Annual Report for Calendar Year 2012

USDA-Agricultural Research Service
Western Regional Plant Introduction Station (WRPIS)
59 Johnson Hall, Washington State University
Pullman, WA

Phone: (509) 335-1502 Fax: (509) 335-6654

Jinguo.hu@ars.usda.gov

Most people are surprised to learn that alfalfa routinely ranks among the top five crops in the nation, both in farmgate value and total acreage. Historically, alfalfa wild relatives have played an important role in breeding productive alfalfa varieties by introducing winter hardiness and insect resistance. What other traits can alfalfa wild relatives provide us, especially as we work to develop more drought tolerant varieties? (See cover story on Page 3)

June 2013

Table of Contents

EXECUTIVE SUMMARY AND HIGHLIGHTS

The Western Regional Plant Introduction Station (WRPIS) is one of the four regional plant introduction stations in the United States. Activities at WRPIS focus on acquisition, preservation, evaluation, documentation and distribution of plant species assigned to the station and conducting research related to its primary mission. This station includes five curatorial programs, one DNA marker lab and three research programs (agronomy, plant pathology and genetics). The operation is primarily funded by two CRIS projects managed through the USDA-ARS Plant Germplasm Introduction and Testing Research Unit at Pullman, WA, and the National Temperate Forage Legume Genetic Resources Unit at Prosser, WA. The Regional Research Project (W-6) also contributes considerable (approximately 15% of the total) funding which covers the salary and fringe benefits of six full time state employees working in WRPIS, as well as partial cost of land, equipment and farm operations for germplasm regeneration, seed increase, evaluation and research. We achieve our goals through close collaboration among scientists in various disciplines such as agronomy, horticulture, plant pathology, genetics, plant physiology and botany. As part of a Regional Multi-State Project (W-6), we work in close association and collaboration with scientists of the State Agricultural Experiment Stations, other state and federal agencies, and the private sector. Our scientists are also actively collaborating with scientists in international centers, foreign universities and research institutes as well as foreign companies. The global crop plant research community showed high interest in the WRPIS collection. In 2012, over 29,000 seed packets were distributed from WRPIS to all 50 domestic states and 53 foreign countries. Satisfactory progress was made in the WRPIS's mission areas. Our scientists published 20 research papers in peer-reviewed journals; one book and three book chapters; and presented 22 oral or poster presentations at various international, national and regional conferences.

The following are the 2012 high-lights:

- On December 31, 2012, there were 92,897 plant accessions belonging to 1,277 genera, 4,604 species and 5,143 taxa in the WRPIS collection.
- We acquired 2,723 new accessions including 1,942 native plant accessions from the SOS (Seeds of Success) project, 270 pea from China by way of Australia, 62 lettuce from the Netherlands and 44 clover from Norm Taylor's collection.
- We distributed a total of 29,345 packets of seed samples to 1,259 requestors with addresses in each of the 50 domestic states and 53 foreign countries. Year 2012 was the second year in which WRPIS germplasm was distributed to all 50 US States. Approximately 43.5% (5,287 out of 12,142 packets) of the domestic distribution went to the 13 Western states.
- We conducted laboratory studies of five bulb-rotting species of *Penicillium* for clarifying species identity and host range. We continued to acquire isolates and conducted pathogenicity tests on six edible and ornamental bulbs (onion, garlic, tulip, narcissus, crocus, iris, etc.). We collaborated with WSU Plant Pathology Department in an analogous project involving multiple fungal genera rotting sweet onion.
- We entered 100,230 observation data points into the GRIN (Germplasm Resources Information Network) database in 2012. These data are for 195 descriptors in 21 crop

species from 8,232 accessions. Sixty-four percent of the data were collected by our collaborators and the remaining 36% by WRPIS staff.

- We entered 5,067 seed viability records into GRIN in 2012. Pullman location tested 1,545 and National Center for Genetic Resources Preservation (NCGRP), Fort Collins, Colorado tested 3,436 accessions.
- We regenerated/harvested 2,363 inventories of a broad range of plant species. The seeds were packed and stored and the quantity by weight was determined for 14,995 inventories.
- We shipped 3,214 seed inventories to the National Center for Genetic Resources Preservation (NCGRP), Fort Collins, Colorado and 401 inventories to the Svalbard Global Seed Vault, Longyearbyen, Svalbard, Norway for secured backup.
- We evaluated segregating populations derived from crosses between high oil and high oleic acid lines and winter-type safflower germplasms for cold tolerance under controlled conditions and in the field. This project will identify useful new sources of cold tolerant safflower germplasm with desired fatty acid profile.
- We, in collaboration with Washington State University, conducted a preliminary study to examine the variation of L-DOPA concentration in the leaf and flower tissues of seven faba bean accessions with various flower colors. L-DOPA, a precursor of a class of neurotransmitters called catecholamines, is the major ingredient in medicines used to treat Parkinson's disease patients. A significant variation of L-DOPA concentration was observed in both flower and leaf tissues among the seven accessions studied. The accession with high L-DOPA concentration in the leaf and flower tissues is potentially useful for pharmaceutical purpose.

Cover: For the past two years we have been evaluating the morphology of 200 accessions of alfalfa crop wild relatives received from the Vavilov Institute in 2010. The following variables have been measured: flower date, plant height, plant habit, winter survival, spring regrowth, wet and dry biomass, relative water content, fall dormancy, presence of glandular trichomes and key taxonomic descriptors such as flower color, and pod and leaf characteristics. SSR's have also been used to classify the accessions. These data will allow us to examine patterns of genetic differentiation, diversity and adaptation among these alfalfa crop wild relatives to help us identify promising accessions that can be used in breeding efforts. From a more practical standpoint, these data will help us determine which accessions merit inclusion into the NPGS collection based upon unique attributes. Of course, data will be entered into GRIN and the user community will be alerted to any accessions we find that have unique adaptations that might be useful.

REPORT

ADMINISTRATION

Michael Kahn (Administrative Advisor)

Ann Marie Thro (NIFA Representative)

Michael Fitzner (NIFA Representative)

Peter Bretting (ARS National Program Staff)

Andrew Hammond (ARS, PWA Area Director)

Jinguo Hu (Research Leader and Station Coordinator)

Jannis Bacani (Program Support Assistant, Retired on December 1, 2012)

PERSONNEL

There were some major changes for the research and curatorial staff in the station during 2012. Dr Molly Welsh, Phaseolus (common bean) Germplasm Collection Curator and Ms. Jannis Bacani, Program Support Assistant retired on September 30 and December 1, 2012, respectively. These two critical positions were on the PWA priority list to be filled after they were vacant. After Dr. Welsh's retirement, the required regeneration and seed increase has been continued by an experienced Agricultural Technician funded through the W6 project. The list of WRPIS staff is shown on Page 19 (Appendix 1). Due to the labor-intensive nature of our operation we hired more than 40 part time helpers (mostly WSU students) for field, greenhouse and laboratory activities throughout the year.

RESEARCH PROJECT

Starting in February, 2012, WRPIS scientists and curators worked very hard in writing the new project plans for the two appropriated projects for the next five years (2013-2018). The new titles are "Management of plant genetic resources and associated information" and "Temperate forage legume genetic resource management, characterization, and evaluation" for Pullman and Prosser, respectively. After several rounds of internal reviews and revisions, we submitted the final version to OSQR (Office of Scientific Quality Review) for peer-review in December, 2012. The panel requested minor revision for both plans. We made some changes and submitted the revision in January 2013. The review was completed and both project plans were certified by OSQR in February 2013.

FUNDING

The FY 13 budget for WRPIS was $2,453,972 (Pullman, WA) and $281,394 (Prosser, WA) for a total ARS budget of $2,735,366. This could allow for $28,381discretionary dollars per SY. However, the implementation of sequestration reduced total budget to $2,529,920 ($2,255,598 for Pullman and $274,322 for Prosser). The discretionary dollar per SY dropped to only $6,238. This situation forced us to reduce the work force by abolishing two vacant positions. The station received $405,288 'in kind' support from a NIFA Multi-State Research Project W-6,

through Washington State University. Projected discretionary funds per SY are $28,284 for FY14 and $25,458 for FY15.

Other research funds received in 2012 by our scientists totaled $148,370 and included: 1) $75,000 of Reimbursable Agreement with Bureau of Land Management with Dr. Richard Johnson entitled "Management, Storage, and Research of National Seeds of Success (SOS) Native Seed Collections"; 2) $8,000 grant to Dr. Richard Johnson from US Forest Service to conduct a research project entitled "Conservation, Adaptation and Seed Zones for Key Great Basin Species". The above two grants support one temporary full time (GS-11 supporting scientist) and one part time (GS-6 technician) employees, other temporary help, supplies and travel; 3) $9,900 research grant to Dr. Clarice Coyne from the United States-Israel Binational Agricultural Research and Development (BARD) Fund to support a collaborative project entitled "Winter chickpea; towards a new winter pulse for the semiarid pacific northwest and wider adaptation in the Mediterranean Basin"; 4) $30,470 research grant to Dr. Clarice Coyne from USA Dry Pea and Lentil Council for genetic study of pea and chickpea. Two Specific Cooperative Agreements were set with Cornell University and UC Davis for high throughput genotyping pea and chickpea populations, respectively, with the above grant. The remaining amount is used to pay for student help and supplies in the lab. 5) $10,000 NPGS Evaluation grant to Jinguo Hu for lettuce germplasm evaluation and genotyping; 6) $10,000 NPGS Evaluation grant to Barbara Hellier to evaluate table beet; 7) $4,000 from the Beet Sugar Development Foundation to Barbara Hellier in supporting Beta germplasm conservation and regeneration; and 8): $1,000 grant from the Plant Exchange Office to Ted Kisha for collecting *Lomatium suksdorfii* (S. Watson) J.M. Coult. & Rose in the Columbia Gorge and Central Washington.

FACILITIES

There was no change in the WRPIS facilities during the year. There are 34,800 square feet of growth facilities (22,375 sq ft Federal, 12,425 sq ft Washington State University) and 157.3 acres of farm land (86.2 acres Federal, 71.1 acres WSU). WRPIS staff uses 12 laboratories (5 Federal, 7 WSU), and 22 offices (4 in Federal buildings, 6 in Federal mobile office building, 12 in WSU buildings). We started the work to put up a bubble greenhouse in Central Ferry. The frame was purchased in 1987 but WRPIS never managed to set it up. We purchased energy-efficient LED lights for the new greenhouse. The *Phaseolus* germplasm program will use it to regenerate/increase day-length sensitive accessions. If the forage legume program is relocated from Prosser to Central Ferry, it could be used as a fall drying facility. We bought a new pick-up to replace a 30-year old one for the Pullman farm.

The replacement of the aged dehumidifier in the WRPIS Seed Storage Building is going to be more difficult than originally proposed. This critical piece of equipment supplies conditioned air of 30% humidity to the seed storage space of the building. Fluctuations in humidity will shorten the storage life of seeds stored in the building. There was an incident of humidity fluctuation in the seed storage area in August 2011. Our service contract Divco changed the desiccant and seals to keep it running. They told us that it is an indication of the aging of the dehumidifier and suggested we replace the unit in the next few years (Our records indicate the same incident happened in 2002). When looking carefully at this project, Mr. Jeff Jewhurst, Project Consultant of Divco Inc. found that the dehumidifier was built "permanent" and very difficult to change or replace. The issue is the size of the new equipment. We can cut the old equipment into small pieces to remove it, but we can't cut the new equipment to get it into the

room. Since the room is built like a bunker, the stairway is narrow and there are corners that need to be negotiated. Even if we get the unit from the manufacturer in sections, the sections are still too large to get into the room/basement. Modifying the room to accommodate the new dehumidifier is a major construction project, which is impossible to start now. In the past month, the RL and the Seed Storage Manager met with Mr. Jeff Jewhurst and decided as a temporary work-around, to replace the evaporation coil, the refrigeration coil and other parts to extend the life of the current dehumidifier. The refurbishment will be completed during the following few years.

Our germplasm holdings continue to grow, being driven by the demand of our stakeholders and customers. Currently, the total number of accessions has surpassed 92,000. We have reached nearly the full capacity of our 4 ºC seed storage facility, which was built and put in use in the early 1980s. There will not be enough space for the accessions currently being regenerated on our farm next year. And we won't be able to add any new needed genetic resources to our collection for the user community. Therefore, an expansion of the facility is necessary for us to fulfill our mission. The RL has discussed the need with PWA Area Office and the NP 301 Leader who conceptually supported the project. We entered this project into the Capital Projects and Repair Plan (CPRP) of the ARS Pullman location. We wish to add approximately 1,000 square feet of -20 ºC seed storage space with moveable shelves. This space will be used to store newly acquired and currently regenerated seed samples. Since seeds stored at -20 ºC have a longer life than those stored at 4 ºC. This will relieve the pressure of regeneration which our curators are facing.

GERMPLASM MANAGEMENT

The crop species assigned to WRPIS by the National Plant Germplasm System (NPGS) can be roughly divided into ten groups: 1) forage and turf grasses, 2) cool season food legumes (pea, lentil, chickpea, faba bean, lupine, etc.), 3) temperate forage legume crops (alfalfa, lotus and clover) 4) beans, 5) lettuce, 6) safflower, 7) garlic, wild onion and onion relatives, 8) sugar beet, 9) selected ornamentals, and 10) medicinal plant species. These ten groups of plant species are managed by five curatorial programs at WRPIS. Figure 1 shows the number of accessions for major crop groups maintained at WRPIS. Currently, WRPIS ranks number two among the 28 sites of NPGS for both seed and clonal germplasm repositories in terms of number of accessions managed (http://www.ars-grin.gov/npgs/stats/sitesummary.html). At the 2012 year end, WRPIS held approximately 16.7% of the total NPGS holdings of 554,909 accessions. Most WRPIS accessions are maintained as seed, with a small proportion (garlic and its relatives and some vegetables and ornamentals) that is vegetatively-propagated.

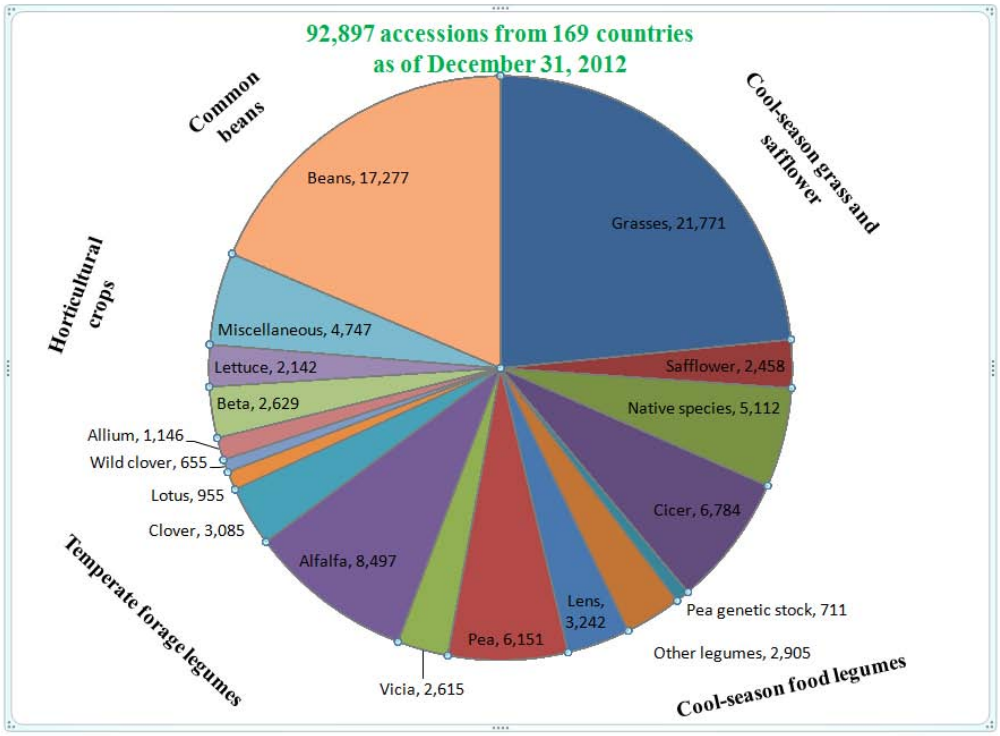

Figure 1. Number of accessions for major crop groups maintained by the five curatorial programs at WRPIS (as of December 31, 2012).

As of December 31, 2012, there were 92,897 accessions belonging to 4,604 species (5,143 taxa) in 1,277 genera. The Agronomy and Safflower Program (Vicki Bradley) manages 24,229 accessions of cool season turf and forage grasses and safflower; the Cool Season Food Legume Program (Clarice Coyne) curates a total of 22,408 accessions of pea, chickpea, lentil, faba bean and lupine; the *Phaseolus* Beans Program (Molly Welsh) manages a collection of 17,277 accessions, all belonging to the *Phaseolus* genus; the Temperate Forage Program (Stephanie Greene, located in Prosser, WA) manages the germplasm of alfalfa, clover, lotus and wild clovers with a total of 13,192 accessions; and the Horticultural Crops Program (Barbara Hellier) takes care of 10,664 accessions of sugar beet, lettuce, garlic, and many miscellaneous species that have potential use for ornamental or medicinal purposes. In addition, there are 5,112 accessions of native species generated or collected by the collaborative activities supported by grants from the BLM's Seeds of Success (SOS) project, the Great Basin Restoration Initiative, and the Forest Service to Richard Johnson (Research Agronomist). Many of these accessions are being transferred to existing NPGS curators for permanent management and distribution.

Germplasm Acquisition

WRPIS Horticultural Crops Curator Barbara Hellier participated in a collaborative international collection trip to the northern Atlantic and Mediterranean coasts of Morocco and brought back 55 accessions of wild *Beta* species in June, 2012. Barbara also requested 62 lettuce accessions from the Centre for Genetic Resources of the Netherlands. The Cool Season Food Legume Curator, Clarice Coyne, obtained 270 Chinese pea accessions from an Australian collaborator. As shown in Figure 2, the accession numbers in WRPIS continued growing.

There were 2,412 new accessions added to our collection in 2012. Among these accessions, 1,942 were collected by the SOS (Seeds of Success) project. The remainder was older cultivars and new releases contributed by researchers and collaborators of WRPIS scientists home and abroad. It is worth mentioning here that WRPIS Temperate Forage Legumes Curator Stephanie Greene successfully acquired the perennial clovers from the collection of the late Dr. Norman Taylor, a world renowned Professor and Clover Breeder in the Department of Plant and Soil Sciences at the University of Kentucky for 48 years.

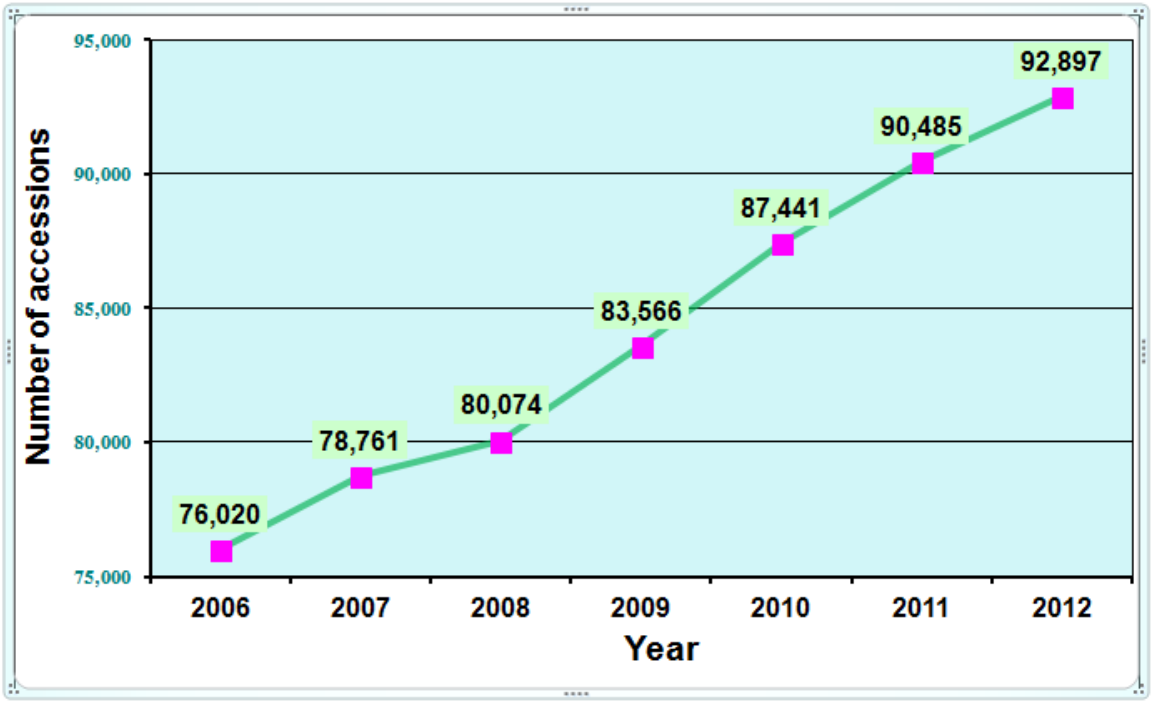

Figure 2. Changes of total number of accessions managed by WRPIS since 2006. The numbers were recorded at the end of each calendar year.

Germplasm conservation

In 2012, WRPIS curators regenerated 2,363 inventories by following our established, labor-intensive procedures and protocols for maintaining the genetic integrity and health of all germplasm collections. These included physical isolation, hand planting and transplanting, controlled hand and insect pollination, hand harvesting, cleaning and packaging for storage and distribution.

A total of 5,067 seed viability records were entered into the GRIN database. WRPIS tested 1,545 inventories and NCGRP in Fort Collins, CO tested 3,436 inventories. Seed quantities of 14,995 inventories in our storage were updated by weighing and converting to number of seeds/inventory.

For security back-ups, we sent 3,214 inventories to NCGRP at Fort Collins, CO and 401 inventories to the Svalbard Global Seed Vault, Longyearbyen, Svalbard through the NCGRP during 2012.

Figure 3. Manually transplanting Lupin seedlings on the Pullman farm for seed increase or regeneration (Photo by Clare Coyne).

Germplasm evaluation and characterization

In 2012, a total of 100,230 observation data records were entered in GRIN on 8,232 accessions on 195 descriptors of 21 different crop species. Sixty-four percent of the data came from our cooperators and thirty-six percent from WRPIS staff. Data records by crop are as follows: 66,663 for safflower (Most of these data were obtained with introduced accessions from our international collaborators including 22,240 data points from Dr. J. Berman and 46,382 data points from Dr. Dajue Li), 12,124 for cool-season grasses, 5,869 for pea, 5,424 for *Phaseolus*, 4,357 for chickpea, 2,497 for lentil, 1,099 for garlic 576 for lettuce, 297 for faba bean, 204 for alfalfa, 163 for lupine , 157 for pea genetic stocks, 126 for *Lathyrus*, 88 for sugar beet, 93 for Vetch, 74 for medicinal plants, 27 for trefoil, 26 for clover, 13 for wild *Allium*, 12 for *Astragalus* and 341 for various W-6 miscellaneous species.

We have applied available DNA marker techniques to assess phylogenetic and genetic diversity of priority crop germplasm in our collection. Projects carried out in 2012 included AFLP genotyping *Trifolium thompsonii; Phalaris arundinacea, Poa supina* and *Eragrostis tef.* Ethiopian safflower landraces were also genotyped with TRAP, AFLP and SSR markers for diversity analysis.

Germplasm distribution

The annual distributed number of seed packets in the past seven years is shown in Figure 4. During the year 29,345 packets of 19,726 (21.2% of our total collection) accessions were distributed. This is the third highest distribution record for packets sent out by WRPIS in one year. Among the distributed packets, 12,142 (41%) were sent to addresses in the USA and 17,203 (59%) were sent to foreign countries. There were 1,522 orders filled by 1259 different

requestors. The most requested plant groups were chickpea (4,900 packets), grasses (4,600 packets), *Phaseolus* bean (4,500 packets), beet (1,900 packets) and lettuce (1,900 packets).

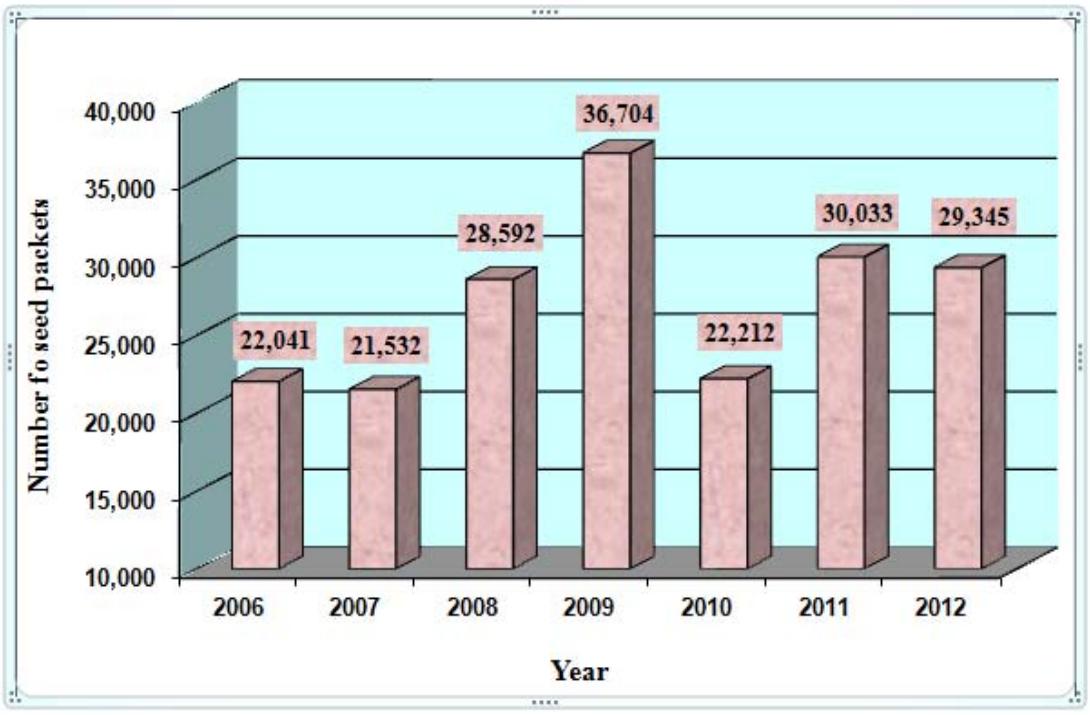

Figure 4. Number of seed packets distributed annually by WRPIS from Year 2006 to Year 2012**.**

Brief Summary of individual programs

1. Grasses and Safflower collections

We maintained 739 grass regeneration plots in the field including 403 planted in 2011 and 336 plots planted at Central Ferry and Pullman in 2012. Sixty grass accessions were harvested from the first year grass nurseries in 2012 and 403 accessions were harvested from the second year grass nurseries. We acquired 37 new grass accessions this year.

We regenerated 134 safflower accessions. We managed to enter into the GRIN data base a large number of evaluation data points including 22,240 data points collected by Dr. J. Bergman of Montana State University from approximately 1,000 accessions and 46,382 data points from Dr. Li Dajue of the Beijing Botanic Garden, China. These data were collected some years ago and have been kept as hard copies and now they have been uploaded into GRIN for the safflower research community to use. We also uploaded 2,322 digital images to the database.

Vicki Bradley is continuing research into alternate uses of the cool season grass and safflower germplasm collections. Current studies are: evaluating the ornamental potential of an *Eragrostis tef* accession with red-colored, compact-panicles, and the use of young safflower plants as a cooked green vegetable.

2. Cool season food legumes

We regenerated a total of 1,022 accessions of pea, chickpea, lentil, lupine and Lathyrus in the field, the screenhouse and greenhouse. We also produced seeds from 453 pea and 256 lentil single plant-derived inbred lines. More than 10,000 characterization data points of agronomic traits and digital images of plants and seeds were uploaded into GRIN. We acquired from an Australian collaborator 270 pea accessions that were recently collection in China.

We published the result of a marker-trait association study on seed mineral nutrient concentrations using the ARS pea core collection. The DNA marker genotype data were generated by a postdoctoral associate in our program a few years back and the data for seed mineral nutrients we analyzed including calcium, copper, potassium, molybdenum, nickel and phosphorus were obtained by Dr. Mike Grusak, ARS-Houston, TX. The reported information is useful for pea breeders to use in marker-assisted selection for crop quality improvement.

3. *Medicago*, *Trifolium* and *Lotus* collections

In 2012 we regenerated 26 *Lotus*, 116 *Medicago* and 35 *Trifolium* accessions and Fall planted an additional 50 accessions of *Trifolium* and *Medicago* species that require overwintering. We received 16 new acquisitions of Medicago, and 556 accessions of Trifolium from the collection of the late Dr. Norman Taylor. Among these accessions 507 are already in the NPGS collection and 49 are new acquisitions. We scanned flowers, stems and pods of 102 accessions which have been uploaded into GRIN. We also collected the following traits for 200 accessions of alfalfa wild relatives: winter survival; spring, summer and fall regrowth; fresh and dry biomass, pod coil, leaf width and length; pod pubescence, degree of pod dehiscence and fall dormancy. This data will be entered into GRIN once it is analyzed. We also scanned 712 historic documents associated with individual PIs. The data included original correspondence, variety description brochures, and evaluation narrative. These data have now been uploaded into GRIN. We wrote our Project Plan of CRIS 5348-21000-022-00D, "Temperate forage legume genetic resource management, characterization, and evaluation" and submitted to OSQR for review.

Other activities in 2012 included managing the NIFA-BRAG Roundup Ready Alfalfa (RRA) project. This included helping to resolve NIFA-ARS money transfer issues and requesting an extension on the project since funding was not received from NIFA until October 2012. Also Greene led a team of 8 to survey roadside alfalfa in Fresno County, CA, May 19-25. We tested leaf samples from 800 Fresno sites and detected the presence of the RRA transgene at over 100 sites. We also mapped and sampled leaves from all alfalfa hay and seed field in Walla Walla Valley to identify RRA and conventional fields. We established a crossing block to develop RRA-feral hybrids. The crossing block consisted of 600 caged microplots containing one plant of each parent. From March through May, we hosted Mauricio Hector Parra, a Spanish scientist who visited on his own resources. We collaborated on two projects: 1) examining the relationship between SSR markers, ecogeographic variables and morphological markers of accessions in the U.S. Medicago truncatula collection, using a geospatial perspective; 2). conducting a Focused Identification of Germplasm strategy (FIGS) on the U.S. red and white clover collections.

4. Horticulture Crops Program and Greenhouse management

In 2012 we regenerated/increased 516 accessions producing seed, cloves, and/or bulbs. We acquired 214 accessions of older cultivars, new releases, wild collected material (SOS mainly), and accessions requested from other gene banks. In addition, we added 55 accessions of wild *Beta* species collected in Morocco (Hellier). This mission was to the northern Atlantic and Mediterranean coasts. We input data in GRIN from the garlic topset evaluation (data and images), miscellaneous accession characterization data (seed color, 100 seed weights, multigermicity data on beet seed), and cooperator evaluation data.

5. Common beans

During 2012 381 accessions of *Phaseolus* beans were successfully regenerated or increased in the greenhouses. Fourteen accessions were added to the collection. Fourteen thousand and six hundred and sixty-nine (14,669) data points were uploaded into GRIN for the *Phaseolus* collection. The Phaseolus bean collection in WRPIS now has 17,277 accessions belonging to 57 species and collected from 110 countries. We distributed 4,582 accessions from 29 species/varieties in 2012. We tested a total of 10,880 plants in 248 accessions that were being regenerated in the greenhouse for the presence of the seed-borne Bean Common Mosaic Virus in 2012. Most of the accessions (220) were virus-free and the seeds harvested from them were recorded as virus-free. For the remaining 28 virus-infected accessions, additional virus tests will be carried out in future regeneration cycle until sufficient number of virus-free plants are identified to produce virus-free seeds for each accession to preserve genetic diversity.

6. The DNA marker lab

With an objective to assess the genetic diversity and structure within and among populations along two different river environments in the Northwest, we sampled 10 populations of Glycyrrhiza along a 30 mile stretch of the Snake River in a mostly wide open and relatively linear environment. We also sampled five populations along 50 miles of the Salmon River in a narrow, canyon-like environment accessible mostly by raft. Unlike the wide and linear environment of the Snake River, the Salmon River environment was narrow and winding with steep walls, which may have limited movement of pollinators among populations. Amplified fragment length polymorphism (AFLP) and Targeted Region Amplified Polymorphism (TRAP) markers were used to measure genetic diversity. The TRAP markers were designed to target regions in the genome corresponding to metabolites specific to Glycyrrhiza. STRUCTURE analysis of the Snake River populations showed a large, panmictic population, while Salmon River populations were more distinct from one another, as well as from the Snake River populations. River environments can have an effect on genetic diversity, likely from isolation of populations from pollinators. Interestingly, the largest populations along the Snake River were the most similar within and differentiated somewhat from the smaller populations; possibly as a result of restricted dispersal of pollinators from an abundant source.

Ted Kisha collected *Lomatium suksdorfii* (S. Watson) J.M. Coult. & Rose in the Columbia Gorge and Central Washington with a plant collection grant of $1,000 from the Plant Exchange Office.

MISSION-RELATED RESEARCH

Agronomy

A. Enhancement of winter type safflower. Current sources of winter hardy safflower (*Carthamus tinctorius* L.) are relatively low in oil percent and oleic fatty acids needed for the edible market. Selection for high oil and high oleic acid content was completed from crosses of three winter-type safflower germplasms and F_3 seed grown for evaluation of cold tolerance under controlled conditions and in the field. Traits associated with cold acclimation including solute accumulation, carbohydrate profiles, and membrane stability, were quantified in winter hardy germplasm with and without acclimation, and under controlled freezing. After cold acclimation, winter types had a higher capacity to accumulate key carbohydrates such as glucose, fructose, and sucrose than did spring types. Thus, acclimation of common mono- and disaccharides appear fundamental to the cold acclimation process in safflower, and may also be useful to find new sources of cold tolerant safflower germplasm.

B. Reed canarygrass ploidy, origin, and adaptation. Reed canarygrass (*Phalaris arundinacea* L.) is of interest both as forage and more recently as a potential biofuel feedstock. In preliminary AFLP analysis at WRPIS, certain accessions were strongly divergent, forming a distinct cluster. Subsequent ploidy analysis determined the clustering represented a hexaploid type (2n = 6x= 42) rather than the more widespread and invasive tetraploid type (2n = 4x = 28). Analysis of the entire Reed canarygrass collection resulted in 97 tetraploids, 8 hexaploids, two with mixed ploidy, and one misidentified accession. Comparative field research in common gardens over two years revealed that tetraploids were much more productive at the cooler and wetter Pullman site than at the warmer, dryer Central Ferry site. At Central Ferry, however, the hexaploids produced as much or more than the tetraploids. Thus, associated with their Mediterranean origin, the hexaploid types have potential for expanded use in warmer dryer regions, may be less invasive, and of increasing value with climate change. Given the underrepresentation of hexaploids there is a need for additional germplasm collection.

Genetics

A. We conducted analyses on the genetic diversity, population structure and genome-wide marker-trait association in a special collection of 298 lettuce (*Lactuca sativa*. L.) lines. Each of these lines was derived from a single plant that had been identified as homozygote at all 322 EST-derived SNP loci. This pure line collection included 122 butterhead, 53 romaine, 63 crisphead, 53 leaf and 7 stem types. Only 258 unique genotypes were identified among the 298 lines since there were 26 pairs or small groups (a total of 66 lines) sharing identical genotypes. Genetic diversity among these plants was assessed by pairwise comparison based on the genotypes of the 322 SNP markers. The average genetic similarity coefficient (GS) among these lines was 63.9% with a range from 40.6 to 99.8%. A phylogenetic tree was constructed based on the genotype data. The most likely number of populations was estimated to be two or six. For association analysis between the 322 SNP markers and the 10 phenotypic traits of the 258 lines, three different methods were performed: single factor analysis, general linear model analysis and mixed linear model analysis. Nine significant marker-trait associations (SMTA) were revealed at $P < 0.0001$ level with all three methods and also when considering kinship and/or population structure for this collection. These marker-

trait associations include five SMTAs for seed coat color, one for leaf undulation, two for leaf anthocyanin and one for stem anthocyanin. These markers will be useful in marker-assisted selection when they are validated in segregating populations.

B. Our faba bean germplasm evaluation and enhancement project attracted an ARCS Scholar, Erik Landry, who is studying for a Ph. D. degree in the Plant Breeding program of the Department of Crop and Soil Sciences. Erik conducted a field experiment with the previously identified "winter-hardy faba bean breeding materials using a split-block experimental design with two planting dates and at three locations. Percent survival, time to flower, branching, height and yield were compiled and analyzed. The 2011-2012 growing season results confirmed the winter-hardy trait in these accessions. Across entries, the average survival rates were 84.1%, 58.5 and 54.0% at Central Ferry, Whitlow and Spillman locations, respectively. Erik's experiment also revealed that plating time had an effect on the agronomic performance of these lines since early October planting also resulted in slightly higher survival (66.8% vs. 64.4) and overall branching (3.9 vs. 3.4) but not yield as compared to the late October planting. These promising winter-hardy germplasm lines have the potential for new pulse crop development in the Palouse region.

We initiated a collaborative project to evaluate cool season grain legume germplasm under a non-funded collaborative agreement between US and China. WRPIS supplies available accessions and Chinese scientists evaluate the responses of these accessions to cold, heat, salinity and drought stresses at various research locations.. In October 2012, our collaborators planted 1,294 pea and 286 faba bean accessions for winter survival in Qingdao, China. The resulting data will be entered into the NPGS' GRIN (genetic resource information network) database, which is accessible to everyone in the global research community. We plan to expand the evaluation to other species like chickpea and lupine in the future.

C. Particularly noteworthy in faba bean is the medicinally important component L-3,4-dihydroxyphenylalanine (L-DOPA), the major ingredient in medicines used to treat Parkinson's disease (PD) patients. L-DOPA can cross the blood-brain barrier into the brain where it is converted to dopamine, a monoamine neurotransmitter. It has been reported that L-DOPA is present in several tissues of faba bean. Although synthetic L-DOPA has been playing a major role in PD treatment, it is documented that the anti-PD effects of faba bean is superior to those of synthetic L-DOPA and considerably more lasting. Therefore, faba bean may be used as a crop for molecular pharming of natural L-DOPA. In collaboration with the Institute of Biological Chemistry of Washington State University, we examine the variation of L-DOPA concentration in the leaf and flower tissues of seven faba bean accessions with various flower colors. Leaf and flower samples were taken from field grown plants with different flower colors, namely, pink with purple lines and black dot, white with a black dot, pure white, brown, and crimson (Figure 5). We sampled the leaf and flower because it has been reported the concentration of L-DOPA is much higher in flower and leaf than in the seeds. Samples were freeze-dried and L-DOPA was quantified by an ACQUITY UPLC system with a HSS T3 column. MS analysis was performed on an inline Synapt G2 HDMS time-of-flight mass spectrometer. Very little variation of L-DOPA concentration was observed in both flower and leaf tissues within an accession.

However, the difference among the seven accessions was significant. The average L-DOPA concentration in flowers ranged from 27.8 to 63.5 mg/g-DW (dry weight) and that in leaf tissues ranged from 18.2 to 48.7 mg/g DW. There was no significant correlation between L-DOPA concentrations in flowers and leaves. The accession with crimson colored flowers had the highest L-DOPA concentration (63.5 mg/g) in flowers but low levels (20.5 mg/g) in leaves. The accession with brown-colored flowers had high L-DOPA concentrations in both flowers (55.7 mg/g) and leaves (48.7 mg/g). Our study revealed a high level of variation of L-DOPA concentration in the leaf and flower tissues among the seven faba bean accessions studied. Open-pollinated seeds were harvested from each of the plant sampled at harvest and these seeds will be grown in 2013 to confirm the differences among these accessions.

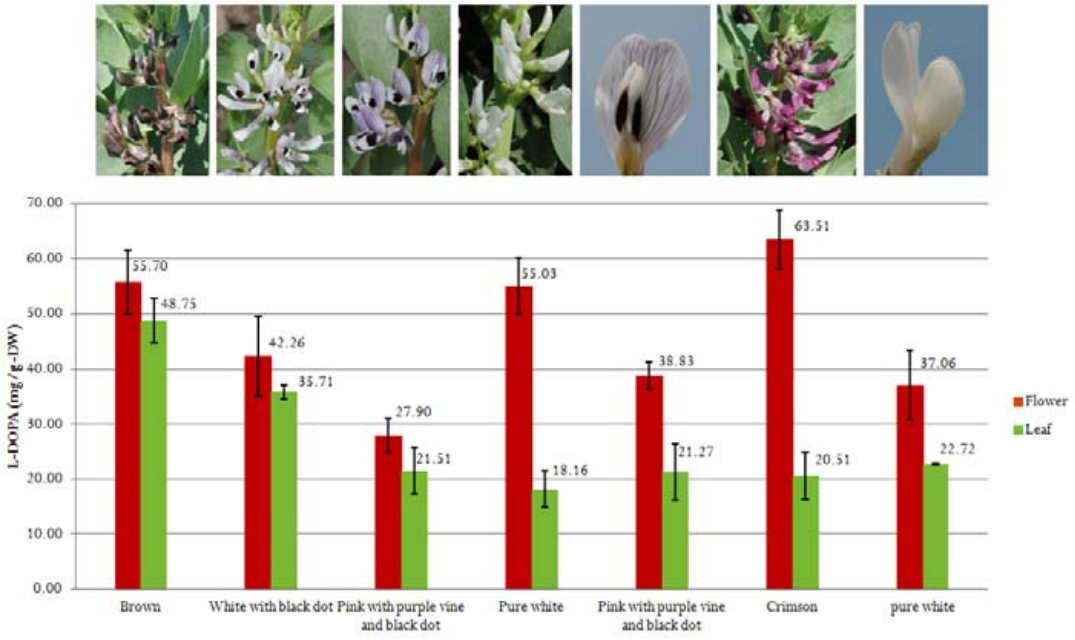

Figure 5. Variation of L-DOPA in the leaf and flower tissues of seven faba bean accessions with different flower colors.

Plant Pathology

A. We have identified to species and conducted experiments on host range for multiple isolates representative of species in Penicillium (blue mold). Potential hosts tested included garlic, table and ornamental onion, narcissus, tulip and other crops planted or harvested as cloves, bulbs or corms. Emphasis was on blue mold of Allium germplasm. We now have novel information regarding isolates of three species of Penicillium in series Corymbifera and one species outside Corymbifera with regard to pathogenicity and aggressiveness on nine hosts with bulbs, cloves or corms. We have isolated several additional Penicillium taxa from such hosts. We have also produced sequence data for a collaborative project (diagnostic macroarray) with Washington State University's Department of Plant Pathology (abstract published, see Activity Report).

B. We surveyed fungi in seed of white lupine (*Lupinus albus*) in multiple accessions at WRPIS for seed health. No major pathogens were detected, and overall results indicate

seed is healthy, although fungi capable of causing damping off were detected. *Fusarium acuminatum*, known to be a minor pathogen on lentils on the Palouse, was detected at a low level. Some results comprise new fungus-host records. The manuscript has been published early in 2013.

COMMITTEES, PRESENTATIONS AND RECOGNITIONS

During 2012 WRPIS scientists and curators served as committee members or chairs of the respective national Crop Germplasm Committees (CGC) and other academic or social organizations. Research Plant Pathologist **Frank Dugan** is a member of the American Phytopathological Society (APS), a Senior Editor for APS Press, Vice-Chair of the APS Mycology Committee, a member of the APS Collections and Germplasm Committee, a member of the Mycological Society of America, the North American Mycological Association, the Western Society of Weed Science and the Northwest Scientific Association. He also serves as an Associate Editor for the journal North American Fungi. Research Agronomist **Richard Johnson** is Member of the Technical Advisory Committee for the Special Grant, Grass Seed Cropping Systems for Sustainable Agriculture, and active Ex-officio member of the Forage and Turf grass CGC. He also serves as a member of a graduate student committee of the Department of Crop and Soil Sciences, Washington State University and advised a MS student on research project. Richard also worked with Art Weisker of Seed-Tec, CalOils, on selection of winter type safflower using our Central Ferry site over the 2011-12 winter and tested the breeding material resulted from crosses by Weisker using WRPIS winter type germplasm. Richard has year-round ongoing cooperative interactions with Luciano Pecetti, CRA (Center for Research and Production of Forage and Dairy), Lodi, Italy, concerning forge grass collection, research, and utilization and with Clara Franchini, Luis Hernádez and Ivone Lindström, University of the South, Argentina, on adaptation of safflower to Argentina, and sunflower seed development research.Supervisory Research Geneticist and Research Leader **Jinguo Hu** continued to serve as an Associate Editor for Crop Science. He serves as a member of a graduate student committee of the Department of Crop and Soil Sciences, Washington State University and is the technical advisor of a PhD student working on cool season legume research project. Agronomy Curator **Vicki Bradley** is the Chair of the International Safflower Germplasm Committee, an Ex-officio member of Forage and Turf Grass CGC (Descriptor Subcommittee Secretary) and New Crops CGC. She is also an Adjunct scientist with the Department of Crop and Soil Science at WSU and serves as a member on one MS graduate student committee for the department. Vicki is a member of the Plant Germplasm Operations Committee, serving on the *in situ* and the Crop Wild Relatives subcommittees. She is a member of the ARS Pullman Location EEO and Outreach Committee and is the editor for the Safflower Genetic Resources Homepage. She is a member of the Association for the Advancement of Industrial Crops and the American Society for Horticultural Science. Cool Season Food Legumes Curator **Clarice Coyne** is an Ex-officio member of the Food Legume CGC, Pea CGC, Clover and Special Purpose CGC, a member of the Plant Germplasm Operations Committee and Molecular Marker PGOC sub-committee. She serves on the Board of Directors for the North American Pulse Improvement Association as Secretary. She also served as Leader of the Bioinformatics Committee of the Agronomy Society of America. Temperate Forage Legume Curator **Stephanie Greene** is the Chair and Ex-officio of the Alfalfa CGC, and Ex-officio of the Clover and Special Purpose Legume CGC and a member of

the Desert Legume Program (DELEP) Advisory Committee, Tucson, AZ and the WSU Legume Variety Release Committee. She was invited to participate as a technical expert in the Technical Workshop "Towards the establishment of a Global Network for in situ conservation and on farm management of Plant Genetic Resources for food and agriculture" at the FAO headquarters in Rome, Italy. She was also commissioned by the Global Crop Diversity Trust to lead an external review of the International Livestock Research Center Forage Gene bank. Horticulture Curator **Barbara Hellier** is an Ex-officio member of six CGCs (Root and Bulb, Leafy Vegetable, the Herbaceous Ornamental, New Crops, the Clover and Special Purpose Legume and sugar beet) and a member of two PGOC subcommittees (Medicinal Plant and *In Situ* Conservation). *Phaseolus* Curator **Molly Welsh** serves as a member in the following organizations: *Phaseolus* CGC, Bean Improvement Cooperative Genetics Committee, W1150 Regional Project and Seed Savers Exchange. Geneticist **Theodore Kisha** is a member of the American Society for Horticultural Science and a member of the "Center for Research on Invasive Species and Small Populations (CRISSP)" at the University of Idaho. He also serves as a volunteer in the Moscow Parks and Recreation Commission. By participating in the regular meetings and other activities of these organizations we effectively outreach and interact with our stakeholders, customers and general public.

WRPIS scientists and curators were actively engaged in conducting mission-related research and in serving the scientific community. They made a total of 24 oral or poster presentations at either scientific or general public meetings, contributed three book chapters and published 19 peer reviewed scientific journal papers in 2012. They were invited to review research manuscripts by editors of the following scientific journals: African Journal of Agricultural Research, BMC Genomics, Crop Science, Crop and Pasture Science, Ecological Restoration, European Journal of Plant Pathology, Genome, Industrial Oil Crops, Journal of Sugar Beet Research, Molecular Breeding, Phytopathology, Plant Breeding, Journal of Plant Registrations, Euphytica, Molecular Breeding, Canadian Journal of Plant Science, Botanical Journal of the Linnean Society, Plant Genetic Resources and Theoretical & Applied Genetics.

SCIENTIFIC PAPERS PUBLISHED IN 2012

Peer reviewed journal articles (17):

Bradley, V.L. (2012). Harvesting data from the United States safflower (*Carthamus tinctorius* L.) germplasm collection. J. Oilseeds Res. (Spl. Issue). 29:40-44.

DeCarie, J., Coyne, C.J., Brumett, S., Shultz, J. (2012). Additional pea EST-SSR markers for comparative mapping in pea (*Pisum sativum* L.). Plant Breeding 131:222-226.

Dugan, F.M. (2012). Ethnomycology. *Access Science*, McGraw-Hill. www.accessscience.com/content/Ethnomycology/900124. 3 pp.

Dugan, F.M. (2012). First report of *Erysiphe knautiae* (Erysiphales) on *Lomelosia caucasica* (Caucasian pincushion flower) in North America. Plant Health Progress doi:10.1094/PHP-2012-0227-01-BR.

Dugan, F.M. (2012). Yippie Yi Yo Mycota Ki Yay! A mycologist's fervently biased account of how the American western frontier was molded by spores and mycelium. FUNGI Magazine 5:6-19. www.fungimag.com

Dugan, F.M., Lupien, S.L. and Chen, W. (2012). *Clonostachys rhizophaga* and other fungi from chickpea debris in the Palouse region of the Pacific Northwest, USA. North American Fungi 7(6): 1-11. http://dx.doi:10.2509/naf2012.007.006

Gao, J., Radwan, M.M., León, F., Wang, X., Jacob, M.R., Tekwani, B.L., Khan, S.I., Lupien, S., Hill, R.A., Dugan, F.M., Cutler, H.G. and Cutler, S.J. (2012). Antimicrobial and antiprotozoal activities of secondary metabolites from the fungus *Eurotium repens*. Medicinal Chemistry Research 21: 3080-3086. DOI 10.1007/s00044-011-9798-7.

Greene, S.L. (2012). Fruit and Nut Crop Wild Relatives in the United States: a Surprisingly Rich Resource. Acta Horticulturae. 948:263-270.

Greene, S.L., Afonin, A.A., Dzyubenko, E., Dzyubenko, N. (2012). Effective conservation of Medicago Crop Wild Relatives in Russia and neighbouring countries: a gap analysis points the way forward. Agrobiodiversity Conservation: Securing the diversity of Crop Wild Relatives and Landraces. p.82-90.

Iqbal, M.J., Mamidi, S., Ahsan, R., Kianian, S.F., Coyne, C.J., Hamama, A.A., Narina, S.S., Bhardwaj, H.L. (2012). Population structure and linkage disequilibrium in *Lupinus albus* L. germplasm and its implication for association mapping. Theor Appl Genet DOI 10.1007/s00122-012-1850-6.

Johnson, R.C., Cashman, M. J. and Vance-Borland, K. (2012). Genecology and seed zones for Indian ricegrass collected in the Southwestern US. Rangeland Ecology and Management 65:523-532.

Johnson, R.C., Petrie, S.E., Franchini, M. C. and Evans, M. (2012). Yield and Yield Components of Winter-Type Safflower. Crop Sci. 52:2358-2364.

Kwon, S.J., Brown, A.F., Hu, J., McGee, R.J., Watt, C.A., Kisha, T., Timmerman-Vaughan, G.M. and Coyne, C.J. (2012). Population genetic sub-structure within the USDA ARS *Pisum* core collection and its potential as a platform for association mapping. Genes & Genomics. 34:305-320.

McGee, R.J., Coyne, C.J., Nayel, M-L. P., Moussart, A., Tivoli, B., Baranger, A., Hamon, C., McPhee, K. and Vandemark, G. (2012). Registration of pea germplasm partially resistant to Aphanomyces root rot for breeding fresh or freezer pea and dry pea types. J. Plant Registrations 6:203-207.

McPhee, K.E., Inglis, D.A., Gunderson, B. and Coyne, C.J. (2012). Mapping a resistance gene for Fusarium wilt Race 2 on LG IV of pea (*Pisum sativum* L.). Plant Breeding 131:300-306.

Smýkal, P., Aubert G., Burstin, J., Coyne, C.J., Ellis, N., Flavell, A., Ford, R., Hýbl, M., Macas, J., Neumann, P., McPhee, K., Redden, R., Rubiales, D., Weller, J., Warkentin, T.D. (2012). Pea (*Pisum sativum* L.) in the genomic era. Agronomy 2:74-115.

Song, X., Deang, Z., Li, G., Hu, J. and Q. Ma. (2012). Cloning and characterization of resistance gene candidate sequences and molecular marker development in gerbera (*Gerbera hybrida*). Scientia Horticulturae. 145:68–75.

Proceedings (2):

Greene, S.L. (2012). Tracking the Roundup Ready® gene: implications for coexistence. Proceedings for the 2012 Winter Seed School, Western Alfalfa Seed Growers Conference, January 15-17, Las Vegas, NV. pp53-55.

Johnson, R.C., Cashman, M. J. and Vance-Borland, K. (2012). Genecology and Seed Zones for Indian Ricegrass Across the Southwest USA. Proceedings for the 65th Annual Meeting of the Society for Range Management, Spokane, WA, 2012 [http://www.rangelands.org/events/]

Abstracts (8):

Bett, K., Sharpe, A., Coyne, C.J., Mcgee, R.J., Ramsay, L.D., Clarke, W.E., Sanderson, L., Fedoruk, M., Vandenberg, B. (2012). SNP-based genotyping in lentil: linking sequence information with phenotypes. The 20th International Conference of Plant and Animal Genome PAG XX), January 14-18, 2012, San Diego, CA.

Hu, J. (2012). Germplasm Management in the Post-genomics Era-a case study with lettuce. The 20th International Conference of Plant and Animal Genome PAG XX), January 14-18, 2012, San Diego, CA.

Hu,J., Kwon, S.J., Park, J.J., Mattinson, D.S., Landry, E.J. and Gang, D.R. (2012). Variation of L-DOPA in the leaf and flower tissues of seven faba bean accessions with different flower colors. 24th International Meeting of the Association for the Advancement of Industrial Crops, November 12-15, 2012, Sonoma, CA.

Kisha, T. and Hellier, B. (2012). Genetic diversity of riperian populations of glycyrrhiza lepidota along the salmon and snake rivers. 24th International Meeting of the Association for the Advancement of Industrial Crops, November 12-15, 2012, Sonoma, CA.

Mcgee, R.J., Piaskowski, J.L., Vandemark, G.J., Zhang, H., Abbo, S., Coyne, C.J. (2012). Screening for winter-hardiness in a cultivated chickpea/wild relative RIL population. Meeting Abstract. ASA-CSSA-SSSA International Annual Meeting, Oct. 21-24, 2012, Cincinnati, OH.

Penmetsa, R.V., Carrasquilla-Garcia, N., Sarma, B.K., Bergmann, E.M., Vance, L.C., Castro, B.M., Kassa, M.T., Datta, S., Dubey, A., Gujaria, N., Baek, J.M., Woodward, J.E., Farmer, A.D., Coyne, C.J., Wettberg, E.J., Varshney, R.K., Cook, D.R. (2012). Multi-locus molecular phylogeny and allelic variation in a transcription factor gene suggest the multiple independent origins of kabuli chickpea. Meeting Abstract. Proceedings of VI International Legume Genomic & Genetics Conference Oct. 2-7, 2012 Hyderabad, India.

Singer, S., E.J.B. von Wettberg, and T.J. Kisha. Genetic variation in the USDA Chamaecrista fasciculata collection. Meeting Abstract. Proceedings of VI International Conference on Legume Genetics and Genomics, October 2-7 2012, Hyderabad, India.

Song, X., Deng, Z., Hu, J. (2012). Inheritance Study and Molecular Marker Development for Powdery Mildew Resistance in Gerbera. Meeting Abstract. 2012 ASHS Annual Conference July 31-August 3, 2012, Miami, FL.

Appendix 1

Western Regional Plant Introduction Station
Current Staffing List as of December, 2012

	Position	Name	Federal or State	Position type
Pullman				
	Research Leader/Station Coordinator	Jinguo Hu	Fed	PFT
	Research Geneticist (postdoc)	Soon-Jae Kwon	Fed	TFT
	Program Support Assistant	Vacant since 12/01/ 2012	Fed	PFT
	IT Specialist	Gwen Pentecost	Fed	PFT
	Seed Manager/Computer Specialist	Dave Stout	Fed	PFT
	Plant Technician	**Paula Lundt**	**Sta**	**PFT**
	Farm Manager, Pullman	**Wayne Olson**	**Sta**	**PFT**
	Plant Technician	**Jacqueline Cruver**	**Sta**	**PFT**
	Plant Technician	**Sean Vail**	**Sta**	**PFT**
	Farm Manager, Central Ferry	Kurt Tetrick	Fed	PFT
	Plant Technician	**Charles Cook**	**Sta**	**PFT**
	Biological Science Technician	Lisa Taylor	Fed	PFT
	Research Plant Pathologist	Frank Dugan	Fed	PFT
	Biological Science Technician	Shari Lupien	Fed	PFT
	Research Agronomist	Richard Johnson	Fed	PFT
	Biological Science Technician	Melissa Scholten	Fed	TFT
	Plant Biologist	Michael Cashman	Fed	TFT
	Geneticist	Theodore Kisha	Fed	PFT
	Agronomy Curator	Vicki Bradley	Fed	PFT
	Biological Science Technician	Bob Guenthner	Fed	PFT
	Cool Season Food Legume Curator	Clarice Coyne	Fed	PFT
	Biological Science Technician	Landon Charlo	Fed	PFT
	Horticultural Crops Curator	Barbara Hellier	Fed	PFT
	Biological Science Technician	William Luna	Fed	PFT
	Biological Science Technician	Alex Cornwall	Fed	TFT
	Biological Science Technician	Marie Pavelka	Fed	PFT
	Phaseolus Curator	Vacant since 9/30/2012	Fed	PFT
	Plant Technician	**Julie Thayer**	**Sta**	**PFT**
Prosser				
	Forage Legume Curator	Stephanie Greene	Fed	PFT
	Biological Science Technician	Martha Cervantes	Fed	PFT
	Biological Science Technician	Jesus Prieto	Fed	TPT

Appendix 2

Research, Service and Outreach Activities

January 3, Barbara Hellier provided information on rhubarb cultivars to a stakeholder.

January 6, Stephanie Greene presented an oral presentation titled "Tracking the Alfalfa Round-Up Ready Gene: Implications for Coexistence" 2012 Western Alfalfa Seed Growers Association, Las Vegas, NV (Invited)

January 9, Barbara Hellier provided cultural information on sanfoin (*Onobrychis viciifolia*) to a stakeholder.

January 10, Vicki Bradley attended the Graduate Committee Meeting for Paula Moore. WSU, Pullman.

January 11, Bill Luna attended a WSU Safety meeting .

January 12, Barbara Hellier provided information on tissue culture for rhubarb to a stakeholder.

January 12, Stephanie Greene presented an oral presentation titled "Tracking the Round-Up Ready Gene in Canyon County" Idaho and Oregon Alfalfa and Clover Seed Growers Association Winter Meeting, Caldwell, ID (Invited).

January 14-17, Clare Coyne organized workshop and co-author on presentations at International Plant and Animal Genome conference, San Diego, CA

January 14-17, Hu attended the 19th International conference of Plant and Animal Genome (PAG XIX) in San Diego, CA. He co-organized the Plant Molecular Breeding Workshop and gave an oral presentation entitled "Germplasm Management in the Post-genomics Era-a case study with lettuce" at the Genomics and Genebanks Workshop. This was partially contributed travel. The conference organizer offered complimentary registration and free hotel stay for six nights at the conference center

January 18, Barbara Hellier provided information on the *Taraxacum kok-saghyz* collection to a stakeholder.

January 19-23, Vicki Bradley attended the 8th International Safflower Conference, Hyderabad, India.

January 20, Vicki Bradley co-chaired the Genetic Resource Management Session and gave a presentation titled "Harvesting data from the US safflower collection" at the 8th International Safflower Conference, Hyderabad, India.

January 21, Vicki Bradley participated in the discussion on "Development of genomic resources and application of the same for the directed improvement of safflower crop", a concurrent session at the 8th International Safflower Conference, Hyderabad, India.

January 23, Vicki Bradley was a member of the panel of speakers for "Safflower Research and Development: Strategies to revitalize the crop" at the 8th International Safflower Conference in Hyderabad, India.

January 30 to February2, Richard Johnson attended and presented an oral presentation entitled "Genecology and seed zones for Indian ricegrass across the Southwest." At the Society of Range Management annual meeting, Spokane, WA.

January 30, Barbara Hellier attended the Society of Range Management Conference, Spokane, WA.

February 6, Barbara Hellier attended the WSU Land Use committee meeting.

February 8, Vicki Bradley attended the Unit's annual Food and Fact Fest and presented a summary of the Agronomy Regeneration Program.

February 13-14, Bill Luna attended WA Department of Agriculture Pesticide License re-certification training, Pullman, WA.

February 14, Bill Luna attended a USDA-ARS Pullman location Safety and Health committee meeting.

February 14-15, Bob Guenthner attended Pesticide training and recertification classes, Moscow, ID.

February 21, Vicki Bradley recommended eight salt and drought tolerant safflower accessions to Dr. Sangu Angadi, New Mexico State University.

February 21-22, Richard Johnson attended the Great Basin Native Plant Selection and Increase Project Annual Meeting, Salt Lake City. Presented talk "Genecology of Indian ricegrass and Sandberg bluegrass."

March 1, Richard Johnson reviewed "Genetic variability for biofuel traits in a circumglobal Reed Canarygrass collection" for Crop Science.

March 2-4, Frank Dugan attended the meeting of the Editorial Board of American Phytopathological Society Press (APS Press) in Minneapolis, Minnesota

March 8, Barbara Hellier provided information on lettuce seed coat inheritance to a stakeholder.

March 8, Richard Johnson provided genecology data for Mountain Brome, Indian ricegrass, and Tapertip onion to Francis Kilkenny, Research Associate, Pacific Northwest Forest Research Lab, Corvallis OR, for studies on species distribution and adaptation with climate change.

March 8, Stephanie Greene Judged Mid Columbia Science Fair.

March 13, Bill Luna attended a WSU Safety meeting.

March 20, Barbara Hellier provided information on cultural practices for *Taraxacum kok-saghyz* to a stakeholder.

March 20, Jinguo Hu attended the California Leafy green Vegetable Research Meeting in Coalinga, CA.

March 21, Richard Johnson severed on ARS Peer Review panel.

March 29, Vicki Bradley was a judge for the Jefferson Elementary School Science and Technology Fair.

March 30, Barbara Hellier provided an annual report to the Beet Sugar Development Foundation on the increase activities for the *Beta* collection.

April 2, Barbara Hellier attended a WSU Land Use committee meeting.

April 8 to April 16, Hu traveled to China to attend the 2012 on-site workshop of cool season food legume crop improvement in Kunming, Yunnan Province, Qingdao, Shangdong Province and Beijing, China. This was an all-expense paid invitation.

April 10, Bill Luna attended a WSU Safety meeting.

April 11, Bill Luna provided Worker Protection Safety training to 1 temporary employee.

April 12, Barbara Hellier attended a Sugarbeet PDRAM conference call.

April 22-26, Clare Coyne co-author poster presentation at International Ascochyta meeting, Cordoba, Spain.

May 7, Barbara Hellier attended the WSU Land Use committee meeting.

May 8, Bill Luna attended a USDA-ARS Pullman location Safety and Health committee meeting.July 11 Stephanie Greene presented an oral report to the Alfalfa Crop Germplasm Committee. Ithaca, NY.

May 15, Bill Luna attended a WSU Safety meeting.

May 16, Jinguo Hu attended an ARS RPES Panel meeting in St. Louis, MO.

May 20, Stephanie Greene was interviewed by Madeline Fisher, CSA News. "Crop wild relatives and their potential for crop improvement".

May 30-June 15, Barbara Hellier travelled to Morocco to collect wild *Beta* species.

June 1, Bill Luna provided Worker Protection Safety training to 8 temporary employees.

June 4-7, WRPIS organized the NPGS 4th Curator's workshop and the 2012 PGOC meeting, Spokane, WA.

June 5, Clare Coyne organized workshop speakers and presented poster for 4th Curator's Workshop, Spokane, WA

June 5, Richard Johnson presented a talk "Common ground for common gardens." At the 4th Curator's Workshop, Spokane, WA

June 5, Bill Luna, Marie Pavelka, and Alex Cornwall attended the NPGS 4th Curators Workshop, Spokane, WA.

June 5, Frank Dugan attended and presented a poster at 2012 NPGS Curators Workshop in Spokane, Washington

June 5, Vicki Bradley attended the NPGS Curator's Workshop and presented "IP's, AD's, and OMG's – Foreign orders at the WRPIS", Spokane, WA.

June 6, Alex Cornwall participated in the Central Ferry Farm tour for the Curators Workshop.

June 6, Vicki Bradley talked about grass and safflower regeneration at the NPGS field tour at Central Ferry, WA.

June 7, Vicki Bradley attended the NPGS PGOC meetings. Spokane, WA.

June 11, Stephanie Greene was interviewed by Virginia Gewin, Freelance science journalist, Article on CWR.

July 5, Stephanie Greene was interviewed by Margaret Evans, Western Producers. Article on CWR.

July 11, Vicki Bradley met with Dr. Timothy VanReken and Qian Zhou, Laboratory for Atmospheric Research, WSU, to discuss use of plants in the grass nursery for a pollen bursting study.

July 12, Barbara Hellier provided information on the lettuce collection to the NPS.

July 13, Clare Coyne, at the request of Washington State University's Office of the Tribal Liaison, and other WRPIS staff organized a hands on genetics workshop for their 14th Annual NY'EHE Camp attended by Native American high school students to introduce STEM.

July 17, Bill Luna provided Worker Protection Safety training to 2 temporary employees.

July 20, Richard Johnson performed peer review of a manuscript entitled "Maturation in sunflower: Visual definition of physiological maturity is associated with capitulum quantitative color parameters" for Luis Hernández, Universidad de Sur, Bahía Blanca, Argentina.

July 29-August 2, Barbara Hellier attended the American Society of Horticultural Science conference, Miami, FL.

July 30-August 3, Jinguo Hu attended the American Society of Horticultural Science conference, Miami, FL. He attended the Herbaceous Ornamental CGC meeting on July 30 and two CGC meetings (Root and Bulb CGC and Leafy Vegetable CGC) on July 31. He also presented a poster entitled "Inheritance Study and Molecular Marker Development for Powdery Mildew Resistance in Gerbera", result of his collaborative research with University of Florida.

July 30, Barbara Hellier attended the Herbaceous Ornamental CGC meeting, Miami, FL.

July 30, Barbara Hellier toured the Miami, FL USDA-ARS station and repository.

July 30, Bob Guenthner attended the Respirator Fit test, Pullman, WA.

July 31, Barbara Hellier attended the Root and Bulb and Leafy Vegetable CGC meetings, Miami, FL.

July 31, Barbara Hellier made a poster presentation titled "Topset diversity in the USDA National Plant Germplasm Systems's *Allium sativum* collection" ASHS 2012, Miami, FL.

July 31, Vicki Bradley sent information about growing safflower as well as accession information and seed to Mr. Onzhigitov Adil, a businessman in Kazakhstan, who attended the 8th International Safflower conference.

August 4-8, Frank Dugan attended and presented an oral presentation entitled "*Cladosporium*: Current concepts, diversity, and taxonomy" and a poster entitled "DNA macroarray for the detection of fungal onion bulb rot pathogens" at the Annual Meeting of American Phytopathological Society in Providence, Rhode Island

August 9, Bill Luna attended a WSU Safety meeting.

August 10-19, Richard Johnson organized the field collection of sulfur-flowered buckwheat, Southern Idaho and Northern Nevada.

August 11, Richard Johnson performed peer review of a manuscript entitled "Improvement of accession distinctiveness as an added value to global yam (Diosorea spp)" for Journal of Nature Conservation.

August 14, Bill Luna attended a USDA-ARS Pullman location Safety and Health committee meeting.

August 14, Barbara Hellier participated in Dr. Gail Wisler's tour of the Pullman, WA ARS facilities.

August 23, Stephanie Greene presented an oral presentation titled "What's up with genetically modified alfalfa seed" International Sprout Grower's Association, Vancouver, BC. (Invited).

September 10, Barbara Hellier attended a WSU Land Use committee meeting.

September 10, Stephanie Greene presented an oral presentation titled "Alfalfa CWR taxonomy and sustainable use" (invited) Alfalfa CWR Specialist Meeting, Noble Foundation, Ardmore, OK.

October 11, Vicki Bradley provided information for a native grass accession table for publication to Dr. Eric Watkins Associate Professor, Department of Horticultural Science at the University of Minnesota.

October 17, Vicki Bradley submitted the Cool-Season Grass annual report to the Chair of the Forage and Turfgrass CGC.

October 18, Clare Coyne presented seminar, Palacký University, Olomouc, Czech Republic

October 23-25, Clare Coyne presented invited keynote lecture, Biotechnology in Legume Breeding, Sumperk, Czech Republic.

October 24, Vicki Bradley worked with Christina Lund - BLM, Megan Haidet - SOS, and Mike Cashman - WRPIS to accommodate the Lockforde, CA PMC's request for a larger than normal amount of seed of three native grass accessions to regenerate for restoration of BLM fire-ravaged land.

October 2-7, Clare Coyne presented poster at the VI International Conference on Legume Genetics and Genomics, Hyderabad, India.

October 9, Barbara Hellier provided information on the garlic collection storability for a WSU student project.

November 1, Vicki Bradley submitted the New Crops CGC safflower report to Dr. Candice Gardiner.

November 1, Vicki Bradley provided an Additional Declaration to Wayne Simpson, AgResearch, NZ, to import seed of Agrostis, Festuca, and Koeleria.

November 1, Richard Johnson performed peer review of a manuscript entitled "A descriptive model of high oleic safflower fruit development" for M.C. Franchini, Universidad de Sur, Bahía Blanca, Argentina.

November 5, Barbara Hellier provided plant collecting proposal reviews for 10 proposals for the NPGS Plant Exchange Office.

November 5, Barbara Hellier attended a WSU Land Use committee meeting.

November 6, Vicki Bradley gave a presentation about the Agronomy Regeneration Program and provided grass totals list to Chinese visitors.

November 8, Vicki Bradley organized the annual Veterans Day potluck celebration.

November 9, Vicki Bradley discussed growing teff in California with Farmer Chris Frame and sent him links to sites with agronomic information of interest.

November 12- 16, Barbara Hellier attended the Association for the Advancement of Industrial Crops Conference, Sonoma, CA.

November 12- 16, Jinguo Hu attended and presented an oral presentation entitled "Variation of L-DOPA in the leaf and flower tissues of seven faba bean accessions with different flower colors" at the 24th Association for the Advancement of Industrial Crops Conference, Sonoma, CA.

November 14-16, Stephanie Greene served as official U.S. delegate Sixth Session of the Intergovernmental Technical Working Group on Plant Genetic Resources for Food and Agriculture, Rome, Italy.

November 13, Barbara Hellier presented an oral presentation titled "Genetic diversity of riparian populations of *Glycyrrhiza lepidota* along the Snake and Salmon Rivers" at the AAIC conference, Sonoma, CA.

November 13, Stephanie Greene was invited to participate as a technical expert in the Technical Workshop “Towards the establishment of a Global Network for in situ conservation and on farm management of Plant Genetic Resources for food and agriculture”, FAO headquarters, Rome, Italy.

November 25-29, Alex Cornwall travelled to the USDA-ARS NCGRP to visit the lab of Dr. Maria Jenderek for training in tissue culture techniques for garlic, Fort Collins, CO.

November 25- December 2, Stephanie Greene was commissioned by the Global Crop Diversity Trust to lead an external review of the International Livestock Research Center Forage Gene bank.

November 27, Barbara Hellier provided an article peer review for HortScience.

November 30, Barbara Hellier provided information on the use of crop wild relatives in beet cultivars in the collection to the NPS.

December 5, Jinguo Hu attended an ARS RPES Panel meeting in St. Louis, MO.

December 11, Barbara Hellier attended the Allium sub-committee meeting of the Root and Bulb CGC, held in Las Cruses, NM via telephone conference.

December 18, Vicki Bradley prepared data files with all safflower descriptor and passport data for Stephanie Pearl

December 31, Vicki Bradley provided grass collection endophyte data file to John Round, Flagship Ventures, Venture Labs, Cambridge, MA

Appendix 3

Minutes of 2012–W6 Technical Advisory Committee Meeting (pending for approval at 2013 meeting)

Annual Meeting Dates: 06/20/12
Period the Report Covers: 01/2011 to 12/2011

Participants:

Committee members present:

Michael Kahn – Administrative Advisor, Washington State Univ.
Dan Parfitt – California
Mark Brick – Colorado chair
Bob Zemetra – Oregon – ex-officio, acting secretary
Shawn Mehlenbacher – Oregon – vice-chair
Jack Martin – Montana (connected by phone)
Joe Kuhl - Idaho

Committee members absent:

Dennis Ray – Arizona
Ian Ray – New Mexico
Robin Groose – Wyoming
Kevin Jensen – Utah
Carol Miles – Washington

States without representation

Alaska
Hawaii
Washington

Guests:

Peter Bretting – NPS, NPGS, Washington DC (connected by phone)
Andrew Hammond – USDA, ARS Western Region
Jinguo Hu –W6, Pullman
Dave Stout – W6, Pullman
Harold Bockelman – National Small grains collection (connected by phone)
Kim Hummer - NCGR, Corvallis
Joseph Postman – NCGR Corvallis
Nahla Bassil – NCGR Corvallis
Francis Zee - NCGR, Hilo (connected by phone)
John Preece - NCGR, Davis
Richard Lee - NCGR, Riverside (connected by phone)
Gabriela Romano – NCGR, Parlier (connected by phone)

Brief Summary of Minutes of Annual Meeting:

Meeting started at 8:00 am

Welcome to the 2012 meeting – Kim Hummer

Director's Report and Budget – Michael Kahn

The requested amount of funds ($405,280) for the W-6 regional project was allocated by the Western Region Experiment Station Directors. The Experiment Station Directors in the Western region continue to be very supportive of the W-6 regional project and its role in supplying plant germplasm for research in the Western states.

Report from ARS Regional Office – Andrew Hammond

Welcomed the attendees to the 2012 W-6 meeting and thanked Kim Hummer and staff for hosting the meeting. Extended a welcome from the USDA-ARS regional and national office to the attendees and indicated that 2012 is the 150th anniversary of the USDA. USDA-ARS has been active in germplasm activities such as plant exploration and seed distribution since the 19th century. In the Pacific Northwest (PNW) the plant germplasm program includes six repositories (Aberdeen, Idaho; Corvallis, Oregon; Davis, California; Hilo, Hawaii; Pullman, Washington; and Riverside, California) plus two staffed worksites (Parlier, California associated with the Davis repository and Prosser, Washington associated with the Pullman repository). The Arctic and Sub Arctic repository in Palmer, Alaska was closed in 2011/2012 in response to budget reductions. The W-6 repository in Pullman has over 91,000 accessions, over 1,000 genera and over 4,000 accessions in its collection. Challenges facing the plant germplasm program are associated with achieving its mission of collecting and maintaining plant germplasm collections to help feed a growing population in an era of reduced funding. This will require making choices and setting priorities and leveraging partnerships between ARS and state programs.

Questions were raised on the issue of setting priorities in relationship to germplasm collections where the goal of increasing and maintaining accessions does not lend itself to reduced activity in response to budget reductions. This is also true for maintaining and increasing facilities to accommodate increases in the number of accessions when there is little funding for new facilities or repair/upgrading old facilities. In response, Dr. Hammond stated that funding functions and activities associated with maintenance of the collections is a top priority and proceeded to explain the budget reductions faced by the ARS. In FY 2012, the ARS had a 38 million dollar reduction in its funding, which it accomplished by closing sites such as the Arctic and Sub-Arctic repository in Alaska though that action incurred a one-time cost of 40 million dollars in closing and personnel relocation costs. To cover the closing costs 0.7% of project funds were assessed from each ARS program and 30% was assessed from any Specific Cooperative Agreements (SCAs) the ARS had with non-federal programs, initiating a hiring freeze and reducing

funding returns to the programs. In response to a second question, Dr. Hammond expanded the discussion on budget cuts to include FY2011, which was a 48 million dollar cut in the ARS budget. The ARS has had to absorb an 8% reduction in its overall budget making it a challenge to meet its obligations during these difficult budgetary times.

Report from National Program – Peter Bretting

To address budgetary issues within the National Program, travel funding was reduced and funds were recouped through buy-outs through early retirements. Positions affected in the Western region include Dr. Steve Clement at the Pullman repository and Doug Cook at the Corvallis repository. Neither position has been refilled due to the hiring freeze.

In germplasm activities the change from GRIN to GRIN Global is progressing with Grin Global v.1 being released in December, 2011. The germplasm system was also a participant in the development of a new computer based Plant Hardiness Zone map released by Oregon State University. The map is computer based and it is interactive so it is possible to go from a national map to a local map based on zip code.

In terms of the FY 2013 budget, nothing has passed but the Senate version, which has a 1% increase for ARS while the House version has a 2% decrease. The hope is for a flat budget. What is confounding the budget issue is raising the debt ceiling on the Federal budget and the potential for mandatory sequestering (reduction) of funds in response to the 2011 agreement to raise the debt ceiling.

In terms of activities at the national level the ARS works on five-year cycles and the National Plant Germplasm System was reviewed in 2011. A new action plan (NP 301) was developed and ARS scientists are working on individual program plans. In relationship to the NPGCC it was stated that it was important to educate the state Agricultural Experiment Station on the importance of regional projects such as the W-6 project and changes occur in experiment station directors. In terms of international treaties associated with plant germplasm, the pending treaty has not been addressed by the Senate since other treaties have taken priority. The NGRA committee has once again been activated in 2012 (started in 1900 – halted in 1999).

Approval of minutes from the 2011 W-6 Regional meeting

It was moved (D. Parfitt) and seconded (J. Kuhl) to accept the minutes from the 2011 meeting. The committee unanimously approved the motion (9:30 am).

Harold Bockelman – Aberdeen

- Distributed 100,000 samples – a record for the Aberdeen repository.
- Large distribution (38,000 accessions) to the gene bank in South Korea. They are reciprocating by sending germplasm to the Aberdeen repository.
- Using flow cytometry to screen wheat land races in the collection for ploidy level (4X or 6X)
- Continuing sending accessions to the Norway seed vault.

- Coordinating the screening nursery of United States wheat and barley germplasm for UG99 stem rust in Kenya screening nursery
- Participating in Triticeae-CAP (T-CAP) program by phenotyping wheat and barley accessions.
- Storage facilities have been upgraded by adding insulation to improve temperature control and to reduce costs associated with temperature control.
- Blair Goates has retired and due to the hiring freeze there are no current plans for replacing his position. Blair was an expert on bunt diseases and coordinated the dwarf bunt screening nursery.

Joseph Postman – Corvallis

Highlights of submitted report:

- There are 12 permanent employees
- 7,420 accessions were shipped in response to 670 requests; Increased 150% this year
- Participated in a germplasm collection expedition to Albania with J. Preece from the Davis repository
- Participated in tours and organizing meetings as part of the public out-reach efforts of the repository.
- Collaborative work continues with the Fort Collins germplasm program on cryo-preservation
- Research continues in the areas of molecular markers for genotypic identification of germplasm and in cryo-preservation of germplasm
- Budget remains flat, which is challenging since the number of accessions and number or requests continue to increase.
- Number of accessions are increasing (ex. 150 new hop accessions)
- Funding and staffing are increasingly challenging (flat line of funding = reduced staffing)
- Accomplishments (check first page of report)
- Received two SCRI grants
- Joseph Postman – National Clean Plant Network – new program to preserve small fruit and grape germplasm (20 million dollars – 5 million per year, first year funded but remaining 3 years depend on inclusion in the Farm Bill.)
- Excellent outreach events

John Preece - Davis report

Highlights of submitted report:

- Clay Weeks, the Prunus horticulturist, retired and the repository was allowed to refill the position though it was a challenge to get the position posted.

- There was an increase in number of accessions shipped in 2011.
- Information was uploaded into GRIN on 134 accessions representing 27 species.
- Research areas include:
    - Genotyping accessions using a SNP chip
    - Genotypic screening of apricots using a set of 12 microsatellites
    - Tissue culture research on walnut, almond and grape

Gabriela Romano – Parlier report

Highlights of submitted report

- The staff of the station includes 2 permanent positions and 5 temporary summer help. There is currently one vacant position at the repository.
- There was a 40% increase in distributions of germplasm with 25% going international.
- Research efforts include:
    - Seed viability of Opuntia accessions
    - Rooting of jojoba cuttings
- Phenotypic descriptions of the accessions are being collected

Francis Zee – Hilo report

Highlights of submitted report:

- Evaluated the quality of the germplasm collection in a collaborative effort with DNA extraction in Puerto Rico and DNA screening in Beltsville, Maryland. Starting to do more of the genotypic screening in-house.
- Working on developing a backup collection for avocados and working on keeping the papaya collection free of disease. Both need screen houses.
- The repository now manages 13 collections and with the increase in the number of collections there is now a need for additional personnel to cover the additional work associated with the collections.

Jinguo Hu – W-6 Pullman

Highlights of submitted report:

Funding from the Western Regional experiment stations ($405,000) supported 6 full time employees (3 field, 1 seed cleaning, 1 seed storage and 1 technician).

- Federal funding for the station (WRPIS) totaled $2,469,800 for Pullman and $271,000 for Prosser.
- 92,000 accessions in total in the collection
- Seed storage facility is now 98% full

- Seed viability tests were done on a total of 4,311 accessions (1,262 in Pullman and 3,049 in Fort Collins)
- 30,033 seed packets of 19,767 accessions were distributed, which was the second highest number of distributions by the Pullman station.
- Research projects include:
    - Screening for gene flow from transgenic alfalfa (Prosser)
    - SNP screening of lettuce collection
    - Faba bean research (see report for details)

Richard Lee- Riverside

Highlights of submitted report:

- 1,365 accessions distributed in 2011 including the first distributions from the quarantine collection. With the quarantine collection now open there are a higher number of requests in 2012.
- The collection is now screened for virus each year
- Challenges to the collection:
    - citrus greening HLV infection found in southern California
    - Palm weevils could pose a risk to the Palm collection
    - Palm decline disease now found in Texas and Florida

State Reports

Arizona – Dennis Ray

Written report submitted but no presentation made.

California – Dan Parfitt

(See start report for specific information)

- Requests were similar to previous years, about 400.
- Responses were also similar to previous years, about 18 to 20%.
- Use of germplasm showed a wide array of uses
- There were fewer home gardener requests in 2011.
- Responses showed that the material requested was useful.
- More requests for use of the germplasm for conventional breeding by private companies.
- More requests for use of germplasm as controls in molecular studies.

Colorado – Mark Brick

(See start report for specific information)

- 2719 accessions were requested in 2011 representing 93 orders. This was slightly lower than previous years.

Hawaii – no representative

Idaho – Joe Kuhl

(See start report for specific information)

- There was a major decrease in the number accessions requested in 2011 due to the high number of cereal accessions that were requested as part of the T-CAP project in 2011.
- 96% of the requests were from ARS or University of Idaho scientists.
- There was a 30% response rate on requests of information on the use of the requested germplasm.

Montana – Jack Martin

(See start report for specific information)

- 168 accessions were requested from a total of 40 reuqests
- The requests came from 12 individuals with 10 of the individuals coming from the University system.
- Requests were primarily for wheat, hops and grapes.

New Mexico – Ian Ray

Written report submitted but no presentation made.

Oregon – Shawn Muhlenbacher

(See start report for specific information)

- Material requests were primarily from plant breeders
- 164 orders were made in 2011
- A purple tomato with high anthocyanin production was released by J. Myers
- The wheat breeding program released two new soft white winter wheat cultivars – R. Zemetra

Utah – Kevin Jensen

Written report submitted but no presentation made.

Washington – Carol Miles (absent)

Written report submitted and Dave Stout made a brief presentation.

Wyoming – Robin Groose

- No report

Business

There was a discussion on how data should be distributed to the state representatives. Currently everything is provided from university and companies but individual requests are not forwarded. Dave Stout requested input on what information is desired by the state representatives.

Another discussion centered on what the state report format should be in the future. It was requested that there would be a summary of the requests and two to three impact statements primarily based on financial impact of the requested germplasm and publications. The financial impact could be based on the impact of the crops being requested in the state. It was also discussed whether there should be a limit on the length of the report based on number of pages, number of words or number of characters. No firm decision was reached on this topic but it was decided that Jinguo Hu and Michael Kahn select a preferred format and distribute it a sub-committee of state representatives (Mark Brick, Joe Kuhl and Shawn Mehlenbacher) for their input. It was recommended in the request for information on germplasm use that a question be added concerning whether the individual used the GRIN-Global system and if they did what were their impressions of the system.

FY2012 - $405,288
FY 2013 – no increase due to WSU budget freeze
FY 2014 – 4.7% increase in funding requested
FY 2015 – 3% increase in funding to be requested
FY 2016 – 3% increase in funding to be requested

It was moved (Shawn Mehlenbacher) and seconded (Dan Parfitt) that the proposed W-6 budget for FY 2014 of $424,336 (a 4.7% increase of the FY 2013 budget) be approved.

The motion passed unanimously.

Future Meeting Locations:

- 2013 – Teleconference based out of the W-6 station in Pullman, Washington
- 2014 – Since the PGOC will be meeting in Davis, California in June it was moved (Shawn Mehlenbacher) and seconded (Joe Kuhl) that the W-6 meeting be held in Davis, California in conjunction with the PGOC meeting.

The motion passed unanimously.

Officers:

It was moved (Shawn Mehlenbacher) and seconded (Dan Parfitt) that Joe Kuhl serve as secretary in 2013 as a replacement for Bob Zemetra since he is no longer on the committee

Resolutions –

Resolution 1. The W-6 Technical Advisory Committee thanks Dr. Kim Hummer and the staff of the USDA ARS National Clonal Germplasm Repository in Corvallis, Oregon especially Joseph Postman and Yvonne Pedersen for their efforts in organizing and hosting the W-6 teleconference/meeting.

Resolution 2. The W-6 Technical Advisory Committee thanks Dr. Ralph Cavalieri for his many years of service as Administrative Advisor for the W-6 Regional Technical Advisory Committee.

Resolution 3. The W-6 Technical Advisory Committee welcomes Dr. Michael Kahn and appreciates his willingness to serve as Administrative Advisor for the W-6 Regional Technical Advisory Committee.

Resolution 4. The W-6 Technical Advisory Committee thanks Dr. Robert Zemetra for his many years of service as a member and officer for the W-6 Regional Technical Advisory Committee.

Resolution 5. The W-6 Technical Advisory Committee is concerned that the capacity of the seed storage at the W-6 Station is insufficient to serve future seed storage needs and that the number of accessions will soon exceed the storage capacity. Be it resolved that appropriate actions be initiated to solve this challenge before significant germplasm is lost.
There was a motion (Jack Martin) and a second (Joe Kuhl) to accept the resolutions as written.

The motion passed unanimously.

Motion to adjourn
Moved – Shawn Mehlenbacher
Seconded – Dan Parfitt
Passed unanimously

Meeting adjourned at 4:45 pm