**NCCC215 Potato Breeding and Genetics Technical Committee**
Dec 9-10, 2025
Hilton Garden Inn - Chicago O'Hare Airport and online via Zoom link
Chair: Jeff Endelman; Vice-chair: Cari Schmitz Carley; Secretary: Maria Caraza-Harter

32 in-person attendees: Alejandro Dominguez, Andy Hamernik, Audrey Gower, Cari Schmitz-Carley, Caroline Gray, Chamila Pathirana, David Douches, Dennis Halterman, Greg Steere, Gustavo Nandi, Han Tan, Jeff Endelman, Jesish Ojha, Jess Norling, Jessi Huege, Joe Coombs, Johan Aparicio, Lauren Sexton, Leo Hoffmann, Logan Rodewald, Maria Caraza-Harter, Mark Clough, Matt Falise, Matt Zuehlke, Mercedes Ames, Pia Spychalla, Sagar Sathuvalli, Sapphire Coronejo, Shyam Chandica Halder, Tim Rendall, Tomas Lopes, Walter De Jong

13 remote attendees: Susie Thompson, Katelynn Kaiser, Megan Ruffley, Isabel Vales, Max Feldman, Becky Eddy, Michaela Erickson, James Spychalla , Marcio Resende, Mario Andrade, Fatima Latif Azam, Kaela Panicucci, Joseph Ifeanyi Ulasi

Called to order @ 3:06 PM, Dec. 9

- No additions or corrections were made to the 2024 minutes.

**Research presentations**

University of Wisconsin-Madison

- Jesish Ojha: Genetics of resistance to the Colorado Potato Beetle
- Alejandro Dominguez: Optimizing crossing decisions in autotetraploid species
- Johan Aparicio: FlexfitR and exploreHTP tools for potato breeding
- Maria Caraza-Harter: Diploid breeding at UW-Madison

USDA ARS Vegetable Crops Research (Madison, WI)

- Dennis Halterman: Genetic mechanisms controlling early blight resistance
- Andy Hamernik: WiDiPo species clones and CPB feeding resistance

Cornell University (New York)

- Pia Spychalla: Ry-adg updates: the process of elimination

University of Minnesota

- Sapphire Coronejo: Using AI to predict deleterious mutations in potato

Recess at 5:30 PM

Resume at 8:00 AM Dec 10

**Announcements**

1. Updates from Caroline Gray, PAA Breeding and Genetics section chair
   a. Section is organizing symposium at the 2026 PAA Annual Meeting on "Innovating Paths to Nematode Control"
   b. Webinar on diploid breeding is planned, by David Douches and Han Tan
   c. Invitation to propose special topics for the American Journal of Potato Research
   d. Suggestions for an international speaker for the PAA conference are welcome, but funding may be limited
2. Update from Joe Coombs about the v5 SNP array
   a. Same SNPs as the v4 array plus trait-specific markers from DArTag
   b. Price will be substantially less than before; more information coming soon
   c. 24-sample format has been discontinued; only multiples of 96 now.
3. Update from Jeff Endelman about DArTag
   a. Current version is called Potato_DArTag_4k 2.0 if ordering directly from DArT; only difference with the previous version (Potato_DArTag_EiB_4k_Diploid 1.0) is new marker for the M6 allele of Rychc.
   b. Suggestions for new trait-specific markers are welcome.

**Elections:** David Douches self-nominated for secretary and was approved by unanimous vote.

**Research Presentations**

Michigan State University

- Tomas Lopes: Identification of CPB resistance-associated loci in *S. pinnatisectum*
- Jess Norling: Progress in diploid potato resistance breeding
- Gustavo Nandi: Image analysis and computer vision applied to potato breeding
- Chameela Pathirana: Screening Solanum species for abiotic heat stress tolerance
- Shyam Chandra Haldess: MSU potato breeding and genetics disease assessment for biotech potato events
- Kaela Panicucci (via zoom): Linkage and QTL mapping for self-compatible characteristics in an F2 diploid mapping population
- Joseph Ifeanyi Ulasi (via zoom): Introgression and pyramiding of novel resistance genes for diploid potato breeding

Aardevo

- Cari Schmitz Carley: Seeding potatoes, changing the world

**North Central Breeding Program Presentations**

- Jeff Endelman, University of Wisconsin-Madison
- Susie Thompson, North Dakota State University
- Laura Shannon, University of Minnesota
- David Douches, Michigan State University

Adjourned at 12:00 pm

**Accomplishments**

- Disease resistance: Scab resistance, late blight resistance, Verticillium wilt resistance, and PVY resistance are being introgressed into advanced breeding lines for the chip processing, frozen processing, and table (red, yellow and white skins) markets.
- Diploid breeding: Genetics of self-compatibility is being studied in germplasm derived from *S. tuberosum, S. chacoense* and *S. verrucosum*; EBN1 wild species are being introgressed using bridge crossing derived from *S. verrucosum*; dihaploids are being extracted by all the breeding programs to establish a diploid cultivated gene pool. Late blight resistance has been identified in *S. microdontum* and is being introgressed into adapted diploid germplasm
- Genetic engineering: potatoes have been engineered for drought tolerance, increased dry matter content, late blight resistance, or cold sweetening resistance.
- Marker-assisted selection: Both single marker and genomic selection strategies are being used to improve selection for breeding value for many traits, including yield, specific gravity, fry color, shape, and common scab.
- Multi-institution grants have been obtained (see below).

**Impacts**

- Manistee (long-term storage chipper) and Mackinaw, a PVY, scab and late blight resistant chipper, is expanding in the US. The newer varieties Petoskey, Dundee, Huron Chipper and Blackberry have increasing certified seed acreage.
- Certified seed potato production for Dakota Russet, a dual-purpose russet with frozen processing potential (approved for McDonald's French fry production in 2022) with resistance to the sugar end disorder, cold sweetening, pink rot and southern rot, and moderate resistance to Verticillium wilt and Pythium leak, moved into the top 10 cultivars grown in North America.
- PVP certificates were issued for five varieties in 2025: Dakota Dawn, Portage Russet, Lakeview Russet, Elk River Russet and W9426-3R.

**Outreach**

National Outreach Activities: Shannon, Endelman and Douches participated in the Potatoes USA PRAC booth to share progress on "Potato 2.0- Update on Breeding, Agronomics, and Industry Impacts" and "Enhancing Integrated Pest Management Strategies for Insect Control" at the Potato Expo in Dallas, TX.

Endelman, Shannon, and Thompson participate in the National Fry Processing Trial and associated meetings. All four PIs participate in the National Chip Processing Trial and associated meetings.

Michigan Outreach activities for Dave Douches: Montcalm Research Center Field Day, August 2025; Variety Trial Field Day, Montcalm County, August 2025; Potato Variety Day, MI, February 2025. Diploid potato breeding was the one of the topics of the Michigan Winter Potato Conference in February 2025.

Minnesota/North Dakota Outreach activities for Laura Shannon & Asunta Thompson: Northland Potato Growers Association Research Reporting Meeting, February 2025; Minnesota Area II Potato Growers Association Short Course, March 2025; Sand Plains Research Farm Field Day, July 2025; Potato Dig Day at the University of Minnesota Arboretum, August 2025; Northland Potato Growers Field Day, August 2025; NPGA and Area II research planning meeting, November 2025.

Wisconsin Outreach Activities: Wisconsin Potato Grower Education Conference (February 2025); UW Hancock Field Day (July 2025).

**Publications**


Behling, W., Coombs, J., Ranaweera, T., Vaillancourt, B., Hamilton, J.P., Brose, J., Buell, C.R. and Douches, D.S., 2025. Genetic basis for broad interspecific compatibility in Solanum verrucosum. *The Plant Journal*, *123*(4), p.e70426.

Cramer, C. S. (2025). Vegetable Cultivar Descriptions for North America List 29 2025. *HortScience*, *60*(11), 2169–2189. https://doi.org/10.21273/HORTSCI19006-25

Coronejo S, Vaillancourt B, Hamilton JP, Meng X, Mailloux K, Christensen G, Huege J, Shaw KM, Agha HI, Brown-Donovan K, Busse JS, Hamernick A, Caraza-Harter MV, Heroux L, Kardile HB, Knoeck E, Sorensen PL, Spencer D, Yilma S, Bethke PC, Douches D, Parsons J, Sathuvalli V, Tan EH, Endelman JB, Buell CR, Shannon LM. (2026). Potato dihaploids uncover diverse alleles to facilitate diploid potato breeding. *Plant Genome*. 19(1) e70169

Douches, D. S., Coombs, J. J., Behling, W. L., Steere, G. E., Zuehlke, M. L., & Long, C. M. (2025). Petoskey A High Gravity Chip-Processing Variety with Long-term Storage Potential and Resistance to Common Scab. *American Journal of Potato Research*, *102*(6), 581-590. Re: Compliance review -Spring 2026 MTRAC Starter Grant Proposal

Douches, D. S., Coombs, J. J., Behling, W. L., Steere, G. E., Zuehlke, M. L., Lopes, T. D., ... & Long, C. M. (2025). Blackberry, an Attractive Deep Purple Potato Variety with Resistance to Common Scab and Extreme Resistance to Potato Virus Y. *American Journal of Potato Research*, *102*(6), 600-608.

Douches, D. S., Coombs, J. J., Behling, W. L., Hammerschmidt, R., Steere, G. E., Zuehlke, M. L., & Long, C. M. (2025). Manistee, a new Round-White Early to Mid-Season Maturing Potato Variety with Excellent Long-Term Storage Potential. *American Journal of Potato Research*, 1-9.

Douches, D. S., Coombs, J. J., Behling, W. L., Steere, G. E., Zuehlke, M. L., Willbur, J., & Long, C. M. (2025). Mackinaw: A Round White Potato Variety with Excellent Long-Term Storage Chip-Processing Quality and Resistance To Late Blight, Potato Virus Y, Golden Cyst Nematode and Tolerance To Common Scab. *American Journal of Potato Research*, 1-9.

Douches, D. S., Coombs, J. J., Behling, W. L., Steere, G. E., Zuehlke, M. L., & Long, C. M. (2025). Huron Chipper a Broadly Adapted Chip-Processing Variety with Long-Term Storage Potential and Resistance to Late Blight and Common Scab. *American Journal of Potato Research*, 1-10.

Endelman, J. B. (2025). Genomic prediction of heterosis, inbreeding control, and mate allocation in outbred diploid and tetraploid populations. *Genetics, 229*, iyae193.

Jarrell, Anne Frances; Hamilton, John; Wood, Joshua C.; Vaillancourt, Brieanne; Norling, Jessica; Douches, David S.; et al. (2025). Building genomic resources to facilitate the study and use of Solanum microdontum, a wild relative of cultivated potato. G3: Genes|Genomes|Genetics.

Kambi V, Wang Y, Shannon LM, Yue C. (2025). Investigating US Potato Farmers' Preferences for True Potato Seed. *Journal of Agriculture and Food Research*.

Makokha P, Thompson AL, Hanson E, Secor G, Robinson AP. (2025). Chip processing potato production using narrow row width. *American Journal of Potato Research* 102: 410–417. https://doi.org/10.1007/s12230-025-10000-2

Makokha P, Thompson AL, Hanson E, Secor G, Robinson AP. (2025). Tablestock potato production using narrower row widths. *American Journal of Potato Research* 102: 402–409. https://doi.org/10.1007/s12230-025-09998-2

Makokha P, Thompson AL, Hanson E, Secor G, Robinson AP. (2025). Optimization of row width and seed spacing for Red Norland. *American Journal of Potato Research* 102: 372–379. https://doi.org/10.1007/s12230-025-09994-6

Tai HT, Shannon LM, Stomvik MV. (2025). Insights on polyploidy from Solanum section Petota. *Trends in Genetics*.

Yusuf M, Meng X, Stefaniak TR, Montesinos-Lopez OA, Shannon LM. (2025). Leveraging unmanned aerial vehicle derived multispectral data for improved genomic prediction in potato (Solanum tuberosum). *The Plant Genome*. 18(3).

**Popular Articles**

Endelman, J. B., Aparicio, J. (2025). Using drones in potato breeding. *Badger Common'Tater*. September, 52-54.

Thompson, S, Peppel K, Ihry P, Andidi H. (2025). Crystal Fresh Market Trial: 2024 Summary. *Northland Potato Grower*. April, 8-12.

**Proceedings and Reports**

D.S. Douches, J. Coombs, G. Steere, M. Zuehlke, J. Norling, C. Long and J. Willbur. (2025) 2025 POTATO VARIETY EVALUATIONS. 2025 MPIC Research Reports. Online

David S. Douches, J. Coombs, K. Zarka, G. Steere, M. Zuehlke, D. Zarka, Audrey Gower and Jess Norling. (2025) 2025 MSU POTATO BREEDING AND GENETICS RESEARCH REPORT. 2025 MPIC Research Reports. Online.

Endelman J. (2025) UW-Madison Potato Breeding Report. Proceedings of the UW-Madison and WPVGA Grower Education Conference. https://vegetables.wisc.edu/references/presentations-from-recent-meetings/

Rosen C, Crants J, McNearney M, Seo S, Shannon L, Stefaniak T, Gupta S. Evaluation of agronomic performance and after-cooking tuber darkening in Elk River Russet relative to Russet Burbank. MN Area II Potato Research and Promotion Council and Northland Potato Growers Association 2024 Research Reports. https://www.northlandpotatoes.com/wp-content/uploads/2025/02/2024-Compiled-Research-Reports-.pdf

Shannon LM (2025). Data Report for the UMN Potato Breeding Program. MN Area II Potato Research and Promotion Council and Northland Potato Growers Association 2024 Research Reports. https://www.northlandpotatoes.com/wp-content/uploads/2025/02/2024-Compiled-Research-Reports-.pdf

Thompson A. Developing Robust Potato Cultivars for the Northern Plains. MN Area II Potato Research and Promotion Council and Northland Potato Growers Association 2024 Research Reports. https://www.northlandpotatoes.com/wp-content/uploads/2025/02/2024-Compiled-Research-Reports-.pdf

**Current collaborative grants awarded**

| NAME<br><br>(List/PD #1 first) | SUPPORTING AGENCY AND AGENCY ACTIVE AWARD/PENDING PROPOSAL NUMBER | TOTAL $ AMOUNT | EFFECTIVE AND EXPIRATION DATES | TITLE OF PROJECT |
|---|---|---|---|---|
| Douches, Endelman, Thompson, Shannon | USDA/NIFA | $1,938,000 | 09/30/25 - 08/31/27 | Potato Breeding and Variety Development in the North Central US: Enhancing Yield, Quality and Resilience with New Technologies, 2025-27 |

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|---|---|---|---|---|
| Pasche, Anderson, Thompson, Shannon | North Dakota Department of Ag | $180,000 | 10/1/24 - 9/30/27 | Digging into the Root of Verticillium Wilt Resistance |

## Attendees

### In person attendees:

| Name | Organization |
|---|---|
| Alejandro Dominguez | Universidad Politecnica de Madrid |
| Andy Hamernik | USDA |
| Audrey Gower | Michigan State University |
| Cari Schmitz-Carley | Aardevo |
| Caroline Gray | Colorado State University |
| Chamila Pathirana | Michigan State University |
| David Douches | Michigan State University |
| Dennis Halterman | USDA |
| Greg Steere | Michigan State University |
| Gustavo Nandi | Michigan State University |
| Han Tan | University of Maine |
| Jeff Endelman | University of Wisconsin-Madison |
| Jesish Ojha | University of Wisconsin-Madison |
| Jess Norling | Michigan State University |
| Jessi Huege | University of Minnesota |
| Joe Coombs | Michigan State University |
| Johan Aparicio | University of Wisconsin-Madison |
| Lauren Sexton | University of Minnesota |
| Leo Hoffmann JR | University of Florida |
| Logan Rodewald | University of Minnesota |
| Maria Caraza-Harter | University of Wisconsin-Madison |
| Mark Clough | Michigan State University |
| Matt Falise | Cornell University |
| Matt Zuehlke | Michigan State University |
| Mercedes Ames | USDA |
| Pia Spychalla | Cornell University |
| Sagar Sathuvalli | Oregon State University |
| Sapphire Coronejo | University of Minnesota |
| Shyam Chandica Halder | Michigan State University |
| Tim Rendall | Potatoes USA |
| Tomas Lopes | Michigan State University |
| Walter De Jong | Cornell University |

### Zoom attendees:

| Name | Organization |
|---|---|
| Susie Thompson | North Dakota State University |

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| Katelynn Kaiser | Aardevo |
| Megan Ruffley | Aardevo |
| Isabel Vales | Texas A&M University |
| Max Feldman | USDA |
| Becky Eddy | University of Wisconsin-Madison |
| Michaela Erickson | University of Wisconsin-Madison |
| James Spycalla | Wisconsin |
| Marcio Resende | University of Florida |
| Mario Andrade | University of Maine |
| Fatima Latif Azam | Wageningen University |
| Kaela Panicucci | Michigan State University |
| Joseph Ifeanyi Ulasi | Michigan State University |