State of Montana
Annual Report for Calendar Year 2016
to the W-6 Technical Committee
Compiled by J. M. Martin

Twenty-seven recipients received 874 plant germplasm accessions in Montana during 2016. Seventeen of the recipients responded to inquiry. About 66% of these accessions were *Triticum* species (bread or durum wheat).

John Gaskin, USDA-ARS, Sidney, MT received *Saussurea nuda* (Chaffless or dwarf saw-wort) and they sent it to CABI (Centre for Agriculture and Biosciences International) in Switzerland for host specificity testing of biological control agents on invasive *Asteraceae*.

Andy Hogg, Dept. Plant Sciences and Plant Pathology, MSU-Bozeman received 1 *Triticum turgidum* subsp. *durum* accession from the National small grains collection. Line PI 330546 is a tall (40+ inches) red seeded durum that contains a 29 bp deletion in the first exon of the starch synthase II- A genome (*ssIIa-A*) gene which results in the abolishment of the protein. Using the primers Sgp-A1F3 (gcgtttacccccacagagc) and Sgp-A1R3 (acgcgccatacagcaagtcata) from Shimbata et al. Theor. Appl. Genet 111:1072-1079 the mutation can be detected using a CAPS marker (unpublished) where the PCR product is cut with the enzyme *NruI*. The deletion removes the cut site so this line does not cut producing only one band (425 bp) on a 2% agarose gel whereas the functional *ssIIa-A* gene cuts once producing two bands (310 bp and 144 bp). Further characterization of this line was reported in Hogg et al J. Cereal Sci. 57:377-383. This line also contains the low cadmium uptake allele based on the CAPS marker *usw47* whereby the PCR product is digested with *Hpy188I* (http://maswheat.ucdavis.edu/protocols/Cadmium/).

Nancy Blake, Dept. Plant Sciences, MSU-Bozeman received 2 *Triticum aestivum* and 3 *Triticum turgidum* subsp. *durum*. These were included in trials of spring wheat and durum landraces screening for sawfly resistance and were also genotyped for potential sawfly resistance genes.

Jamie Sherman, Dept. Plant Sciences and Plant Pathology obtained 31 *Hordeum vulgare* (barley) accessions. These were all used in crosses with various breeding goals. The *Medicago sativa* accession is being used to culture root lesion nematodes.
Myron Bruce, Dept. Plant Sciences and Plant Pathology, MSU-Bozeman received 2 *Beta vulgaris* subsp. *vulgaris*. They are being used as part of an experiment in stable transformation and regeneration of sugarbeet. Research is ongoing, and they will be certain to report any findings or publications as they become available. They are very grateful that this germplasm resource is available to researchers.

Jeff Littlefield, Dept. Land Resources and Environmental Sciences received 13 accessions representing 7 genera. These were all used to test host range for his long term weed biocontrol project.

Brent Sarchet, Lewis and Clark County MSU Extension, Helena, MT received 25 *Malus domestica* accessions. They used the scion wood from the National Plant Germplasm collection

in New York to assist with the identification of apple cultivars for the Montana Heritage Orchard Research Program (www.mtorchards.org). They are working with over 60 100 plus year old orchards across the state trying to identify the cultivars through DNA testing. They used the scion wood as 'standards' to identify the cultivars in Montana. He sincerely appreciates the opportunity to access the plant material for our research.

Phil Hahn, University of Montana, Missoula, MT received 27 total accessions. These were *Achillea millefolium* (8), *Asclepias* speciose (9), *Chenopodium album* (6), and *Solidago missouriensis* (4). He grew a few of the *Achillea*, *Chenopodium*, and *Solidago* assessions, but did not record trait data. He reports that he could not use the germplasm because he needed to have seed that came from a single plant.

Mark Henning, USDA-NRCS, Miles City, MT obtained 43 *Vigna radiate* (mung bean) accessions. Mung bean is used as a cover crop and in cover crop mixtures in Montana. These lines were used in an observation trial to determine flowering response. Lines that do not flower would be an advantage for cover crops. But lines that do flower and produce seed could be used as an alternative cash crop for farmers.

Patrick Hensleigh, NRCS State Agronomist, Bozeman, MT received 61 accessions that included several genera. The *Trifolium* and *Meliotus* species were hand planted in the spring of 2016 as an observation trial at Bridger, MT in one row plots. The *Melilotus* species had very poor stands and were not able to be evaluated other than plant stands. Poor stand establishment could have been due to the extremely small seed size, although the nursery was hand planted and rows covered with soil by hand. The *Trifolium* species had much better establishment, most species had acceptable growth but did not look as vigorous as the checks (clovers, alfalfa and vetch species). None of the species survived the winter. Some of the Triticales were planted last fall as observation plots. He does not expect any data from these plots except for winter survival. All winter wheat checks survived the winter.

Dennis Cash, Forage Genetics International, based in Bozeman, MT received 14 *Medicago sativa* subsp. s*ativa* accessions. He sent this seed to their FGI research facility at Nampa, ID. It will be used in standard tests for Fall Dormancy and Winter Survival

Craig Cook, Northern Seeds, LLC, Bozeman, MT received 1 *Triticum aestivum* accession. They made eight single crosses for breeding purposes.

Luke Robinson, BlueSky Stewardship, Missoula, MT received 49 accessions representing several genera. The *Malus* accessions were grafted on either Geneva935 or Geneva41. They report very good survival. The *Corylus* accessions (filberts, 7 accessions) unfortunarely weren't grafted. All of the grafts for *Juglans cinerea* (walnut, 5 accessions) unfortunately failed but they are giving it a go again this year and trying some different things. They reported that the *Mespilus germanica* (known as the medlar, 2 accessions) and a *Cydonia oblonga* (quince, 5 accessions) were never received.

Melissa Meredith, Belgrade, MT received 8 accessions. These included *Malus*, *Vaccinium*, *Rubus*, and *Fragaria* species. The short report indicated the one that survived was the red raspberry.

Jacob Cowgill, Power, MT is a wheat grower in north central Montana. He received 494 wheat (*Triticum aestivum*) accessions. He planted 126 landrace accessions of winter wheat last fall and this spring he planted 126 landrace accessions of spring wheat. His goal is to identify unique genotypes for his small bakery. His plans are to identify individual accessions that are unique to his environment, use these to create mixtures (blends) of accessions, and to make specific crosses among good accessions. The website to his businessis: www.PrairieHeritageFarm.com.

Cory Simpson is a farmer from Lewistown, MT. He is interested in doing some armature plant breeding. He received 5 wheat (*Triticum aestivum*) and 6 barley (*Hordeum vulgare*) for his project. They were planted in the field for evaluation. He did not get a good evaluation because of severe hail damage.

Jim Jorgenson, Broadview, MT received one *Triticum aestivum* accession, the historically important variety Yogo. He reports they planted it last Fall. Their interest is to compare it to current varieties for their own interest.

Jason Mustain, a private individual from Great Falls, MT received 5 *Pisum sativum* accessions. He reported he is growing them for his own use.

Publications:

Berg, J.E., P. F. Lamb, J. H. Miller, D. M. Wichman, K. D. Kephart, R. N. Stougaard, G. P. Pradhan, D. L. Nash, W. E. Grey, D. Gettel, S. Gale, Y. Jin, J. A. Kolmer, X. Chen, G. Bai, T. D. Murray and P. L. Bruckner. 2016. Registration of 'Northern' Hard Red Winter Wheat. J. Plant Reg. 10:135-138. doi:10.3198/jpr2015.10.0062crc

Heo, H.-Y., S. P. Lanning, P. F. Lamb, D. Nash, D. M. Wichman, K. D. Kephart, R. N. Stougaard, J. Miller, G.V.P. Reddy, C. Chen, J. L. Eckhoff, W. E. Grey, N. K. Blake and L. E. Talbert. 2016. Registration of 'Lanning' Hard Red Spring Wheat. J. Plant Reg. 10:287-290. doi:10.3198/jpr2016.03.0016crc

Hystad, S.M., M.J. Giroux, and J.M. Martin. 2016. Impact of null polyphenol oxidase alleles on white salted noodles. Cereal Chem. 93:255-262.