W-6 RTAC Germplasm Report CY 2024
State of Montana

By Mike Giroux

In 2024, there were six NPGS – W6 orders received from eight unique recipients requesting a total of 376 accessions. The majority (213) of the requested accessions were for one genetic diversity study being conducted in alfalfa. All requested accessions were for breeding and research.

NPGS Site	#	Species	Common	Primary Purposes	Entity
COR	1	*Fragaria virginiana*	strawberry	Native food research	MSU
DAV	33	*Vitis* hybr.	Grapes	Breeding and research	MSU
GEN	29	*Vitis* hybr.	grapes	Breeding and research	MSU
GSOR	1	*Oryza sativa*	rice	Breeding and research,	MSU
NC7	6	*Camelina*, *Zea mays*, *Echinochloa*	camelina, corn, barnyard grass	Breeding and research,	MSU, company
NE9	38	*Solanum* sp.	tomato	Breeding and research,	MSU, company
NR6	7	*Solanum* sp.	potato	Breeding and research,	MSU
NSGC	38	*Triticum* sp., *Oryza*, *Avena*	wheat, rice, oats	Breeding and research,	MSU, company
OPGC	1	*Calochortus nuttallii*	sego lilly	Research, private company	
PARL	9	*Physaria* sp.	Bladderpod	Private company	
W6	213	*Medicago sativa*	alfalfa	Breeding and research	
	3	*Carthamus tinctorius*	Safflower	Beeding and research, company	

Recipient

Jerald Bergman – 3 safflower accessions for safflower breeding, Safflower Technologies, Sidney, MT

Barney Bernstein – 1 camelina accession for breeding, Sustainable Oils, Great Falls, MT

Jason Cook – 6 wheat accessions for breeding, Montana State University

Arpit Gaur – 8 rice accessions for research, Montana State University

Pat Hensleigh – 31 oat, barley, fava bean accessions for breeding and research, RLNTZ Inc, Bozeman, MT

Duane Johnson – 9 accessions, bladderpods, cropping mixes, Phoenix Rising, Bigfork, MT

Janak Joshi – 1 potato accession, breeding and research, Montana State University

Venkat Kadium – 19 grape accession, breeding and research, Montana State University

Saurabha Koirala – 198 alfalfa accessions, breeding and research, Montana State University

Tara Luna – 3 rangeland plant accessions, breeding and research, Rocky Mountain Botany, East Glacier, MT

Dhirendra Niroula – 12 Solanum accessions, breeding and research, Montana State University

Alice Pilgeram – 7 oat accessions, breeding and research, Montana State University

Jill Falcon Ramaker – 3 corn accessions, native food research, Montana State University

William Schlegel – 9 tomato accessions, breeding and research, Montana Tomato Project, Ronan, MT

Andrej Svyantek – 56 tomato and grape accessions, breeding and research, Montana State University

Tavin Wyrick – 1 camelina accession, breeding and research, Montana State University

Jean Yost- 1 lettuce accession, breeding and research, Local Bounti- Hamilton, MT

Example publications involving US germplasm use.

1. Oiestad AJ, Blake NK, Tillett BJ, O'Sullivan ST, Cook JP, Giroux MJ. (2025) Plant Productivity and Leaf Starch During Grain Fill Is Linked to QTL Containing Flowering Locus T1 (FT1) in Wheat (Triticum aestivum L.). Plants (Basel). 2025 Feb 7;14(4):512. https://doi:10.3390/plants14040512

Germplasm use: Screen of 29 wheat landraces.

Abstract: Shifts in the environment due to climate change necessitate breeding efforts aimed at adapting wheat to longer, warmer growing seasons. In this study, 21 modern wheat (*Triticum aestivum* L.) cultivars and 29 landraces were screened for flag leaf starch levels, with the goal of identifying a genetic marker for targeted breeding. The landrace PI 61693 was identified as having exceptionally high flag leaf starch values. Yield trials were carried out in a Berkut × PI 61693 recombinant inbred line (RIL) population and a negative correlation was observed between leaf starch, flowering time, and yield. Genetic mapping identified a Quantitative Trait Loci (QTL) explaining 22-34% variation for leaf starch, flowering time, biomass, and seed yield. The starch synthase *TraesCS7D02G117800* (*wSsI-1*) is located in this region, which possibly accounts for leaf starch variation in this population; also within this QTL is *TraesCS7D02G111600* (*FT-D1*). Sequencing of *FT-D1* identified a single base pair deletion in the 3rd exon of the Berkut allele. This indel has recently been shown to significantly impact flowering time and productivity and likely led to significant variation in flowering date and yield in this population. Here, we illustrate how allelic selection of *FT-D1* within breeding programs may aid in adapting wheat to changing environments.

2. Hogg, A. C., Hale, C. O., Tillett, B. J., Huang, L., Carr, P. M., Eberly, J., Chen, C., Kowatch-Carlson, C., Crutcher, F., Lamb, P., Haney, E., Smith, V., Dykes, L., Chen, X., Islam, M. M., Liu, Z., & Giroux, M. J. (2025). Registration of 'MT Blackbeard' and 'MT Raska' durum wheat. Journal of Plant Registrations, 19, e20425. https://doi.org/10.1002/plr2.20425

Germplasm use: Crosses between varieties maintained by NSGC, release of two varieties, storage of the released genotypes by the USDA.

Abstract: 'MT Blackbeard' (Reg. no. CV-1212, PI 703025) and 'MT Raska' (Reg. no. CV1213, PI 703026) are spring durum wheats (Triticum turgidum L. ssp. durum) developed by the Montana Agricultural Experiment Station and released in 2022. MT Blackbeard was bred using a four-parent cross followed by single seed descent and was selected for high yield under rainfed conditions across Montana, low grain cadmium accumulation, large seed size, high gluten strength, and resistance to the most common races of the stem rust (Puccinia graminis f. sp. tritici) and leaf spot pathogens in Montana. MT Raska was also bred using a four-parent cross followed by single seed descent and was selected for high yield under rainfed conditions across Montana, semi-dwarf plant height, exceptional test weight, semolina color retention, and resistance to the most common races of the stem rust and leaf spot pathogens in Montana. Both lines yield well in the North Central and Eastern regions of Montana, where most Montana durum is produced and are intended for pasta production. MT Blackbeard is approximately 72.7 cm tall, similar to the commonly produced line 'ND Riveland', has signature black awns, and flowers 1 day later than ND Riveland.