ANNUAL REPORT FOR CALENDAR YEAR 2012

USDA ARS
National Clonal Germplasm Repository
33447 Peoria Road, Corvallis, OR 97333-2521
Phone 541.738.4200 FAX 541.738.4200
Kim.Hummer@ars.usda.gov
http://www.ars.usda.gov/pwa/corvallis/ncgr

National Clonal Germplasm Repository Staff

Permanent/Term Federal Staff
Liz Alperin, Bio. Science Tech., Genetics
Bruce Bartlett, Ag. Science Tech., Plant Distribution
Nahla Bassil, Geneticist – Plants
Jill Bushakra, Research Associate, Genetics
Jeanine DeNoma, Bio. Science Tech., TC
Missy Fix, Bio. Science Tech., Plants
Barb Gilmore, Research Associate, Genetics
Kim Hummer, Research Leader/Curator
April Nyberg, Bio. Science Tech., Genetics
Jim Oliphant, Bio. Science Tech., Greenhouse Manager
Yvonne Pedersen, Program Assistant
Joseph Postman, Plant Pathologist/Pear Curator
Barbara Reed, Research Plant Physiologist
Joe Snead, Ag Science Tech./Field Manager
Dennis Vandeveer, Facilities Manager

Kim Hummer described a new strawberry species native to the Oregon Cascades. She named it: *Fragaria cascadensis*.

Temporary Staff and Students
Manuel Barocio, Wk. Study
Emily Bouldin, Bio. Science Aid/Field
Annie Horton, OSU Classified Student
Andrew Isaacs, Wk. Study
Sequoia Lockhart, Wk. Study
Yasmin Moussaoui, Wk. Study
Brealan Mosieur, Wk. Study
Angelina Nachorniy, Bio. Science Aid/TC
Jane Olson, Bio. Science Aid, Greenhouse
Antonio Perez, Wk. Study
Kasey Schaefer, Wk. Study

Debra Tyson, Bio Science Aid, Greenhouse
Carly Waddell, Wk. Study
Sky Woods, Wk. Study
Tyler Young, Work Unlimited

Graduate Students and Visiting Scientists
Amira Bidani, Fullbright Student/Tunisia
Charles Hand, GRA, OSU, Hort.
Daeil Kim, Visiting Scientist/Rep. of Korea
Megan Mathey, GRA, OSU, Hort.
Sukalya Poothong, GRA, OSU, Hort Thailand
Natalia Salinas, Fullbright/Ecuador
Fenghui Song, Visiting Scientist/China
Sugae Wada, Post Doc. OSU

Fragaria cascadensis Hummer in fruit.

Accomplishments

Stakeholder/Service Accomplishments

- More than 12,000 accessions of temperate fruit, nut, and specialty crops were conserved.
- Obtained new accessions of *Fragaria* (42), *Rubus* (18) and *Vaccinium* (73) from Oregon and from subtropical locations through plant exchange with Canada.
- Received 659 new plant requests and shipped 6631 items in 2012.
- Obtained a total of 279 new accessions and 2447 new inventory items in 2012. This included inventory repatriated from Palmer, AK, when it closed.
- Completed 3 year tree rejuvenation effort of pear and hazelnut field collections.
- Participated on Governing Board for USDA National Clean Plant Network.
- Collaborated with NCGRP, Ft. Collins, CO, on cryopreservation protocols of dormant blueberry, hazelnut, pear, and currant.
- Served as Advisory Panel Member for SCRI Research and Ext. Planning Project Seattle, 5/12.
- Presented theory and results of SNP and SSR markers in blueberry in researcher and stakeholder Blueberry Meeting in Michigan-November 2011.
- Provided tours to Slow Food group, Rotarians, Life Long Learning, Master Gardeners and school groups. Trained visiting scientists from China, Korea, Kazakhstan, and California.
- Developed new, durable and inexpensive field labels with 10-20 year anticipated service life and relabeled NCGR North Farm tree collections (700 accessions).
- Expanded NCGR tree fruit and nut collections to improve representation of historic genotypes, fill taxonomic gaps in collections, replace dead or misidentified accessions.
- Flagged “Curators Choice” tree fruit accessions in the database and promoted them to our stakeholder groups.

Research Accomplishments

- Determined paternity: performed pedigree analysis on Old Home x Farmingdale pear rootstock using molecular markers. ‘Bartlett’ not ‘Farmingdale’ is the pollen parent of these selections!
- Improved growth of pear rootstocks by optimizing nitrogen ratios.
- Completed an analysis of major and minor nutrients for improving growth of hazelnut in vitro.
- Began analysis of major nutrients required for in vitro raspberry mineral nutrition.
- Completed propagation study of cold hardy quince selections from hardwood and softwood cuttings. Propagation by softwood cuttings was more successful than hardwood cuttings. Used 21 polymorphic SSR markers to examine diversity in 148 black raspberries.
- Implemented a new technique, ‘microsatellite allele dosage configuration establishment (MADCE), to fingerprint 947 strawberries with two SSR markers.
- Tested a multiplex fingerprinting strategy of eight SSR regions in a single PCR reaction for fingerprinting 219 strawberry accessions.
- Determined that half-high blueberries can survive and fruit in Kenai, Alaska; production is best if grown in containers under tunnels. The native *Vaccinium uliginosum* should be selected for production in the rest of the state.
- Evaluated strawberry species for cold hardiness and disease resistance in Minnesota. *Fragaria iinumae* was sensitive to powdery mildew, leaf scorch, frost and mid-winter injury. *F. nipponica* was resistant to powdery mildew and leaf scorch. *Fragaria iinumae* suffered severe winter injury, while *F. nipponica* and *F. orientalis* survived winter well.

Administrative Overview

Staffing Changes

The FY 2012 year for Agricultural Research Service was fraught with financial uncertainty. Our federally supported staff members dropped to 12 FTE, the amount that we had a decade ago. Five of our permanent staff members are retirement-eligible. While it is not likely that our unit in Corvallis will be closed, and reduction in staff (RIF) or furloughs have not been authorized, reduction of our staff by attrition, as staff members retire, is highly likely. With increasing genetic resource acquisition, increasing requests, and demands for increasing knowledge base on our collections, remaining staff have already taken on multiple responsibilities. Programmatic change or reduction will be needed for our unit to continue conservation efforts during these financially slim times.

Dennis Vandeveer retires after 21 years of service to NCGR.

In 2012, location facilities staff members for the 3 Corvallis ARS research units were united under the supervision of Corvallis Location Engineering Specialist. This has enable sharing of facilities technical expertise between the different units. Our Facilities Manager, Mr. Dennis Vandeveer, is retiring at the end of February 2013, after more than 21 years of service to our unit. We will miss Dennis greatly as he pursues the freedom of retirement. *Bon Voyage*, Dennis. Mr. Tom Garbacik, location Engineering Specialist will now be coordinating our facilities needs. We hope to soon refill Mr. Vandeveer's position.

Laura Duncan-Allen (r) of Work Unlimited is awarded NCGR volunteer contribution. John Tillis (l) looks on.

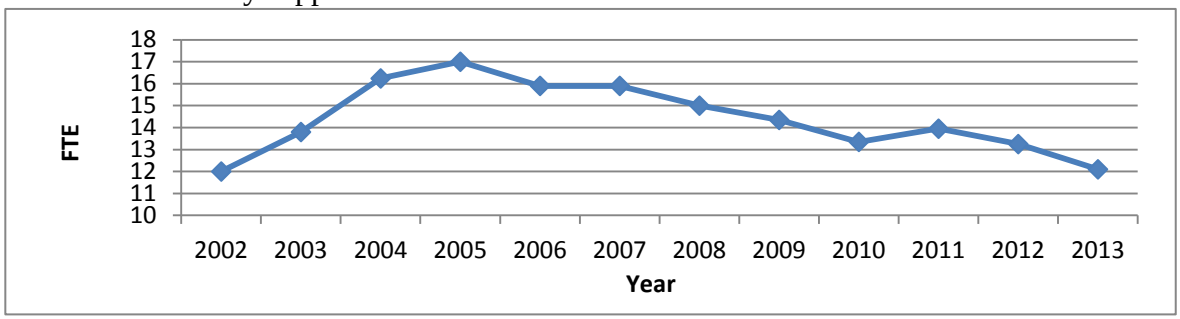
EEO/CR/Outreach

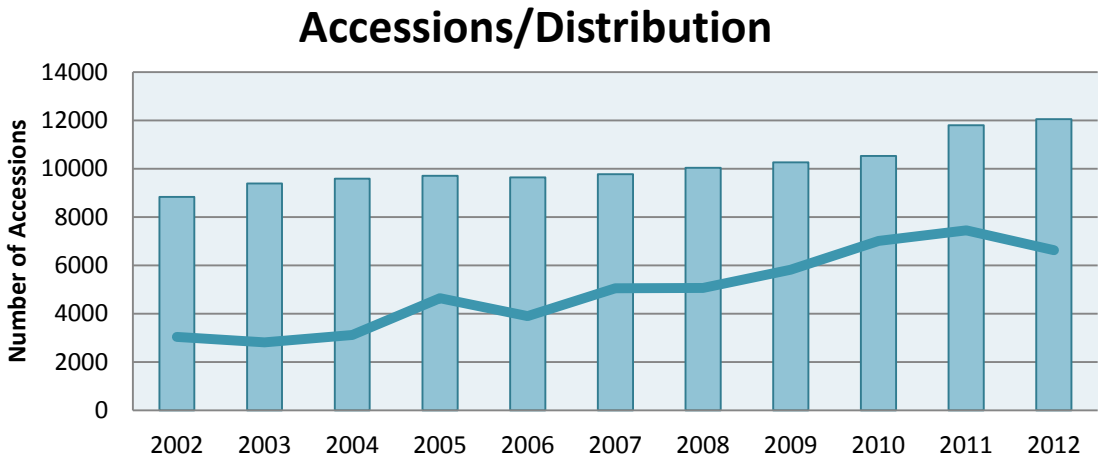
• Attended SACNAS annual conference in Seattle, WA, and Job Fair at Oregon State University to encourage interested applicants for federal jobs. Staff judged scientific posters.

• Through a Research Support Agreement with Oregon State University 1 male and 3 female graduate students were trained. During the winter, 15 disabled high school students (program was funded through local school district grants) were trained in greenhouse management activities.

• During the winter an additional 3 disabled individuals from a local private organization (Work Unlimited) were trained in strawberry greenhouse activities.

Federally supported salaries have returned to the level of 2002.





Accessions maintained (bars) have increased, and the number distributed (line) has increased.

View from the Front Office
By Kim Hummer

The public view of federal work in America is changing. Highly needed projects and activities in agriculture, research, and education are being reduced and eliminated. Although most people would agree that conservation efforts are "good," financial contributions and support of programs that preserve plant materials have greatly diminished. We in the National Plant Germplasm System know all too well that the federal governmental support of conservation efforts in plant genetic resources for food and agriculture is critical. Genetic resources are the foundation from which commercial cultivars are developed. Administrators and legislators who run our country must recognize that our strength is based on a safe and secure agricultural foundation. As new diseases and pests emerge and expand their distribution, and as global warming enables serious climate change, continued successful crop growth and yield will depend on a broad base of genetic resources. Native plants are disappearing as habitats succumb to human development so conservation efforts are more critical than ever. Despite these details we will keep the protection of our germplasm as our highest priority. Other less essential operations will be suspended until the funding climate turns around again. Tough financial times will be with us for a while.

Facilities
By Dennis Vandeveer
(note: Dennis retired at the end of February, 2013)

The big event this past year was to combine the facilities activities at the three ARS units in Corvallis into one Facilities Program. This program is managed by the Location Facilities Engineer. Each of the units can be more efficiently serviced by combining the three "force accounts." The facility needs will be met through administrative staff and budgets, rather than those of research.

We are working within the federal mandate to have "greener" operations. We have an active NCGR Safety/EMS (SHEM) committee. We have replaced numerous florescent light ballasts with electronic and T8 tubes. We purchased a new John Deere electric Gator for field use.

We continue to recycle metal, plastics, paper, cardboard, used engine oil, hydraulic fluid, antifreeze and electronic equipment.

We installed new rollup controllers for the winter plastic covers on our screenhouse. They have power relay panels. We put these rollup drives on all six screenhouses. Each controller operates two houses and maintains both sides of each house plus controls the heaters in each house. The controllers work from a flash memory device so that the programming is not lost during a power outage. The rollup drives and heaters can be operated manually from the keypad or switches. We also replaced the plastic rollup sides on two houses this past summer.
Power relay panel on the left and rollup drives on the screenhouse on the right.

We had swamp

additional new stainless steel cooler racks fabricated and totally rebuilt two swamp coolers. We replaced three swamp cooler fan motors with Green Star energy efficient motors. We installed new wiring in greenhouse1 for irrigation control and installed new controller. We pulled new CAT5 cable for gas meter and backup server to server closet. We upgraded our security Lenel/CCTV system. We also now connect our data system to the North farm via bridge network. Our staff has new smart cards for entering locked doors.

A new multi-zone system was installed replacing a 30+ year old system. We serviced numerous HVAC and cooling systems, including repair of the seed room cooling system. We installed a new heater in the tractor barn for the air blast sprayer. Maintenance was provided for six vehicles and five tractors plus numerous pieces of farm equipment, small engines and sprayers.
Other projects that kept us busy included re-striping the parking lots to include handicapped parking, plumbing repairs, minor electrical repairs, lighting upgrades and security badging and coding. We also maintain the Security and CCTV systems.
We installed a new stairway to the storage loft replacing a wooden ladder. This project was completed within house by force account.

We are working with Beltsville engineers for potential replacement of our aging screenhouses with a glass or twin-wall polycarbonate growing structure. If approval continues these could be constructed in 2016.

Corvallis Travel 2012

Compiled by Yvonne Pedersen

Kim Hummer – Palmer, Alaska, site visit; October 2011.

Dan Barney – San Antonio, Texas, Tri-Society Meeting, October 2011
Kim Hummer – Fayetteville, Arkansas attended Small Fruit CGC meeting; October 2011.
Joseph Postman – Riverdale, Maryland, attended the National Clean Plant Network Leadership Workshop; November, 2011.
Nahla Bassil – SanDiego, California, Plant & Animal Genome meeting; November, 2011.
Kim Hummer – South Africa, attended and presented paper at a Horticulture Congress; Jan.2012.
Nahla Bassil – Presented progress report at the SCRI workshop; November 2011.
Kim Hummer – Rome, Italy, participated in the Bioversity International meeting discussing genebank standards; January, 2012.
Kim Hummer – China, attended and gave presentation at International Strawberry Symposium; Feb. 2012
Barbara Reed – Wenatchee, Washington, attended and presented final report and submit new proposal to the Washington Tree Fruit Commission; February 2012.
Joseph Postman - Wenatchee, Washington, attended and presented final report and submit new proposal to the Washington Tree Fruit Commission and also attended Pear Crop Germplasm Committee meeting; February 2012.
Nahla Bassil – Lansing, Michigan, participated in RosBREED meeting and took training; March 2012.
Joseph Postman – Prosser, Washington, attended Clean Plant Network and Fruit Trees meeting; March.
Nahla Bassil – New Zealand, presented research results at the International Symposium of Biotechnology of Fruit Species; March 2012.
Joseph Postman – Tucson, Arizona, provided specialized input to the Science Advisor to the National Park Service Director; April 2012.
Nahla Bassil – Seattle, Washington, invited to present and serve as technical advisor for Red Raspberry Roadmap Planning Grant; May 2012.
Barbara Reed – Argentina, attended and participate on the board of governors for the Society for Cryobiology; May/June 2012.
Joseph Postman – Spokane, Washington, attended a curator workshop and PGOC meeting; June 2012.
Kim Hummer - Spokane, Washington, attended a curator workshop and PGOC meeting; June 2012.
Barbara Reed – Mexico, attended and spoke at the First International Symposium for in vitro conservation and cryopreservation; June 2012.
Barbara Reed – Belgium, attended Woody Ornamental of the Temperate Zone symposium and the International Science and Technology commission grant program meeting; June 2012.
Joseph Postman – Riverdale, Maryland, governing board of the National Clean Plant Network; July 2012.
Kim Hummer – Canada, obtain blueberry plants and wild relatives from Nova Scotia Agriculture and Agriculture Food Canada and Acadia University; July 2012.
Nahla Bassil – Miami, Florida, participated in RosBREED and ASHS meetings; July 2012.
Kim Hummer – Miami, Florida, participated in the ASHS meetings; July 2012.
Barbara Reed – Czech Republic, invited to attend and participate in the *Humulus* Symposium; September.

Contributed travel, paid for by inter/intra agency or outside private funds in accordance with FTR Chapter 304-1 “Acceptance of funds from non-federal source is in accordance with.”

Awards 2012
Compiled by: Yvonne Pedersen
Performance Bonus Awards for the rating period of 10/1/20011-9/30/2012.

Dennis Vandeveer	April Nyberg	Bruce Bartlett
Rob Carter	Danny Barney	Missy Fix
Joseph Postman	Jim Oliphant	Jeanine DeNoma
Nancy Robertson	Yvonne Pedersen	

Time Off Awards for the rating period of 10/1/2011-9/30/2012

Bruce Bartlett	Jim Oliphant
Joseph Postman	Missy Fix

SPOT Award for the rating period of 10/1/2011-9/30/2012
Randy Cram

QSI Award for the rating period of 10/1/2011-9/30/2012

Barbara Reed	Nahla Bassil	Kim Hummer

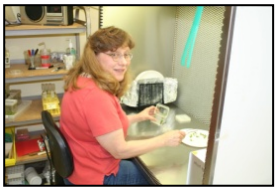
Visitors during 2012
By Yvonne Pedersen

During Calendar Year 2012, approximately 625 people came through the Repository's front door during business hours. Guests arrived in large or small groups, as organized class tours or as individuals. For outside tours, the repository had several extra events. About 61 people attended the 2012 Blueberry Open House held 26 July 2012.

Some groups used the Repository for their annual meetings such as the Oregon Hazelnut Commission, and the Oregon Processed Vegetable Committee. Educational tours ranging from groups of 2 to 150 came from Willamette University, Home Orchard Society, Chemeketa, Linn-Benton Community College, Oregon State University, Linn Benton Community College, various garden clubs, as well as the Eugene Permaculture and Slow Food group and Oceanography Life-Long Institute to tour the facility for their horticultural experience. In addition, the Corvallis Outreach Diversity and Equal Opportunity Committee arranged a tour to visit the three ARS Corvallis units for students and others interested, to see what the other units are researching.

There were also numerous general international visitors: 3 from India, 3 from China, 1 from Ecuador, 20 from Japan, 1 Russia, 1 from Belgium and 8 from Korea. Also, there were graduate students and a visiting scientist working at the National Clonal Germplasm Repository from Tunisia, Thailand, Korea, Ecuador, China, and Japan.

Tissue Culture and Cryopreservation
By Barbara M. Reed and Jeanine DeNoma

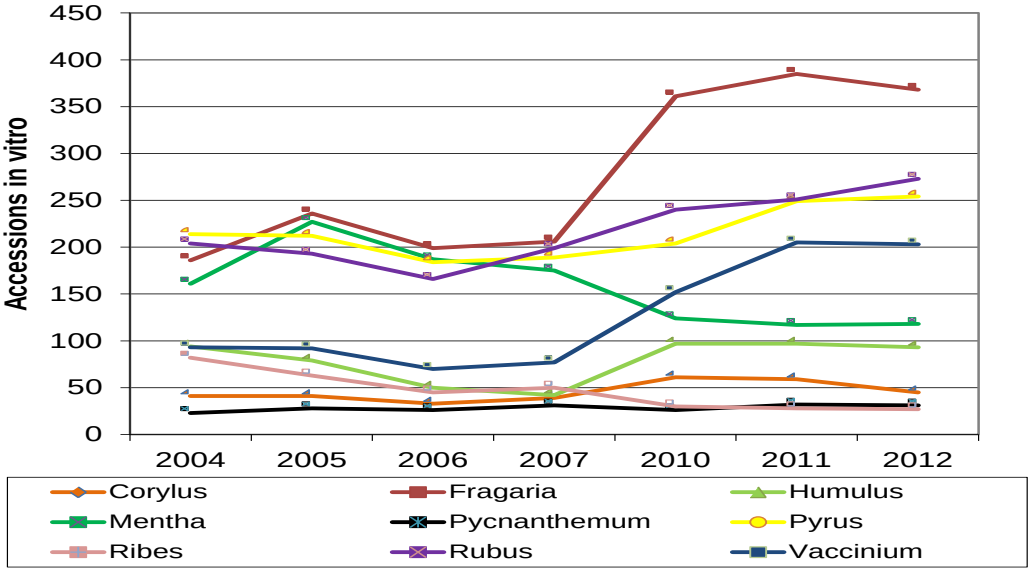


Jeanine DeNoma transfers tissue cultured plants in the hood.

The In-Vitro Collection

The *in-vitro* collection contains mostly the core and other highly requested accessions. Technician Jeanine DeNoma and helpers collected new accessions as plants were available. The spring and summer explanting season resulted in many accessions successfully initiated into culture and cold

stored. December 2012, 1412 accessions were in culture and most were in storage. A graph of the tissue culture collections from 2004 to present are shown below. The size of each collection fluctuates over time depending on priorities for distribution and what plants are available for collecting in a particular year. The *Corylus* collection is gradually being reinitiated and carefully screened to provide more bacteria-free cultures.



Medium Optimization for *Pyrus*

Dr. Sugae Wada, OSU Post Doc., transfers pears from tissue culture to greenhouse.

We finalized the pear medium optimization experiments initiated with grants from the Oregon Association of Nurseries and the Oregon Department of Agriculture. This project produced a wealth of data for improving pear micropropagation and manuscripts are in progress. The mineral nutrition greatly influenced plant appearance, shoot initiation, and elongation of pear. In 2008 we tested the overall mineral nutrients and found that meso elements (calcium, magnesium, phosphorous and potassium), iron and nitrogen were driving factors for many growth attributes. In 2009 we optimized the meso elements for 17 pear accessions and used this to provide an improved medium for the *in vitro* pear collection. In 2010 we determined the nitrogen ratios important for overall quality, shoot number and shoot length. When nitrogen compounds were tested in medium with the increased meso elements, low nitrogen produced more shoots on most genotypes, but also increased callus production and physiological disorders on some. The best concentrations of ammonium, potassium and nitrate varied with the cultivar but were less important when the meso elements were increased. Iron concentrations in the medium were optimum for most pears at 1 to 1.25X MS levels. We began a project in 2011 to study dwarfing pear rootstock selections and cultivars and to optimize the medium for these important accessions. We optimized the Ca, Mg and P as well as nitrate and ammonium nitrate ratios. Dwarfing rootstocks are by nature short and slow growing so they provide some additional challenges for culture. The California Pear Board and the Washington Tree Fruit Commission

(Pear section) are funding Dr. Reed and Dr. Sugae Wada (OSU Dept of Horticulture) for this project. Storage experiments with the new pear medium are also in progress.

Corylus Culture

Graduate student Chip Hand is completing a MS project to improve hazelnut growth *in vitro* with funding from the Oregon Hazelnut Commission. We are developing improved *Corylus* culture medium using methodology similar to our pear studies, determining methods for initiating clean cultures and identifying some common bacterial contaminants. This study involves culture of advanced selections from the OSU hazelnut breeding program as well as named cultivars. The response of hazelnuts to mineral nutrients is quite different from the pears; we are seeing a greater diversity of optimal mineral combinations. There was a great deal of genotype variation, and because of this, it is likely that several new media will be developed for use with hazelnut. The initial study showed important contributions of nitrogen ratios, increased nitrogen, $MgSO_4$ and KH_2PO_4, and minor nutrients. A second study involving minor nutrients is in progress to determine which of the minor nutrients is driving the improvements.

Raspberry Culture

Ph.D. graduate student Sukalya Poothong is studying the response raspberry cultivars to mineral nutrients. The standard medium is not optimum for many cultivars and she is using the surface response design to develop improved mineral nutrition for five cultivars. In the first set of experiments testing five stock solutions at five concentrations, the results varied by cultivar for some characteristics. All cultivars had improved growth or appearance with some treatments compared to MS. The amount of mesos stock solution ($CaCl_2$, KH_2PO_4 and $MgSO_4$) was the most significant limiting factor associated with changes in plant quality, multiplication and shoot length in all cultivars. Future experiments will address optimizing mesos and nitrogen ratios to improve red raspberry micropropagation. In addition, we will study the accumulation of mineral nutrients in the plants and metabolomics will be employed to investigate the effects of mineral nutrition on plant metabolism in collaboration with Dr. Claudia Meier, OSU Department of Chemistry.

Germplasm Storage by Cryopreservation (Long-Term Storage)

Our long-term storage is coordinated directly with Dr. Maria Jenderek of the Vegetative Propagation Group at NCGRP from plant materials supplied by NCGR. These are the accessions in long-term storage at NCGRP at the end of 2012. Some additional accessions are also stored at NCGR.

Genus	Accessions Cryopreserved (+ 2012)	Form cryopreserved	Technique
Corylus	5 species	embryonic axes	desiccation
Cynodon	35 (+10)	shoot tips	encapsulation-dehydration
Fragaria	202 (+34)	shoot tips	vitrification
Humulus	103 (+30)	shoot tips	encapsulation-dehydration

Lolium	17	shoot tips	slow cooling, e-d
Mentha	50	shoot tips	vitrification
Pycnanthemum	32 (+10)	shoot tips	encapsulation-dehydration
Pyrus	231 (+15)	shoot tips	slow cooling, vitrification
Ribes	81	shoot tips	encapsulation-dehydration
Rubus	173 (+23)	shoot tips	slow cooling, e-d
Vaccinium	32 (+16)	shoot tips	encapsulation-dehydration

Molecular Genetics

By Nahla V. Bassil

The molecular lab has benefited from the activities of many visitors during the past year. Left to right, top to bottom, the staff included: Liz Alperin, Jill Bushakra, Daeil Kim, Natalia Salinas, Nahla Bassil, Megan Mathey, Amira Bidani, April Nyberg, and Kasey Schaefer

Graduate Students

In collaboration with Chad Finn, MS Megan Mathey finished fingerprinting 960 strawberry individuals that include the supercore accessions and ~ 200 NCGR strawberry accessions that are important founders and breeding parents for US breeding programs. In collaboration with Dr. Eric Van de Weg and Dr. Andrew Jamieson, we are validating association of an SSR marker that is linked to the Rpf1 red stele resistance gene with the disease response by inoculations.

Projects Completed in 2012

Analysis of phylogeny, sex function and age of *Fragaria* based on whole chloroplast genome sequencing. Completed phylogenetic analysis of chloroplast genome sequences of 21 *Fragaria* species and subspecies resolved the western North American diploid *F. vesca* ssp. *bracteata* as sister to the clade of octoploid/decaploid species. No extant tetraploids or hexaploids were directly involved in the ancestry of the octoploids. There was a strong geographic segregation of chloroplast haplotypes in subsp. *bracteata*, and the gynodioecious Pacific Coast populations are implicated as both the maternal lineage and the source of male-sterility in the octoploid strawberries. Analysis of sexual system evolution in *Fragaria* provided evidence that the loss of male and female function can follow polyploidization, but does not seem to be associated with loss of self-incompatibility following genome doubling. *Fragaria* has apparently attained its circumboreal and amphitropical distribution in the past 1.72 million years, and the octoploid clade is estimated to be less than 573,000 years old.

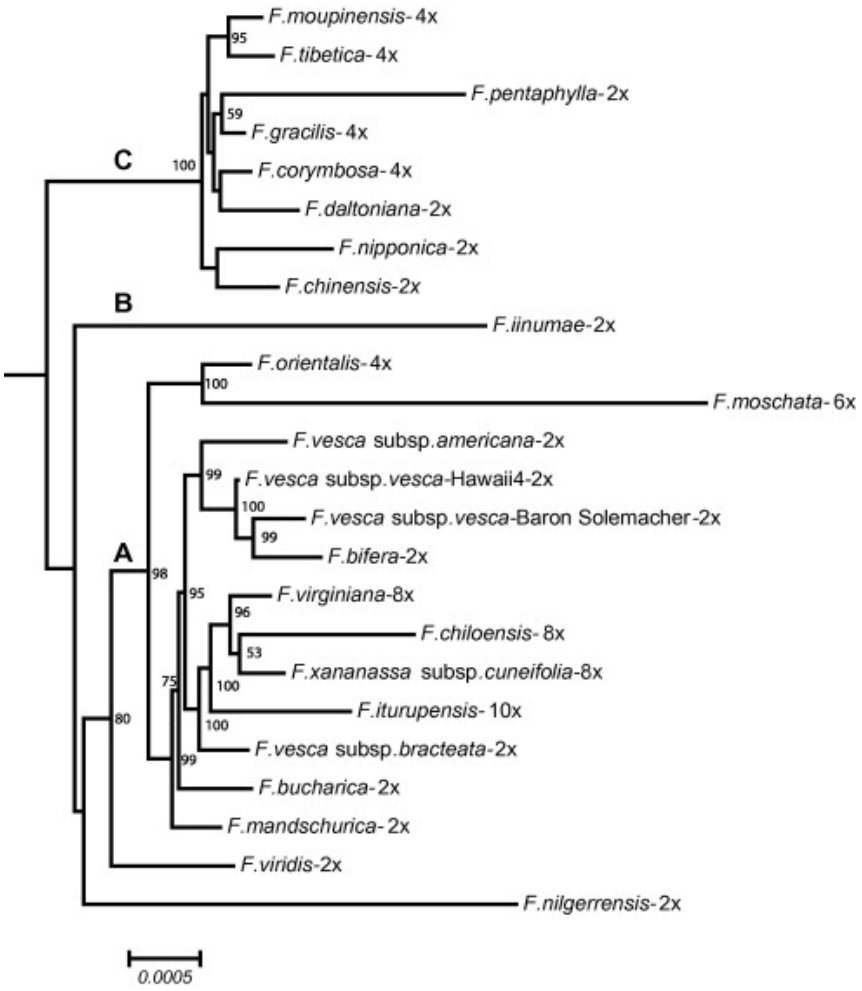


Fig. 1. Phylogenetic relationships of *Fragaria* based on maximum likelihood analyses of almost complete chloroplast sequences indicating *F. vesca* subsp. *bracteata* as sister to the clade of octoploid/ decaploid species.

A genome-enabled, high-throughput, and multiplexed fingerprinting platform for strawberry (*Fragaria* L.) We used a high-throughput protocol for generating simple sequence repeat (SSR) composed of tetra- through nona-nucleotide repeat units patterns from the *Fragaria vesca* genome sequence. A single-fluorophore secondary labeling strategy was devised that allows simultaneous amplification of eight SSR regions in a single PCR reaction. This strategy was used in fingerprinting 219 strawberry accessions. The methods are comparable to SSR use in DNA typing in humans. The approach yields reproducible, highly-variable, complex patterns. The technique was applied to detect closely-related individuals across ploidy levels, including full sibling progeny in an inter-related octoploid pedigree. The resultant fingerprinting platform successfully differentiated the vast majority of individuals tested and identified few accessions that are not true to type.

Genetic diversity in wild and cultivated black raspberry (Rubus occidentalis L.) evaluated by simple sequence repeat markers. Using 21 polymorphic SSR markers, we examined genetic diversity in 148 wild and cultivated black raspberry (*Rubus occidentalis*) accessions. Black raspberry cultivars clustered tightly and averaged higher than expected heterozygosity while heterozygosity of wild accessions was much lower than expected. Relationships between wild black raspberry accessions were poorly resolved and strong regional clusters were mostly absent

from our analysis. Our results show that wild black raspberry germplasm is a relatively untapped resource available for future breeding.

Projects in Progress in 2012

Genetic fingerprinting of the pear core collection. We are using multiplex PCR (Type-it Microsatellite PCR Kit™ (Qiagen, Valencia, CA) (catalogue # 206243) for fingerprinting the entire core collection using a universal fingerprinting set developed by the ECPGR. Comparison of the fingerprints of the eight reference accessions obtained from East Malling Research (EMR) to those maintained at the NCGR generated different profiles for 'Hosui'. Kate Evans (apple breeder, WSU) identified the EMR 'Hosui' as 'Shinsui'. We are re-analyzing this data and comparing fingerprints of same name accessions in common between the National Brogdale Pear Collection in the U.K. and the USDA-ARS-NCGR collection.

Developing genomic tools for blueberry. As part of an SCRI grant led by Jeannie Rowland, we screened 91 genic (associated with 25 genes) blueberry SSR primer pairs and 72 SSRs that were placed on the cranberry linkage map for polymorphism in parents of two tetraploid blueberry mapping populations ('Draper' x 'Jewel'; and 'Southern Belle' x 08-467), and diploid blueberry mapping population [(Fla4B x W8520) x W85-23]. Polymorphic SSRs are shared with collaborators for constructing linkage maps in each of these crops. So far, 365 markers were placed across the 12 linkage groups in the tetraploid map and over 200 markers on the diploid map.

RosBREED: Enabling marker-assisted breeding in Rosaceae. As leader of the genotyping team in an SCRI grant led by Amy Iezzoni (MSU), I led a Strawberry SNP Consortium in weekly teleconferences to develop different SNP categories to use in implementing a 90 K Axiom (Affymetrix) chip as a high throughput SNP genotyping platform for genome-wide scanning in strawberry.

Testing markers associated with remontancy in strawberry. In collaboration with Daeil Kim, Jim Hancock and Beatrice Denoyes, we are testing three SSR markers linked to remontancy in strawberry in 947 strawberry accessions. The strawberries were also phenotyped for this trait in at least two geographical locations (Corvallis, OR and East Lansing, MI).

Black raspberry genomic resource development. The USDA-ARS NCGR manages and maintains a collection of over 175 black raspberry germplasm accessions, which includes newly collected wild accessions from 130 locations across 27 US states and two Canadian provinces. Evaluation of this wild germplasm led to the identification of four potential sources of aphid resistance, and potential new sources of resistance to the fungal pathogen *Verticillium dahliae*. We are building the genomic infrastructure for black raspberry by developing, and making available, genomic tools including molecular markers for construction of linkage and physical maps, and a draft genome assembly that will benefit both black and red raspberry breeding programs across the U.S. To date, we have developed over 200 SSR markers polymorphic in the parents of two crosses. Up to 704 Gbp of sequence was generated from six cDNA libraries of five tissues types of 'Jewel'. A draft genome assembly of 300Mbp was generated from a highly homozygous accession. These genomic resources are essential for building the infrastructure needed for identification of candidate genes or closely linked markers for traits of interest during the

development of improved black raspberry cultivars, and will inform decisions regarding germplasm value and usage, crossing, and selection through marker-assisted breeding.

Genetic diversity assessment of wild Southeastern American *Vaccinium*. More than 44 simple sequence repeats (SSRs) developed in *V. corymbosum* were used to screen 14 accessions of four *Vaccinium* species for polymorphism. Fourteen SSRs proved polymorphic and easy to score in these species and were used to estimate genetic diversity of the 67 individuals including 19 *V. elliottii*, 12 *V. fuscatum*, 1 *V. myrsinites*, and 35 *V. darrowii* accessions. Genetic distance was closest among the two named cultivars: *V. darrowii* 'Everblue' and 'Johnblue'. *Vaccinium darrowii* Florida 4B, a well-known breeder selection used for introducing the economically valuable low chilling trait into the cultivated highbush blueberry gene pool, was obtained from two sources. Unfortunately, the two Florida 4B samples had different fingerprints. Two accessions of *V. darrowii* with different New Jersey selection numbers had identical fingerprints. Cluster analysis separated the wild accessions into species groups. Future analyses will include confirming the identity of the Florida 4B genotypes and evaluating the genetic diversity and population structure of these wild accessions.

Developing a multiplex set for blueberry. Eighteen trinucleotide-containing SSRs were screened for polymorphism and ease of scoring in eight diverse blueberry cultivars. A set of five SSRs that are polymorphic, map to different linkage groups and can be PCR multiplexed were selected as a fingerprinting set. They are being evaluated in 132 groups of accessions made up of each clone of the same name blueberry plants present in the USDA-ARS-NCGR collection (in the screenhouse and field collections).

Greenhouse/Screenhouse

By Jim Oliphant and Missy Fix

• Optimized softwood propagation methods greatly improve rooting success
• Cleaned *Vaccinium* house and replaced benches
• Improved GRIN inventory data and developed a working pot label
• Propagated *Mentha* collection
• Continued the rearrangement of the potted *Vaccinium* collection.

All clonal accessions of Rubus are maintained under screen. Accessions from tropical, subtropical, and high latitude habitats are maintained in the greenhouse of which there are now 202 accessions. In 2012, 255 accessions were re-propagated for placement in the collection bringing the total number of accessions to 894 of which 454 are named cultivars. The repository received six new accessions or replacements this year and six new seed lots. Some Rubus are difficult to grow in containers indoors. We have been giving additional care for these accessions and call them "Rubus of Concern." While some previously in this category have recovered, these accessions will be reevaluated to emphasize the care for those accessions that have proven to be difficult to propagate.

Clonal Accessions maintained in the Greenhouses and Screenhouses as of March 2013

Genus	Total Accessions	Available # Acc.	%	Single Plants #Acc	%
Actinidia	45	18	40.0	1	2.2
Corylus	18	18	100.0	4	22.2
Fragaria	1580	768	48.6	750	47.5
Humulus	370	190	51.4	171	46.2
Mentha	454	64	14.1	0	0.0
Pycnanthemum	34	34	100.0	0	0.0
Pyrus	324	243	75.0	0	0.0
Ribes	65	58	89.2	8	12.3
Rubus	858	550	64.1	520	60.6
Vaccinium	1090	800	73.4	216	19.8
Other1	42	37	88.1	9	21.4
Total	4880	2780	57.0	1679	34.4

JMO 29 March 2013

1) includes: ASI, CYD, GAY, GAU, MES, SAM

Quarantined Plants

At this time we have 330 accessions in quarantine.

Status of Quarantined Accessions at the Repository

	Federal	State	In-House
Corylus			2 NCGR
Cydonia	21 Provisional Release		
Fragaria	7 Departmental Permit		
Humulus		20 Directors Exemption (seed)	116 NCGR
Ribes		16 Directors Exemption	
Rubus	3 Post-Entry		
Pyrus	72 Provisional Release		
Vaccinium	73 Post-Entry		
330 QUAR at this time	Federal	State	In-House

North Farm Field Operations

By Joe Snead

About 10 acres on the North Farm are planted in germplasm collections. Several other small plots are managed for other scientist at the Corvallis location. This last year was dominated by maintenance. All efforts were centered on field collection care and farm equipment and facilities repair. Most of the field budget went to tractor repair and irrigation system repairs. This left very little of the field budget for supplies and small repairs. The dwindling field budget has been coupled with a marked decrease in field labor. We greatly appreciate donated labor and support from other research units that have field plots on the farm. There are two small plots left from other research units. In 2012, the plantings were given good care and grew well. The farm as a whole looked very nice and lots of compliments were received. There was plenty of plant material for distribution.

Farmscaping for Beneficials

The farm is continuing a program to aid natural predators on the farm for insect and rodent control. We added some new bird houses and refurbished some others. The perennial flower bed grew in well this year along with the annual flowers. These flowers promote the population of beneficial insects. These beneficial insects keep the population of pests reduced without the needing to spray pesticides.

Plot removal

Several research projects that were on North Farm land have now been completed. Our farm crew was put to work to remove the remaining plants and weeds, and restore the land for future use.
In late summer the former ARS hop genetics field was removed. The field was 2.5 acres. This field was particularly hard to remove because of the huge root system of the hops. Working around the trellis system added further challenges. Several other small plots were removed including an ornamentals and grape field. All the ground was worked down and left fallow. The ground will have to be worked again in the spring to keep the weeds down.

Farm Equipment

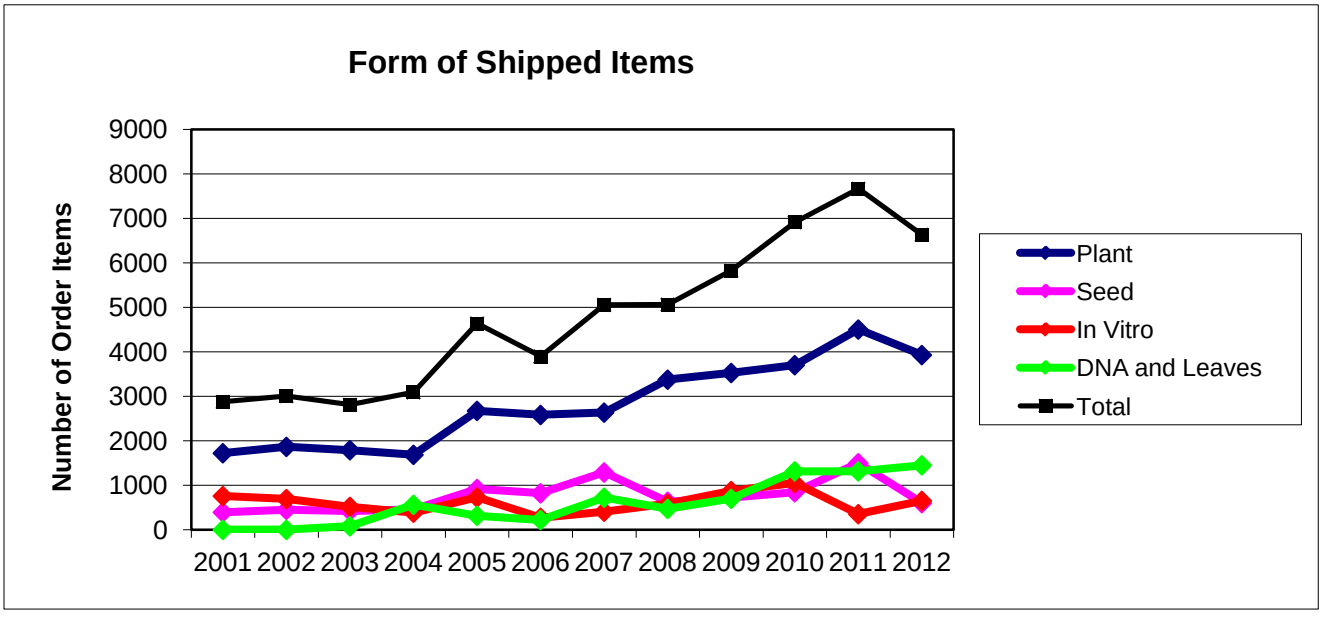
Our farm equipment is aging and requires frequent repairs. Two years ago we received a new compact tractor that we use for mowing. We have five other tractors, two are 31years old, one at 29 years old, one at 24 years old, and finally one at 19 years old. Most of the equipment attachments match these ages. We have taken very good care of our equipment with regular service and repairs. The problem is the tractors are requiring bigger repairs as they age. Repairs can easily surpass budget spending limits. Not all the parts are available for the oldest tractors so we have to source used parts. This last year two tractor repairs took most of my allotted budget.

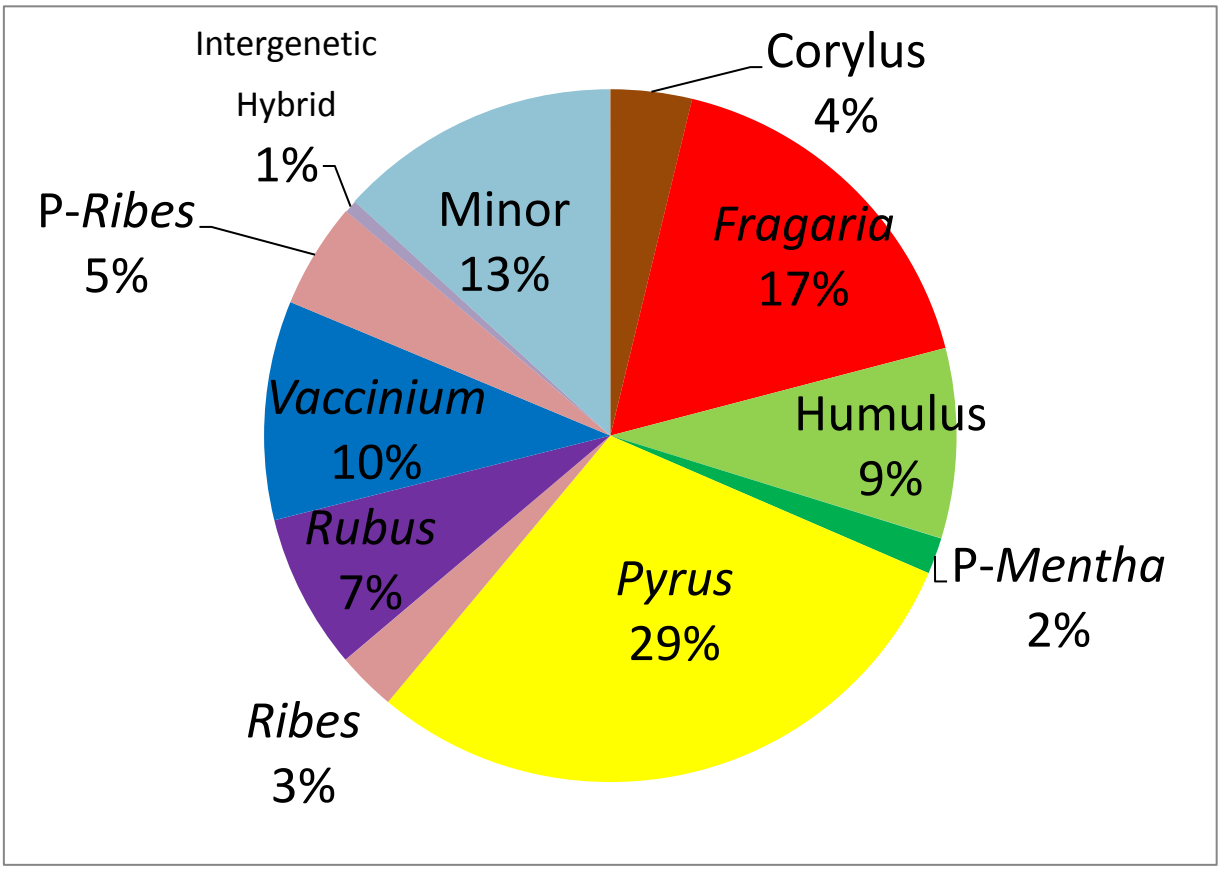
Just as the equipment has aged, so have the facilities at the North Farm. The main irrigation well needed to be back flushed to get the flow back in mid-July2012. This was a two day operation that required pulling the pump. We greatly appreciate the financial assistance from Area and Headquarters for this major repair to our irrigation system.

(L-R) Dr. Whitey Lawrence, Small Fruit Geneticist, Retired, Dr. Mel Westwood, Pomologist, Oregon State University, Emeritus, stop by to visit Dr. Kim Hummer, Research Leader, and Dr. Bruce Bartlett, Plant Distibution Manager, at the Repository. Bruce's boxes (R) are heading out the door for plant requestors.

Distribution

- In CY 2012, NCGR staff shipped 6,631 items as seeds, cuttings, runners, scionwood, rooted plants, tissue cultures and DNA and leaf samples, down slightly from 2011.
- In CY 2012, 659 new orders were received and more than 700 orders were shipped.
- The pears and strawberries topped the list of crops distributed.
- Domestic individuals, state agencies and universities, and ARS researchers received the most germplasm from Corvallis in 2012.




Intergenetic
Hybrid
1%
Corylus
4%
P-*Ribes*
5%
Minor
13%
Fragaria
17%
Vaccinium
10%
Humulus
9%
Rubus
7%
P-*Mentha*
2%
Pyrus
29%
Ribes
3%

NCGR Corvallis Tree Fruit and Nut Collections
Joseph Postman

Joseph Postman in his run-about.

The NCGR *Pyrus* collection includes 2230 orchard or screenhouse trees and 325 seedlots representing 36 *Pyrus* taxa from 56 countries. A collection of 250 clones are backed up in vitro as shoot cultures at 40° F, and 320 clones are backed up as small potted screenhouse trees. The bacterial disease fire blight rarely occurs in Corvallis due to the cool temperatures during bloom and dry summers, making this an ideal location to preserve this living pear germplasm collection for future generations. As of January, 2013, the NCGR genebank houses 900 European cultivars, 176 Asian cultivars, 116 hybrid cultivars, 169 rootstock selections, 25 perry (cider) cultivars and 946 trees representing pear wild relatives.

The *Corylus* collection includes 744 hazelnut accessions representing 20 taxa from 36 countries. A backup collection of 65 accessions is maintained in vitro as shoot tissue cultures at 40 ºF. Eastern Filbert Blight (*Anisogramma anomala*) is present nearby, but prophylactic fungicide applications have so far kept the germplasm collection free of this disease. The genebank maintains 775 trees in a living field collection, with 1 tree per accession, although some trees are duplicated as the "tree" hazels move to a new field plot. Most field trees are self-rooted, but some are grafted using red-leaf rootstocks to avoid confusion between rootstock suckers and the grafted clone.

A globally diverse collection of Quince (*Cydonia, Chaenomeles, Pseudocydonia*) has been assembled with unique genotypes maintained as growing trees. The Corvallis genebank includes 170 orchard and screenhouse trees and 24 seedlots representing 6 taxa from 15 countries. Quince is very susceptible to the bacterial disease fire blight, and occasional "strikes" or infected branches must be quickly removed from trees to avoid spread. Quince is grown for its fragrant, edible fruit; as a dwarfing rootstock for pear, and as a flowering ornamental plant. The Repository maintains 21 rootstock clones, and 77 fruit clones. We recently completed a 3 year cold hardiness study using 50 clonal accessions, and selected the most cold-hardy to be further evaluated as potential dwarfing pear rootstocks.

Propagation of cold hardy quince selections from hardwood and softwood cuttings. Propagation by softwood cuttings was more successful than hardwood cuttings for most selections. Rooting hormone improved levels of rooting. Eight accessions had ≥ 19% rooting success from hardwood cuttings with hormone, and only two rooted at this rate with no hormone. Twelve accessions had > 25% rooting with hormone from softwood cuttings. Only one top selection did not root. Softwood results were scored at 6 weeks to identify the most easily rooted clones. Most quince accessions were observed to root more efficiently than the standard OHxF pear clones used as controls. In

12 Most Cold Hardy Quince Clones

Hardiness Rank	Accession	Browning Score (1-6)
1	C. oblonga - Arakseni, Armenia	1.50
2	Aiva from Gebeseud	2.39
3	Akhtubinskaya O.P. seedling 4	2.42
4	Tashkent AR-232 seedling 4	2.75
5	Skorospelka O.P. seedling 1	2.86
6	Quince S	3.00
7	Quince W	3.00
8	C. oblonga - Megri, Armenia	3.03
9	C. oblonga - Seghani, Armenia	3.08
10	Tashkent AR-232 seedling 2	3.14
12	C. oblonga - Babaneuri, Georgia	3.61
13	Krukovskaya O.P. seedling 2	3.64

vitro initiation was successful on newly developed pear medium. Eight quince clones had multiplication rates >10 and twenty one had multiplication rates ≥ 6 during in vitro establishment.

Old Home x Farmingdale pear rootstock pedigree analysis determined that : 'Farmingdale' is not the father!

Early in the 20th century, a collection of fire blight resistant pears from around the world was assembled in southern Oregon in efforts to develop improved rootstocks. 'Old Home' and 'Farmingdale' are two cultivars from Illinois that exhibited strong fire blight resistance and became important as interstem stocks and as parents in the development of new rootstocks. Several OHxF selections are now valued as rootstocks worldwide, and 45 unique OHxF selections are maintained at the USDA-ARS National Clonal Germplasm Repository, in Corvallis. SSR (microsatellite) profiles were generated for 'Old Home', 'Farmingdale', 8 OHxF selections, and several reference pear cultivars using a standard international fingerprinting set. 'Farmingdale' is thought to be a seedling of 'Beurré d'Anjou', and we confirmed this parental relationship. All OHxF selections shared an allele with 'Old Home' at each locus, however, based on the SSR results, it is impossible for 'Farmingdale' to be the pollen parent for any of the OHxF selections examined. We determined that cultivar 'Bartlett' is the actual pollen parent of these rootstock clones. Fruit and leaf morphology was consistent with 'Bartlett' and not 'Farmingdale' as a parent of OHxF rootstock selections. The highly fire blight resistant 'Farmingdale' is apparently very under-represented in the pedigrees current pear rootstocks, and deserves renewed consideration.

Developed new, durable and inexpensive field labels with 10-20 year anticipated service life and relabeled NCGR North Farm tree collections (700 accessions).

Long-lasting, high quality tags are commercially available for nursery, forestry, botanic garden, and museum applications with costs beginning around $3.00 and up to $10.00 each for more durable tags. These costs are prohibitive for labeling the thousands of long-lived woody tree and shrub accessions conserved in many NPGS field collections. A durable, attractive and functional, high density polyethylene (HDPE) tag was developed that can be easily manufactured for direct mounting onto a tree trunk for a total cost of less than $0.70 each including stainless steel screw and nylon spacer (4" x 6" HDPE tag with 3 ⅓" x 4" weather-proof label and 2" screw). Tags can be mounted onto a stake for young trees, and moved on the tree trunk after 2-3 years.

Expanded NCGR tree fruit and nut collections to improve representation of historic genotypes, fill taxonomic gaps in collections, replace dead or misidentified accessions.

Nearly 200 seed and plant inventories were added to the *Corylus*, *Cydonia*, and *Pyrus* collections, and another dozen new accessions were acquired for "minor" genera including *Chaenomeles*, *Crataegus*, *Mespilus* and ×*Sorbaronia*.

Underutilized "Curators Choice" accessions with valuable traits such as disease resistance, excellent fruit quality, high productivity, very early fruit ripening or unique historic significance were flagged in the database and promoted to our stakeholder groups. The "Curator Choice" designation has been especially well received by small farms and nurseries who are always seeking unique plant materials to help them be competitive in the marketplace. For example, see http://www.ars.usda.gov/SP2UserFiles/Place/53581500/catalogs/cydchoice.html for Quince.

Joseph Postman continued to serve on 5 member National Governing Board for USDA National Clean Plant Network. This program was established by Congress in the 2008 Farm Bill is to provide national sources of high quality asexually propagated foundation plant material free of targeted plant pathogens and pests as a collaboration between ARS, APHIS and NFIS. In 2011, the Governing Board assisted NCPN coordinator Erich Rudyj to develop a request for proposals, review submitted proposals and award more than $5 million to 13 foundation plant material centers serving the 5 crop commodities: Grapes, Tree Fruits, Berries, Hops and Citrus.

Continued a collaboration with Maria Jenderek at NCGRP (Fort Collins, CO) to develop a dormant-bud cryogenic storage procedure for *Pyrus*, *Vaccinium* and *Corylus* that will permit us to backup vegetative propagules of these collections in liquid nitrogen.

Summary table of tree fruit and nut accessions, plant and seed inventories, and backup status.

Genus	Accessions	Taxa	seedlots	FLD locations	SH locations	in vitro backup
Amelanchier	50	11	54	19	2	0
Amelasorbus	1	1	0	1	0	0
Arbutus	2	1	6	0	1	0
Chaenomeles	13	4	1	9	2	0
Cornus	1	1	0	0	2	0
Corylus	744	21	0	735	100	56
Crataegomespilus	3	1	0	2	0	0
Crataegosorbus	1	1	0	1	1	0
Crataegus	17	7	0	4	0	0
Crataemespilus	1	1	0	1	0	0
Cydonia	125	1	22	129	28	0
Juglans	26	3	1	34	0	0
Malus	8	4	0	3	0	0
Mespilus	58	2	19	40	25	0
Peraphyllum	8	1	4	0	1	0
Pseudocydonia	2	1	1	7	3	0
Pyracomeles	1	1	0	0	0	0
Pyronia	7	1	0	5	2	0
Pyrus	2149	36	325	1995	412	251
Sorbaronia	7	4	0	5	2	0
Sorbocotoneaster	3	2	3	2	1	0
Sorbopyrus	11	2	0	10	0	0
Sorbus	146	48	0	71	15	0
total trees	3384	155	436	3073	597	307

New Tree Fruit and Nut Accessions received in 2012. – J. Postman

Seed Accessions Received 2012

CCOR	983	Corylus avellana ALB-2011-014	Albania
CCOR	984	Corylus avellana ALB-2011-030	Albania
CCOR	985	Corylus avellana ALB-2011-049	Albania
CCOR	986	Corylus avellana ALB-2011-056	Albania
CCOR	987	Corylus avellana ALB-2011-090	Albania
CCYD	162	Corylus oblonga - Gjirokaster Quince	Albania
CCYD	163	Corylus oblonga - Qinam Quince	Albania
CPYR	2965	Pyrus communis ssp. pyraster ALB-2011-024	Albania
CPYR	2961	Pyrus spinosa ALB-2011-001	Albania
CPYR	2962	Pyrus spinosa ALB-2011-007	Albania
CPYR	2963	Pyrus spinosa ALB-2011-010	Albania
CPYR	2964	Pyrus spinosa ALB-2011-015	Albania
CPYR	2966	Pyrus spinosa ALB-2011-028	Albania
CPYR	2967	Pyrus spinosa ALB-2011-034	Albania
CPYR	2968	Pyrus spinosa ALB-2011-038	Albania
CPYR	2969	Pyrus spinosa ALB-2011-043	Albania
CPYR	2970	Pyrus spinosa ALB-2011-064	Albania
CPYR	2971	Pyrus spinosa ALB-2011-067	Albania
CPYR	2972	Pyrus spinosa ALB-2011-070	Albania
CPYR	2973	Pyrus spinosa ALB-2011-072	Albania
CPYR	2974	Pyrus spinosa ALB-2011-078	Albania
CPYR	2975	Pyrus spinosa ALB-2011-089	Albania

Corylus Plant Accessions Received 2012

PI	637890	C. avellana ARM-02-009 - Kapan	Armenia
PI	637891	C. avellana ARM-02-051 - Micha	Armenia
CCOR	810	C. avellana ARM-02-053 - Vodka Man	Armenia
PI	637893	C. avellana ARM-02-173 - Shnogh	Armenia
CCOR	949	Khachapura O.P. - Adjara	Georgia
CCOR	950	Dedoplis Titi O.P.	Georgia
CCOR	953	Chachapura O.P. - Lagodekhi	Georgia
CCOR	954	C. avellana G10-109	Georgia
CCOR	955	C. avellana G10-110	Georgia
CCOR	956	Zolotoy orekh O.P.	Georgia
CCOR	957	Khrustala O.P.	Georgia
CCOR	958	Lekuri O.P.	Georgia
CCOR	959	Khoji Tkhili O.P.	Georgia
CCOR	960	C. avellana G10-115	Georgia
CCOR	961	Apenuri berdznula O.P.	Georgia

CCOR	962	Gavazuri O.P.	Georgia
CCOR	963	Anakliuri O.P.	Georgia
CCOR	964	C. avellana G10-119	Georgia
CCOR	966	C. avellana Adygeysk	Russia
CCOR	968	C. avellana Homskij-1	Russia
CCOR	969	C. avellana Homskij-2	Russia
CCOR	970	C. avellana Homskij-3	Russia
CCOR	971	C. avellana Homskij-4	Russia
CCOR	972	C. avellana Krasnodar-4	Russia
CCOR	973	C. avellana Maikop	Russia
CCOR	974	C. avellana Sochi Inst.	Russia
CCOR	975	C. avellana Sochi-2	Russia
CCOR	976	C. avellana Sochi-3	Russia
CCOR	977	C. avellana Sochi-4	Russia
CCOR	978	C. avellana Alushka-Simferopol-1 large	Ukraine
CCOR	979	C. avellana Alushka-Simferopol-1 small	Ukraine
CCOR	980	C. avellana Alushka-Simferopol-2	Ukraine
CCOR	981	C. avellana Alushka-Simferopol-4	Ukraine
CCOR	982	C. avellana Nikita Botanic Garden	Ukraine

Cydonia Plant Accessions Received 2012

Q	44715	Quince from Ioseb Tomashvili (GE-054)	Georgia
Q	44716	Skra Exp. Sta. Selection No. 1 (GE-067)	Georgia
Q	44717	Chacha Quince (GE-101)	Georgia
Q	35680	Hov. No.2	England
Q	45234	hvbrid V-7 (fire blight res.)	Bulgaria
Q	45235	hybrid I-83 (fire blight res.)	Bulgaria
Q	43201	Meeches Prolific	England
Q	39558	Yuz-begi 90-2	Turkmenistan
Q	39554	Zeakli 89-1	Turkmenistan
Q	39831	Zvezdnaia	Russia
Q	39832	Muskatnaia	Russia
Q	39551	Kichikara Dede 88-1	Turkmenistan
PI	655051	Bourgeault	France
Q	44764	Alena	Armenia
Q	44761	Ttvash Serkevil (Sour Quince)	Armenia
CCYD	161	Lisle	Ohio
PI	655044	Orange	Oregon
PI	660759	Pseudocydonia - Chinese Quince sdlgs.	China

Pyrus Plant Accessions Received 2012

Q	25261	1-150	Nepal
Q	22421	14/109 F2-F-2	Romania
Q	22418	14/125 F2-3-131	Romania
Q	43936	Arlingham Squash (perry pear)	England
CPYR	2957	Bartlett - John Muir Gravesite No. 85	California
Q	39539	Birleshik 84-1	Turkmenistan
Q	29573	Camusina di Bonarcado	Italy
Q	29574	Camusina di Cagliari	Italy
Q	25057	Changpa Li	China
Q	44725	GE-135 Gulabi from Dedoplis Tskaro	Georgia
CPYR	2951	Gldani Pear G10-120 sdlgs.	Albania
Q	27965	Ho Mon	China
CPYR	2956	Horner 10 (rootstock)	United States
CPYR	2955	Horner 4 (rootstock)	United States
Q	43108	IC 20808	India
Q	43112	IC 20813	India
Q	43103	IC 22040	India
Q	44171	Julienne (perry pear)	France
Q	27968	Keshinugeamulti	China
Q	27439	Kharnak I	Pakistan
Q	29578	Limoni	Italy
Q	24302	Malti	Tunisia
Q	39531	Marut	Turkmenistan
Q	43939	Oldfield	England
Q	39601	P. communis	India
Q	39609	P. communis	India
Q	39605	P. communis	India
Q	35615	P. communis rootstock 217-26.12	Russia
CPYR	2953	P. pashia HBG 13803 #1	California
CPYR	2954	P. pashia HBG-13803 #2	California
Q	25267	P. pyrifolia	Nepal
CPYR	2892	P. sachokiana GE-2006-114	Georgia
CPYR	2952	P. salicifolia - G10-122 sdlgs.	Georgia
Q	28419	P. salicifolia A-53-14	Russia
Q	44753	P. salicifolia hybrid	Armenia
Q	27631	P. salicifolia Pall. N1	Russia
Q	43922	Plant de Blanc (perry pear)	France
Q	44266	Quince-Pear	Armenia
CPYR	2960	Rutter	United States Heirloom
Q	39530	Sholve	Turkmenistan
PI	654942	SIM 117-11	Alberta, Canada

Q	27437	Spin Tangoo	Pakistan
Q	27436	Sur Tangoo	Pakistan
Q	26692	Tama	Japan
Q	25047	Ta-Shian-Sui Li	China
Q	36683	Trupnjak	Macedonia

Miscellaneous Other Crop Accessions Received 2012

CCHA	26	Chaenomeles sp. - Baoshan Quince	China
CCHA	27	Chaenomeles japonica - Mr. West's Japonica	Missouri
CCRA	214	Crataegus mexicana - Tejocote (Mexican Hawthorn) - red	California
CCRA	215	Crataegus mexicana -Tejocote - yellow	California
CMAL	156	Malus sp. - Tinsley Quince	United Kingdom
CMES	62	Mespilus germanica - Tzanetakis Variegated Medlar	United States
CIGC	44	×Sorbaronia fallax UC078	Connecticut
CIGC	45	×Sorbaronia fallax UC079	Connecticut
CIGC	46	×Sorbaronia fallax UC140	Connecticut

Most Requested *Corylus*, *Cydonia* and *Pyrus* Accessions. – J. Postman

<u>*Corylus*: Top 15 accessions requested in 2012 (01/01/2012 to 12/31/2012)</u>

Rank	Accession	Taxon	Plantname	Total shipped
1.	PI 657902	Corylus avellana	Jefferson	10
2.	PI 495606	Corylus americana	OSU 366.088 Iowa	8
3.	PI 557019	Corylus americana	Winkler	7
4.	PI 557029	Corylus avellana	Gem	7
5.	PI 637885	Corylus avellana	Zeta	7
6.	PI 654984	Corylus avellana	Sacajawea	7
7.	PI 617185	Corylus hybr.	Grand Traverse	6
8.	PI 654983	Corylus avellana	Santiam	6
9.	PI 657905	Corylus avellana	Yamhill	6
10.	PI 296207	Corylus avellana	Tonda di Giffoni	5
11.	PI 557027	Corylus avellana	Hall's Giant	5
12.	PI 557022	Corylus americana	Rush	4
13.	PI 637882	Corylus avellana	Gamma	4
14.	PI 637902	Corylus fargesii	C. fargesii 96-574-A Gansu	4
15.	PI 637903	Corylus fargesii	C. fargesii 96-574-F Gansu	4

***Corylus*: Top 15 accessions requested last 10 years (01/01/2003 to 12/31/2012)**

Rank	Accession	Taxon	Plantname	Total shipped
1.	PI 557037	Corylus avellana	Barcelona	30
2.	PI 296207	Corylus avellana	Tonda di Giffoni	28
3.	PI 557027	Corylus avellana	Hall's Giant	25
4.	PI 557019	Corylus americana	Winkler	22
5.	PI 557029	Corylus avellana	Gem	21
6.	PI 617210	Corylus avellana	Lewis	19
7.	PI 657902	Corylus avellana	Jefferson	18
8.	PI 557042	Corylus avellana	Gasaway	17
9.	PI 495606	Corylus americana	OSU 366.088 Iowa	16
10.	PI 654984	Corylus avellana	Sacajawea	16
11.	PI 637885	Corylus avellana	Zeta	15
12.	PI 654983	Corylus avellana	Santiam	15
13.	PI 557048	Corylus avellana	Pendula	14
14.	PI 637882	Corylus avellana	Gamma	14
15.	PI 557049	Corylus avellana	Contorta	13
16.	PI 657905	Corylus avellana	Yamhill	13

***Cydonia*: Top 14 accessions requested in 2012 (01/01/2012 to 12/31/2012)**

Rank	Accession	Taxon	Plantname	Total shipped
1.	PI 502332	Cydonia oblonga	C. oblonga AR-232 - Uzbekistan	12
2.	PI 559900	Cydonia oblonga	Akhtubinskaya	11
3.	PI 655052	Cydonia oblonga	Majes Valley (Karp’s Sweet)	11
4.	PI 559892	Cydonia oblonga	Pineapple	8
5.	PI 655047	Cydonia oblonga	Cooke's Jumbo	8
6.	PI 665839	Cydonia oblonga	Bereczki	8
7.	PI 559894	Cydonia oblonga	Pigwa S-1	7
8.	PI 559898	Cydonia oblonga	Quince C7/1	7
9.	PI 647032	Cydonia oblonga	C. oblonga - Babaneuri, Georgia	7
10.	PI 655053	Cydonia oblonga	C. oblonga - Seghani, Armenia	7
11.	PI 660753	Cydonia oblonga	Kaunching	7
12.	PI 665840	Cydonia oblonga	Portugiesische Birnquitta	7
13.	PI 665843	Cydonia oblonga	Tekkes	7
14.	PI 665844	Cydonia oblonga	Sekergevrek	7

***Cydonia*: Top 15 accessions requested last 10 years (01/01/2003 to 12/31/2012)**

Rank	Accession	Taxon	Plantname	Total shipped
1.	PI 655052	Cydonia oblonga	Majes Valley (Karp's Sweet)	59
2.	PI 665843	Cydonia oblonga	Tekkes	53
3.	PI 665842	Cydonia oblonga	Ekmek	49
4.	PI 502332	Cydonia oblonga	C. oblonga AR-232 - Uzbekistan	47
5.	PI 665839	Cydonia oblonga	Bereczki	47
6.	PI 665844	Cydonia oblonga	Sekergevrek	45
7.	PI 559892	Cydonia oblonga	Pineapple	44
8.	PI 655047	Cydonia oblonga	Cooke's Jumbo	39
9.	PI 659063	Cydonia oblonga	Limon	37
10.	PI 559900	Cydonia oblonga	Akhtubinskaya	35
11.	PI 655058	Cydonia oblonga	Krymskaya	29
12.	PI 655049	Cydonia oblonga	Tencara Pink	28
13.	PI 655046	Cydonia oblonga	Van Deman	24
14.	PI 655057	Cydonia oblonga	Meech's Prolific	24
15.	PI 665840	Cydonia oblonga	Portugiesische Birnquitta	24

***Pyrus*: Top 15 accessions requested in 2012 (01/01/2012 to 12/31/2012)**

Rank	Accession	Taxon	Plantname	Total shipped
1.	PI 541287	Pyrus communis	Yellow Huffcap	15
2.	PI 541156	Pyrus communis	Butt	14
3.	PI 541271	Pyrus communis	Taynton Squash	13
4.	PI 541273	Pyrus communis	Thorn	13
5.	PI 541123	Pyrus communis	Barland	11
6.	PI 541195	Pyrus communis	Gin	11
7.	PI 541150	Pyrus communis	Beurre Superfin	10
8.	PI 541262	Pyrus communis	Seckel	10
9.	PI 541317	Pyrus communis	Red Pear	10
10.	PI 541486	Pyrus communis	Winnals Longdon	10
11.	PI 312507	Pyrus communis	Summer Blood Birne	9
12.	PI 483365	Pyrus pyraster	Gelbmostler	9
13.	PI 541151	Pyrus communis	Blakeney Red	9
14.	PI 541205	Pyrus communis	Hendre Huffcap	9
15.	PI 300693	Pyrus communis	Bartlett	8
16.	PI 541281	Pyrus communis	White Doyenne	8
17.	PI 638013	Pyrus communis	Bloodgood	8

***Pyrus*: Top 15 accessions requested last 10 years (01/01/2003 to 12/31/2012)**

Rank	Accession	Taxon	Plantname	Total shipped
1.	PI 541262	Pyrus communis	Seckel	77
2.	PI 541287	Pyrus communis	Yellow Huffcap	74
3.	PI 541123	Pyrus communis	Barland	70
4.	PI 541273	Pyrus communis	Thorn	69
5.	PI 541317	Pyrus communis	Red Pear	68
6.	PI 541256	Pyrus communis	Rousselet de Reims	65
7.	PI 541281	Pyrus communis	White Doyenne	62
8.	PI 541195	Pyrus communis	Gin	61
9.	PI 300693	Pyrus communis	Bartlett	60
10.	PI 541271	Pyrus communis	Taynton Squash	60
11.	PI 541156	Pyrus communis	Butt	57
12.	PI 541448	Pyrus communis	Warren	55
13.	PI 541150	Pyrus communis	Beurre Superfin	54
14.	PI 541486	Pyrus communis	Winnals Longdon	54
15.	PI 541205	Pyrus communis	Hendre Huffcap	50

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