Woody Landscape Plant Crop Germplasm Committee Annual Meeting

tele-web conference hosted by Kansas State University April 29, 2010

Minutes

The Woody Landscape Plant Crop Germplasm Committee (WLPCGC) held its annual meeting via tele-web conference hosted by Jason Griffin at Kansas State University.

The meeting was called to order at 9:15 am (see agenda below). Lunch break at 12 pm EST. The meeting was presided over by the chair, Dr. Jason Griffin (Kansas State Univ.). Minutes recorded by the secretary, Dr. Richard Olsen (USDA-ARS-FNPRU U.S. National Arboretum).

In attendance: Pam Allenstein, Mark Bohning, Peter Bretting, Kevin Conrad, Richard Criley, Michael Dosmann, Ned Garvey, Jason Griffin, Kim Hummer, Kunso Kim, Robert Mazalewski, Alan Meerow, Richard Olsen, Joseph Postman, Tim Rinehart, Jim Robbins, Alan Whittemore, Sue Wiegrefe, Mark Widrlechner, John Wiersema, Karen Williams, Keith Woeste

Approval of 2009 minutes:

Mark Wirdlechner made a motion to accept minutes as is, seconded by Alan Meerow. Motion passed unanimously.

With Richard Olsen in the incoming chair for 2010-2011, it was identified that a secretary was needed. J. Griffin was nominated as secretary, seconded by M. Widrlechner, and unanimously approved.

Progress Reports:

Due to the nature of the tele-web conference, discussion of progress reports were kept to a minimal. For details see submitted reports accompanying the minutes. Submitted reports:

Office of National Programs (Peter Bretting) National Germplasm Resource Laboratory (Mark Bohning) USDA-ARS Woody Landscape Plant Germplasm Repository- Beltsville, MD (Kevin Conrad) USDA-ARS National Clonal Germplasm Repository- Corvallis, OR (Joseph Postman) USDA-ARS North Central Regional Plant Introduction Station- Ames, IA (Mark Widrlechner) USDA-ARS National Clonal Germplasm Repository- Subtropical Horticultural Research Station, Miami, FL (Alan Meerow) USDA-ARS Southern Horticultural Laboratory- Poplarville, MS (Tim Rinehart) USDA-ARS U.S. National Arboretum Breeding and Germplasm update (Richard Olsen) USDA-ARS U.S. National Arboretum Herbarium (Alan Whittemore) North American Plant Collections Consortium (Pam Allenstein)

Status Report

The last status report was approved in 2009 with the idea that the statistics be updated regarding number of research programs in the U.S. working on woody ornamentals and the number of different genera. Richard Olsen conducted a plant breeding survey approved by the committee that was disseminated through the academic research and industry community (utilizing list serves from the American Society for Horticultural Science and other contacts). Thirty-one responses were returned. A total of 85 genera were found represented. The most frequently cited genera were the following, with numbers in parenthesis representing the number of programs: *Acer* (7); *Camellia, Prunus, Pyrus* and *Rhododendron* (5 each); *Carpinus, Celtis, Hydrangea, Ulmus,* and *Viburnum* (4 each). The survey should not be viewed as exhaustive and non-biased, since many private programs did not report, perhaps due to fear of disclosing new potential markets for established or underutilized genera. Complete survey results will be added to the status report as an appendix. As requested by the committee, an appendix was added to the report to track germplasm evaluation proposals reviewed and funded. In addition, yearly recommendations for the NPGS are added to the report.

Germplasm Evaluation and Collection Proposals

Four proposals were received for woody ornamental landscape plant evaluation, with requests totaling \$66,426.00. Top two were "Evaluation of 40 wild rose species for horticultural traits, alkalinity tolerance and aphid susceptibility" by X. Wang (35 of 50 points) and "Evaluative assessment of native North American woody species, *Diospyros virginiana*, for its potential as an attractive edible species for managed landscapes" by J. R. Stewart (34 of 50 points). Due to competition within the germplasm system for funding, it was not fully funded (\$10,725).

Membership

Membership update discussed the retirement of Harold Pellett, the status of the Landscape Plant Development Center (LPDC) and proposed candidates to maintain representation from the northern tier of the U.S. The director of the LPDC is not an exofficio member of the WLPCGC. Jason proposed contacting Harold to thank him for his years of service and ask who at the LPDC might be a suitable replacement [ACTION ITEM]. Addition member suggestions included Jim Sellmer at Penn State University; a representative of Bailey's in Minnesota; Dr. Gu from Mississippi State University; Martin van der Giessen from Alabama; John Preece was noted as being added as an ex-

officio from USDA-ARS, NCGR-Davis; Mark Brand from University of Connecticut, and dedicated user of the Ames repostiory's collection; Dale Deppe or Tim Wood from Spring Meadow; Dan Hinkley formerly of Heronswood and consulting for Monrovia.

Plant Breeding Survey (see status report)

Ash Symposium/Germplasm Update

Mark Widrlechner reviewed the ash (*Fraxinus*) meeting, "The Symposium on Ash in North America" held on March 9-11, 2010 at Purdue University, West Lafayette, Indiana. Ash germplasm collecting is heavily influenced by geography and species distribution, with 2009 a poor year, but 2010 should be good. For the 2011 germplasm collection proposals, Mark felt a better endorsement from the WLPCGC would increase chances of funding. The NPGS ash conservation website is being developed, but details remain as to execution of design, content, etc. An electronic proceedings of the symposium is to be made available.

Germplasm Evaluation Proposal Scoring

The priority status ranking in the Germplasm Evaluation Proposal Score sheet was discussed. The ranking of 1-5, is heavily weighted to the list of priority genera, which is quite long, and not actually ranked. Some reviewers simply give the proposal a 5 in this category if the genus is on the list. Others, actually determine the actual degree of priority; this flexibility is good as we have different definitions of priorities, and priorities change faster than the list. However, we need consistency on this interpretation. Continual problem noted is that proposals are submitted by researchers that include a lot of material not in GRIN or material not eligible/desired for entering into GRIN. Would be nice to see more proposals with GRIN material. Ornamental cultivars that area propagated as clonal material are not currently collected in GRIN; for NAPCC contact individual curators. For the proposals, a letter from the curator at the appropriate repository should be changed to mandatory [ACTION ITEM]. For this, need a transparent curator list, as the websites are often difficult to navigate to find the actual curator. K. Kim asked whether there was merit to providing a description to a particular score to the applicants. Comments from the reviewers to the applicants would be helpful as well. Upon funding, an SCA is developed between the appropriate USDA repository and scientist with the awardee; requires a progress report be sent to CGC, the data uploaded to GRIN, and accessioning of new material into GRIN. P. Allenstein proposed that at each meeting we get a status report of active germplasm evaluations (SCA) [ACTION ITEM].

Next Meeting Details

The site of the next meeting, which is to be a face-to-face meeting, is to be determined, pending conflicts with other national meetings. Mark Widrlechner offered Ames, but not in April, so late May on is good. New members are needed

Meeting was adjourned at 3 pm.

Minutes respectfully submitted by Richard Olsen, Secretary.

Schedule and Agenda 2010 WLPCGC Meeting (April 29) Teleconference

All times are Eastern Wednesday, March 4

9:00 am to noon	Welcome Introductions'Who is on the line'					
	Approval of minutes of last meeting					
	Reports					
	NPS – Peter Bretting					
	NGRL – Mark Bohning					
	WLPGR – Kevin Conrad					
	NCGR, Corvalis – Joseph Postman					
	NCRPIS, Ames – Mark Widrlechner					
	SHRS, Miami – Alan Meerow					
	SHL, Poplarville – Cecil Pounders					
	USNA Tree Breeding – Richard Olsen					
	North American Plant Collections Consortium – Pam Allenstein					
Noon to 1 pm	Lunch break					
1:00 to 3:00 pm	Discussion items:					
	Membership – Harold Pellett Retirement					
	Plant Breeding Survey					
	Ash Symposium / Germplasm Update					
	Germplasm Evaluation Proposal scoring					
	Site and date for next meeting (Travel or Teleconference?)					
	Other germplasm issues					
	Meeting Adjourned					

2010 OFFICE OF NATIONAL PROGRAMS REPORT

FOR THE U. S. NATIONAL PLANT GERMPLASM SYSTEM

OFFICE OF NATIONAL PROGRAMS, NATIONAL PROGRAM 301: PLANT GENETIC RESOURCES, GENOMICS, AND

GENETIC IMPROVEMENT

(PETER BRETTING, JACK OKAMURO, SALLY SCHNEIDER, ROY SCOTT, GAIL WISLER, ACTING DA KAY SIMMONS)

1 **Personnel changes:**

1.1

Farewell and best wishes to Phil Forsline, who retired in Dec. 2009 as Research Leader at the Plant Genetic Resources Unit, Geneva, NY; and Bonnie Furman, who vacated the Curator position at the National Arctic Plant Genetic Resources Unit, Palmer, AK in March 2010. 1.2 Welcome to John Preece, new Research Leader at Davis, CA; Gabriela Romano, new curator at Parlier, CA; Laura Gu, new software developer at the DBMU, Beltsville, MD; and Pablo Jourdan, new director of the Ornamental Plant Germplasm Center, Columbus, OH.

2 Site developments and changes:

2.1 Conserving genetic resources of tree crops in field plantings is expensive and subjects the invaluable genetic materials to the constant threats of diseases, pests, and environmental extremes. NPGS personnel at Ft. Collins, CO and Geneva, NY applied statistical genetic models to identify a "core subset" of about 100 trees that captures most of the genetic diversity contained in a total of more than 1000 wild apple trees. Similarly, for another species of wild apple, a core subset of about 30 trees encompassed most of the genetic diversity in 700 trees. These results will enable apple curators to reduce the number of wild apple trees required for field plantings without significantly diminishing the total amount of genetic diversity which is conserved. 2.2 The USDA/ARS-NPGS is partnering with Bioversity and the GCDT on a three-year, \$1.4 million project to transform GRIN into GRIN-Global, a powerful but easy-to-use, Internet-based, plant genetic information management system that will link world's plant genebanks. NPGS personnel in Beltsville, MD and Ames, IA are leading the project. The nucleus of the system will be ARS's existing GRIN, which already houses information about the more than 534,000 accessions of more than 13,000 plant species in the NPGS. Software upgrades will enable GRIN be used by genebanks of all sizes from many countries, making more information about more plants available to researchers. The project successfully reached its 2/3 complete mark in December 2009.

2.3 "DNA-barcoding" seeks to develop simple, inexpensive, and rapid DNA assays that can be applied by non-experts to identify unknown species. NPGS researchers at Madison, WI tested the ability of three different DNA "bar-coding" marker genes to determine accurately the species identity for a diverse set of 72 wild potato species. None of the three genes were very accurate at distinguishing or serving as markers for species boundaries for these wild potatoes. Consequently, these results serve as a warning against relying solely on DNA-barcoding genes to identify highly diverse plant species successfully.

3 **Budgets:**

3.1	During FY09, internal USDA/ARS reallocations benefitted the permanent, base budgets
	of several NPGS genebanks, including Davis, CA (\$90,000); Griffin, GA (\$80,000); Miami, FL
	(\$100,000); and Pullman, WA (\$250,000).
3.2	USDA/ARS received \$176 million from the stimulus package to address high-priority repair and
	maintenance tasks. The FY 10 budget provided a modest increase (ca. \$40 million) for
	USDA/ARS as a whole. Sites across the NPGS received modest increases in funding that partially
	covered increased personnel costs. The economic downturn clearly affected the FY10 budget, and
	will likely also affect future budgets.
3.3	The new Administration's research priorities for USDA include climate change, food
	safety, children's nutrition/health, international food security, and bioenergy.

The President's FY 11 budget proposes a substantial budget increase (\$6.9 million) for the ARS plant (NPGS), insect, and microbial collections. Congress will determine whether to appropriate those funds during the House and Senate "mark-ups" of the President's FY 11 budget during summer 2010, followed by Conference Committee budget reconciliation during fall 2010.

4 National Programs:

3.4

ARS's research portfolio is organized as a series of 22 national programs. Plant and microbial genetic resource management, genetic improvement, genomics, bioinformatics, and genomic database management are incorporated into National Program 301 (see the WWW at:

http://www.nps.ars.usda.gov/programs/programs.htm?NPNUMBER=301). During 2007-2008, NP301 Project Plans were developed by ARS scientists and then were reviewed by thirteen peer review panels. 88% of the Project Plans were rating passing during the first review, with a median score of Minor Revision, a substantial improvement as compared to the first review cycle five years ago.

5 National Plant Germplasm Coordination Committee (NPGCC):

The NPGCC seeks to promote a stronger, more efficient, more widely-recognized and better utilized NPGS. Its goals are to facilitate the coordination of ARS, NIFA and SAES planning and assessment mechanisms for NPGS policy, organization, operations and support; promote awareness and understanding of the NPGS across ARS, NIFA, and SAES and more broadly to the scientific community; and serve as a vehicle for improving communications and discussions about issues impacting the NPGS with ARS, SAES, and NIFA. It will assess, develop and recommend to the SAES, ARS and NIFA strategies for improved coordination of NPGS activities; develop and recommend a process for improved communication of the value of the NPGS; initiate a strategic planning effort for the NPGS to better define and communicate the vision, mission and short- and long-term goals; and to evaluate the current funding models for the NPGS and report findings to the SAES directors, ARS and NIFA.

The current members of the NPGCC are L. Sommers (Colorado State-SAES), Chair; E. Young (Executive Director, Southern Region); J. Colletti (Iowa State-SAES), G. Arkin (University of Georgia-SAES), T. Burr (Cornell University-SAES), A. M. Thro (NIFA), E. Kaleikau (NIFA), P. S. Benepal (NIFA), P. Bretting (ARS-Office of National Programs), D. Upchurch (ARS-Southern Plains Area), and G. Pederson (ARS-Griffin).

NPGCC members made a joint presentation on the NPGS to the 2006 Experiment Station Section/State Agricultural Experiment Station/Agricultural Research Directors Workshop September 24-27, 2006. That presentation, plus testimonials from key Directors about the NPGS's value, increased the NPGS's visibility to this important group. In May 2007, the NPGCC recommended to the National Research Support Project Review Committee that it recommend restoring off-the-top funds designated for NRSP-5 (the Prosser, WA virus-free pome and stone fruit project) and NRSP-6 (the potato genebank project at Sturgeon Bay, WI) to their FY 06 levels to sustain these valuable efforts. Support for NRSP-6 has been maintained at the FY 06 level for FY 07, FY 08, and FY 09. The NPGCC met on June 5, 2008, in conjunction with the annual PGOC and biennial CGC Chairs meetings. It discussed the NPGS's budget levels, funding for NRSP-5 and NRSP-6, the location of crop collections, and mechanisms for publicizing the NPGS. Similarly, the NPGCC met on 23-24 June 2009 in Beltsville, MD to continue its work on these priority issues.

6 International germplasm items:

Negotiations on the Revision of the International Undertaking on Plant Genetic Resources for Food and Agriculture concluded in November 2001, with 113 nations adopting the text of the International Treaty (IT) for Plant Genetic Resources for Food and Agriculture. Despite its abstention from voting for the IT text, the US on 1 Nov. 2002 signed the IT, joining more than 100 other nations which have already done so. The IT came into force on 29 June 2004. Signing the IT was strongly supported by the US agricultural community, who wanted to enable the US to participate actively in developing the standard material transfer agreement (SMTA) for plant genetic resource exchange. The SMTA was completed immediately prior to the first meeting of the IT Governing Body in Madrid, Spain in mid-June 2006. Beginning in 2007,

the SMTA was adopted by Parties to the IT and the CGIAR Centers for use in distributing plant genetic resources for food and agriculture. NPGS staff developed a standard operating procedure (SOP) for handling incoming germplasm accompanied by the SMTA. Early in 2008, the Departments of State and Agriculture transmitted the IT to the White House for its consideration. On 7 July 2008, the White House transmitted the IT to the Senate; ratification would require the advice and consent of a 2/3 majority of the Senate. The Senate Foreign Relations Committee held hearings on the IT on 10 November 2009. The entire Senate might consider the question of IT ratification during the next few months.

Concurrently, the Convention on Biodiversity (CBD) adopted the voluntary, non-binding Bonn Guidelines on Access and Benefit-Sharing during the sixth Conference of Parties (COP-6) of the CBD at The Hague in April 2002. The Ad Hoc Open-Ended Working Group for Access and Benefit Sharing (ABS), which developed the Bonn Guidelines mentioned above, held its second meeting in Montréal on 1-6 December 2003. This meeting followed the World Summit on Sustainable Development, in Johannesburg during the summer of 2002, which endorsed an effort by "biodiversity-rich nations" to establish a separate international regime for benefit-sharing, under the auspices of the CBD. The CBD Conference of the Parties (COP-7), at its meeting in Malaysia in February 2004, authorized the ABS to begin negotiating during its February 2005 meeting in Bangkok elements of an international regime for benefit-sharing associated with access and sustainable use of genetic resources. The negotiations in Bangkok set the stage for more detailed discussions during the fourth ABS meeting held in Granada, Spain in January 2006. The recommendations from that negotiation were carried to the COP-9 in Brazil in April, 2006. At that COP, it was decided to continue the ABS negotiations, with the deadline for completion the COP-10 in Nagoya, Japan in October 2010. The ABS met for a fifth time during October 2007 in Montréal, a sixth time in Geneva during January 2008, a seventh time during April 2009 in Paris, and an eighth time during November 2009 in Montréal. During the most recent ninth meeting in Cali, Colombia during March 2010, operational text for a potentially legally-binding International Regime for Access and Benefit-Sharing was discussed in great detail for the first time. This ninth meeting ended inconclusively, and will reconvene once again in Montréal during July 2010.

The preceding developments at FAO and with the CBD will substantially affect international exchange of plant genetic resources, and the NPGS, whether or not the U. S. is ultimately a Party to either or both treaties. Precisely how they will affect U. S. users of germplasm is uncertain at present, but some of the most important questions bearing on the IT and its SMTA are beginning to be resolved.

National Germplasm Resources Laboratory USDA-ARS Beltsville, Maryland 2010 Report to PGOC, RTACs and CGCs

The National Germplasm Resources Laboratory (NGRL), Beltsville, MD, supports the acquisition, introduction, documentation, evaluation, and distribution of germplasm by the National Plant Germplasm System (NPGS) and other components of the U.S. National Genetic Resources Program (NGRP). The Laboratory is comprised of the Plant Exchange Office (PEO), the Germplasm Resources Information Network/Database Management Unit (GRIN/DBMU), and the Plant Disease Research Unit (PDRU), whose functions and procedures are provided below. The Laboratory also facilitates the activities of the Crop Germplasm Committees that advise components of the NPGS on a variety of matters. The permanent NGRL Research Leader position has been filled with the hiring of Dr. Gary Kinard in January 2009.

The Plant Exchange Office

Plant Exploration and Exchange Program

The PEO supports the collection of germplasm for the NPGS through the management of a Plant Exploration and Exchange Grant Program. Plant explorations involve field collection of germplasm not available in any germplasm collections, while plant exchanges are expeditions to arrange exchange of germplasm already conserved in foreign genebanks. Annual guidelines for developing plant exploration and exchange proposals are prepared by the PEO and distributed to researchers.

An extensive review procedure is used to assess the relevance of the proposals to the NPGS needs and the likelihood that the proposed explorations or exchanges will accomplish their stated objectives. Before submission, proposals are reviewed by the appropriate CGC or other crop experts. After submission to the PEO, proposals are reviewed by a subcommittee of the NPGS Plant Germplasm Operations Committee (PGOC). The PEO then evaluates the proposals and the PGOC reviews and makes recommendations on funding to the ARS National Program Staff (NPS).

All foreign explorations supported by PEO comply with the provisions of the Convention on Biological Diversity on access and benefit sharing related to genetic resources. Prior informed consent to collect genetic resources is obtained from the appropriate host country authorities before the exploration takes place. The permission includes agreement on the benefits to the host country associated with access to genetic resources. The PEO is involved in most requests to foreign governments for permission for collecting and negotiates the terms of agreements when necessary. Foreign explorations are always conducted in cooperation with scientists from the host country and cooperation with the national genetic resources programs is strongly encouraged. Germplasm obtained on explorations is shared by the NPGS and the host country.

Facilitation of Germplasm Exchange

The PEO assists NPGS personnel and other scientists with acquiring germplasm from scientists, foreign national and international genebanks, domestic and foreign explorations, and special projects and agreements. The PEO also helps to expedite the distribution of germplasm from the NPGS to foreign scientists and other genebanks.

In FY 2008, PEO assisted with the distribution of 803 shipments with a total of 27,156 NPGS accessions to scientists in 69 different countries. PEO also assisted with importing 71 shipments containing 707 items from 21 different countries for the NPGS and ARS.

GRIN Taxonomy for Plants

GRIN Taxonomy provides current and accurate scientific names and other taxonomic data on the internet for the ARS National Plant Germplasm System and other worldwide users. This standard set of plant names is essential for effective management of ARS plant germplasm collections, which now represent over 13,100 taxa. GRIN taxonomic data now include scientific names for 26,500 genera (14,150 accepted) and 1,230 infragenera and 91,250 species or infra-species (54,900 accepted) with nearly 42,000 common names, geographical distributions for 49,000 taxa, 314,000 literature references, and 21,800 economic impacts. A broad range of economically important plants are treated by GRIN nomenclature, including food or spice, timber, fiber, drug, forage, soil-building or erosion-control, genetic resource, poisonous, weedy, and ornamental plants. Most or all species of important agricultural crop genera are represented. Information about the systematic relationships of species is provided, which is critical for optimally determining the disposition or use of individual germplasm samples. Included in GRIN Taxonomy are federal- and state-regulated noxious weeds and federally and internationally listed threatened and endangered plants, with links to information on noxious weed and conservation regulations to ensure unimpeded interstate and international exchange of plant genetic resources. The scientific names are verified, in accordance with the international rules of botanical nomenclature by taxonomists of the National Germplasm Resources Laboratory using all available taxonomic literature and consultations with taxonomic specialists. Generally recognized taxonomic database standards have been adopted in GRIN Taxonomy.

The current focus of GRIN taxonomic work is to ensure that scientific plant names in GRIN continue to reflect recent plant taxonomic and nomenclatural literature, and that new data on classification, synonymy, native and naturalized distribution, economic impacts, and common names for plants and economic use categories currently treated in GRIN are incorporated. We also seek to expand the nomenclatural, classificatory, and ecogeographical information for specialty or new crop taxa, especially horticultural or medicinal plants. A project accomplishing this for medicinal plants was concluded in 2008. In late 2008 another project to provide thorough coverage in GRIN-Taxonomy to wild relatives of all major and minor crops was initiated. We have now completed work

on 13 major crops, including alfalfa, cotton, lettuce, maize, potato, rice, sorghum, soybean, strawberry, sugarbeet, tobacco, tomato, and wheat, and an interface to query these data in various ways has been developed (http://www.ars-grin.gov/~sbmljw/cgi-bin/taxcrop.pl). The breadth of coverage and quality of GRIN taxonomic data has encouraged usage of GRIN-Taxonomy data among genetic resource managers and other agricultural workers worldwide. GRIN taxonomic data are the most requested item on public GRIN, with ca. 800,000 of these reports retrieved monthly.

PI Documentation

Since 1898, Plant Introduction (PI) numbers have been used as unique identifiers for accessions incorporated into the NPGS. In earlier times, PI numbers were automatically assigned to all plant material received by the Plant Introduction Office, a predecessor of the PEO. Currently, before PI numbers are assigned, NPGS curators first evaluate the passport data, and if possible grow and observe new accessions to verify uniqueness and rationale for preservation in the NPGS. For this reason, curators usually assign a local identifying number to an accession until a decision is made to assign a PI number. When the decision is reached to assign a PI number to an accession, the curators contact Mark Bohning in DBMU for assignment of the next sequential number(s).

PEO has implemented two new projects to make the PI Books more accessible: 1) PEO, DBMU and the National Agricultural Library (NAL) are collaborating to digitize the older volumes of the PI books and make them available for downloading from the NGRL and the NAL websites; 2) The PI books for the years 1997 – 1979 will be formatted for downloading using Adobe Acrobat and made available through the PEO website so that the PI Books for years 1979 to the current completed year will be available. Beginning in 1979, all new Plant Introductions (PIs) were entered directly into the Germplasm Resources Information Network (GRIN).

<u>International Collaboration to support conservation and exchange of plant genetic</u> <u>resources</u>

PEO works with other U.S. and international programs to support plant germplasm conservation and exchange worldwide.

During the past year, PEO continued to collaborate with the National Department of Genetic Resources and Biotechnology (DENAREF) of the National Institute of Agricultural Research (INIAP) in Ecuador, the Organization of Farmers and Indigenous Peoples of Cotacachi (UNORCAC), and Bioversity International on a P.L. 480 – funded project to support complementary (*ex situ* and on-farm) conservation and increased utilization of agrobiodiversity in native farming communities in Cotacachi, Ecuador.

The PEO continued to collaborate with USDA/FAS and USDA/ARS/OIRP to develop joint germplasm collection, conservation and maintenance programs in Guyana, Jordan, Morocco, Tunisia, Georgia and Azerbaijan using US Food for Peace and other programs.

Since 2002, PEO has been collaborating with the plant genetic resources programs of the eight Central Asia and the Caucasus countries: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Armenia, Georgia and Azerbaijan. This program is organized by ICARDA (International Center for Research in the Dry Areas) and the focus is on development of national plant inventories, staff training, and plant exploration.

Target Crop	Country	Principal Contacts
		C. Husby, R. Determann, M.
Conifers (exchange)	United Kingdom	Gardner
Peas (exchange)	United Kingdom	C. Coyne, M. Ambrose
Alfalfa and other forage		S. Greene, A. Afonin, V.
legumes	Ukraine	Korzhenevsky
		B. Hellier, M. Whelan, R.
Taraxacum kok-saghyz	Kazakhstan	Janesko
		R. Johnson, L. Pecetti, M.
Grasses	Italy	Romani, R. Paoletti
		J. McCreight, T. Wehner, A.
Melons	Turkmenistan	Davis, E. Kokanova
Wild relatives of		
pseudocereals	United States (Texas)	D. Brenner
Grasses	Russia	D. Johnson, V. Chapurin
		M. Harrison-Dunn, M.J.
Switchgrass	United States (Florida)	Williams
	United States (Missouri,	M. Widrlechner, J. Carstens, N.
Ash	Illinois)	Johnson
		M. Aradhya, M. Scanlon, S.
Woody landscape plants,		Lura, Z. Akparov, Z. Ibrahimov
fruits, and nuts	Azerbaijan	
		J. Bamberg, A. del Rio, C.
Potato	United States (Arizona)	Fernandez
Woody landscape plants		
	Georgia	M. Mosulishvili
	United States (Utah,	
Chenopodium	Arizona, New Mexico)	E. Jellen
Ash	China	W. Kang, K. Bachtell, C. Carley

FY 2008 NPGS Plant Explorations/Exchanges

Target Crop	Country	Principal Contacts
Forage legumes	Armenia	K. Tamanyan, G. Fayvush
Lettuce	Armenia	K. Tamanyan, G. Fayvush
Ash	China	W. Kang
	Azerbaijan,	M. Aradhya, Z. Akparov, Z.
Fruits, and nuts	Kyrgyzstan	Ibrahimov, A. Orozumbekov
Forage legumes	Georgia	M. Mosulishvili, G. Arabuli
Lettuce	Georgia	M. Mosulishvili, G. Arabuli
Fruits, nuts, specialty		K. Hummer, J. Postman, H. Imanishi,
crops	Japan	H. Iketani
Carrot, onion, and		
garlic	Tunisia	P. Simon, D. Spooner
	United States (MO,	
Ash	IL)	M. Widrlechner, J. Carstens
	United States (MD,	
Herbaceous	VA, WV, NC, SC,	
ornamentals	GA, FL, AL)	S. Stieve, E. Renze
Pecan	United States (FL)	L.J. Grauke
Potato	United States (AZ)	J. Bamberg, A. del Rio, C. Fernandez
	United States	
Spinach relatives	(Nebraska)	D. Brenner, G. Kostel
	United States (NC,	
Sunflower	SC, TN, GA)	L. Marek, G. Seiler
		M. Harrison-Dunn, G. Pederson, M.A.
Switchgrass	United States (FL)	Gonter

FY 2009 NPGS Plant Explorations/Exchanges

The Germplasm Resources Information Network (GRIN)

The mission of the GRIN Database Management Unit (DBMU) is to develop and maintain information systems for the National Genetics Resources Program comprised of plants, animals, microbes, and invertebrates. We have completed the development of a new interface for the plant database and will continue to enhance that system when specific needs arise. The first version of the National Animal Germplasm Program system has been completed and is currently being used in a production mode. Recent statistics for data in the plant database include:

Over 94,800 taxonomic names (including synonyms) 531,006 accessions representing 13,448 species and 2,196 genera 1,809,572 inventory records 1,551,178 germination records 7,120,608 characteristic/evaluation records Over 182,785 images Germplasm accessions acquired by the National Plant Germplasm System (NPGS) since the effective date of the Convention on Biological Diversity continue to be flagged in the database with appropriate disclaimers and MTAs. The new SMTA issued under the International Treaty is also flagged and tracked through the system. These agreements are displayed with accession passport data and automatically printed on GRIN generated packing slips when accessions are distributed. During the past year, the DBMU continued to provide support to NPGS site personnel and assisted NPGS sites in loading passport data, evaluation data, distribution information and images into the database

GRIN was demonstrated at several Crop Germplasm Committees and commodity meetings, as well as to scientists visiting NGRL throughout the year. The membership lists and related reports for the Crop Germplasm Committees continue to be maintained on the GRIN Web page.

GRIN has been enhanced to handle molecular data. New tables have been added to the database to store this data and software has been developed to display it. SSR data generated on apple, cacao, grape, hazelnut, hops, pear and blueberry, along with AFLP data on Rhubarb, has been loaded into the system.

The GRIN-Global project continues to move forward and successfully reached its halfway mark in June 2009. The project is a cooperative effort between the Global Crop Diversity Trust, USDA-ARS and Bioversity International. The system will be freely available for any country to use. It will replace the current GRIN system with all new site maintenance and public retrieval software. A technical steering group (TSG) has also been convened to guide the project and provide recommendations. Several posters describing the GRIN-Global project were presented at the 2009 American Society of Horticultural Science (ASHS), the American Phytopathological Society (APS) and the Agronomy Society of America/Crop Science Society of America meetings along with a poster and computer demo of the system at the Plant & Animal Genome XVIII meeting in January 2010. A training session for GRIN-Global international trainers will be held April 12-23, 2010 in Beltsville, Maryland. These individuals will then be responsible for deploying the system to the international community.

The DBMU continues to work with the international community to make the GRIN data available through a plant germplasm specific portal which will allow users to search on more specific fields with respect to plant genetic resources including characteristic/evaluation descriptors.

The GRIN system was available 98% of the time on a 24 hour a day and 7 day a week schedule. Access to the database through the web pages continues at a brisk pace. In 2009, there were 1,892,505 visits to the GRIN database. We always encourage users to send any comments on the public interface by email to <u>dbmu@ars-grin.gov</u>.

Security for the computer and databases are always being reviewed and monitored for intrusion by those who may attempt to corrupt web pages or to destroy data. New security patches are implemented as soon as they become available. The system is protected by a

firewall and all data are backed up at onsite and offsite locations. We keep backups at several local offsite locations and one at Ft. Collins, CO, for long term storage. The computer system has an Uninterruptible Power Supply for short term power outages and a diesel generator for long term power outages. The building housing NGRL is locked with access permitted only by proximity card. The GRIN server room is locked with further limited proximity card access and is monitored for temperature fluctuations 24/7/365.

Crop Germplasm Committees

Since June 1, 2009, over twenty-five of the 42 Crop Germplasm Committees (CGC) have met. An NGRL representative was present at most of the meetings or via a teleconference to help facilitate their activities. Summaries of each meeting are prepared and distributed to appropriate National Program Leaders, NGRL staff and other NPGS personnel. The committees continue to provide advice on all aspects of the NPGS including identifying gaps and duplications in the collections, germplasm maintenance and evaluation, quarantine issues and maintaining updated versions of the crop vulnerability reports. The 13th biennial meeting of the CGC Chairs will be held in Geneva, NY July 27-28, 2010 in conjunction with the Plant Germplasm Operations Committee and the Regional Technical Advisory Committees. This meeting provides an opportunity for the Chairs to hear presentations on the status of NPGS sites, plant germplasm exchange, international issues, preservation and utilization, the molecular characterization of accessions, interactions between curators and CGCs and plant quarantine issues. It also allows the Chairs to meet and interact with each other, NPGS managers and curators, and invited guests from ARS, other government agencies, and non-government organizations.

The Plant Disease Research Unit

Since October 1, 2005, the responsibilities for the quarantine indexing and distribution of prohibited genera germplasm that were performed by the ARS, Plant Germplasm Quarantine Office (PGQO) in Beltsville MD were transferred to APHIS-Plant Health Programs (APHIS-PHP). The quarantine program manager for APHIS-PHP is Dr. Joseph Foster. Three SYs (Gary Kinard, Ruhui Li, and Ray Mock) and nine support staff now make up the Plant Disease Research Unit within National Germplasm Resources Lab (NGRL-PDRU). The mission of NGRL-PDRU is to conduct research to understand the biology of pathogens that infect economically important prohibited genera plant germplasm, including their etiology, detection, and elimination by therapeutic procedures. These projects provide support to the USDA quarantine programs and help facilitate the safe introduction and international exchange of valuable plant germplasm.

Personnel

The permanent NGRL Research Leader position has been filled with the hiring of Dr. Gary Kinard in January 2009. Gary has been with the PDRU and quarantine based

research for almost 10 years and primarily focuses on work with the pome fruits. Ray Mock works with the sugarcane, stone fruits, and small fruits, and Dr. Ruhui Li provides molecular support for all unit projects and works more intensively on sugarcane, sweet potato, grasses, and stone fruits. A new biological laboratory technician, Allison Kerwin began work with PDRU on March 30th and provides molecular lab support primarily for Dr. Li but for all other lab research to some extent. Sam Grinstead, a biological research technician, has worked in the PDRU one and one half years providing greenhouse support for the unit. Dr. Eun Ju Cheong, a post-doctoral research horticulturist who joined NGRL-PDRU in May 2006 has a primary focus on Saccharum and stone fruits. Dr. Cheong is focusing on developing methods for the in vitro cultivation of a broad range of Saccharum sp., and elimination of quarantine pathogens from this prohibited genus crop. Four International Visiting Research Scholars have joined the lab since February 2008: Dr. Liming Lin, working on viroid detection in stone and pome fruits; Donglin Xu, working on characterization and detection of sugarcane viruses; Ae Rin Jeon, focusing on developing methods for the in vitro cultivation of a broad range of small fruit species, and elimination of quarantine pathogens from these 'prohibited' category crops; and Dr. Fan Li began working on viruses of potatoes and sweet potatoes. Three part-time students currently provide supplemental greenhouse and lab support for PDRU.

Research Objectives and Progress

The NGRL-PDRU performs research on viral pathogens of quarantine significance infecting clonally propagated prohibited crop genera, with an emphasis on deciduous tree and small fruits, sugarcane, grasses, and sweet potatoes. Our mission is to characterize and investigate the etiology of poorly described diseases and pathogens of quarantine significance, and to develop more reliable detection and elimination methods. Once complete, these protocols will be submitted to the USDA, APHIS quarantine for validation and inclusion in the quarantine testing program. PDRU provides regular updates about its research projects to the CGCs that deal with prohibited genera crops. The staff regularly confers and collaborates with APHIS scientists on matters pertaining to the quarantine of plant germplasm. NGRL-PDRU personnel are glad to discuss potential collaborations with colleagues and stakeholders in the NPGS.

NGRL Contact Information

Research Leader Gary Kinard (Gary.Kinard@ars.usda.gov, 301-504-5951 or 5115)

Plant Exchange Office

Ned Garvey (<u>Edward.Garvey@ars.usda.gov</u>, 301 504-7511) Karen Williams (<u>Karen.Williams@ars.usda.gov</u>, 301 504-5421) John Wiersema (<u>John.Wiersema@ars.usda.gov</u>, 301 504-9181)

GRIN-Database Management Unit

Quinn Sinnott (Quinn.Sinnott@ars.usda.gov, 301-504-6072)

Crop Germplasm Committees

Mark Bohning (Mark.Bohning@ars.usda.gov, 301-504-6133)

Plant Disease Research Unit

Ruhui Li (<u>Ruhui.Li@ars.usda.gov</u>, 301-504-7653) Ray Mock (<u>Raymond.Mock@ars.usda.gov</u>, 301-504-8624)

Report to the Woody Landscape Plant Crop Germplasm Committee from the Woody Landscape Plant Germplasm Repository (WLPGR), U.S. National Arboretum

April 2010

Richard Olsen, Lead Scientist, Research Geneticist Mark Roh, Horticulturist Kevin Conrad, Curator, WLPGR

Research

A new CRIS project plan has been submitted for ad hoc review, reflecting the change in administration of the project, "Genetic Resources, Evaluation, and Information Management of Woody Landscape Plant Germplasm". Richard Olsen has taken over as lead scientist. Mark Roh will continue at 0.7 FTE for germplasm and 0.3 FTE on research on chicken feather pots in the at BARC. The new CRIS project plan reflects a more coordinated effort between the germplasm and research activities that has been lacking for the last ten years. Priority genera, with varying emphasis were identified, which will form the focus of germplasm collection for the next three years: Carpinus, Celastrus, Cercis, Celtis, Cladrastis, Clethra, Cornus, Cotinus, Hamamelis, Hydrangea, Magnolia, Ostrya, Stewartia, and Viburnum. The plant material at the WLPGR is of sufficient age and stability (after the move from Glenn Dale) for systematic evaluation and regeneration of accessions. Regeneration will create sufficient seed for depositing in long-term storage at NCGRP and medium-term storage and distribution from the WLPGR. Phenotypic descriptors for priority genera will be uploaded to GRIN, increasing data on available germplasm. We will join ongoing research efforts in Fraxinus germplasm conservation, focusing on elucidating the relationships between ploidy levels and morphology, the resulting geographic or population distribution of the different ploidies, and implications on species delimitation and genetic diversity in the Fraxinus americana complex.

Service

The WLPGR continues its collaboration with the American Public Garden Association (APGA) and its efforts at Genetic Resource Conservation through the North American Plant Collections Consortium (NAPCC). A Meeting on April 15, 2010 between ARS National Program Staff, National Arboretum staff and APGA was held in Beltsville to update both groups on efforts throughout 2009.

We've added 177 new accessions to our inventory including 89 from a joint collection expedition between NCRPIS (Jeff Carstens), the WLPGR and the Gardens Unit of the National Arboretum to Ohio, Kentucky, Virginia and West Virginia. The WLPGR's focus was on increasing our holdings of native populations of *Viburnum, Magnolia* and *Cornus florida*. We also continue our collaboration with the North American China Plant

Exploration Consortium (NACPEC). Last year Dr. Ned Garvey working with NACPEC and Dr. Kang Wang contracted with Dr. Wang to revisit areas collected in 2008 Shaanxi Expedition. 67 accessions were collected and distributed with 13 being added to the WLPGR inventory.

In December 2009 Kevin Conrad and Kevin Tunison (Garden Unit USNA) in collaboration with the U.S. Fish and Wildlife Service hosted a delegation from the Russian Academy of Sciences and the Russian Federation of Botanical Gardens in an effort to strengthen our ties between both countries in the area of botanical exchange. The Russian delegation consisted of leaders from all geographical regions of Russia. The U.S. delegation consisted of 9 botanical institutions representing public gardens and academia.

Considerable effort has been given to backing up more of our living collections to areas outside of our facility at South Farm in Beltsville, Maryland. This includes moving plants to the Beltsville Agricultural Research Center as well as the D.C. campus of the U.S. National Arboretum. We also have been targeting the conservation of existing germplasm at the D.C. campus that is either represented by a single individual or that is currently found only in research fields dedicated to Tree and Shrub breeding programs. Our first efforts have been focused on conserving the Prunus holdings brought into the country from Japan by former USNA researcher Roland Jefferson as well as Sino American Botanical Expedition (SABE) material and those accessions with PI numbers again represented by only one individual.

Along with our domestic collection effort the WLPGR remains committed to assist in the national effort to collect and preserve *Fraxinus* germplasm in response to the Emerald Ash Borer infestation. We are planning to continue this effort again this fall in collaboration with and providing assistance to Mark Widrlechner. Our tentative plans are to collect in the state of Virginia.

The WLPGR in collaboration with the USNA Tree Breeding Program has accomplished a great deal over the past year with the building of a fourth polyhouse and the addition of a propagation house. Considerable effort was also given to the addition of a second office trailer increasing our lab and office space to 1440 square feet. The additional trailer prompted the relocation of our existing trailer to consolidate the office and lab space to our Production site. This involved moving the trailer, equipment shed and all the associated utilities. The end resolute is more productive and efficient use of space and other resources.

Our distribution requests like many other NPGS sites around the country are continuing to increase. In the second half of 2009 and the first part of 2010 we have had 150 requests for seeds with a distribution of 200 seed packets and 13 requests for DNA extraction. This represents 41 genera and 106 taxa.

ANNUAL REPORT FOR CALENDAR YEAR 2009 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

Bruce Bartlett, Ag. Sci. Tech., Plant Distribution Nahla Bassil, Geneticist-Plants Ted Bunch, Bio. Sci. Tech, Genetics Douglas Cook, Computer Specialist Missy Fix, Bio. Sci. Tech., Plants Kim Hummer, Research Leader/Curator April Nyberg, Bio. Sci. Tech., Genetics James Oliphant, Bio. Sci. Tech., Greenhse. Mgr. Yvonne Pedersen, Program Assistant Joseph Postman, Plant Pathologist/Pear Curator Barbara Reed, Research Plant Physiologist Joe Snead, Ag. Sci. Tech., Field Manager Dennis Vandeveer, Facilities Manager

Temporary Staff and Students

Curtis Barnhard, Wk. Study Dana Beaty, ARF, TC Lab Emily Beezhold, Bio. Sci. Aid, TC Emily Bouldin, Wk. Study Andy Brooks, Bio. Sci. Aid, Field Adam Cartmill, Wk. Study Erin Conley, Bio. Sci. Aid, TC Randy Cram, STEP Charles Hand, ARF, TC Priscilla Harlow, Wk. Study Gordon Hilberg, Wk. Study Jason Hotchkiss, Bio. Sci. Aid Kimberly Kittridge, Bio. Sci. Aid, TC Brandon Mahon, Wk. Study Matt Oleman, Wk. Study David Olsen, Bio. Sci. Aid Jane Olson, Bio, Sci, Aid Chelsea Rayford, Wk. Study Corey Robbins, Bio. Sci. Aid Anthony Shireman, Bio. Sci. Aid, TC Jesse Showers, Wk. Study



(Left) Joseph Postman, Pome Fruit Curator, Barbara Ghazarian, Quince Expert, and Diana Brinn, Master Gardener, at the *Unappreciated Fruit Event*, October 2009.

Graduate Students and Visiting Scientists

Danny Dalton, GRA Horticulture Wambui Njuguna, GRA, Horticulture Sukalya Poothong, GRA, Horticulture Esther Uchendu, GRA, Horticulture Sugae Wada, GRA, Horticulture

Collaborators

Francis J. Lawrence Maxine Thompson Melvin Westwood

Table of Contents

National Clonal Germplasm Repository Staff	1
Corvallis Major Accomplishments for 2009	3
Service	3
Research	3
Budget at the NCGR Corvallis	4
Non-base and Extramural Funding for the USDA-ARS NCGR- Corvallis	4
Budget and Fiscal	5
Staffing supported by Federal base funds	5
Staffing Changes	5
EEO/CR/Outreach	6
View from the Front Office	6
NCGR Corvallis – 2009 Accession Summary for major collections (counts from 3/26/2010)	8
New Accessions in 2009:	0
Plant Pathology 2009:	0
Characterization, Documentation, Evaluation	1
Website Visits for Calendar Year 2009 - Top 15 Pages:	1
Facilities - by Dennis Vandeveer	2
Awards 2009	2
Training 2009	3
Travel 2009 12	3
Visitors 2009	5
Information Management/Computer Operations	6
Field Report	6
Screenhouse/Greenhouse Collection	7
Clonal Accessions maintained in the Greenhouses and Screenhouses as of April 2009 19	9
Actinidia1	9
Quarantined Plants	0
Plant Distribution	0
2009 Distribution by Genus	1
2009 Non-US Plant Distribution	2
Distribution by User Group	2
Shipping Costs for Distribution from 2001 to 2009	3
Shipping Cost per Item	3
Publications Submitted in 2009	4
Journal Articles and Websites	4

Corvallis Major Accomplishments for 2009

Service

- NCGR received 521 plant requests and 5,821 items were shipped in 2009. Each year more people find our repository through our website and the GRIN shopping cart so our order processing is up. Less than one fourth of our distribution was international.
- NCGR staff organized the 2nd ISHS International Symposium on Molecular Markers in Horticulture, 29 July 29 August 1 2009 in Corvallis, Oregon. More than 100 participants toured the repository: http://oregonstate.edu/conferences/event/molecularmarkers2009/
- NCGR staff with OSU Department of Horticulture, and the Horticultural Crops Research Unit hosted an open house on 17-18 July 2008. More than 200 public attendees toured the Lewis Brown Horticultural Research Farm and the Repository collections of blueberries and pears.
- NCGR scientists collaborated with NCGRP on the long-term storage of *in vitro* and cryogenic accessions. We provided techniques and plant materials of blueberries, black and red currants, and pears for cryopreservation of the dormant shoots in liquid nitrogen.
- NCGR staff transferred a protocol for cryopreservation of blueberry accessions to NCGRP for use in long term germplasm storage.
- NCGR staff served on National Plant Germplasm System representative of the National Governing Board for new USDA National Clean Plant Network. The Governing Board developed request for proposals, reviewed submitted proposals, and award a total of \$3.1 million to improve health at 5 foundation plant material centers.
- NCGR staff participated in a 3 week USDA funded expedition to Japan to collect temperate fruit and berry germplasm. Samples included five seedlots representing unique sources of *Corylus heterophylla* and *C. sieboldiana* from northern Honshu and three seedlots of *Pyrus ussuriensis* that represent a rare relict population of the only pears to have truly originated in Japan. These populations may also be the progenitors of many cultivated Japanese pears.
- NCGR staff chaired the Genetics and Germplasm Working Group in the ASHS, organized a Workshop 'Standardized Phenotyping: Advantages to Horticulture' at the annual conference in St. Louis, MI.
- NCGR staff organized the 'Fruit and Nut Crops' Workshop at the Plant and Animal Genome XII Meeting, in San Diego, on January 10, 2009.

Research

- Determined that many native Oregon strawberries (*Fragaria virginiana* subsp. *platypetala*) distributed on the western side of the Oregon Cascades have 10 sets of chromosomes (are decaploid), not 8 sets (octoploid), as was previously reported.
- Determined that aeciospores and urediniospores infect black currants equally and can both be used to determine white pine blister rust susceptibility.
- Determined relative blooming phenology in Corvallis for black, red, and ornamental currants and gooseberries averaging over the past decade.
- Determined that antioxidant compounds double the regrowth of cryopreserved shoot tips.
- Determined that seed coat thickness and hardness are the most important factors controlling seed dormancy in *Rubus* species seed.
- Initiated a three year project was initiated to evaluate the NCGR quince collection (*Cydonia oblonga*) for cold hardiness. Lack of cold hardiness and sensitivity to fire blight are limitations to wider use of quince as a dwarfing rootstock for pears. Several clonal *Cydonia* accessions, including

samples from Poland, Germany and Turkmenistan, were found to have levels of dormant stem cold hardiness comparable to that of the most cold-hardy pear accessions.

- Applied EST-SSR technology to fingerprint 146 pear accessions and submitted the article- Article was accepted on 8/3/2009 and published on Sept 11, 2009. Uploading to GRIN awaits final revisions.
- Fingerprinted four Ohelo berries and 28 representatives from nine species in Vaccinium section Myrtilus.
- Determined improved media for use with difficult to grow *Pyrus* accessions.
- Developed an SSR-based identification protocol for IQF blackberries and fingerprinted 16 of the most important western cultivars.

NCGR Funding



Budget at the NCGR Corvallis

base and Extramural Funding for the USDA-ARS NCGR- Corvallis

<u>FY 2010</u> Amount	Purpose	Source
128,000	RosBreed2010	CSREES
8,500	Quince evaluation JP	NPS, Germplasm evaluation
4,000	GRIN update for nut evaluation – KH	NPS, Germplasm evaluation
15,000	Additional Trusts - NB	Matching for Blueberry SCRI
69,060	Blueberry genetics – NB	SCRI – carryover funding
51,400	Ohelo tc, cryo, id – KH , BR	SCRI – carryover funding
22,000	Tissue culture of pears - BR	OAN- ODA
30,324	Tissue culture of hazelnuts – BR	Oregon Hazelnut Com.
328,284	Total	

<u>FY 2009</u>		
Amount	Purpose	Source
10,000	White pine blister rust on Ribes - KH	NW Center Small fruit
12,500	Azores cooperative grant - KH	OIRP
2,200	Summer Student intern – BR	ARS PWA
77,411	Blueberry identification – NB	SCRI – carryover funding
51,734	Ohelo tc, cryo, id – KH BR, and NB	SCRI – carryover funding
19,800	Tissue culture of pears - BR	OAN- ODA
29,156	Tissue culture of hazelnuts – BR	Oregon Hazelnut Com.
29,000	Plant Exploration to Hokkaido – KH and JP	USDA Exploration Grant
231.801	Total	

Budget and Fiscal

Our base funding for Corvallis has remained at about \$1.4 million for the past five years.

One big difference in our operation this year is the success of our scientists (go team!) in obtaining supplemental non-base funding. During 2009-2010, this non-base funding has increased to about one fourth of our total funding. New grants, such as the CSREES Specialty Crop Research Initiative, has provided additional opportunities to form coalitions with agricultural and horticultural industries as well as national and international scientists to focus on research that provides answers to specific priority questions. The projects that we are working on here are closely related to genetic resource conservation and evaluation activities in assigned crops.

Staffing supported by Federal base funds.



Staffing Changes

In December 2009, the USDA ARS Arctic and Subarctic Plant Genetic Resources Unit in Palmer, Alaska was administratively merged as a worksite with the Corvallis National Clonal Germplasm Repository under the management of Kim Hummer as Research Leader. While 2,570 miles separate the two locations, many aspects of clonal genebank management unite their efforts.

Corvallis will continue to focus on pears, quince, strawberries, blueberries, cranberries, raspberries, blackberries, hardy kiwifruits, hazelnuts, butternuts, and hop and other specialty crops. Both units have objectives to collect, maintain, distribute, evaluate and document phenotypic and genotypic information concerning their assigned crops. The Palmer unit will focus on conservation of mints, peonies, currants and gooseberries, and rhubarb, in addition to 25 additional genera of agronomic reclamation interest to arctic and subarctic regions. Each genebank will backup some collections for the other location.

At the Corvallis genebank, base funding is limited. Our scientists actively sought funding from many non-base sources. Term and temporary technical support employees, Ted Bunch, Tony Shireman, and Erin Conley, were hired on non-base funding from specialty crop research initiative (SCRI) grants. We are thankful for these new grants. They are really making a difference in our capacity and productivity.

Our graduate students worked hard this past year. Four of them graduated, successfully completing 1 MS and 3 Ph. D. degrees. Congratulations to: Danny Dalton, Ester Uchendu, Sugae Wada, and Wambui Njuguna for the successful completion of their graduate programs at Oregon State University, Department of Horticulture.

EEO/CR/Outreach

- The Corvallis location has a very active CODEOC, an EEO outreach committee. Dr. Nahla Bassil contributed as chair of the committee, and received the location EEO award for 2010.
- Through Research Support Agreement with Oregon State University three female and one male graduate student were trained. Two of these students were women of color; one Asian; one disabled. Three of these students graduated in 2009 and in the first quarter of 2010.
- During the winter, 15 disabled high school students (program was funded through local school district grant) 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.
- Three disabled individuals have temporary federal technical appointments on our staff.

View from the Front Office

Recently large funding sources have recognized that the security of the worlds food supply depends on the conservation of plant genetic resources. Support for the Svalbard World Seed Bank. We understand that the President's budget for 2011 includes and increase for preservation of plant genetic resources. We are encouraged that the conservation of plant genetic resources is receiving an resurgence of interest in the present world political arena.

We are encouraged by efforts of the National Clean Plant Network, a new initiative to promote healthy foundation plant material for nurseries. Joseph Postman is our unit's and the NPGS representative, on this important committee. This committee will have grant possibilities for the improvement of plant health in tree fruit, hop, and in the berry crops. We will be working closely with these NCPN groups to provide plant material improve health of foundation material for horticultural industry use.

In December 2009, Dr. Andrew Hammond, our Area Director, assigned the management of the National Arctic and Subarctic Plant Genetic Resources Unit in Palmer, Alaska, under the supervision of Dr. Kim Hummer, Research Leader at the NCGR-Corvallis. The decision for this assignment was based on programmatic issues to improve efficiency in plant genetic resource conservation management.



Distribution: A Record of 5,821 accessions from Corvallis shipped in 2009.



	total	seed	clonal			
genus	accessions	accessions	accessions	screenhouse	field	tc
Actinidia	196	37	159	68	136	0
Corylus	737	0	737	118	640	65
Cydonia	135	21	114	25	108	0
Fragaria	1837	430	1407	1398	0	320
Juglans	35	0	35	1	34	0
Humulus	617	240	377	376	0	79
Mentha	509	55	454	454	0	146
Mespilus	63	19	44	27	36	0
Pyrus	2418	323	2095	324	1970	185
Ribes	1360	532	828	446	680	36
Rubus	1970	1109	861	856	113	210
Sambucus	172	120	52	5	50	0
Sorbus	233	167	66	6	63	0
Vaccinium	1597	823	774	638	333	146

NCGR Corvallis – 2009 Accession Summary for major collections (counts from 3/26/2010)







New Accessions in 2009:

Corylus

• 36 clonal accessions were added including seedlings of C. *colurna* from Georgia, seedlings of *C. avellana* from Georgia and Azerbaijan and 7 EFB resistant selections from the Oregon State University breeding program. Five seedlots representing unique sources of C. heterophylla and C. sieboldiana from northern Honshu were collected by J. Postman and K. Hummer during their Japan expedition.

Cydonia

• Three *C. oblonga* clonal accessions were added: a replacement for misidentified cultivar 'Van Deman', a seedling of a fire blight resistant cultivar from Bulgaria, and a rare yellow flesh quince discovered by a grower in southern California.

Fragaria

• 111 seed and plant accessions were added including a wild strawberry species from Kyrgyzstan, samples of *F. iinumae* and *F. nipponica* from Japan, and populations of *F. vesca, F. virginiana* and *F. x ananassa* from the SE United States.

Pyrus

• Three seedlots of *Pyrus ussuriensis* collected during the Hummer-Postman Japan expedition may represent a rare relict population of the only pears to have truly originated in Japan and may also be the progenitors of many cultivated Japanese pears. A population of 8 *P. salicifolia* seedlings was grown from a seedlot collected in Azerbaijan during an NPGS funded expedition, and are the first accessions of the species from that country. Three new clonal accessions from Nepal, Pakistan and Poland were received from the USDA quarantine station. Seedlings *of P. communis ssp. Caucasica* grown from seed recently collected in Armenia were received from the Woody Landscape Plant Genebank in Beltsville, and a replacement clone of the hybrid pear cultivar 'Pineapple' was obtained from a grower in Tennessee, since the identity of that clone in the NCGR collection is in question.

Rubus

• 21 *Rubus* seedlots and 32 plant inventory records were added. Most of the seedlots came from the Japan expedition. New plant accessions included raspberry cultivars from Canada, and black raspberry and hybrid berry selections from the Oregon USDA breeding program.

Vaccinium

• 65 mostly seed accessions were added. Several samples each *of V. smallii, V. oldhamii, V. hirtum, V. praestans* and *V. oxycoccus* were collected in Japan, and a number of *V. reticulatum* were received from Hawaii as part of the Ohelo berry project.

Plant Pathology 2009:

- The NCGR Corylus collection continues to be free of Eastern Filbert Blight.
- Pear and Quince field collections were evaluated for natural incidence of scab (pear only), mildew, fire blight (quince only), rust and Fabraea leafspot.
- About 100 Corylus accessions were assayed for Apple mosaic virus by ELISA.

Characterization, Documentation, Evaluation

- Development of Dormant Bud Cryogenic Storage capabilities continues in collaboration with David Ellis and Maria Jenderek at NCGRP, Fort Collins, Colorado using several Pyrus, Ribes and Vaccinium accessions in trials.
- With funding from the Washington Tree Fruit Research Commission, we sampled the quince collection monthly for cold hardiness evaluations beginning in September, propagated quince trees for whole-tree freezing studies to be performed in the winter of 2010-11.
- Scanning of leaves GRIN vouchers:
 - o Fragaria 330 images
 - o Humulus 175 images
 - o Rubus 180 images

Website Visits for Calendar Year 2009 - Top 15 Pages:

Pages	Visits
Home	9989
NCGR-Corvallis - Actinidia Germplasm	2312
NCGR-Corvallis - Rubus Germplasm	2279
Products and Services - Distribution Policies	2108
NCGR-Corvallis - Pyrus Germplasm	1766
NCGR-Corvallis - Humulus Germplasm	1600
NCGR-Corvallis - Fragaria Germplasm	1549
NCGR-Corvallis - Ribes Germplasm	1379
NCGR-Corvallis - Corylus Germplasm	1114
NCGR-Corvallis - Vaccinium Germplasm	1110
Products and Services - Catalog Index	988
NCGR-Corvallis - Asimina Germplasm	875
People & Places - Staff Directory	727
NCGR-Corvallis - Cydonia Germplasm	721
NCGR-Corvallis - Mespilus Germplasm	495

At right: Invited speakers at the Unappreciated Fruits Event (L-R) Kim Hummer, Maxine Thompson, Joseph Postman, Chad Finn, Barbara Ghazarian, David Karp, Susan Dolan, Jules Janick.



Facilities - by Dennis Vandeveer

We are working within the federal mandate to have "greener" operations. I have volunteered for the Safety/EMS committee. Numerous T12 ballasts and tubes have been replaced with T8 electronic ballasts and tubes. Replaced additional office light switches with motion controlled switches. We continue looking for an electric vehicle for farm use that can achieve a speed of 55 mph between farms. We continue to recycle metal, plastics, paper, cardboard, used engine oil, hydraulic fluid, antifreeze and electronic equipment.

During 2009 we replaced vinyl on sections of the main building and replace rotted T-111 on the West, East and north side of the main building. Additional vinyl replacement is needed on the shop building and will be repaired as funding comes available in the near future.

We repaired the N. farm domestic well with a new down pipe, pump and foot valve which had eroded and had sever leaks pumping air in to the main system.

Had new swamp cooler racks fabricated and totally rebuilt two swamp coolers. Eight swamp cooler motors have been replaced with Green Star energy efficient motors. Rebuilt roof mount blowers for cryogenics labs flow hood with new motors and new shafts.

Repaired numerous HVAC and cooling systems including growth chambers. We repaired two irrigation controllers at the N. farm and replaced three phase blower motor for the main HVAC system.

Repaired screenhouse 10 eave by removing and replacing a 12 foot section of new pressure treated 2X4s. Replaced rotted lath on the front of screenhouses with over 8000 linear feet of trex. Replaced caulking in the roof eve of screenhouse 10. Installed a complete dual 4 zone, 40 station irrigation system including timer controls and 1600 sq. ft. of weed matting and installed 20 benches in the tubehouse. New underground water and electrical supply were moved from screenhouse 9 to the tubehouse. I removed 20 strawberry planting boxes and all soil from the planting area.

Four vehicles were replaced with new vehicles under the "Junker Law".

Maintenance was provided for six vehicles and five tractors plus numerous pieces of farm equipment, small engines and sprayers. Although our vehicle/tractor fleet is aging I have maintained a 95% operational status throughout the year.

Other projects included painting of exterior doors, door replacement for the TC lab growth room, restriping of all parking lots to include handicapped parking, plumbing repairs, minor electrical repairs, lighting upgrades and security badges and coding. Monitoring and adjusting the Lenel security and CCTV systems. I remain Point of contact, technical consultant and initial SOW generation for contracts.

Awards 2009

Compiled by: Yvonne Pedersen

<u>Bruce Bartlett</u> – Performance Bonus Award for superior performance for the rating period of 10/1/2008-9/30/2009.

<u>Nahla Bassil</u> –Performance Bonus Award for highly superior performance during the rating period of 10/1/2008-9/30/2009.

<u>Jeanine DeNoma</u> –Performance Bonus Award for superior performance during the rating period of 10/1/2008-9/30/2009.

<u>Missy Fix</u> – Performance Bonus Award for superior performance during the rating period of 10/1/2008-9/30/2009.

<u>Kim Hummer</u> - Quality Step Increase for outstanding performance during the rating period of 10/1/2008-9/30/2009.

<u>James Oliphant</u> – Performance Bonus Award for superior performance during the rating period of 10/1/2008-9/30/2009.

<u>Yvonne Pedersen</u> – Quality Step Increase for outstanding performance during the rating period of 10/1/2008-9/30/2009.

<u>Joseph Postman</u> – Performance Bonus Award for superior performance during the rating period of 10/1/2008-9/30/2009.

<u>Barbara Reed</u> – Performance Bonus Award for highly superior performance during the rating period of 10/1/2008-9/30/2009.

<u>Dennis Vandeveer</u> – Performance Bonus Award for highly superior performance during the rating period of 10/1/2008-9/30/2009.

Training 2009

Compiled by: Yvonne Pedersen

Joe Snead – Orchards Pest & Disease Management; January 2009.

<u>Jim Oliphant, Joe Snead</u> – Seminars on the Production and Maintenance of Small Fruits (credit towards pesticide applicators license renewal); January 2009

Missy Fix, Jim Oliphant, Joe Snead – Pesticide Application Training; January 2009.

Bruce Bartlett – Integrated Pest Management; February 2009.

<u>Missy Fix, Jim Oliphant</u> – Seminars on the Production and Maintenance of Small Fruits (credit towards pesticide applicators license renewal); July 2009

Joe Snead – Blueberry Field Days; July 2009

Doug Cook, April Nyberg, Kim Hummer, Ted Bunch, Joseph Postman, Corey Robbins – CPR/AED training.

All employees completed the annual AgLearn training of Information Systems Security Awareness, Civil Rights, and Re-inventing Diversity for Today's USDA Training in 2009.

Joseph Postman and Yvonne Pedersen continues to participate in the monthly ARS Site Publisher teleconference/training.

Travel 2009

Compiled by: Yvonne Pedersen

<u>Kim Hummer</u> – Raleigh, North Carolina, to attend the NCCC-22 (Small Fruit Crop Germplasm Committee Meeting); October 2008.

<u>Joseph Postman</u> – Denver, Colorado, to attend the Fruit Tree Commodity Committee supporting the USDA National Clean Plant Network; December 2008.

<u>Joseph Postman</u> –Eugene, Oregon, to give presentation to the Osher Lifelong Learning Institute group; December 2008.

Nahla Bassil – Woodburn, Oregon, to attend the Raspberry/Blackberry Meeting; December 2008.

<u>Nahla Bassil</u> – San Diego, California, to organize the Fruit and Nut Crops Workshop and attend the Plant and Animal Genome Meeting; January 2009.

<u>Deb Tyson, Jim Oliphant, Joe Snead</u> – Woodburn, Oregon, to attend the Organic Crops seminar; January 2009.

<u>Joseph Postman, Joe Snead</u> – Portland, Oregon, to attend the Western Orchards Pest & Disease Management Conference; January 2009.

Jim Oliphant – Canby, Oregon, to attend the Berry Conference; January 2009.

<u>Kim Hummer</u> – Portland, Oregon, to attend the Western Orchards Pest & Disease Management Conference; January 2009.

<u>Kim Hummer</u> – Bodega Bay, California, to attend the Juglans Crop Germplasm meeting; January 2009. <u>Missy Fix, Joe Snead, Jim Oliphant</u> – Portland, Oregon, to attend Pesticide Certification class; January 2009.

<u>Joseph Postman</u> – Hood River, Oregon, to attend the Northwest Pear Research Review; February 2009. <u>Joseph Postman</u> – Miami, Florida, to attend the Woody Landscape Plant Crop Germplasm Committee; March 2009.

Kim Hummer– the Azores, blueberry site visit and Apple DNA collection; March 2009.

<u>Joseph Postman</u> – Washington, DC, attend the USDA National Clean Plant Program meeting; March 2009.

<u>Barbara Reed</u> – Germany and Belgium, to attend and present at the International Society for Horticultural meeting and site visit; March 2009.

<u>Joseph Postman</u> – Riverdale, Maryland, to attend the National Clean Plant Network Meeting; May 2009. <u>Barbara Reed</u> – Charleston, South Carolina, to attend the Society of In Vitro Biology Meeting; June 2009.

<u>Joseph Postman</u> – Battle Creek, Michigan, to attend the Fruit Tree and Small Fruit meeting; June 2009. Jim Oliphant, Deb Tyson, Missy Fix, Nahla Bassil, Joe Snead, Corey Robbins, Randy Cram – Aurora, Oregon, to attend the Caneberry Day Event; July 2009.

<u>Jim Oliphant, Deb Tyson, Joe Snead, Corey Robbins</u> – Aurora, Oregon, to attend the Blueberry Field Day Event; July 2009.

<u>Kim Hummer</u> – Sturgeon Bay, Wisconsin, to attend the Plant Germplasm Operations Committee; July 2009.

<u>Barbara Reed</u> – Malaysia & Japan, invited to speak at the University of Kebangsaan Malaysia and to attend the Society for Cryobiology Meeting in Japan; July 2009.

Nahla Bassil, Kim Hummer – St. Louis, Missouri, to attend the ASHS Conference; July 2009.

<u>Joseph Postman</u> – Riverdale, Maryland, to attend the National Clean Plant Network proposal and review and attend the ASHS meeting; July 2009.

<u>Joseph Postman</u> – Portland, Oregon, to attend the American Phytopathological Society meeting; August 2009.

<u>Joseph Postman</u> – Ames, Iowa, to attend the GRIN Global Technical Steering Group meeting; August 2009.

Kim Hummer – Davis, California, to attend participate on the Evaluation Committee; August 2009.

<u>Barbara Reed</u> – Germany, attend Society for Low Temperature Biology and invited to lecture on cryobiology; August 2009.

Kim Hummer – Japan, specimen collection trip; September 2009.

Joseph Postman – Japan, specimen collection trip; September 2009.

Kim Hummer – Sweden, to accept honorary degree; September 2009.

Nahla Bassil – Corvallis, Oregon, to attend CGRB meeting; September 2009.

<u>Nahla Bassil</u> – Wenatchee, Washington, to attend/participate on the Apple CGC tour and meeting; October 2009.

<u>Joseph Postman</u> – Richland, Washington, to attend participate on the Governing Board Meeting of the National Clean Plant Network; October 2009.

Kim Hummer – Portland, Oregon, to attend the AISES National Conference; October 2009.

Barbara Reed, Kim Hummer – Hilo, Hawaii, SCRI site visit; November 2009.

<u>Joseph Postman</u> – St. Louis, Missouri, to attend the National Clean Plant Network meeting; November 2009.

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

Visitors 2009

by: Yvonne Pedersen

During Calendar Year 2009, 471 people came through the Repository's front door. Guests arrived in large or small groups, or as individuals. In addition to the 471 people, over 100 people attended the 2009 Open House held in July.

In July, the Open House was a combined effort between NCGR, HCRL (Hort Crops Research Lab), OSU's Department of Horticulture, and the City of Corvallis DaVinci Days festival with approximately 200 individuals exploring the cherry research trials, vegetable breeding plots, blueberry irrigation research, berry breeding, pear collection, and taste samples of fruits of the season. In October, An "Unappreciated Fruits Seminar" event was held with the Horticulture Department of OSU. Activities started in the evening with a book signing of featured author Barbara Ghazarian and her book "<u>Simply Quince</u>". The following day, other authors were met at a reception followed by a quince themed dinner offered by one of Corvallis' local restaurants. The last day started with visiting the Corvallis Farmers Market's Master Gardener's booth and then unappreciated fruit tasting held at the National Clonal Germplasm's site off Peoria Road

Some groups used the Repository for their annual meetings such as the Oregon Hazelnut Commission, the Oregon Sweet Cherry Commission, and the Oregon Processed Vegetable Committee. Educational tours ranging from groups of 8 to 20 came from Willamette University, Home Orchard Society, Master Gardener Group, Oregon State University, Philomath School District, Evergreen University, various garden clubs, Corvallis School District, Linn Benton Community College, as well as the Greater Albany Public Schools 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 visitors from around the world: 1 each from Argentina and Korea; 2 from South Africa, Kazakhstan, Uruguay, Germany, and Kenya, 3 from Thailand; 4 from Chine; and 15 from Chile. Also, there were graduate students working at the National Clonal Germplasm Repository from Kenya, Nigeria, Thailand, and Japan.

Information Management/Computer Operations Computer/Information Management

By Douglas Cook and Kim Hummer

GRIN Records

TableGRIN Records Activity during CY 2009						
Created	Modified					
13363	698					
842	830					
11225	1					
0	0					
427	6					
156	21					
26013	1556					
	Activity (Created 13363 842 11225 0 427 156 26013					

This year there were 114 new accessions and other sub-tending data category records added to GRIN (587 Accession Names, 96 Name Changes, 46 Habitat, 5 Narratives, 576 Pedigree, 213 Source, 369 Source Members, 127 Quarantine Records, 11224 Observations, 5 IPR and 1 Voucher). There were 525 new Inventory records and 317 Inventory Actions added to GRIN. For Distribution there were 3 Orders, 6 Order Actions, 418 Order Items and 156 Cooperator records add. Among 698 existing accession records, and other sub-categories, modifications were made during the year (107 Accessions, 106 Accession Names, 66 Habitat, 9 Narratives, 85 Pedigree, 1 Voucher, 2 IPR, 1 Quarantine and 321 Source records). There were 450 Inventory, 380 Inventory Actions, 6 Order Items and 21 Cooperator records modified.

Hardware and Infrastructure

All workstations operate with at least a 2.0 MHz CPU, 2 GB of memory and use Windows® XP-Pro software. All workstations are equipped with uninterruptible power, anti-virus and the network is firewall protected. Two new workstations were purchased. Numerous minor computer software configurations and hardware repairs took place. The no major events occurred during the year.

Field Report

By Joe Snead

There has not been a lot of change in the field collections for 2009 growing season. Each of the field collections grew a small amount. The Ribes field collection was undergoing1 a major renewal and this was completed in early 2010.

On Lewis Brown Farm the Vaccinium collection was prepped for an annual farm field day for the general public. This was quite successful. The people got to roam the collection just past peak fruit season. Several staff members were in the field to guide and educate the public. At the main entrance to the Pyrus collection a station was set up to educate the public about the collection. Unfortunately the event occurred before fruiting season.

In the Corylus collection Eastern Filbert Blight remains a concern. An intensive spray program has seemly been successful so far. Monitoring for the disease has found no outbreaks so far.

The North Farm germplasm collections are in good shape. The minor genera collections are growing quite well. The quince collection had some outbreaks of Fire blight. The cultural control methods were not enough to control the disease. In 2010 new biological control agents and new organic fungicides will be sprayed in the field at bloom. These materials have been reported to work well. The Actinidia field produced quite well this season. The frost protection irrigation did it job quite well. The Actinidia field and quince field were used as a weekend visit site for the Home Orchard Society. Plans were made to move the Lonicera collection to the North farm. A site was picked out and new rows are being formed for planting in the fall. A large group of mature seedling plants is going to be maintained next to the collection as a display planting until the permanent collection sizes up.

Many of the trees in the Juglans collection are producing nuts. Nuts were collected from many of the trees and data was collected from the nut samples. Scion wood was collected with the pruning tower as the best material could be reached. Afterwards the trees were pruned and opened up with the use of the tower.

The repository continues to lend out plot ground to other ARS units for research. There are three ARS scientist and one OSU professor using seven acres in total. A fourth ARS scientist works in conjunction with the repository on the Hops collection. The North farm is a busy place in the spring and summer with many users in the greenhouse areas. A Porta-potty was placed near the greenhouses for the many seasonal staff to use. This simplified security issues quite a lot. Every person does not receive a key and a code to get into the Blue barn.

The biggest news of the year for the field has been in staff reassignments. Since I was unable to keep up with the resources available some of my duties have been resigned. Joseph Postman has been assigned the care of the Pyrus and Corylus field collections. Jim Oliphant has been assigned the care of the Vaccinium field collection. This lightened my load considerably.

Screenhouse/Greenhouse Collection

by Jim Oliphant and Missy Fix

- Establishment of modified climate zones to accommodate accessions originating in montane, high latitude, and subtropical regions (up to 20% of collections).
- Continued sanitation throughout facilities with an emphasis on weed control, in plant containers, floors inside the houses, and a wide buffer zone outside the houses.

ACTINIDIA

Actinidia is maintained in the screenhouse, as a back-up collection; at a minimum the accessions are housed for 3 years until the field plants are established. Currently, we have 37 backup accessions, there were no new accessions added in 2008. Nine accessions have been identified as Non-hardy, within this group five are identified as 'Tropical' and are being housed in greenhouse 1 which provides the climate needed for these plants. The remaining four accessions have been placed in greenhouse 3 which houses non-hardy genera.

CORYLUS

Temporary back-up trees of all new young field trees and virused clones of *Corylus* are maintained under screen. Before a new accession can be planted in the field it must be grafted and layered until the scion is on its own roots. Scion wood of core clones is also grafted and maintained in a greenhouse as needed for tissue culture source material. Currently, 90 accessions are being maintained for tissue culture.

FRAGARIA

All clonal accessions of *Fragaria* are maintained under screen. An additional backup set of Supercore is maintained in the greenhouse. We are continuing our 3-year re-propagation cycle using runners.

HUMULUS

All clonal accessions of Humulus are maintained in the screenhouse.

MENTHA

All clonal accessions of *Mentha* had maintained under screen, with a 3-year re-propagation cycle via cuttings. This collection has been transferred to ASPGRU. The backup collection has been relocated to an outside growing area until these accessions are established at ASPGRU.

PYRUS

Permanent back-up trees of all non-hardy clones, virus infected clones, and temporary back-up trees of all new young field trees of *Pyrus* are maintained under screen.

RIBES

All core or non-hardy clonal accessions of *Ribes* are maintained in a Tube House or under Green House. To date, 380 accessions are maintained as part of the permanent collection in Tube House, of these 229 core accessions are established in the tube house and another 144 have been identified as non-cold hardy; these non-cold hardy are housed permanently in greenhouse. 45 finished *Ribes* were either introduced to the permanent tube house as new accessions or as replacement plants. 17 accessions remain in quarantine awaiting virus testing. Now that the Ribes collection has been turned over to the ASPGRU facility, propagating for in-house replaces is no longer required. Re-propagated accessions will now be turned over for field replacement as needed.

In late 2009, 111 *Ribes* cuttings were shipped for establishment at the ASPGRU facility. An additional 44 accession cuttings from Heat Treated Backup and In House Quarantine were sent in early 2010 for establishment. The *Ribes* collection will be maintained in our tube house until permanent plants have been established at the ASPGRU facility.

RUBUS

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 213 accessions. In 2009 19 new or replacement accessions were made ready for placement in the collection bringing the total number of accessions to 858 of which 267 are core accessions. 112 accessions that had a screen house date of four years or older were collected and re-propagated; of these 99 were successful. Regarding the *Rubus* of Concern, 11 of the remaining accessions are in this group, continued efforts are made to find workable propagation for these accessions. In the *Rubus* collection there are 74 accessions, (which

include 22 new accessions), represented by one plant; 26 of these were successfully re-propagated this year and will be placed in collection in the spring or fall of 2010. There is a continued effort to re-propagate the remaining accessions in this group. *Rubus* accessions having a re-propagation date four years or older will be placed in 3 gallon containers with new soil as their re-props progress, which should encourage growth vigor.

VACCINIUM

Due to blueberry shock virus and *Phytophthora ramorum* concerns, we have established the primary collection in the screenhouse. We are growing vigorous stock plants to provide hard cutting material for distribution. We maintain under screen all core, named cultivars, and non-hardy clonal blueberry, as well as, all prostrate accessions, including lingonberry and cranberry. Additionally, we are maintaining 118 montane or non-hardy accessions in the greenhouse. All 250 core accessions have a plant under screen.

	Total #	Core	e	Avail	able	Single	Plants
	Accessions					with No Back-Up	
	110005510115	# Ac.	%	# Ac.	%	# Ac.	%
Actinidia	a 72	10	14	58	81	8	11
Corylus	119	33	28	76	64	33	28
Fragaria	1496	554	37	1412	94	784	52
Humulu	s 385	169	44	362	94	132	34
Mentha	455	51	11	447	98	303	67
Pycnantl	hemum 34	18	53	34	100	0	0
Pyrus	341	21	6	222	65	113	33
Ribes	449	227	51	375	84	72	16
Rubus	891	275	31	793	89	66	7
Vacciniu	m 669	248	37	595	89	133	20
Other ²	134	48	36	72	54	37	28
Total	5045	1654	33	4446	88	1681	33

Clonal Accessions maintained in the Greenhouses and Screenhouses as of April 2009

1) includes: ASI, CYD, GAY, GAU, MES, SAM, SOR, and OTHINV

JMO 03-30-10

Quarantined Plants

At this time we have 173 accessions in quarantine.

Genus	Federal	State	In-House
Corylus	2 Post-Entry		2 NCGR
Cydonia	11 Provisional Release		
Fragaria	22 Departmental Permit		
Humulus		20 Directors Exemption (seed)	
Pyrus	50 Provisional Release		
Ribes	1 Post-Entry	17 Directors Exemption	30 NCGR
Rubus	6 Post-Entry		
Vaccinium	2 Post-Entry		
Total	104	37	32

Status of Quarantined Accessions at the Repository

Plant Distribution

Kim Hummer and Bruce Bartlett "2009 Highlights"

- 5,822 items were shipped as seeds, cuttings, runners, scionwood, rooted plants, tissue culture and DNA. Once again this is a record for number of accessions sent.
- 62% of accessions requested in 2009 have been shipped.
- 11% of all items shipped were sent to foreign requestors to 20 countries
- Requests for DNA samples of our accessions, in the form of DNA and lyophilized leaves, were 698 or 11% of the total number of accessions shipped.
- Hard Cuttings (19%) Scionwood (17%), In vitro (15%), DNA (extracted and lyophilized leaves) (12%), Seed (12%) were the top forms sent.

The NCGR-Corvallis continues to distribute plant germplasm within the United States and at the international level. This report summarizes all items shipped in CY 2009, which includes accessions requested in 2006 up to and including 2009. At the time of this printing, we have distributed 5,822 items as seeds, cuttings, runners, scionwood, rooted plants, tissue culture and DNA in 2009. This represents 62% of the total number of items requested for 2009. Additional material will be shipped in CY 2010. An average of the total number of items shipped over the last seven years show that we ship about 90% of the total number of items requested from any given year.



CY 2009 saw an increase in the total number of items shipped to an all time high of 5,822. This total is about 800 more than the amount shipped in 2008. Plants, scionwood/hardwood cuttings, in vitro cultures, and DNA (leaves) were predominant categories of material sent.

Material requested in a given year may require more than one year before the item is eventually shipped. This is because we have very diverse holdings and are a clonal facility. At times plant material needs to be propagated from our mother plants in order to have items in a form that is sufficiently large for shipping. However, an average of 91% of items requested will be shipped within two years of the original request.

Plants items of *Fragaria Pyrus, Vaccinium* and were sent the most. When all plant items from minor genera are considered collectively the group represents 13% of all items shipped. Continued interest in Hardy Kiwi Fruit (*Actinidia arguta*) accounted for 37% of all minor genera sent.



2009 Distribution by Genus

Our largest distributions were in *Fragaria*, *Pyrus* in 2009. *Vaccinium* has recently become of interest to many requestors. *Actinidia* (the hardy kiwifruit) has now broken out of the minor category and has become a genus with major distribution activity.

We are in the process of testing our strawberry, raspberry and blackberry accessions for additional viruses, phytoplasms, and viroids. New rules for many countries ask that these plants be tested for additional pathogens. We are in the process of having these tests performed to allow out plant material meet certification requirements when we can. *Pyrus* shipments to the EU continue to been limited to seed and tissue culture since scionwood is prohibited due to fire blight (*Erwinia amylovora*). Japan, South Korea, and China have not been as restrictive and therefore reflect the high numbers of *Rubus*, *Fragaria* and *Pyrus* still being sent internationally.



2009 Non-US Plant Distribution

During CY 2009 we shipped plant accessions to twenty one countries including the United States.

By region, 90% of the material was sent to North American destinations. But relative to only the foreign distribution, most went to Europe including Austria, Belgium, France, Germany, Italy, The Netherlands, Slovenia and Sweden. Asian distribution went to India, Japan and South Korea. Items were sent to New Zealand representing Oceania. South and Central American distribution was up this year over previous years (to 10% of foreign requests).

Those organizations or individuals receiving plant material have been identified by the codes established by the Germplasm Resources Information Network (GRIN). These GRIN codes can be condensed into three user groups (Public, Commercial and Individual). Domestically the Public group represents state agencies, universities (public or private), the Agricultural Research Service of USDA, other Federal agencies, and non-profit or other public organizations (botanic gardens, arboretums, societies, centers, institutes). Internationally the Public group represents similar organizations of foreign origin. The Individual group presents persons with no affiliation and the Commercial group represents commercial companies domestic and international. The most significant change in user groups from 2006 to 2008 was the increase in shipments to individuals domestically from 36% in 2006 to 42% in 2008.

This effect is even greater between 2008 and 2009. The NCGR-Corvallis has seen an even **larger increase in requests by individuals** over public researchers while the commercial requests have held steady. This must be attributed to the 'shopping-cart' option on our national GRIN web site and access by the public.







The total postage paid for domestic and international shipping was \$584.07. The total cost for Federal Express/DHL was \$7322.02 and the total paid to the Oregon Department of Agriculture for 58 Phytosanitary Certificates was \$573.00. The total cost of shipping plant material in CY 2009 was \$8,479.09. This total is the most spent on any distribution year to date. The repository has begun asking requestors to pay costs of private courier, or the total cost would be higher. The Oregon Department of Agriculture also increased the cost of writing Phytosanitary Certificates from \$15.00 to \$18.00 in January 2010. The arrangements for the certificates are now made on-line. The cost of the phytosanitary certificates in Oregon is much less than other US states due to a state subsidy for the very active Oregon nursery association groups.

Shipping Cost per Item

We have continued to maintain a very low shipping cost per item (\$1.46) on average during 2009.



Publications Submitted in 2009

Journal Articles and Websites

- **Bassil, Nahla, Bunch, Ted, Nyberg, April, Zee, Francis, Hummer, Kim.** 2009. Microsatellite Markers Distinguish Hawaiian Ohelo from Other Vaccinium L. Section Myrtillus Species.
- **Bassil, Nahla,** Muminova, Magfrat, Njuguna, Wambui. 2009. Microsatellite-Based Fingerprinting of Western Blackberries from Plants, IQF Berries and Puree. 2009.
- **Bassil, Nahla, Postman, Joseph**. 2009. Identification of European and Asian Pears Using EST-SSRs From Pyrus.
- Dossett, Micahel, **Bassil, Nahla, Lewers, Kimberly, Finn, Chad**. 2009. Transferability of Rubus Microsatellite Markers for use in Black Raspberry. [Abstract]
- Dossett, Micahel, **Bassil, Nahla, Finn, Chad.** 2009. Transferability of Rubus Microsatellite Markers to Black Raspberry. 2009.
- Njuguna, Wambui, **Hummer, Kim, Bassil, Nahla**. 2009. DNA Barcoding in Fragaria L. (Strawberry) Species [Abstract]. HortScience. 44(4):1090.
- Reed, Barbara, Castillo, N.R., Wada, Sugae, Bassil, Nahla. 2009. Transitory Polymorphisms are Observed in Cryopreserved Rubus Shoot Tips Using AFLP Markers. [Abstract]
- **Reed, Barbara,** Castillo, N.R., Wada, Sugae, **Bassil, Nahla.** 2009. Genetic Stability of Cryopreserved Shoot Tips of Rubus Germplasm.
- Njuguna, Wambui, Liston, Aaron, Cronn, Rich, **Bassil, Nahla.** 2009. Multiplexed Fragaria Chloroplast Genome Sequencing.
- Hummer, Kim, Davis, Tom, Njuguna, Wambui, Bassil, Nahla, Nathewet, Preeda, Yanagi, Tomohiro. 2009. Decaploidy in Oregon Fragaria virginiana subsp. Platypetala (Rosaceae).
- Njuguna, Wambui, **Hummer, Kim,** Richards, Christopher, Davis, Thomas, **Bassil, Nahla.** 2009. Genetic Diversity of Diploid Japanese Strawberry Species Based on Microsatellite Markers.
- Flores, Nina, **Reed, Barbara**, Graham, Julie, Fernandez-Fernandez, Fel, **Bassil, Nahla.** 2009. Microsatellite Markers for Raspberries, Blackberries, and their Hybrids.
- Slovin, Janet, Shulaey, Vladimir, Folta, Kevin, Davis, Thomas, Sargent, Daniel, Bassil, Nahla, Folkerts, Otto. 2009. A Genome Enabled Reference Species for Fruit Development; The Diploid Strawberry, Fragaria vesca. [Abstract]
- Hummer, Kim. 2009. Rubus Pharmocology: Antiquity to the Present. [Abstract] HortScience. 44(4):985.
- Hummer, Kim. 2009. Proceedings of the Ninth International Vaccinium Symposium Vol 1.
- **Hummer, Kim.** 2009. Proceedings of the Ninth International Vaccinium Symposium Vol. 2. Lueven, Belgium. International Society of Horticultural Science Proceedings. 810(2):439-909.
- Hummer, Kim. 2009. International Regulations Regarding Exchange of Rubus Plant Material.
- Hummer, Kim, Dale, Adam. 2009. Horticulture of Ribes. Forest Pathology
- Hummer, Kim, Davis, Tom, Njuguna, Wambui, Bassil, Nahla, Nathewet, Preeda, Yanagi, Tomohiro. 2009. Decaploidy in Oregon Fragaria virginiana subsp. Platypetala (Rosaceae.
- Hummer, Kim. 2009. Maxine M. Thompson Dedication.
- Njuguna, Wambui, **Hummer, K.E., Bassil, N. V.** 2009. DNA Barcoding in Fragaria L. (Strawberry) Species. [Abstract] HortScience. 44(4):1090.
- Hall, H., **Hummer, K.E.**, Jaimieson, A., Jennings, S., Weber, C. 2009 Plant Breeding Reviews: Raspberry Breeding and Genetics. New Jersey: Wiley Blackwell. 32:39-382.
- Nathewet, Preeda, **Hummer, K.E.,** Iwatsubo, Yoshikane, Sone, Kazuyoshi, Yanagi, Tomohiro. 2009. Karyotype Analysis in Octoploid and Decaploid Wild Strawberries, Fragaria (Rosaceae).

Dalton, Danny, Hummer, K.E. 2009. Inheritance of the Cr Gene in Ribes nigrum.

- Dalton, Danny, Hummer, K.E. 2009. Ribes Bloom Phenology: Section Botrycarpum and Ribes.
- Njuguna, Wambui, Hummer, K.E., Richards, Christopher, Davis, Thomas, Bassil, Nahla. 2009.
- Genetic Diversity of Diploid Japanese Strawberry Species Based on Microsatellite Markers. Nathewet, Preeda, **Hummer, Kim E.**, Iwatsubo, Yoshikane, Sone, Kazuyoshi, Yanagi, Tomohiro. 2009. Karyotype Analysis in Octoploid and Decaploid Wild Strawberries Fragaria (Rosaceae).
- Dalton, Danny, Postman, Joseph, Hummer, Kim E. 2009. Comparative Infectivity of Cronartium ribicola Aeciospores and Urediniospores on Ribes nigrum.
- Bassil, Nahla V., Bunch, Theodore, Nyberg, April, Zee, Francis, Hummer, Kim E. 2009
- Microsatellite Markers Distinguish Hawaiian Ohelo from Other Vaccinium L. Section Myrtillus Species.
- Cyr, Peter, Weaver, B., Millar, Mark, Gardner, Candice, Bohning, Mark, Emberland, Gorm, Sinnott, Quinn, Kinard, Gary, **Postman, Joseph, Hummer, Kim**, Franco, T., Mackay, M., Guarino, L., Bretting, Peter. 2009. GRIN-Global: An International Project to Develop a Global Plant Genebank and Information Management System [Abstract].
- Postman, Joseph. 2009. Cydonia oblong: The Unappreciated Quince. Arnoldia. 67(1): 2-9.
- **Postman, Joseph**, Aldwinckle, H., Volk, G.M. 2009. Standardized Plant Disease Evaluations will Enhance Resistance Gene Discovery. Meeting Proceedings. HortScience. 44:975.
- **Postman, Joseph**, Stockwell, Virginia. 2009. Relative Susceptibility of Quince, Pear, and Apple Cultivars to Fire Blight Following Greenhouse Innoculation.
- **Postman, Joseph,** Bobev, Svetoslav. 2009. Field Susceptibility of Quince Hybrids to Fire Blight in Bulgaria.
- **Hummer, Kim, Postman, Joseph.** 2008. Pyrus L. Pear. Bonner, F.T. and Karrfalt, R.P., editors. The Woody Plant Seed Manual. Washington, D.C.: United States Government Printing Office. P. 922-927.
- Jenderek, Maria, **Postman, Joseph**, Stover, Eddie, Ellis, David. 2009. Desiccation Studies of Dormant Buds from Selected Woody Horticultural Plant Species.



Some "Unappreciated" Fruits

2010 U.S. National Arboretum Updates for WLPCGC

Submitted by R. Olsen and A. Whittemore (see separate report for WLPGR activities)

USDA-ARS U.S. National ArboretumTree and Shrub Breeding update (Richard Olsen):

Research geneticists Richard Olsen (trees; germplasm) and Margaret Pooler(acting RL; shrubs) are moving to the Beltsville campus as it was determined that there would be no laboratories in the renovated administration building. The taxonomists (A. Whittemore and J. Kirkbride) will remain at the arboretum to curate the herbaria. This is the second move of the tree breeding program in four years. Despite this, the tree breeding program is making progress in its *Nyssa* breeding program and developing large F2 populations from interspecific hybrids. With A. Rossman's lab at Beltsville, have characterized the causal pathogen for the devastating leaf spot found on blackgums, and identified early selections tolerant to the organism. See A. Whittemore's report for American elm research. Margaret Pooler and the shrub breeding program continue advanced breeding objectives in *Lagerstroemia, Prunus, Cercis* and *Corylopsis*. A new cold-hardy camellia, *Camellia japonica* 'Anacostia' was released by the arboretum as collaboration between the research program and gardens unit. Sandy Reed's program has released two new oakleaf hydrangeas, *Hydrangea quercifolia* 'Munchkin' and 'Ruby Slippers'.

Richard Olsen was made lead scientist of the germplasm program (60% as trees lead scientist; 40% in germplasm) and wrote an ad hoc project plan for directing germplasm repository activities and germplasm research. Renewed focus on native North American taxa, coordination with NAPCC, and research objectives that support repository activities, including work in *Cornus florida, Corylopsis* (Hamamelidaceae), and *Fraxinus*. Will work with M. Widrlechner and A. Whittemore on identifying ploidy relationships among North American *Fraxinus* to assist germplasm collection efforts in this genus. For further details on the repository see Kevin Conrad's WLPGR report.

U.S. National Arboretum Herbarium (Alan Whittemore): Dr. Robert Webster is now assistant curator; *Celtis* apomixis research has concluded and ready to write up. A ploidy screening study conducted with the tree breeding program on American elm (*Ulmus americana*) revealed a significant number of diploids in native populations which has significant implications on species relationships and breeding in the genus. Similar work is planned for American ash species, particularly within *Fraxinus americana* in collaboration with Mark Widrlechner. Pursuing building an ornamentals data set for invasiveness.

NCGR Miami, Subtropical Horticulture Research Station

Major Accomplishments of the Ornamentals Program at SHRS 2009-10 pertaining to woody ornamentals

Alan W. Meerow and Tomas Ayala-Silva

We had a very rough winter this year, with two freezes in December and January. All of our *Cocos nucifera* germplasm was damaged, with possibly the loss of 2 individuals. The original *Portlandia* collection was again severely damaged. The "protected" planting in the walled-in area even showed some slight damage after the second freeze as stored heat in the rock walls was likely depleted over two weeks of continuous nights in the 40's.

Research (NOTE: 50% of the Ornamentals program at SHRS is oriented towards herbaceous ornamentals and is not covered here)

- 1. Preparing 2010 release of Tecoma diffusa 'Luisa'.
- 2. Collected leaf samples and seed of Zamia populations in the Bahamas (Long Island,



Andros, New Providence, Eleuthera). An NSF grant proposal will be submitted this summer in support of our population genetic and phylogeographic studies of this genus in Florida and the Caribbean.

3. An outstanding pink clone has been identified from six precocious flowering (< 1 year from seed) *Lagerstroemia speciosa* clones selected from seed collected in Puerto Rico from a street planting in Mayaguez of diverse color forms.

4. *Chionanthus holdrigei* seedlings flowered for the first time this spring, and the shrub looks like an excellent addition to the landscape flora in

south Florida.

5. Our studies with WRKY transcription factor loci has been expanded across the entire palm tribe Cocoseae and we are presently collecting the data.

Publications:

- Meerow, A.W., Noblick, L., Borrone, J.W., Couvreur, T.L.P., Mauro-Herrera, M., et al. 2009. Phylogenetic analysis of seven WRKY genes across the palm subtribe Attaleinae (Arecaceae) identifies *Syagrus* as sister group of the coconut. PLoS ONE 4(10): e7353. doi:10.1371/journal.pone.0007353.
- Mauro-Herrera, M., A. W. Meerow, L. Perera, J. Russell, and R. J. Schnell. 2010. Ambiguous genetic relationships among coconut (*Cocos nucifera* L.) cultivars: the effects of outcrossing, sample source and size, and method of analysis. Genetic Resources and Crop Evolution 57:203–217.

Collections Expansion

- 1. Planted Jamaican Zamia collections.
- 2. Planted collection of Cycas micronesica, C. guazhouensis, C. micholitzii, C. diannensis,
- C. debaoensis, and C. multipinnata.
- 3. Began planting extensive *Ficus* collection received from David Dewsnap.
- 4. Planted Roystonea oleracea, Pritchardia spp., Licuala spp., Pinanaga spp.

Service

1. 2009-10 Ornamental Germplasm Distributions: Total = 18; 10 genera (*Iochroma*, *Lagerstroemia*, *Portlandia*, *Tabebuia*, *Cedrela*, *Byrsonima*, *Plumeria*, *Dombeya*, *Encyclia*, *Jasminum*). 7 International (4 China, 3 Dominican Republic) and 11 USA.

2. Continued with work in the input/upload of new accessions and removal of duplicate accessions in the GRIN. Approximately new 200 accessions were given local (MIA) and some PI numbers.

3. We hosted a meeting of Tropical Flowering Tree Society. Two dozen visitors came to the repository expressly to see ornamental germplasm.

Southern Horticultural Laboratory Update

WLPCGC Meeting 2010

Woody plant populations at SHL:

- *Hydrangea* and *Dichroa* small cultivar collection used as mother plants for tissue culture, EMS and X-ray *H. macrophylla* and *H. paniculata* seedlings (M1 and M2), frozen tissue for genetic studies.
- *Lagerstroemia* intraspecific breeding populations and cultivar parents for improved ornamental traits/disease/insect resistance, EMS and X-ray seedlings, partial diallel populations (in ground), small collection of species representatives and interspecific hybrids (containers), replicated cultivar collection (in ground) for long term evaluation, frozen tissue for genetic studies.
- *Cornus* select species and cultivars (in ground) for southern evaluation, frozen tissue for genetic studies.
- *Cercis* cultivar collection (in ground) for southern evaluation, frozen tissue for genetic studies.
- Chionanthus frozen tissue for genetic studies, wild-collected trees.
- *Hibiscus* active breeding populations for improved ornamental traits/disease/insect resistance including cultivars and species plants (containers).
- Evergreen azalea active breeding populations, cultivar and species parents (containers), replicated cultivar collections (containers) for insect research.
- *Aleurites fordii* (tung tree) historical germplasm collection including production cultivars and breeding lines for late flowering, seed collected by request, one ornamental selection that is semi-sterile (nutless).
- Other germplasm includes palms, Japanese magnolias, ornamental ginger, begonias, etc.

SHL maintains funding for eight CAT1 SY and three support scientists. Unit is split into two research groups, NP305 Production and NP301 Genetics. Genetics group includes three scientists working on ornamental genera (breeding, genetics, tissue culture). Production group includes pathologist, entomologist, and support scientist (Horticulture) working on ornamental genera. No word yet on specialty crop grant proposal (SCRI) for ornamental production and genetics, which would add support personnel to these programs. SCRI proposal on *Cornus* expected in future. We expect continued progress on woody ornamental genera listed above with relatively few changes or additions. Hydrangea research is focused on developing transformation system to take advantage of the newly sequenced hydrangea transcriptome (Roche 454 data). EMS and X-ray mutagenesis, linkage mapping (SSR and SNPs), and plant evaluations are ongoing. There is a cooperative agreement and grant funding with Oregon State University to manipulate ploidy in *H. macrophylla* cultivars.

Traditional crapemyrtle breeding is focused on leaf and flower color combinations, wide hybridizations with *L. speciosa* to increase flower size, and evaluations for cold tolerance, disease resistance, etc. Molecular breeding for crapemyrtle includes pedigree-based SSR analysis, DNA fingerprinting, genetic linkage mapping, and marker assisted selection with an emphasis on insect resistance. There is a non-funding Cooperative Agreement with Texas AgriLife on crapemyrtle breeding related to insect resistance, embryo rescue of interspecific hybrids, and new germplasm collections from China.

Cornus research is in collaboration with University of Tenneessee and includes traditional breeding, molecular markers, marker-assisted selection, etc. Dogwood transcriptome will be sequenced using Roche 454 technology in summer 2010. *Cercis* and *Chionanthus* research are collaborations with National Arboretum and SHL is responsible for molecular markers. Hibiscus, evergreen azalea, and other genera (palms, etc) are traditional breeding projects focused on improved ornamental traits.

2010 U.S. National Arboretum Updates for WLPCGC

Submitted by R. Olsen and A. Whittemore (see separate report for WLPGR activities)

USDA-ARS U.S. National ArboretumTree and Shrub Breeding update (Richard Olsen):

Research geneticists Richard Olsen (trees; germplasm) and Margaret Pooler(acting RL; shrubs) are moving to the Beltsville campus as it was determined that there would be no laboratories in the renovated administration building. The taxonomists (A. Whittemore and J. Kirkbride) will remain at the arboretum to curate the herbaria. This is the second move of the tree breeding program in four years. Despite this, the tree breeding program is making progress in its *Nyssa* breeding program and developing large F2 populations from interspecific hybrids. With A. Rossman's lab at Beltsville, have characterized the causal pathogen for the devastating leaf spot found on blackgums, and identified early selections tolerant to the organism. See A. Whittemore's report for American elm research. Margaret Pooler and the shrub breeding program continue advanced breeding objectives in *Lagerstroemia, Prunus, Cercis* and *Corylopsis*. A new cold-hardy camellia, *Camellia japonica* 'Anacostia' was released by the arboretum as collaboration between the research program and gardens unit. Sandy Reed's program has released two new oakleaf hydrangeas, *Hydrangea quercifolia* 'Munchkin' and 'Ruby Slippers'.

Richard Olsen was made lead scientist of the germplasm program (60% as trees lead scientist; 40% in germplasm) and wrote an ad hoc project plan for directing germplasm repository activities and germplasm research. Renewed focus on native North American taxa, coordination with NAPCC, and research objectives that support repository activities, including work in *Cornus florida, Corylopsis* (Hamamelidaceae), and *Fraxinus*. Will work with M. Widrlechner and A. Whittemore on identifying ploidy relationships among North American *Fraxinus* to assist germplasm collection efforts in this genus. For further details on the repository see Kevin Conrad's WLPGR report.

U.S. National Arboretum Herbarium (Alan Whittemore): Dr. Robert Webster is now assistant curator; *Celtis* apomixis research has concluded and ready to write up. A ploidy screening study conducted with the tree breeding program on American elm (*Ulmus americana*) revealed a significant number of diploids in native populations which has significant implications on species relationships and breeding in the genus. Similar work is planned for American ash species, particularly within *Fraxinus americana* in collaboration with Mark Widrlechner. Pursuing building an ornamentals data set for invasiveness.

North American Plant Collections Consortium (NAPCC)

Submitted by Pam Allenstein, NAPCC Manager, American Public Gardens Association April 2010

PROGRESS REPORT

GOAL 1 – Increase the number of NAPCC Collections to represent the major genera of ornamental plants found in APGA member gardens

New Collections

Dawes Arboretum – *Metasequoia* Collection, 9 taxa, 47 WKO accessions, 8 cultivars Donald E Davis Arboretum of Auburn University – *Quercus* Collection added to existing multisite, 2-year provisional status, 34 taxa, focuses on natives of Alabama Matthaei Botanical Garden & Nichols Arboretum – *Paeonia*, historic Upjohn collection, 292 cultivars Reiman Gardens of Iowa State University – Dr Griffith Buck Rose Collection, 2-year provisional, 74 cultivars Rogerson Clematis Collection – 2-year provisional status, 623 taxa Starhill Forest Arboretum - *Quercus* Collection added to existing multisite, 290 taxa

Applications Under Review

Arizona-Sonora Desert Museum – *Agave* Collection Betty Ford Alpine Gardens – Alpine Plants of CO Collection Dawes Arboretum – *Aesculus* Collection Desert Botanical Garden – *Agavaceae & Cactaceae* Collections Jenkins Arboretum – *Kalmia & Rhododendron* Collections

Herbaceous Ornamentals Task Force

A list of priority herbaceous genera and families has been developed through a panel of representatives from USDA/ARS, botanic gardens, research, and industry. NAPCC efforts have been designed to complement the priority genera set by the herbaceous ornamentals CGC for the Ornamental Plant Germplasm Center at Ohio State University. Targeted public and private collections are being compiled for recruitment.

GOAL 2 – Facilitate coordination of NAPCC plant collections

Multi Institutional Initiatives

NAPCC Oak Curatorial Group –Two additional sites have joined the collection: Starhill Forest Arboretum of Illinois College and Donald E Davis Arboretum at Auburn University in Alabama. NAPCC representatives from four sites shared information about the multisite collection at the International Oak Society Conference on Oct 20-22, 2009, in Puebla, Mexico, organized by Maricela Rodriguez-Coombes from BUAP. Acorns from several unrepresented taxa were imported. Future Mexican botanical garden representation in NAPCC is being considered.

NAPCC Maple Curatorial Group – Status report and updated 1- and 5-year goals have been developed. A working list of maple names has been compiled for the group. Kunso Kim from the Morton Arboretum has taken over as coordinator for this curatorial group.

Magnolias - Initial steps have been taken to start a multi-institutional initiative for Magnolias. Andrew Bunting, curator at Scott Arboretum of Swarthmore College and NAPCC committee chair, is coordinating a multi-

institutional application. Inventories from twenty gardens are being compiled into a master list, then analyzed for red-listed species representation and other criteria before a subset will be selected for inclusion in the application. Magnolia Society International is collaborating in these efforts.

North American Collections Assessment

NAPCC is assisting Botanic Gardens Conservation International in determining the amount of North American plant diversity that is currently safeguarded in living collections. Data gathered can be used to coordinate *ex situ* conservation activities.

Distributive Database Querying System

The "*PlantCollections*TM– A Community Solution" project is currently transitioning to APGA. A beta version of its portal is available <u>www.plantcollections.org</u>. Chicago Botanic Garden has written specifications for participating institutions. APGA is seeking funding to move this project forward and to expand participation. (Background: this three-year project will develop a distributed database system for Web-based querying utilizing open-source data-sharing software. This will allow information from multiple institutions currently using a variety of incompatible database formats to be accessed to retrieve integrated results. Project funding is from an Institute of Museum and Library Services National Leadership Grant awarded to Chicago Botanic Garden in partnership with APGA and University of Kansas, and fifteen participating NAPCC institutions. An anonymous donor in 2007 expanded the project to include international participants in China and the National Trust in the UK.)

APGA-USDA Annual Meeting

Meeting held April 15, 2010, at ARS Headquarters included representatives from APGA, ARS national program leaders, and USNA germplasm project staff. October 2010 marks the 15th year of formal collaboration between APGA and USDA/ARS. An article highlighting this partnership coinciding with the 100th anniversary of USDA-BARC and recognition at the next APGA conference in Philadelphia are being developed to mark this milestone.

FY2009 Financial APGA Contributions		
APGA General Operating	\$	50,000
NAPCC Application Fees		3,500
NAPCC Challenge Grant (anonymous donor)		4,000
FY2009 In-Kind Contributions *		
48 participating APGA institutions	1	,840,000

TOTAL FY2009 Contributions

* In-kind contributions from participating institutions includes estimated direct expenses relating to the maintenance, curation, and administration of NAPCC collections which includes personnel, equipment and supplies, acquisition of germplasm. Property value of land upon which collections are housed is not included

\$1.897.500

GOAL 3 – Raise professional plant curation standards in public gardens

Professional Development and Networking Meetings

Australian Botanic Garden meetings, December 6-18, 2009, visited government botanic gardens in Sydney, Canberra, Adelaide, and Melbourne. Exchanged information on collections management and NAPCC. Also met with leaders of Botanic Gardens of Australia and New Zealand (BGANZ) and Garden Plants of Australia Association (GPAA) to discuss collaborative activities. Exploring feasibility of establishing a trans-national working group to coordinate collections development.

NAPCC Members Forum, Annual meeting of 42 individuals was hosted in conjunction with the APGA conference in St. Louis, Missouri. Oak and Maple Curatorial Groups held breakout meetings. Next Forum will be held in Atlanta, Georgia, on June 2 prior to the APGA Conference.

Upcoming Programs

APGA Annual Conference, June 1–5, 2010, Atlanta, GA. Hosted by Atlanta Botanical Garden with Callaway Gardens and the State Botanical Garden of Georgia.

APGA Plant Collections Symposium, October 13–15, 2010, hosted by Denver Botanic Gardens.