVID restrictions

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| --- | --- | --- |
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**Tri-State Potato Variety Development Technical Committee Meeting - Agenda**

February 3rd, 2022

Virtual Meeting

Chair: Rhett Spear (Idaho)

Secretary: Jake Blauer (Washington)

1. Call to order 9:00 am
2. Housekeeping
3. Introductions
4. Approval of Agenda
5. Approval of minutes from the 2021 meeting
6. Database update – Max Feldman
7. State Report-Idaho
8. State Report-Oregon
9. State Report-Washington
10. Break
11. PVMI Update – Jeanne Debons (PVMI)
12. Clone Bank, Tissue Culture and Mini-tuber production updates – Jennie Durrin (Idaho)
13. Tri-State Russet Trial Report – Chelsea Lowder (Idaho)
    1. Field, Post-Harvest and Line Disposition
14. Tri-State Specialty Trial Results – Mike Thornton (Idaho)
    1. Field, Post-Harvest and Line Disposition
15. Discussion of Clones for Release
    1. NDA050237B-1R
    2. POR14PG22-3
16. Seed Supplies and Shipping lists
    1. Discussion of 2021 needs
17. Election of Secretary, Chair, and 2023 date and location
18. Adjourn Meeting
19. Lunch Break ~12:30 PM

**Start of Minutes**:

Tri-State technical committee was called to order at 8:07 am PST by Rhett Spear with 51 attendees reported. Rhett started recording the meeting on Zoom. Everyone was asked to put their name and email in the chat for attendance recording. Rhett led role call and introductions of all on the call.

Rhett presented the agenda.

Motion to approve agenda by Brian Charlton and seconded by Jeanne Debons. Motion carried.

Approval of the minutes. Sagar Sathuvalli requested the attendee list be updated to include his name and Jake Blauer’s name for the 2021 attendees.

Motion to approve with amendments by Jeanne Debons and seconded by Sagar Sathuvalli.

Max Feldman updated the minutes with Tri-State and the WERA-27 minutes. Max asked that the minutes be combined and approved for the 2020 meeting. Mark McGuire said that the 2020 minutes could be approved.

There was a motion and a second for the 2021 approval. Approval was voted to pass unanimously.

Reports:

Jeanne Debons updated that the PVMI website and now it has a technical information section including the minutes from this meeting on the site.

Isabel Vales asked for clarification for the minutes on the PVMI site. Jeanne let everyone know it is password protected and she will pass out the password for everyone later.

Time was passed to Max Feldman for an update on the database. He shared a powerpoint presentation on the zoom meeting.

The goal is to share data and update tools to manage variety development data. The second goal is to have a public visualization data view.

Need by the industry to select new clones and by breeders for tracking performance.

4 different options were reviewed and considered with a Pros/Cons list for each shared with the group.

Recommended that Breedbase be the best solution for our group.

It is being adopted in a lot of crops and in other potato programs so there is good life-expectancy.

Shared an example from Julia Piaskowski in wheat how the program is being used. She is the project leader for this initiative.

Rhett Spear and Max Feldman will be the support for the users in industry and breeders.

This is a two-year project and it will cost about $51,000 per year. There is a two-year proposal in for funding request.

Max opened it up to questions.

Noelle Anglin asked who is the donor support for this and what is the long-term plan? The concern is the longevity of the project financially. Secondly, do researchers have time to not have the data public because publications are in process?

Max Feldman answered that this database is funded by the Gates foundation and it is adopted in other crops. USDA is pushing teams to adopt this solution because of its utility. Max thought would be around a long time. Secondly, there is likely solutions to keep data confidential until ready to share, but he did not have a good answer to this.

Chris Voigt asked if the database could store photos. Max responded yes.

Sagar Sathuvalli asked what the maintenance cost was. Max said it depended on the person curating it and the associated man-hours. The annual estimate is about $2,000/year up to $5,000/year.

Rhett said that set parameters in the building the database will keep these costs lower.

Rich Novy asked if the initial request was adequate to get all the historical data input into a useful format? Also, what are the thoughts for routine procedure for data input.

Max said, initial costs have changed since this was first thought of. The initial bid was too low from Julia. The biggest challenge is each testing site collects data slightly different. If we can get that standardized it will make it easier.

Rich asked how far back are we going to go? Max responded 10 years is the goal for historical data input.

Jonathan Whitworth asked if the software was open sourced or was it licensed? Also, what is the security like?

Max said data is stored on Amazon’s webserver and there is a $2,000 fee to maintain the storage. The inputs are open sourced.

Isabel Vales shared her opinion about databases and Texas A&M was using Agribase but they are changing systems now.

She further thought there needed to be a gate-keeper for all the data and across the locations. Additionally, all the replicates need to be inserted and not just summary reports.

Max thanked her for the comments, asked for clarifications on comments.

Isabel said curation and consistency on data were key. Replication data input and genotypic information is important to follow. She also asked if other sites such as CO and TX can use it.

Max responded that the team with Julia, Rhett and himself are going to help with the gate keeping. Currently, this will only be a Tri-State tool to start.

Max asked for David De Koeyer’s opinion. David agreed with everything said.

Jonathan Whitworth said that when Tri-State was set up, Rhett’s current position was developed/organized. PVMI had to be set up later. Perhaps the database will be a similar evolution for long-term management and curation. Max agreed it was a good way to think about it long-term.

Rhett thanked all for the time on this, commented that Jeewan added a site for reference in the chat (https://breedbase.org/) and moved the agenda forward.

State Reports started.

Rhett started with the ID report and he shared his screen. His report is a follows:

**2021 Idaho State Report**

**Tri-State Variety Development Program**

**Summary of accomplishments:**

A total of 92,435 Aberdeen-generated seedling tubers and seedling tubers from other state breeding program were planted for first field generation selection at Aberdeen and Tetonia, ID. A total of 1,532 second-field year (12-hill) selections were also planted at both sites. Seven agronomic trials of Aberdeen breeding clones and the National Fry Processing Trial were planted at Aberdeen and Kimberly, as well as disease screening trials for early blight, common scab, and PVY/PLRV.

**Tri-State and Western Regional Trial Results**

In 2021, 11 entries from the Aberdeen program were entered in advanced agronomic and processing trials in the Tri-State and Western Regional to assess their performance relative to industry standards. We had 1 russet clone in the Western Regional Trials, 10 russet clones in the early season Tri-State Variety Trials, and 10 in the late season Tri-State Variety Trials.

**Russet Trial Results:** The highest yielding clones in the Aberdeen Early Tri-State Trial were A09086-1LB, A10594-4sto, A11175-12TE and A12305-2adg, all of which produced higher total yields than the standard cultivars, and higher U.S. No. 1 yields than Russet Burbank, Russet Norkotah, and Clearwater Russet (Table 1). Overall, specific gravities for the clones were greater than the standard varieties, with the exception of A10130-1, A11175-12TE, A11259-1, and A12114-7 which were more similar to the standard varieties. Merit scores were highest for A09086-1LB, A11175-12TE, A12114-7, and AFA5661-8. Hollow heart incidence was low for all clones with the exception of A12114-7 with 15%.

In the Late Tri-State Russet Trial, the top yielding clones were A09086-1LB, A11259-1, A12305-2adg, and AFA5661-8,all of which produced greater total yields and US No. 1 yields than the standard cultivars (Table 2). Specific gravities were similar to Clearwater and Ranger Russet with the exception of A10130-1, A10594-4sto, A11175-12TE, A12114-7, and AOR13064-2 which were relatively lower. Merit scores were highest for A12114-7, A12305-2adg, and AOR11217-3. Fry colors after 3 months of storage at 45oF were generally acceptable (USDA 1 and 2) for all clones. Hollow heart incidence was problematic for Russet Norkotah and breeding clones A09136-9LB, A10594-4sto, A11259-1, A11326-1, A12114-7, and AOR11217-3 with the incidence of hollow heart ranging from 15% to 38%.

**Table 1. Yield and quality characteristics of five standard russet potato cultivars and twelve breeding lines grown in Early Tri-State Russet Trial at Aberdeen, ID during 2021. 1**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Cultivar/Breeding line** | **Total Yield** | **No. 1 Yield** | **% >10oz** | **Specific Gravity** | **Merit** | **Maturity** | **Hollow Heart** |
| **Clearwater Russet** | 220 | 100 | 2 | 1.078 | 3.0 | 3.0 | 0% |
| **Ranger Russet** | 292 | 146 | 12 | 1.079 | 1.8 | 3.9 | 0% |
| **Russet Burbank** | 180 | 44 | 0 | 1.069 | 1.5 | 3.6 | 0% |
| **Russet Norkotah** | 214 | 117 | 10 | 1.067 | 2.8 | 2.9 | 8% |
| **Shepody** | 215 | 61 | 5 | 1.076 | 1.6 | 4.3 | 0% |
| **A09086-1LB** | 290 | 186 | 16 | 1.084 | 3.1 | 3.9 | 0% |
| **A09136-9LB** | 223 | 92 | 8 | 1.086 | 2.3 | 3.5 | 0% |
| **A10130-1** | 211 | 89 | 17 | 1.075 | 2.4 | 3.4 | 0% |
| **A10594-4sto** | 291 | 186 | 38 | 1.084 | 2.8 | 4.0 | 0% |
| **A11175-12TE** | 265 | 164 | 9 | 1.077 | 3.5 | 2.8 | 0% |
| **A11259-1** | 246 | 87 | 7 | 1.073 | 2.4 | 3.8 | 0% |
| **A11326-1** | 205 | 120 | 7 | 1.082 | 3.0 | 3.6 | 0% |
| **A12114-7** | 235 | 141 | 8 | 1.074 | 3.4 | 3.8 | 15% |
| **A12305-2adg** | 269 | 202 | 26 | 1.080 | 3.1 | 3.3 | 0% |
| **AFA5661-8** | 235 | 175 | 17 | 1.083 | 3.3 | 4.0 | 0% |
| **AOR11217-3** | 203 | 117 | 14 | 1.082 | 2.5 | 3.9 | 0% |
| **AOR13064-2** | 233 | 106 | 19 | 1.086 | 2.6 | 3.6 | 0% |

1 Yields are reported in cwt/A. Merit score is based on appearance characteristics and rated on a 1-5 scale, where 5 = exceptionally good. Maturity is rated 1-5, where 5 = very late. Hollow heart (HH) is reported as the percentage of 10 tubers greater than 10 ounce showing the defect. Early harvest is approximately 121 days after planting.

**Table 2. Yield and quality characteristics of four standard russet potato cultivars and twelve breeding lines grown in Late Tri-State Russet Trial at Aberdeen, ID during 2021. 1**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cultivar/Breeding line** | **Total Yield** | **No. 1 Yield** | **% >10oz** | **Specific Gravity** | **Merit** | **Maturity** | **Hollow Heart** | **Fry Color2** |
| **Clearwater Russet** | 367 | 282 | 28 | 1.092 | 4.0 | 3.5 | 5% | 0 |
| **Ranger Russet** | 369 | 212 | 43 | 1.095 | 2.0 | 2.6 | 3% | 0 |
| **Russet Burbank** | 222 | 78 | 9 | 1.070 | 1.3 | 1.9 | 8% | 2 |
| **Russet Norkotah** | 201 | 129 | 12 | 1.070 | 3.0 | 1.0 | 30% | - |
| **A09086-1LB** | 414 | 280 | 35 | 1.092 | 2.4 | 2.9 | 0% | 0 |
| **A09136-9LB** | 310 | 222 | 42 | 1.094 | 2.4 | 2.6 | 15% | 0 |
| **A10130-1** | 292 | 197 | 21 | 1.082 | 3.0 | 2.3 | 8% | 0 |
| **A10594-4sto** | 275 | 160 | 26 | 1.084 | 2.3 | 1.3 | 18% | 0 |
| **A11175-12TE** | 347 | 217 | 23 | 1.080 | 3.0 | 1.8 | 10% | 0 |
| **A11259-1** | 410 | 286 | 37 | 1.088 | 2.6 | 3.3 | 23% | 0 |
| **A11326-1** | 384 | 230 | 34 | 1.096 | 2.1 | 2.8 | 38% | 0 |
| **A12114-7** | 260 | 166 | 24 | 1.078 | 3.3 | 1.8 | 18% | 0 |
| **A12305-2adg** | 435 | 341 | 50 | 1.090 | 3.6 | 2.4 | 8% | 0 |
| **AFA5661-8** | 381 | 290 | 50 | 1.099 | 3.0 | 2.1 | 0% | 0 |
| **AOR11217-3** | 299 | 184 | 25 | 1.090 | 3.4 | 1.8 | 23% | 0 |
| **AOR13064-2** | 347 | 217 | 26 | 1.084 | 2.5 | 1.5 | 5% | 0 |

1 Yields are reported in cwt/A. Merit score is based on appearance characteristics and rated on a 1-5 scale, where 5 = exceptionally good. Maturity is rated 1-5, where 5 = very late. Hollow heart (HH) is reported as the percentage of 10 tubers greater than 10 ounce showing the defect. Late harvest is approximately 148 days after planting.

²Fry samples stored at 45oF for approximately 2 months. Color determined using USDA color chart 00-4 with lower number lighter fry color.

In the Late Western Regional Trial at Aberdeen, the top yielding clones were AOR10204-3,

CO10085-1RU, COA11013-2, and OR12133-10 (Table 3), all of which exceeded the total and U.S. No. 1 yields of the standard cultivars except OR12133-10 which had total yield similar to Clearwater Russet. Specific gravities were generally similar to Clearwater and Ranger Russet with the exception of AOR10204-3 and COA11013-2 which were relatively lower. The incidence of hollow heart for all clones was relatively low with the exceptions of AOR08540-1 and CO11009-3RU with >15%. CO09205-2RU and CO08155-2RU/Y-1RU and AO02183-2 had the highest merit scores. All of the clones had acceptable fry colors after 2 months of storage at 45oF.

There also were some very high yielding clones in the Late Western Regional Trial at Kimberly, all of which produced higher total and U.S. No. 1 yields than the standard cultivars (Table 4). Specific gravities for the four highest yielding clones were all higher than Russet Burbank and Russet Norkotah but were most similar to Clearwater and Ranger Russet. Merit scores at Kimberly were highest for COA11013-2. Hollow heart was high for AOR08540-1, CO11009-3RU, and TX13590-9Ru with 45%, 55%, and 43% respectively.

**Table 3. Yield and quality characteristics of four standard russet potato cultivars and nine breeding lines grown in Late Western Regional Russet Trial at Aberdeen, ID during 2021. 1**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cultivar/Breeding line** | **Total Yield** | **No. 1 Yield** | **% >10oz** | **Specific Gravity** | **Merit** | **Maturity** | **Hollow Heart** | **Fry Color2** |
| **Clearwater Russet** | 347 | 238 | 23 | 1.090 | 2.9 | 3.1 | 4% | 0 |
| **Ranger Russet** | 382 | 237 | 40 | 1.097 | 1.8 | 2.5 | 0% | 0 |
| **Russet Burbank** | 215 | 69 | 6 | 1.070 | 1.1 | 1.6 | 1% | 2 |
| **Russet Norkotah** | 173 | 111 | 20 | 1.070 | 2.8 | 1.0 | 6% | - |
| **AOR08540-1** | 285 | 149 | 24 | 1.089 | 2.8 | 2.6 | 15% | 2 |
| **AOR10204-3** | 427 | 314 | 49 | 1.084 | 2.4 | 2.4 | 4% | - |
| **CO10085-1RU** | 398 | 268 | 26 | 1.096 | 2.6 | 2.6 | 1% | 0 |
| **CO11009-3RU** | 280 | 185 | 26 | 1.093 | 3.3 | 2.5 | 23% | 0 |
| **CO12378-1RU** | 306 | 184 | 15 | 1.094 | 2.6 | 2.8 | 9% | - |
| **COA11013-2** | 427 | 327 | 27 | 1.085 | 3.6 | 2.9 | 0% | - |
| **OR12133-10** | 358 | 261 | 42 | 1.091 | 2.9 | 2.5 | 1% | 0 |
| **POR12NCK50-1** | 294 | 201 | 30 | 1.089 | 2.8 | 1.5 | 5% | 0 |
| **TX13590-9Ru** | 301 | 164 | 9 | 1.089 | 2.6 | 2.4 | 1% | - |

1 Yields are reported in cwt/A. Merit score is based on appearance characteristics and rated on a 1-5 scale, where 5 = exceptionally good. Maturity is rated 1-5, where 5 = very late. Hollow heart (HH) is reported as the percentage of 10 tubers greater than 10 ounce showing the defect.

Late harvest is approximately 148 days after planting.

² Fry samples stored at 45oF for approximately 2 months. Color determined using USDA color chart 00-4 with lower number lighter fry color.

**Table 4. Yield and quality characteristics of four standard russet potato cultivars and nine breeding lines grown in Late Western Regional Russet Trial at Kimberly, ID during 2021.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Cultivar/Breeding line** | **Total Yield** | **No. 1 Yield** | **% >10oz** | **Specific Gravity** | **Merit** | **Hollow Heart** |
| **Clearwater Russet** | 488 | 390 | 36 | 1.090 | 2.8 | 5% |
| **Ranger Russet** | 514 | 315 | 37 | 1.081 | 1.8 | 0% |
| **Russet Burbank** | 469 | 284 | 29 | 1.069 | 1.4 | 23% |
| **Russet Norkotah** | 368 | 272 | 16 | 1.072 | 3.0 | 10% |
| **AOR08540-1** | 654 | 489 | 62 | 1.090 | 2.4 | 45% |
| **AOR10204-3** | 574 | 442 | 47 | 1.076 | 2.5 | 0% |
| **CO10085-1RU** | 567 | 317 | 17 | 1.095 | 1.6 | 8% |
| **CO11009-3RU** | 633 | 464 | 36 | 1.092 | 2.9 | 55% |
| **CO12378-1RU** | 525 | 391 | 19 | 1.096 | 2.4 | 23% |
| **COA11013-2** | 696 | 568 | 37 | 1.084 | 3.8 | 3% |
| **OR12133-10** | 709 | 555 | 41 | 1.081 | 2.8 | 0% |
| **POR12NCK50-1** | 432 | 356 | 42 | 1.087 | 2.8 | 0% |
| **TX13590-9Ru** | 659 | 530 | 27 | 1.081 | 2.5 | 43% |

1 Yields are reported in cwt/A. Merit score is based on appearance characteristics and rated on a 1-5 scale, where 5 = exceptionally good. Hollow heart (HH) is reported as the percentage of 10 tubers greater than 10 ounce showing the defect.

Late harvest is approximately 166 days after planting.

**National Fry Processing Trial:** A total of 29 breeding clones from our program were also entries in the 2021 National Fry Processing Trial (NFPT) which seeks to identify processing varieties having acceptable agronomic and processing characteristics and low acrylamide that could be rapidly adopted by the U.S. potato processing industry. Nine of the 29 entries were entered into the Tier 2 category, two entries were entered in the Tier 3, with the remaining 18 clones entered in the Tier 1. Following discussion and final recommendations of the NFPT Steering Committee, eight Aberdeen breeding clone entries were advanced to Tier 2 in 2022, with an additional two retained again as Tier 2 where seed was limiting. Five entries were also advanced to Tier 3 for the 2022 NFPT, with an additional 16 Tier 1 entries also in the trial. In addition, the breeding program is progressing in developing germplasm with genetic resistance to PVY, PVX, and PLRV, PMTV, late blight (foliar and tuber), nematodes, corky ringspot and zebra chip disease—for example five entries in the NFPT in 2021 exhibited extreme resistance to PVY. New varieties will continue to be released in cooperation with the University of Idaho Nuclear Seed Program, private seed growers in the state, and the processing and fresh pack industries.

**Agronomic Research Trials:** Additional studies were conducted in 2021 designed to compare nitrogen use efficiency of 3 advanced selections (A071012-4BF, A10021-5TE, OR12133-10) from the breeding program with that of Russet Burbank and Russet Norkotah. The efficiency of N fertilizer use for these new clones is substantially greater than standard varieties, ranging from 10-25% better than Russet Burbank. Reducing fertilizer applications per unit of yield produced would provide a considerable economic benefit to growers and would also contribute significantly to the sustainability of potato production systems. Additional studies were conducted to determine optimal between row spacing, seed size and cut vs. whole, seed piece spacing, and fertility x maturity for Russet Burbank. Between row spacing seems to be variety dependent although, results have shown that reducing row spacing to 34” has not impacted overall yield and size profile detrimentally.

**Specialty Trial**

Accomplishments:

Promising specialty breeding lines from the Pacific Northwest Potato Variety Development Program were evaluated in two locations. These same lines were also evaluated for dormancy length, and chemical composition.

Results:

Objective 1- Identify and completely evaluate within Idaho growing areas tri-state potato germplasm with specialty characteristics.

Field Evaluations - Seed of five standard potato cultivars and 6 breeding lines were obtained from Brian Charlton (OSU, Klamath Falls) and Rich Novy (ARS, Aberdeen). The seed was cut, organized into a randomized, four-replicate trial, and planted at the Aberdeen and Parma R & E Centers in mid to late April.

Chieftain and Bintje checks had total yields above 600 cwt/acre at Parma and over 400 cwt/acre in Aberdeen. (Tables 1 and 2). Modoc, Yukon Gold and Purple Majesty were also included as checks. A11576-1Ysto produced higher yield than Bintje at Parma and had the highest yield among other breeding lines at Aberdeen. As in previous years, Chieftain and Yukon Gold had a high proportion of tubers over 10 oz at both locations. The premium yield category (2-6 oz) is an attempt to capture the perceived optimum size of specialty tubers for fresh market. A08122-9RY, A11573-5RYsto and A11576-1Ysto tended to produce high yields in that size range.

Specific gravity ranged from 1.056 to 1.079 at Parma, and from 1.068 to 1.083 in Aberdeen (Tables 1 and 2). Yukon Gold had the highest specific gravity at both locations, while A11576-1Ysto had the highest specific gravity of the breeding lines. Specific gravity greatly effects cooking quality, and this information should be used with the culinary evaluations reported in the WSU cultivar report to make decisions about appropriate uses for these new potential varieties.

Most of the entries showed very few external and internal defects. The exception was common scab in Yukon Gold at both Parma and Aberdeen and growth cracks in POR16PG34-1 at Parma (Tables 1 and 2). These defects, along with skin russeting, black scurf and sprouting contributed to low appearance scores for some entries. Merit score is a combined evaluation of yield, tuber size distribution, tuber shape uniformity, and appearance. A08122-9RY and A11576-1Ysto had a relatively high merit scores at both Parma and Aberdeen location. (Tables 1 and 2).

**Table 1. Yield and quality characteristics of five standard specialty potato cultivars and six breeding lines grown in Parma, ID during 2021. 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cultivar/Breeding line** | **Total Yield** | **No. 1 Yield** | **Premium Yield (2-6oz)** | **Yield** | **Yield** | **Specific Gravity** | **Skin app** | **Maturity** | **Scab** | **Hollow Heart (%)** | **Growth Crack** | **Merit** |
| **0-2 oz** | **>10 oz** |
| **Chieftain** | 615 | 550 | 273 | 36 | 71 | 1.057 | 2.0 | 4.3 | 4.8 | 2.5 | 4.5 | 2.9 |
| **Modoc** | 580 | 534 | 297 | 41 | 54 | 1.056 | 2.5 | 2.6 | 3.8 | 0.0 | 4.8 | 3.4 |
| **A08122-9RY** | 604 | 532 | 401 | 68 | 14 | 1.068 | 2.0 | 3.3 | 4.8 | 0.0 | 4.5 | 3.5 |
| **A11573-5RYsto** | 574 | 423 | 390 | 145 | 0 | 1.063 | 4.0 | 4.0 | 5.0 | 0.0 | 5.0 | 3.3 |
| **Yukon Gold** | 510 | 500 | 110 | 7 | 232 | 1.079 | 4.0 | 2.3 | 2.5 | 2.5 | 5.0 | 3.0 |
| **Bintje** | 651 | 364 | 323 | 98 | 3 | 1.056 | 1.3 | 4.5 | 4.0 | 0.0 | 3.5 | 1.6 |
| **A11576-1Ysto** | 661 | 574 | 418 | 63 | 24 | 1.067 | 3.0 | 3.0 | 3.8 | 0.0 | 4.3 | 3.6 |
| **POR16PG34-1** | 382 | 249 | 233 | 100 | 1 | 1.064 | 2.0 | 2.0 | 4.5 | 0.0 | 2.8 | 1.8 |
| **Purple Majesty** | 585 | 438 | 376 | 93 | 11 | 1.058 | 3.3 | 2.8 | 3.8 | 0.0 | 4.8 | 2.6 |
| **OR11157-1** | 141 | 71 | 71 | 68 | 0 | 1.055 | 1.8 | 3.3 | 5.0 | 0.0 | 5.0 | 1.5 |
| **POR16PG25-2** | 393 | 346 | 225 | 31 | 27 | 1.058 | 3.8 | 4.1 | 4.8 | 0.0 | 4.8 | 2.9 |

1 Yields are reported in cwt/A. Merit score is based on appearance, yield, uniformity and defects and rated on a 1-5 scale, where 5 = exceptionally good. Maturity is rated 1-5, where 5 = very late. Scab, growth cracks (GC), and second growth (Knobs) are rated 1-5, where 5 = none. Hollow heart (HH) is reported as the percentage of 10 tubers showing the defect.

**Table 2. Yield and quality characteristics of five standard specialty potato cultivars and five breeding lines grown in Aberdeen, ID during 2021. 1**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cultivar/Breeding line** | **Total Yield** | **No. 1 Yield** | **Premium Yield (2-6oz)** | **Yield 0-2 oz** | **Yield > 10 oz** | **Specific Gravity** | **Skin app** | **Maturity** | **Scab** | **Hollow Heart (%)** | **Growth Crack** | **Merit** |
| **Chieftain** | 436 | 406 | 121 | 8 | 122 | 1.071 | 3.3 | 4.0 | 4.3 | 25.0 | 5.0 | 2.5 |
| **Modoc** | 276 | 234 | 209 | 39 | 3 | 1.068 | 3.8 | 2.5 | 3.9 | 0.0 | 5.0 | 3.6 |
| **A08122-9RY** | 335 | 266 | 241 | 66 | 7 | 1.072 | 3.0 | 3.3 | 4.4 | 0.0 | 5.0 | 3.6 |
| **A11573-5RYsto** | 311 | 248 | 222 | 59 | 0 | 1.072 | 4.0 | 3.5 | 4.5 | 0.0 | 5.0 | 3.6 |
| **Yukon Gold** | 292 | 271 | 53 | 6 | 110 | 1.083 | 3.4 | 2.6 | 3.1 | 0.0 | 5.0 | 2.8 |
| **Bintje** | 428 | 203 | 156 | 25 | 8 | 1.071 | 3.3 | 3.5 | 3.9 | 0.0 | 4.8 | 1.0 |
| **A11576-1Ysto** | 356 | 303 | 266 | 45 | 3 | 1.075 | 4.0 | 4.1 | 4.0 | 0.0 | 5.0 | 3.8 |
| **POR16PG34-1** | 235 | 165 | 155 | 50 | 3 | 1.072 | 3.6 | 3.1 | 4.6 | 0.0 | 3.8 | 2.9 |
| **Purple Majesty** | 402 | 303 | 277 | 82 | 6 | 1.078 | 2.9 | 2.5 | 3.9 | 5.0 | 5.0 | 2.8 |
| **OR11157-1** | 27 | 7 | 5 | 16 | 3 | 1.068 | 2.3 | 3.4 | 4.6 | 0.0 | 4.9 | 1.5 |

1 Yields are reported in cwt/A. Merit score is based on appearance, yield, uniformity and defects and rated on a 1-5 scale, where 5 = exceptionally good. Maturity is rated 1-5, where 5 = very late. Scab, growth cracks (GC), and second growth (Knobs) are rated 1-5, where 5 = none. Hollow heart (HH) is reported as the percentage of 10 tubers showing the defect.

Biochemical Assessments- The cultivars and breeding lines showed a range of biochemical characteristics, such as solids, antioxidant levels, glycoalkaloids, and Vitamin C content (Table 3). Purple Majesty and OR11157-1 were noteworthy for exceptionally high antioxidant levels, while Yukon Gold had the highest level of solids and Vitamin C. None of the glycoalkaloid levels were high enough to cause concern.

**Table 3. Biochemical characteristics of five standard specialty potato cultivars and five breeding lines grown in Aberdeen, ID during 2021.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Clone** | **Solids Oven Dry (%)** | **Antioxidants (ug/g FW) 2** | **Vitamin C**  **(mg/100 g FW)** | **Glycoalkaloids**  **(mg/100 g FW)** |
| **Chieftain** | 17.7 | 399.6 | 22.07 | 5.5 |
| **Modoc** | 17.9 | 339.7 | 29.68 | 4.0 |
| **A08122-9RY** | 18.7 | 263.4 | 21.02 | 2.9 |
| **A11573-5RYsto** | 18.6 | 336.8 | 30.29 | 2.8 |
| **Yukon Gold** | 21.4 | 344.3 | 32.00 | 3.3 |
| **Bintje** | 19.8 | 313.6 | 22.99 | 3.7 |
| **A11576-1Ysto** | 19.5 | 339.2 | 22.13 | 4.8 |
| **POR16PG34-1** | 18.7 | 593.1 | 29.41 | 3.2 |
| **Purple Majesty** | 19.7 | 1207.9 | 21.99 | 6.9 |
| **OR11157-1** | 17.4 | 1186.6 | 20.02 | 3.7 |

2 Higher numbers for antioxidant capacity indicate potentially greater health benefits.

Storage Evaluations- Skin color and appearance were rated on samples from the Parma trial after approximately 90 days storage at 45oF. Most entries had moderate skin appearance, with lower ratings being associated with russeting, scab and enlarged lenticels (Table 4). The exception was A11573-5RYsto and POR16PG25-2 that had the highest overall appearance ratings. Dormancy length varied from 65 to 146 days at 45oF, with breeding line OR11157-1 notable for no sprouts after 146 days.

**Table 4. Appearance ratings and dormancy length for two standard specialty potato cultivars and four breeding lines grown in Parma, ID during 2021.**

|  |  |  |
| --- | --- | --- |
| **Cultivar** | **Appearance1** | **Dormancy length** |
|  |
| **Chieftain** | 2.0 | 146 |  |
| **Modoc** | 2.5 | 146 |  |
| **A08122-9RY** | 2.0 | 133 |  |
| **A11573-5RYsto** | 4.0 | 104 |  |
| **Yukon Gold** | 4.0 | 119 |  |
| **Bintje** | 1.3 | 65 |  |
| **A11576-1Ysto** | 3.0 | 104 |  |
| **POR16PG34-1** | 2.0 | 119 |  |
| **Purple Majesty** | 3.3 | 104 |  |
| **OR11157-1** | 1.8 | > 146 |  |
| **POR16PG25-2** | 3.8 | 104 |  |

1 Rated on a 1 = very poor to 5 = very good scale.

Objective 2- Cooperate with the Pacific Northwest variety development program to identify specialty breeding lines with potential for release. A08122-9RY has been in the Tri-state specialty trial for three years, while A11573-5RY has been in for two years. Therefore, Table 5 presents a historical summary of performance compared to Chieftain as a check for red-skinned varieties. A08122-9RY has shown merit in all three years of the trial and will be advanced to the 2022 Western Regional Red/Specialty Trial.

**Table 5. Compilation of multiple years of data for breeding lines grown in the specialty potato trial 2020-2021. 1 Values are means of four replications and two locations (Parma and Aberdeen).**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cultivar/Breeding line** | **2019** | | | **2020** | | | **2021** | | | **Average** | | |
| **Total Yield** | **Premium Yield (2-6oz)** | **Merit** | **Total Yield** | **Premium Yield (2-6oz)** | **Merit** | **Total Yield** | **Premium Yield (2-6oz)** | **Merit** | **Total Yield** | **Premium Yield (2-6oz)** | **Merit** |
| **Chieftain** | 450 | 136 | 2.8 | 465 | 125 | 2.6 | 526 | 197 | 2.7 | 480 | 153 | 2.6 |
| **A08122-9RY** | 427 | 311 | 3.8 | 489 | 324 | 2.8 | 469 | 321 | 3.6 | 461 | 319 | 3.4 |
| **A11573-5RYsto** | - | - | - | 383 | 275 | 3.3 | 443 | 306 | 3.5 | -**2** | - | - |

1 Yields are reported in cwt/A. Merit score is based on appearance and agronomic characteristics and rated on a 1-5 scale, where 5 = exceptionally good.

2 Average not calculated as not all locations and years data available for all 3 years.

Sagar Sathuvalli shared the OSU report generally as follows:

**2021 Oregon Potato Breeding and Variety Development Report:**

* ~61,000 single hill seedling tubers were planted at a Rock Creek Ranch near KF (79 % Russets, 12% chips and 9% specialty). We selected 592 clones from Russet crosses, 75 from Chip crosses and 39 clones from specialty crosses
* 849 PYT1 (2nd year in field) selections were planted as 4-Hills at HAREC (82% Russets: 5.5% Chipper and 12.5% Specialty). All these selections were planted at KF as part of evaluation and Seed Increase. Selected 155 Russets, 14 Chips and 10 Specialty clones
* 188 PYT2 (3rd year in field; 75.5 % Russets, 17.5 % Chip and 7 % specialty) selections were planted at two locations (HAREC, MES). In addition, an early harvest PYT2 trial was planted at Hermiston Retained 46 Russets, 6 Chip and 4 Specialty clones.
* Statewide (mid generation) trials were conducted on 40 russet selections, 10 chip selections and 18 specialty selections. Retained 12 russets, 3 chip and 8 specialty clones.
* 14 russet and 12 chipping regional selections were planted, harvested and graded as early harvest trials (4 x 24 Hills) while 17 tristate and 13 regional russet selections were planted and harvested as full season trails (4 x 24 Hills) at HAREC. Early harvest tristate and regional specialty trials were harvested at MES.
* Reduced irrigation trials were conducted at KBREC.
* Harvested around 50,000 seedling tubers for 2022 single hill planting at KBREC
* All the selections from Oregon breeding program, tristate and regional and advanced and newly released selection breeder seed for ID and OR were planted at KBREC for seed increase. We have noticed significant increase in powdery scab this year.
* More than 300 crosses were made with primary objectives of breeding for resistance to soil-borne pathogens and PVY. We made few croses with special emphasis on powdery scab resistance.
* NCPT and SNAC trials were conducted at HAREC and NFPT trial at MES.
* Rainier Russet was officially submitted for PVP by USDA-ARS on behalf of the Tri-state program. The application is currently pending under PVP# 202100426
* We are planning on releasing POR14PG22-3, a yellow flesh, yellow skin baby potato.

Additional Updates

* Hu Shengwei, Femi Omilani, Hemant Khardile and Abigail Moore are graduate students working with Potato breeding program. Hu Shengwei graduated with M.S. degree and is continuing towards his PhD. He will be working on CRKN nematode resistance introgression. Femi Omilani is working on mutation breeding, He has generated mutants for Castle Russet, Umatilla Russet and AO02183-2 and is currently evaluating mutants for low glycoalkaloids, fusarium dry rot and low PME activity, respectively.. Hemant Khardile is working on developing diploid russet germplasm and genome sequence of Ozette potato. Abigail Moore is working on genome sequencing of powdery scab pathogen along with mapping of powdery scab resistance.

Brian Charlton had nothing to add to Sagar’s Report.

Rich Novy shared his updates. \*A summary of these reports is above in the official report Rhett shared as a combined report.

Jonathan Whitworth is working on Mop Top mapping for resistance as well

Mark Pavek shared the WSU updates.

**Washington State University Potato Research Group State Report**

By Mark Pavek and Jacob Blauer, February 3, 2022

The 2021 version of the annual WSU Potato Cultivar Yield and Postharvest Quality Evaluations booklet is available at www.wsu.edu. Thanks to Zach Holden for compiling and sending to the Tri-State and Regional teams. The graduating Tri-State entries can be found on page 8 and are shown with all the data from each year they were in the Regional and Tri-State trials along with the standard control varieties. Pages 9-15 are multi-year field performance and post-harvest merit scores along with grading comments and visual appearance ratings.

The Pavek Team conducted several agronomy trials on named and released Tri-State varieties with the assistance of PhD Graduate Student Francisco “Paco” Gonzalez (now Dr. Gonzalez), and MS student Alexa Hintze: Nitrogen timing, Potassium rate, and Calcium rate and type fertilizer trials, seed size x variety, a growth regulator trial, and several others. The variety trials included: Early Harvest Tri-State Russet Trial, Late Harvest Tri-State Russet Trial, Early Harvest Regional Russet Trial, Late Harvest Regional Russet Trial, Tri-State Red & Specialty Trial, and a Tri-State Chipping Trial.

Francisco Gonzalez (PhD) and Joe Townsend (MS) graduated from the Pavek program in 2021. We kept Francisco on as a post-doc, but he will soon be leaving us for a USDA-ARS position dealing with Hop physiology. MS graduate student: Alexa Hintze started in January 2021, and she is doing well, specializing in seed size needs of several Tri-State potato varieties as well as grower emergence and plant spacing surveys to identify areas of need. The Pavek team has a new graduate student starting in May 2022.

The annual WSU field day was altered due to COVID restrictions. We offered a self-guided field day and commercial seed lot evaluation, allowing growers a view of how their 2021 seed lots performed.

In conjunction with the WA OR Potato Conference, WSU and OSU held the annual Potato Cultivar Performance Workshop. The presentations and variety displays were all in person this year. We displayed all regional and Tri-State clones, including Russets, Specialties, and Chips. We had a minimum of 150 attendees.

A continuation report and progress report will need to be submitted in the near future to receive the funding for 2022-23 for the NIFA Potato Breeding Grant. A reminder will be sent out by Mark Pavek once the agency prompts me and provides a deadline.

Recent Accomplishments: (NOTE: Since 2018 NASS potato variety data has not been available for reasons unknown to the general public). The NWPVD program has produced a number of widely adopted varieties, among these varieties, Ranger Russet, Umatilla Russet, Clearwater Russet, Alturas, and Bannock Russet have greatly benefited the United States and Northwest potato industry and as such, were the 3rd, 4th, 9th, 12th and 17th most widely grown cultivars in the United States in 2021. Varieties released by the NWPVD Program are now produced on approximately 165,000 acres in the Pacific Northwest with value to growers estimated at approximately $740 million. NWPVD varieties represented 32%, or 295,300 acres, of the 2021 fall crop nationally. The estimated 2021 US farm-gate value of NWPVD varieties was more than $1.2 billion (values extrapolated from 2020 certified seed acres (https://potatoassociation.org/seed-acres-reports/) and NASS 2021).

After Mark’s report there was a break at 9:05 am PST.

During the break, Jeanne Debons shared the PVMI log in credentials for specific users (omitted from this report for confidentiality).

Meeting recommenced at 9:20 am PST.

Rhett gave Jake Blauer time to update on WSU postharvest activities.

Jake Blauer’s program had 2 students join, Morgan Southern and Connor. Morgan is studying the effect of planting time as it relates to in season field heat stress and postharvest heat stress on seed productivity. Connor is studying periderm development in Alturas, Clearwater, and Burbank and the impact of grower practices on postharvest loses. Scott Mattinson joined the team for analytical chemistry work. Other research is focused on best practices for Tri-State varieties for seed wound healing, bruise susceptibility, and alternatives to CIPC. WSU announced in 2021 that a new USDA building would be built where Johnson Hall currently stands, and the new building would house the Potato postharvest program with continued support for the pilot plant and storages. WA State Potato Commission has been an excellent support for the new building.

Jeanne Debons shared the PVMI report

**PVMI Annual Report to Tri-State Partners** Debons February 3, 2022

Fiscal year ended September 30th, 2021.

**Royalty Income Collected** – Total royalty receipts were $1,195,288.84, $173k higher than last year’s record year. The royalty receipts received from seed sold in the spring of 2021 (2020 crop year) was $819,237.35, up $114k on similar receipts the previous year. The royalty receipts collected resulting from the seasons prior to 2020 amounted to $376,059.41, up approximately $60k on last year.

**Acreage by cultivar by region** – The report is extracted from USA Seed Potato Acreages for 2021 compiled by Colorado State University. Total US certified seed acreage of Tri-State varieties for the 2021 seed crop is 7664 compared with 7,481 for 2020, an increase of 2.5%. There are minor changes in acreage to many varieties, but the most significant change is to Clearwater Russet; this variety has increased over last year by 440 acres, that is, 14%.

**Summary of work completed and work in progress with respect to introduction, production, and sublicensing of Licensed Products in each country**

Australia: Simplot Australia, McCain Produce, Lamb Weston and Anchor Farms in Pyengana, Tasmania are current sub-license holders. In 2020 PVMI received $9,341.65 from Simplot Australia, $374 from McCain in Australia and

Argentina: Drakar SRL, McCain Produce, and Lamb Weston hold annual licenses and are growing trials of PVMI varieties in Argentina.

India: Simplot India, managed by Mark Heap, DOS Advanced Agro Biotech Limited, McCain and Technico Agri-Sciences currently have sub-licenses.

Brazil: Lamb Weston is currently the only license holder.

Chile: Global Ag Supply visited the US and attended the field days at Hermiston and Othello. They became a license holder in 2021 and have imported several varieties of tissue culture.

New Zealand: AS Wilcox, and McCain currently hold sub-licenses. AS Wilcox have successfully applied for protection and registration for AmaRosa, Yukon Nugget and Purple Pelisse.

South Africa: McCain has a current sub-license and is trialing Clearwater and Blazer Russet.

China: Simplot China, Lamb Weston and Industrial Crops Research in Yunnan Province currently hold sub-licenses.

Germany: Agrarfrost/Interseed GmbH are our exclusive partner in Europe for the production of processing russets. For the 2019 crop they paid $4,201.26..

Norika GmbH is our exclusive partner in Europe for specialty/non-processing lines. In 2021 they paid $353.04 for royalties in 2019 and 2020.

Website

The PVMI website includes several new Videos.

Disbursements

Based on 20/21 income $1049k was distributed to the universities in December, retaining $108k in reserves. This compared to $841,974.16 the year before and $886,186.19, and $646,879.08 the two years before that. Since 2008 the total royalty checks dispersed has been $6,292,729.30.

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Jeanne further shared a view of the PVMI website and some features such as the new videos being uploaded about the program.

She shared the technical library previously mentioned with information on how to log in.

Kingsman Variety has been requested for testing in the PNW by Alistair Redpath. If you are interested, contact Jeanne.

Jeanne announced her retirement for January 31, 2023. She asked for replacement references and support with recruiting.

Jeanne expressed gratitude for the opportunities. If next year’s meeting is before Jan 31, then she will attend.

Rich Novy discussed how the videos are helping with communication and encouraged everyone to see them.

Jenny Durrin gave an update on the clone bank and the new building at the University of Idaho.

She shared a list of all the material she currently has access to share. She asked for feedback on which to eliminate. There are about 11 entries getting cleaned up for disease. PVY has created a challenge, but she is getting through it. It takes about 6 months to get them through. There have been requests for Galena and its disease status is being sent out to confirm status.

Rich Novy said he would get back to her later with recommendations on what material to dispose of. He also asked Jenny to clarify what this process for clone line clean-up.

Jenny said when a clone is close to release, they start the clean up process. She described the process and it takes about a month for a clean up cycle and that the cycle is repeated four or five times. The germplasm is then validated for cleanliness.

There were challenges getting Galena cleaned-up but it is getting worked through.

Rich asked Jenny to explain how the funding supports the clean-ups.

Sales of materials come back into the program. There are no grants which support the process. Clean-ups cost about $800 and it needs to be billed more consistently. Rich asked this be a point of discussion in future meetings to standardize the costs for clean-up initiatives. Rich thanked Jenny for all the work she does.

Sagar Sathuvalli echoed the support of Rich.

Jenny then talked about the germplasm transfers. $125 domestically and $250 internationally. 43% were for Tri-State varieties. Plantlet shipments are heavy in spring. About 42% of mini tuber requests were Tri-State Varieties. Shipments are going to N.America and Canada.

New building updates from Jenny. They needed more space so there was a new building built at the University of Idaho in Moscow, ID. They are waiting for furniture still, but they are currently working in the space. Laminar Flowhoods are still waiting to be delivered. March 29, 2022 will be the grand opening which is open to the public.

Rhett asked everyone to email Jake Blauer their reports to be included into the minutes.

Chelsey Lowder was asked to give a Tri-State report.

Chelsey shared her screen. 4 checks and 12 clones were in the 2021 trial. The highest yielding was A12305-2adg. General reports on the performance of the other clones was briefly described.

Technical issues occurred so Rhett shared his screen to allow Chelsey to speak before he had to take over and present due to Chelsey losing full contact.

For US #1’s, RB and Shepody were the lowest yielding.

The highest for early trial was A12305-2adg. For the late trial the highest was A09086-1LB.

A09136-9LB had the highest gravities for the early and A11326-1 was the highest for the late trial.

In the Early trial, A10594-4sto had the largest tubers. In the Late trial, Ranger had the longest LxW ratio.

There was low shatter in all entries. A09136-9LB was the most resistant to shatter.

Internal defects looked good overall generally.

Fry color A11175-12TE and AOR13064-2 had the best fry color out of 44’F storage for 60 days. There were about 20-30% sugar ends reported overall.

Disease results: Jonathan Whitworth took over the explanations. Clearwater did very well against disease. A11259-1 and A12114-7 did good for the season. The in-season heat created challenges with testing. There were some good results for corky ringspot resistance. AOR13064-2 had resistance similar to the checks for Common Scab. \*All results are in the Tri-State Research report.

Max Feldman commented that the Corky Ringspot trials were low so the results should be taken with caution.

Sagar Sathuvalli and Jonathan discussed the genetics associated with the resistance program and emphasis looking for the RY genes for resistance.

Rhett continued to share the results for the trial summaries. Nothing concerning with glycoalkaloids.

Fresh pack results: AOR13064-2 was best for the early trials, and AOR11217-3 for late trials. For processing AOR11217-3 was best for early trials and for the late trials, AOR13064-2 & AOR11217-3 were best.

Jake Blauer shared the Postharvest merit scores based on what was presented in the book report at [www.potatoes.wsu.edu](http://www.potatoes.wsu.edu).

AOR13064-2 was the top performing entry and six entries were estimated to have LTS resistance.

Chelsey got back online and shared the recommended disposition proposals for advancements and new entries.

10 new entries are proposed for the Tri-State. 5 to be advanced, 3 to discarded and 4 to return for additional testing.

Brian Charlton asked why we were retaining A11326-1.

Rich said that it had high marketable yield for fresh and while the merits postharvest were not good, it was comparable to Burbank. It would be in a second year to validate.

Tom Salaiz asked why A11175-12TE to return because the gravities were low. He wanted to know if it would be a fresh only consideration.

Rich said that it did generally well and that is why we want to look at it again. He also thought it had LTS resistance. Jake confirmed this appears to be true based on the 2021 tests.

Mike Thornton shared the results for the Specialty potato report.

All data can be seen in the report. There was a lot of variability in size and yields with the entries. OR11157-1 had very poor yield.

Defects were reported. A11573-5RYsto had skinning issues. Purple Majesty had a lot of shatter concerns.

Everything looked pretty good for greening.

Internal defects were the worst in Chieftain for hollow heart. Everything else looked pretty good, though Net Necrosis was worse in WA.

Purple Majesty had the highest glycoalkaloids so there really was not a concern here.

Jonathan Whitworth shared the early blight results.

Dormancy had the lowest dormancy and OR11157-1 still has not sprouted after 146 days.

AO8122-9RY, Bintje, A11576-1Ysto, Chieftain, and Purple Majesty were the highest yielding.

OR11157-1 was very low yielding and very non-uniform appearance. Lots of knob issues.

Jonathan updated some PVY results and they are still screening for leafroll.

Jake shared the culinary report from WSU as seen in the potato book report. OR11157-1 was the best performing entry overall. All clones performed high generally though for the culinary evaluations.

Time was turned to Chelsey for the disposition of these entries.

3 entries advanced, 3 to return, & 4 new entries to be added to next year’s trials.

Sagar Sathuvalli asked about OR11157-1 and its yield being so low. Historically it was better so he was curious if heat in 2021 was a concern and if a fingerling check should be added. Mike responded the heat could be a contribution, but he was not sure.

Rhett suggested keeping it for evaluation again. Jake recommended cutting it due to potential heat risk. Rich ask Sagar Sathuvalli for clarification about justification for keeping it. Sagar Sathuvalli said it is for a unique market. Mark Pavek asked what control to add. La Ratte is proposed as a control and Brian Charlton said he has seed for it. The vote was to keep it one more year with La Ratte added for a check. Isabel said La Ratte has a lot of issues with powdery scab. Rich asked the industry attendees to suggest another control. Nora Olsen recommend Austrian Crescent. Max Feldman suggested Banana Fingerling and/or AmaRosa. Dave Holm suggest Purple Peruvi. Rich Novy recommended that we use Austrian Crescent. Sagar Sathuvalli agreed. All agreed to add Austrian Crescent. Chelsey added it to the testing list.

Rich Novy shared information about the NDA050237B-1R. It is a red and there is a lot of interest out of MI for this entry. Rich said due to this interest it should be released. Rhett said that he would share a summary of its performance out once the minutes are finalized. Brian recommended that we discuss this more tomorrow in the technical meeting. Jeanne Debons said that we need to do more to get it out to the markets. There has been very little interest in it so she cautioned expectations for adoption. Rich said there is motivation among seed growers to have it available.

Rhett asked Sagar Sathuvalli to present releasing POR14PG22-3. Sagar Sathuvalli shared a powerpoint. It was a cross by Chuck Brown. It is a baby potato, yellow skin, yellow flesh. It has good agronomics and it is an early to medium maturity potato. It is similar to Yukon Gold for field performance. Sagar Sathuvalli asked for potential name recommendations. Oregon Potato commission supports the release of this variety. Further discussion was delayed until tomorrow’s committee meeting.

Brian Charlton shared a seed supply and shipping list. Due to field concerns and soil carry over, he does not have a good estimate of yields. With COVID and mechanical concerns there will be issues getting seed shipped out in a timely manner. Brian asked for patience getting material to the users. Brain asked for requests for seed by the 14th.

Rich asked if there were any concerns with Tri-State seed sources. Nicole said no.

Jake asked Brian about scab on the seed concerns. Brian said it was same as last year.

Rhett asked for nominations for secretary for next year.

Sagar Sathuvalli nominated Noelle Anglin from the USDA. Noelle asked for clarification of responsibilities. Rhett explained and Noelle accepted. Max Feldman seconded. Unanimous support. Motion carried with Noelle as the secretary for 2023 with Jake Blauer as Chair next year.

The 2023 meeting timing will January 31, 2023, in Boise, Idaho. Tentatively the location will be the Best Western near the airport, or at the University of Idaho Building.

Rich asked if the timing would work for the Regional meetings and the location. They expressed challenges but having a hybrid meeting would be best.

Rich moved to adjourn the meeting. Jonathan Whitworth seconded the motion and Rhett ended the meeting at 11:24 am PST.