

State of Montana
Annual Report for Calendar Year 2019
to the W-6 Technical Committee
Compiled by Mike Giroux

Twenty-three recipients received a total of 633 plant germplasm accessions in Montana during the last year. The biggest users were Montana State University wheat and pulse breeding programs. The biggest use by far was for varietal development.

NPGS Site	Sent #	Species	Primary Purposes
COR	13	Raspberry, apples, pears	Breeding for short season fruit varieties
DAV	2	Grapes	Breeding cold hardiness
GEN	6	Grapes, raspberries, apples	Home orchard breeding and demonstrations
NC7	6	Corn, camelina	Varietal development, biocontrol
NE9	2	Tomatoes	Educational
NSGC	353	Wheat and wheat relatives	Breeding and production of "ancient grains"
PARL	8	Oil shale Fescue	Varietal Development of oilseed crops
S9	14	Guar, cowpea	Sorghum breeding, biocontrol plants
W6	229	Pulse crops	Pulse crop breeding, genetics studies, disease
Total	633		

User type	#	Primary uses
Homeowner	3	Fruit and clover production
Private company	7	Varietal development/ direct use for production
MSU	10	Varietal development
USDA	3	Host for insect biocontrol agents / varietal development

Recipient

COR – James Sapp (private company) received 8 accessions of apple and pear as part of his development of a permaculture orchard in Missoula, MT.

COR – Sarah Smith (homeowner) received 5 blackberry and raspberry accessions for home gardening purposes.

DAV, GEN - Carl Camper (private company) received 4 grape varieties to screen for cold hardiness as part of a varietal development program.

GEN – Stephanie Lamarr (homeowner) received 4 apple relative accessions

NC7 – Gaskin (USDA) received 1 *Eutrochium maculatum* (spotted jo-pye weed) accession to screen for host-specificity of biological control agents as a part of his entomological investigations.

NC7 – Lu (MSU) received 4 *Camelina* accessions for his genetics and biochemistry research.

NC7 - Ed Schultz (private company) received 1 corn accession for his research on breeding early dry land cold hardy corn.

NE9 – Siegle (education) received 2 *Solanum* tomato wild relative accessions. He is making a video about the history of tomatoes and the two strains of tomatoes on the Galapagos.

NSGC – Nancy Blake (MSU) received 218 hexaploid wheat accessions to screen for wheat stem sawfly resistance.

NSGC – Jacob Cowgill (private company) received 49 wheat accessions to evaluate in the field prior to making crosses for varietal development.

NSGC – Mike Giroux (MSU) received 18 hexaploid wheat accessions to screen for leaf starch levels to determine how leaf starch impacts plant growth.

NSGC – Pat Hensleigh (USDA-NRCS) received 40 accession to examine possible use in breeding programs.

NSGC – Jamie Sherman (MSU) received 1 barley accession for a possible new source of FHB resistance.

NSGC – M.J. Walton (private company) received 23 wheat accessions to see if they would grow well in MT and make good loaves of bread and if so he plans to use them on his farm.

PARL – Duane Johnson (private company) received 8 *Festuca* (oil shale fescue) accessions to determine if they could be a source of lesquerolic acid adaptable to Montana (temperate) conditions. Observation of success will lead to plant breeding through hybridization.

S9- John Gaskin (USDA ARS) received 8 *Ipomoea pes-caprae* (morning glory) accession to screen for host-specificity of biological control agents as a part of his entomological investigations.

S9-Pat Hensleigh (USDA-NRCS) received 1 sorghum accession to examine possible use in breeding programs.

S9- M.J. Walton (private company) received 5 accessions of sorghum increase and screen for cold tolerance.

W6- Mac Burgess (MSU) received 44 pulse accessions to screen for winter hardiness.

W6- John Gaskin (USDA ARS) received 2 *Hydrolea ovata* (ovate false fiddleleaf) accessions to screen for host-specificity of biological control agents as a part of his entomological investigations.

W6- Pat Hensleigh (USDA NRCS) received 27 faba bean accessions to examine possible use in breeding programs.

W6 – Duane Johnson (private company) received 1 *Festuca dasyclada* (oil shale fescue) accession to determine if it could be a source of lesquerolic acid adaptable to Montana (temperate) conditions. Observation of success will lead to plant breeding through hybridization.

W6 – Qasim Khan (MSU) received 25 accessions of faba bean for breeding for adaptability.

W6 – Kevin McPhee (MSU) received 57 pulse crop accessions in support of his pea, lentil, and chickpea breeding programs.

W6 – Perry Miller (MSU) received 1 faba bean accession for breeding for legume green manure.

W6- Sarah Smith (homeowner) received 1 *Trifolium pratense* (red clover) accession for home gardening.

W6- Jake Tracy (MSU) received 27 pulse accessions to screen them for salinity tolerance.

W6 – Norm Weeden (MSU) received 44 pulse accessions to carry out DNA extraction for fingerprinting and phylogenetics and to characterize the stay green cotyledon gene and study *Pisum* subspecies taxonomy.

Publications:

Ahmed, S., Byker, C., Miller, P. (2019) Sustainability Dimensions of a North American Lentil System in a Changing World. *Frontiers in Sustainable Food Systems*: v. 3

Briar, S. S., Carr, P. M., Miller, G. G., Menalled, F. O., Miller, P. R. (2019) Current status and soil biology impacts of organic conservation tillage in the U.S. Great Plains. *Organic Farming: New Advances Towards Sustainable Agricultural Systems*. Springer International Publishing AG. eBook: p. 11-23

Briar, S. S., Carr, P., Graming, G., Menalled, F., Miller, P. (2019) Current status and soil biology impacts of organic conservation tillage in the U.S. Great Plains. *Organic Farming: New Advances Towards Sustainable Agricultural Systems*, . Springer International Publishing

D'Agati, K., Miller, P. R., Zabinski, C. A., Jones, C. A. (2019) Soil biological, chemical, and physical effects of long-term multispecies cover crop mixes.. ASA-CSSA-SSSA Annual Meeting, Nov 10-13, 2019, San Antonio, TX.

- Gaskin, J.F., Andres, J.A., Bogdanowicz, S.M., Guilbault, K.R., Hufbauer, R.A., Schaffner, U., Weyl, P., Williams III, L.H. 2019. Russian-olive (*Elaeagnus angustifolia*) genetic diversity in the western United States and implications for biological control. *Invasive Plant Science and Management*. DOI: 10.1017/inp.2019.16.
- Harms, N., Shearer, J., Cronin, J., Gaskin, J.F. 2019. Geographic and genetic variation in susceptibility of *Butomus umbellatus* to foliar fungal pathogens. *Biological Invasions*. DOI: 10.1007/s10530-019-02109-3.
- Jobson, E. M., Johnston, R. E., Oiestad, A. J., Martin, J. M., Giroux, M. (2019) The impact of the wheat Rht-B1b semi-dwarfing allele on photosynthesis and seed development under field conditions. *Frontiers in Plant Science*: v. 10 i. 51
- Lee, S., Park, H., Kim, B., Lee, J., Gaskin, J.F., Kim, Y. 2019. An unexpected genetic diversity pattern and a complex demographic history of a rare medicinal herb, Chinese asparagus (*Asparagus cochinchinensis*) in Korea. *Nature Scientific Reports*. 9:9757.
- Martin, J., Hogg, A. C., Giroux, M. (2019) Registration of wheat lines carrying novel mutagenesis-derived Puroindoline alleles. *Journal of Plant Registrations*: v. 13 p. 455-460
- Neyhart, J. L., Sweeney, D., Sorrells, M., Kapp, C., McFarland, A., Kephart, K., Sherman, J., Stockinger, E. J., Fisk, S., ... Smith, K. P. (2019) Registration of the S2MET Barley Mapping Population for Multi-Environment Genomewide Selection. no. *Journal of Plant Registrations/Crop Science Society of America*: v. 13 i. 2 p. 270-280
- Rapo, C.B., Schaffner, U., Eigenbrode, S.D., Hinz, H.L., Price, W., Morra, M., Gaskin, J.F., Schwarzlaender, M. 2019. Feeding intensity of insect herbivores is associated more closely with key metabolite profiles than phylogenetic relatedness of their potential hosts. *PeerJ*. 7:e8203. DOI: 10.7717/peerj.8203.
- Vetch, J. M., Stougaard, R. N., Martin, J. M., Giroux, M. (2019) Allelic impacts of TaPHS1, TaMKK3 and Vp1B3 on preharvest sprouting of Northern Great Plains winter wheats. *Crop Science*: v. 59 p. 140-149
- Villar, J.L., Alonso, A.M., Juan, A., Gaskin, J.F., Crespo, M.B. 2019. Out of the Middle East: New phylogenetic insights in the genus *Tamarix* (Tamaricaceae). *Journal of Systematics and Evolution*. DOI: 10.1111/jse.12478.
- Warne, T., Ahmed, S., Shanks, C. B., Miller, P. (2019) Sustainability Dimensions of a North American Lentil System in a Changing World. *Frontiers in Sustainable Food Systems*
- Zhang, H., Nyamesorto, B., Giroux, M., Yue, J., Chen, X., Huang, L. (2019) Registration of MNR434 and MNR527 wheat germplasm with new resistance to rusts. *Journal of Plant Registrations*: v. 13 p. 461-464