

2006 W-6 Idaho state report

R.S. Zemetra

The number of genera (32) requested in 2006 increased over 2005 while the number of species (45) decreased. The total number of accessions requested in 2006 was similar to 2005 with 1,665 accessions requested in 2006 compared to 1,777 in 2005. The species with the most accessions requested was *Hordeum vulgare* with 617 accessions requested by both public and private solicitors. This is similar to 2005 where *Hordeum vulgare* was one of the two top species requested in that year. There was a total of 43 individuals requesting germplasm, slightly higher than 2005 with more requests (25) coming from the private sector compared to the public (18) sector.

The wheat breeding program at the University of Idaho in Moscow continues its program evaluating the use of the *Ph1* of wheat and *Gc* of jointed goatgrass (*Aegilops cylindrica*) to transfer genes from jointed goatgrass into wheat. An additional round of backcrossing was done on lines originating from either a 34 chromosome hybrid or a 35 chromosome hybrid. Seed set varied for both groups of hybrids with the 34 chromosome hybrid BC₂ lines averaging a mean seed set of 26.8% with a range of 1.2% to 84.5%. This average seed set was slightly lower than the average seed set for the 35 chromosome hybrid BC₂ lines (31%) with less of a range at both the high and low end (14% to 62.5%). The greater range in the 34 chromosome hybrid derived backcrosses was expected due to the chromosome rearrangements that occurred with the absence of the *Ph1* gene in the original hybrid. Genomic Insitu hybridization (GISH) is planned using the C genome from *Aegilops markgrafii* as a probe to determine the presence of translocations between the C genome of *Aegilops cylindrica* and either the A, B or D genome of wheat in the BC₂ generation.

The recombinant inbred line (RIL) population involving the soft white winter wheat cultivars Coda and Brundage has been used to identify new molecular markers for *Pch1*, the resistance gene for *Cercospora* foot rot in wheat. The population has also been found to show transgressive segregation for stripe rust resistance and *Cephalosporium* stripe tolerance. Work on this population has been initiated by the USDA-ARS program at Pullman, Washington and at Oregon State University respectively to develop markers associated with resistance/tolerance to these two diseases. A second RIL population involving IDO444 and Rio Blanco is being evaluated to develop markers for dwarf bunt resistance and stripe rust resistance.

In the other breeding programs at the University of Idaho, the bean breeding program of Dr. Shree Singh is using *Phaseolus* accessions in a project to develop white mold resistance in *Phaseolus vulgaris*. The oil seed breeding program requested *Helianthus annuus* accessions to identify sunflower lines with *alternaria* resistance and early maturity. While the accessions were not as early as desired, some of the lines were found to potentially have useful levels of *alternaria* resistance.

Germplasm reports

Private

Emily Bartell, J.R. Simplot Co., Post Falls – Received 4 *Poa pratensis* accessions for use in PVP trials. Data collection on these lines is targeted for the end of June, 2007.

Bob Bruick, Coors Barley Research and Development, Burley – Received 72 *Hordeum* germplasm accessions for use in their breeding program. The accessions are being evaluated for agronomic characteristics and a sub-sample will be evaluated in the winter for malting traits.

Snjezana Dacic, Syngenta, Nampa – Received one *Torilis* accession for use as a herbarium sample.

Clint Dalrymple, Salmon – Received two *Camellia sinensis* accessions and four *Vaccinium angustifolium* accessions last year. He reported that the two *Camellia sinensis* cultivars were used in a test with children, with the test being a comparison of the growth and bud production under identical conditions indoors. The cultivation area was a large aquarium with fluorescent lights and a heated pool of water for moisture, keeping the plants between 70° and 80° F and an average humidity of 50%. The end result was that the HCAM 14 'Bohea' in general were much more productive than the HCAM 13 'Yabukita' with the HCAM 14 producing more leaves and stems, and a more constant production of new buds in comparison to the slower, more staggered growth and production of the HCAM 13. Although the *Vaccinium angustifolium* have not been germinated as of yet, the planned usage remains the same; they will be germinated indoors and then transplanted out of doors when at a proper size, in the short term

determining which are more suitable to the local climate, and in the long term comparing berry production.

Mark Jones, Crookham Company, Caldwell – Received 54 *Zea mays* accessions for use in their breeding program. They have not collected very much data on the germplasm yet. They planted all of the accessions on April 10 and except for some poor germinating lines and wind damage the accessions look great. Some lines are just beginning to show tassel, which surprised them because they assumed all of this material would be very full season. Their plans this first year is to get a few selfs on all the lines so they can continue with them and learn more about the accessions. We are also going to cross them to some of their better sweet corn inbreds and see what happens. Their goal with this material is to expand our germplasm base by introducing new material into our program. Since they have never seen any of this before they not sure what specific traits the accessions will be bringing in but they will know a lot more this fall after watching them this season. They hope this works out because they would like to get 5-10 new lines each year to work with in the breeding program. This fall they plan on reporting their assessment of these lines to the NCRPIS. He would guess that at least 1/3 of the lines will not be continued because the accessions are not adaptable to their environment or the accessions have some other detrimental characteristic that they don't think can be fixed. The rest of accessions will be sent to Chile this winter for additional selfing, crossing, and evaluation.

Jay Kiha, Gooding – Received 5 *Vitis vinifera* accessions for potential use at his home in Boise. He reported that he had nothing to report of much relevance. Of the various *vinifera* selections ordered, He had a 100% germination rate from the cuttings. Unfortunately, not one variety managed to survive the late spring frosts when planted in a test plot in his yard in Boise. This is of interest because French Hybrids (Marechal Foch, Leon Millot) and Interlaken did manage to make budbreak without any trouble.

Michele Krucker, J.R. Simplot, Boise – Received 10 *Solanum berthaultii* accessions for a study to develop a visual marker in a transformation/grafting system. The accessions were selected based on the websites observations of trichome density. They found that the trichomes were not as distinctive in the tissue culture environment and other means for a visual marker were pursued.

Dick Lowe, Pure line Seeds, Inc., Moscow – Received one *Phaseolus vulgaris* accession for seed increase for future sales.

Judith Miller, Paradise Gardens Rare Plant Nursery, Bonners Ferry – Received one accession of *Fragaria moschata* as a potential source for her nursery. She reported that she used the *fragaria moschata* to start a new bed of that cultivar, with hopes of replacing an older bed which has deteriorated (specifically, the other mother bed plants were ceasing to runner, and the plants not growing or thriving but appearing increasingly stunted). Those older plants were discarded and the bed fallowed. So far, the material she received last year has done well, settling in and she noticed two days ago, are flowering (emailed June 1, 2007). So she has great hopes of re-establishing this plant at the nursery. It would be wonderful to find another cultivar of *moschata* besides this and Profumata di Tortona, but at least with the two, she gets fruit! Her final comment was “Thank you for this great service in supplying plant material!”

Dave Putensen, Genesee – Received three accessions of *Humulus lupulus* last year. All three accessions were potted indoors through the winter and planted outdoors in late March/early April. About the only good sun spot in his yard is unfortunately very sandy soil and the hops are planted there with some tomato cages and makeshift trellis for this year (he will expand and make more permanent trellis next year as he wanted to be sure the plants would grow before putting that effort in). He plans on doing a little bit of home-brewing and plans to use any harvest from the plants for some beers this fall. As for individual data:

PI 632858 (Newport) was easily the best sample when received. A healthy root system and some green leaves and stems were present when it arrived. Outdoors, this has been a very aggressive grower so far; today (6/23/07) there are probably 20-30 vines, some as long as four feet. He don't know whether to attribute that to being a stronger sample from the beginning or having some actual competitive advantage. Maybe another year or two for the others will allow for better comparison.

PI 558693 (Chinook) was a much less impressive **cutting when it arrived**. A small root clump and no above-ground growth to speak of (there was a single cut-off stem of previous year's growth). This variety has performed reasonably well, but significantly weaker than the Newport plant. As of today, it has four or five stems of about 12 inches each.

PI 558948 (Nugget) arrived in similar condition to the Chinook cutting. It has been the weakest of the three; today it has two stems of 7-8 inches.

All appear healthy in terms of color and leaf quality. There are some whitish aphids and companion lady beetles making a home mostly on the Newport plant, and its leaves appear much oilier/waxier than the other two (but again it is much larger and more fully developed).

Susan Samudio, Jacklin Seed by Simplot, Post Falls – Received 49 *Paspalum* accessions for use in her turf-type *paspalum* breeding program. So far most appear to lack her main objective. Once she gets her collection into the US the few that are useable will be crossed with her own material for population improvement.

David Whitwood, Crookham Company, Caldwell – Received 8 *Allium* accessions for use in their breeding program. The accessions were planted out in March of this year. They hope to be able to intercross this material with Crookham inbreds to develop new hybrid onions. Most of these germplasm sources had very low germinations.

Public

Blair Goates, USDA-ARS, Small Grains and Potato Research Unit, Aberdeen - Received 216 *Triticum turgidum* accessions for inclusion in the stem rust screening nursery in Kenya.

Saad Hafez, University of Idaho, Parma - Received 24 *Beta vulgaris* accessions to be included in a nematode (BCN) evaluation nursery.

John Martinson, Bureau of Reclamation, Boise – Received 2 *Achillea millefolium*, 2 *Achnatherum hymenoides*, and 3 *Leymus cinereus* accessions for use in an exhibit on PaleoIndians of Idaho. The seeds are also being used in a living history exhibit for the anniversary of the Owyhee Dam and as living history exhibits during 4th -5th grade class presentations.

Jill Petrisko, University of Idaho, Idaho Falls – Received one *Triticum aestivum* accession for use in a *Fusarium culmorum* study.

Victor Rayboy, USDA-ARS, Aberdeen – Received two *Zea mays* accessions and 19 *Orzya* accessions for studies on genetics of the control of seed phosphorous levels and for the development of low phytic acid corn and rice. All accessions were found to have normal seed phosphorous and phytic acid levels.

Larry Smith, University of Idaho Extension, Lewiston – Received two *Amaranthus* accessions, two *Chenopodium* accessions, one *Echinochloa* accession, one *Panicum miliaceum* accession, one *Panicum sumatrense* accession, one *Setaria italica* accession and one *Eragrostis tef* accession for use in a demonstration nursery. Due to time constraints last year the nursery was not planted but there are plans for it in the future.

Anne Sturbaum, USDA-ARS, Aberdeen – Received 106 *Hordeum vulgaris* accessions for use in a molecular diversity study of barley landrace accessions.

Publications:

Murphy K.M., A. Carter, R.S. Zemetra, and S.S. Jones. 2007. Karyotype and ideogram analyses of four wheatgrass cultivars for use in perennial wheat breeding. *Journal of Sustainable Agriculture*. (in press)

Ghandi, H., C. Mallory-Smith, C. Watson, M.I. Vales N. Mori, R.S. Zemetra, and O. Riera-Lizarazu. 2006. Hybridization between wheat and jointed goatgrass (*Aegilops cylindrica*) under field conditions. *Weed Sci* (in press).

Perez-Jones, A., C. A. Mallory-Smith, J. Hansen, and R. S. Zemetra. 2006. Introgression of an Imidazolinone-resistance gene from winter wheat (*Triticum aestivum* L.) into jointed goatgrass (*Aegilops cylindrica* Host). *TAG*. 114: 177-186.

Perez-Jones, A., C. A. Mallory-Smith, O. Riera-Lizarazu, C. J. W. Watson, Z. Wang, M. Rehman, and R. S. Zemetra. 2006. Introgression of a foot rot resistance gene from winter wheat (*Triticum aestivum*) into jointed goatgrass (*Aegilops cylindrica*). *Crop Sci* 46: 2155-2160.

Rehman, M., J.L. Hansen, J. Brown, W. Price, R.S. Zemetra, and C. Mallory-Smith. 2006. Effect of wheat genotype on the phenotype of wheat x jointed goatgrass (*Aegilops cylindrica*) hybrids. *Weed Sci.* 54: 690-694.

Rehman, M., J. Hansen, and R.S. Zemetra. 2006. Hybrids and amphidiploids of *Aegilops cylindrica* and *Triticum aestivum*; production, morphology and fertility. *Pak. J. Biol. Sci.* 9: 1563-1566.