

State of Montana  
Annual Report for Calendar Year 2007  
to the W-6 Technical Committee  
Compiled by J. M. Martin

During 2007 302 individual accessions were distributed to 17 individuals in Montana. Ten of those requesting germplasm represented public agencies and the remainder were individual home owners or from private companies.

Norm Weeden, Dept. Plant Sciences and Plant Pathology, MSU-Bozeman received 40 *Malus* accessions. These included 3 *Malus domestica*, 30 *Malus orientalis*, 4 *Malus sieversii*, and 3 *Malus sylvestris*. They used these in a study to determine if there was common parentage between *M. domestica* and *M. orientalis*.

Nancy Blake, Dept. Plant Sciences and Plant Pathology, MSU-Bozeman got 5 *Triticum aestivum* accessions. One was used as a DNA source for orange wheat blossom midge resistance, and the other 4 were used in greenhouse heat tolerance studies.

Jackie Campbell, Dept. of Plant Sciences and Plant Pathology, MSU-Bozeman received 2 *Triticum aestivum* accessions. These two accessions, Sturdy and Mustang, were used as high and low reference genotypes for heat tolerance.

Tracy Dougher, Dept. of Plant Sciences and Plant Pathology, MSU-Bozeman received seed for 1 *Vaccinium membranaceum*. This seed was for a student experiment on germination.

Alice Pilgeram, Dept. of Plant Science and Plant Pathology, MSU-Bozeman got 20 accessions representing 5 genera. They used these to simulate an existing weed seed bank. The overall goal is to study the effect different mulches have on suppressing weed seed growth.

David Sands, Dept. of Plant Sciences and Plant Pathology, MSU-Bozeman, received 2 *Hordeum vulgare* and 6 *Avena sativa* accessions. The two *Hordeum* were used to demonstrate to a biotechnology class at MSU that plasmid curing activity exists in crop plants, and that it could have uses in antiviral research. The *Avena* was used in experiments to validate that it does not trigger gluten type responses, an important feature of cereal grains such as wheat and barley.

Luther Talbert, Dept. of Plant Sciences and Plant Pathology, MSU-Bozeman, received 1 *Triticum aestivum*. This accession was used for DNA extraction.

Elaine Nichols, Seed Potato Certification Program, MSU-Bozeman, got 2 *Solanum tuberosum* accessions. The plants were requested by a Montana Seed Potato grower. The lines were increased and given to the grower June 2007.

Ragan Callaway, Division of Biological Sciences, University of Montana, Missoula, MT received 23 *Pseudoroegneria spicata* accessions. The goal with the germplasm lines is to compare the different lines of bluebunch wheatgrass for competitive ability with spotted

knapweed. They conducted the first tests in the greenhouse, and simply grew individuals from each line with spotted knapweed in pots and compared the effects of individuals from the different lines on knapweed and also the effects of knapweed on individuals from the different lines. They found substantial differences for each measurement among the different lines. In other words, some germplasm lines were much better competitors than others. They then established experiments in a common garden experiment, also intended to test the competitive abilities of the different germplasm lines against spotted knapweed. This experiment was established last spring and they are allowing the plants to grow large in plots. This fall they will invade each of the plots with knapweed seeds. In the summer of 2009 they will measure the ability of the different germplasm lines to resist knapweed invasion.

Kim Mann, USDA-ARS, Sidney, MT got 1 *Achillea sibirica*, 7 different (representing different species) *Artemisia*, 1 *Tanacetum cinerariifolium*, 1 *Tripleurospermum maritimum* subsp. *Phaeocephalum*, 1 *Lepidium virginicum* var. *pubescens*, and 1 *Lepidium lasiocarpum* accession. These were all grown up for DNA and voucher specimens. They are to be included in a systematic study of Anthemideae (Asteraceae).

Robert Quinn, Montana Flour and Grains, Big Sandy, MT received 26 *Triticum turgidum* subsp. *Turanicum* accessions. These were grown in 2007 and again in 2008 to determine their adaptation and agronomic characteristics.

Fernando Guillen, Barkley Ag Enterprises, LLP, Bozeman, MT is a camelina breeder and got 14 Camelina accessions representing 7 different *Camelina* species. He is currently using this material to attempt inter and intraspecific crosses among them and to determine the levels of taxonomic relatedness among them using molecular marker techniques.

Individuals received 44 *Vitis* accessions. These included Carl Camper, Forsyth, Montana (13), Don Roberge, Rollins, MT (19), and Ruth Wilson, Lakeside, MT (12). These individuals are all doing hobby breeding and adaptation trials. Ruth Wilson provided a detailed report for individual accessions.

S.V. 18.307: Died; presumed winter kill.

S.V. 14.287: Died.

S.V. 12.327: Good vigor.

S. 7136: Died.

S. 14.117: One out of 5.

S. 13.770: Died.

S. 10868: Died, even though Chelois survives here.

Lomanto: Died.

S. 5455 Plantet: Slow growth.

Florental (Burlin 7705): Slow growth; 2 survived.

Aris: 2 out of 3.

Villard Noir: Died.

Vivant: One out of five.

Winchell: Died.

Rupestris St. George: Failing.  
 Van Buren: Slow growth in gravel, which is usually good.  
 Triomphe d'Alsace: Died.  
 S. 1077: Died.  
 Skujins 675: Vigorous grower; good variety for here.  
 Price: Good vigor once established.  
 S. 14.664: Died.

Beauty and Phoenix are surviving here on my property while they do badly elsewhere here in NW Montana.

Dave Christensen, Big timber, MT received 8 *Zea Mays* accessions from the North Central regional PI station. He has evaluated lots of corn accessions over the years, and has done some breeding to develop types for short growing seasons. He sent the report describing some of his results.

I have worked with over 100 lines of corn from Ames which had some promise of growing in Montana. I have studied them thoroughly, and done extensive breeding with many of them. I have created my own lines from them. I am the only breeder and developer of Native corn that I know. My Painted Mtn Corn, and Montana Morado Maize withstand cold Springs and hot summer droughts.

**NDSU lines**

The following 3 lines are synthetics, combinations of several lines developed in ND over years. They are dents with fairly strong stalks. Cobs are medium short and very thick, too thick for fast dry down. There is much genetic diversity in them. Most have some wing cobs and unnecessarily long shanks are common. They need selection. I find them to be faster maturing than most other seed available. The NDSU corn is the only lines developed in our dryland Western region that I know of, and I consider them a valuable resource. I will have more information on these lines at the end of this year.

Newer cycles are now available from NDSU, which have several more generations of selection. I am growing 500 plots of the NDSM for cold trials for Marcelo Carena, breeder at NDSU. In these days where almost everything has some GMO contamination, these older versions would not be contaminated.

<b>542101</b>	<b>NDSM</b>	<b>cold hardiness</b>	<b>A</b>	<b>silk July 25</b>	<b>100%</b>	<b>better cobs</b>
<b>550535</b>	<b>NDSAB</b>	<b>cold hardiness</b>	<b>B</b>	<b>silk July 25</b>	<b>75%</b>	
<b>510671</b>	<b>NDSCD</b>	<b>cold hardiness</b>	<b>C+</b>	<b>silk July 25</b>	<b>70%</b>	

**550553 ND101** Good. A very small fast maturing flint corn, developed to be useful in commercial breeding. I consider it more useful than Gaspe, which was from the damp East coast and not as useful in the West.

**Ames 27050 CO255** An inbred from Canada. Big healthy seedlings in early Spring. Good little plants and cobs.

**213734 Hopi.** I got this for a friend in California. It is not adapted to Montana. I tried it years ago.

**213737 Navajo Red.** I tried this 20 years ago when I tried SW desert corns for our drought. It was the most drought-adapted Navajo corn for Montana. However no Navajo corn does well in Montana. Mandan corn does better. I developed it for 20 years because of the black colored kernels which I created a high antioxidant corn from. It did not grow well dryland in Montana until only 1/4 of 1% of Navajo genetics was left. Short compact plants and many tillers. The line carries a dwarf gene, if not more than one. Twenty years ago the corn had lots of dark red and black kernels. The new accession has lost it's color, and so I did not grow any. Like other Native lines at Ames, they are getting inbred, and losing original color. (Other Ames Native lines are becoming more concentrated for cob deformities.)

**218159 Zia** A New Mexico corn that I grew to get a color gene. I could not find any with the cherry/black kernels it is supposed to have. The corn has tillers, and is extremely large and slow. It is over 6' tall. It originates from too far South. It had very long cobs.

#### Publications:

Bruckner, P.L., J.E. Berg, N. Riveland, J.L. Eckhoff, D.M. Wichman, D.Kephart, G.R. Carlson, G.D. Kushnak, R.N. Stougaard, D.L. Nash, W.E. Grey, A.T. Dyer, Y. Jin, and X. Chen. 2007. Registration of 'Yellowstone' wheat. *J. Plant Registrations* 1:18-19.

Carlson, G.R., J.E. Berg, R.N. Stougaard, K.D. Kephart, N. Riveland, G.D. Kushnak, D.M. Wichman, J.L. Eckhoff, D.L. Nash, E.S. Davis, W.E. Grey, and P.L. Bruckner. 2007. Registration of 'Bynum' wheat. *Journal of Plant Registrations* 1: 16-17.

Heo, H., L. Talbert, N. Blake, J. Sherman, Suh, J., Kim, D, and S.Kim. 2007. Identification of microsatellite markers linked to photoperiod insensitive gene Ppd-D1a in wheat. *Korean J. Crop Sci.* 52:12-16.

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Kephart, K.D., J.E. Berg, G.R. Carlson, R.N. Stougaard, J.L. Eckhoff, N. Riveland, G.D. Kushnak, D.M. Wichman, D.L. Nash, E.S. Davis, W.E. Grey, and P.L. Bruckner. 2007. Registration of 'Hyalite' wheat. *J. Plant Registrations* 1:14-15.

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Stougaard, R.N., J.E. Berg, K.D. Kephart, G.R. Carlson, D.M. Wichman, J.L. Eckhoff, N. Riveland, G.D. Kushnak, D.L. Nash, E.S. Davis, W.E. Grey, and P.L. Bruckner. 2007. Registration of 'Norris' wheat. *J. Plant Registrations* 1:12-13.

Sherman, J. D., S. P. Lanning, D. Clark, and L. E. Talbert. 2007. Registration of near-isogenic hard spring wheat lines differing in puroindoline alleles. *J. Plant Reg.* 1:171-172.

Weeden, N.F. 2007. Genetic changes accompanying the domestication of *Pisum sativum* L.: is there a common genetic basis to the 'domestication syndrome' for legumes? *Ann. Bot.* 100:1017-1025.