Calendar Year 2004 Abbreviated Annual Report for W-6
USDA ARS
National Clonal Germplasm Repository

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The complete, unabridged report can be downloaded from:
http://www.ars-grin.gov/cor/news/AnnualReport2004.pdf

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Collaborators

Maxine Thompson
Francis J. Lawrence

Annual Report for Calendar Year 2004

The Repository is maturing beyond its teen-age years. It has been 23 years since our 1981 dedication and 25 years since ground was broken for facilities construction. The Repository collections and staff have achieved international recognition for representing global genetic diversity for our eight major genera. Crop committees have defined core collections and are proceeding to address gaps in species with planned plant collecting expeditions. Evaluations of plant materials are progressing and emphasize documentation of horticultural identity through morphology, digital images and molecular marker analysis. Plant distribution is increasing to record levels despite increased quarantine challenges. DNA was the most frequent form of distribution to foreign requestors this past year due to several collaborative research projects! Great concerns continue for the security of the collections because of newly emerging diseases. Funding is sufficient but looming cuts portend upcoming challenges to the operation. The innovative staff is dedicated to the mission and will approach the future with experience and vigor. The Repository's mission stands in strong support of the new **Age of Specialty Crops in American Agriculture**.

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Major Accomplishments for 2004

Service

1. Kim Hummer and hop breeder John Henning (ARS National Forage Seed Lab) **convened the First International ISHS *Humulus* (hops) Symposium** from August 1 through 7, 2004, in Corvallis. More than 100 participants from 13 countries attended and presented 22 oral and 15 posters. The symposium was co-sponsored by USDA/ARS, the International Society for Horticultural Science (ISHS), Oregon State University, the Hop Research Council, Anheuser Busch Inc., Heineken, and John I. Haas Inc.

2. For the second year in a row, Bruce Bartlett, Plant Distribution Manager, broke records for distribution, **shipping 3,091 items for 402 requests around the world. This is the largest number of accessions distributed in one year from the Corvallis Repository** since establishment in 1981. **DNA shipments emerged as the most shipped form of germplasm for foreign requestors this year.**

3. Joseph Postman (National Germplasm Repository, Corvallis, Oregon), Paul Meyer (Morris Arboretum, Philadelphia), Marina Mosulishvili (Institute of Botany, Tbilisi, Georgia) and Giorgi Arabuli (State Museum of Georgia, Tbilisi, Georgia) participated in a **plant germplasm expedition in the Republic of Georgia.** Eight provinces were visited from September 19 to

October 10, 2004. The team collected 136 plant and seed samples, and 94 herbarium vouchers representing 43 different plant genera.

4. Kim Hummer (NCGR, Corvallis), Tom Davis (University of New Hampshire), Hiroyuki Iketani (National Institute of Fruit Tree Science, Japan), and Hiroyuki Imanishi (Akita University, Japan) participated in a **plant germplasm expedition in Hokkaido, Japan**, to collect genetic resources of temperate small fruits from July 7 through July 28, 2004 under a bilateral agreement between the USDA ARS and the MAFF in Japan. They collected 100 seed and plant samples of temperate fruits, including *Actinidia* (hardy kiwifruit), *Fragaria* (strawberry), *Ribes* (currant), *Rubus* (blackberry and raspberry) and *Vaccinium* (blueberry and cranberry).

Research

1. Dr. Barbara Reed and her lab developed a **modified encapsulation-dehydration cryopreservation protocol** based on the replacement of cold acclimation with high-sucrose pre-treatment for the long-term storage of ***Ribes* germplasm.** Additional genotypes were added to the USDA cryopreserved *Ribes* collection.

2. Dr. Nahla Bassil and her graduate student, Peter Boches, developed microsatellite markers in blueberry. These **molecular markers for blueberry are now publicly accessible on GRIN** as a result of a team effort between our molecular genetics laboratory, our IT staff and the GRIN team in Beltsville. SSR marker descriptors (13) for 56 cultivars of blueberry were uploaded. These data can be seen at:http://www.ars-grin.gov/cgi-bin/npgs/html/desc_form.pl?111 Besides making this fingerprinting data publicly available to blueberry researchers, this provides a structure that other Repositories could use for storing molecular data on GRIN. The SSR markers developed at NCGR-Corvallis are already being used by blueberry researchers and growers.

3. Dr. Reed's lab characterized the **response of 12 diverse *Humulus lupulus* genotypes to the iron formulation used in the growth medium** during medium-term cold storage. In standard storage conditions the average length of storage for hops is 14.1 $\pm$ 3.5 months. Evaluation of 12 genotypes after 6 months indicated that the plantlets grown with standard MS iron were greener and growth-condition ratings (mean >4) were similar to the initial ratings (5). Plants on either concentration of sequestrene iron declined at both 3 and 6 months (mean <3). Decline in growth condition was much greater for several genotypes stored on medium with sequestrene irons than those on MS iron.

4. Joseph Postman, working in collaboration with Yannis Tsanetakis and Bob Martin, detected 6 viruses in the NCGR mint collection. **Three viruses, not previously reported from mint in North America, were detected in a variegated *Mentha* × *gentilis*** clone. Genomic sequences indicated that one was a new potexvirus, the second was a new closterovirus and the third virus was *strawberry latent ringspot virus* (SLRSV), a European virus not previously known to occur in North America.

5. Dr. Kim Hummer and Jodi Smith **evaluated more than 2100 wild hop seedlings for resistance to powdery mildew.** Specific lots from Manitoba, Saskatchewan, and North Dakota had high percentages of foliar resistance in the greenhouse. Many of these showed foliar and cone resistance in the field. Three Kazakhstani seedlings demonstrated an unusual hypersensitive response and will be tested further for potential germplasm release.

Administration

Budget and Staffing at the NCGR Corvallis

NCGR had 16 FTE for 2004 including 12 permanent 4 'term' appointments. The FY 2006 Presidential budget proposed about 20% cut that would eliminate our molecular marker identification program (Congressional add-on in FY 2002.) We hope that these funds will be reinstated. We anticipate a non-program specific, across the board cut of a lesser degree, at the end of FY 2005. To accommodate such a budget cut we would eliminate student or part-time positions. Our scientists continue to seek extramural funding for graduate students and research projects.

Non-base and Extramural Funding received during fiscal year 2004:

Amount	Purpose	Source
24,500	Blueberry Evaluation for molecular markers	NW Center for Small Fruit
11,000	Former Soviet Union Science Cooperative program	ARS-OIRP
20,000	Evaluate hops for powdery mildew	HRC
27,880	Mint virus identification	MIRC
20,000	Japan plant collection	USDA Exploration Grant
16,000	Georgia plant collection	USDA Exploration Grant
119,380	Total	

Visitors to NCGR 2004

By Yvonne Pedersen

During Calendar Year 2004, 478 people came through the Repository's doors. Guests arrived in large or small groups, or as individuals. **The Repository hosted the Western Regional W-6 Technical Advisory Committee meeting in June** (photo at right).

Educational tours ranging from groups of 8 to 18 came from Oregon State University and area public and private Schools to tour our facility. There were also numerous visitors from around the world: 7 from China, 3 from the United Kingdom, 1 from Thailand, 1 from South Africa, 4 from Japan, 4 from New Zealand, 1 from Germany, 1 from Poland, 1 from Sweden, 1 from the Netherlands, 1 from the Philippines, 4 from Columbia, 1 from Turkey, 1 from Ecuador, 3 from Argentina, and 5 from Chile. Also, there were 4 graduate students working at the National Clonal Germplasm Repository from India, Ethiopia, Nigeria, and the Philippines.

Germplasm Collections and Research

In Vitro Culture and Cryopreservation

By Barbara Reed

In Vitro Collection Status as of December 15, 2004

Genus	Available Core accessions	Core accessions *in vitro*	Total accessions *in vitro*
Corylus	171	24	41
Fragaria	519	154	186
Humulus	94	76	94
Mentha	47	44	161
Pyrus	218	111	214
Pycnanthemum	15	12	23
Ribes	216	76	82
Rubus	297	133	204
Vaccinium	255	76	93
Total	1832	706	1098

The tissue culture lab continues to initiate, multiply, store, and maintain accessions *in vitro*. We are sending accessions to NCGRP in Fort Collins for backup *in vitro* storage and for cryopreservation. Technician Janine de Paz continues adding accessions each year as time and plants permit. We are also replacing many accessions that have been in culture for over 10 years. Technician Carolyn Paynter retired in the fall of 2004 after 16 years at NCGR.

We collaborated with the laboratory of Dr. E. E. Benson at the University of Abertay in Dundee Scotland on a *Ribes* cryopreservation project. With assistance from Laura Schumacher we completed experiments for a *Cynodon* cryopreservation manuscript and it was submitted to Crop Science. Collaboration on *in vitro* storage and cryopreservation of fruit germplasm with the Kazakh Institute of Horticulture and Viticulture was initiated in 2002. Visiting scientist Dr. Sandhya Gupta worked in the lab April 1, 2004-2005.

Two new students are beginning PhD programs: Esther Uchendu (Ford Foundation Fellowship) will study the effect of antioxidants on cryopreservation protocols; Nina Castillo (Fulbright Fellowship) will study the genetic fidelity of cryostored *Rubus* meristems and do some additional genetic studies on *Rubus* in cooperation with Dr. Bassil.

Molecular Genetics

By Nahla Bassil

Technician Barb Gilmore is routinely extracting and quantitating DNA in 96-well plates. DNA is sequenced using Beckman CEQ 8000. Christine Neou, a student intern, is evaluating EST-SSR primers for fingerprinting European and Japanese pear accessions. Peter Boches, an MS graduate student, has used 28 SSRs to develop unique fingerprints in 72 important cultivars of blueberry. We continue to develop and evaluate microsatellite primers in order to generate reliable molecular markers for fingerprinting accessions form various genera including:

Corylus - Previously developed SSRs in the hazelnut were used by Tufan Gokirmak, a graduate student in Horticulture, to identify duplicate hazelnut accessions. The SSRs were used to develop genetic fingerprints for important hazelnut genotypes. We continue to collaborate

with Dr. Shawn Mehlenbacher and Dr. Roberto Botta on developing additional microsatellite loci to use in construction of a hazelnut linkage map.

Fragaria - Twenty-five EST-SSR primer pairs previously designed were tested for cross-species amplification in twelve accessions of strawberry: two *F. vesca*, one *F. iinumae*, two *F. chiloensis*, two *F. viginiana* and five *F. x ananassa*. We are evaluating single-locus polymorphic SSRs for their ability to fingerprint the supercore collection.We collaborated with Dr. Kevin Folta and Dr. Kim Lewers on developing additional SSR markers from an EST library of 'Festival'. Some of these primers were placed on a diploid linkage map of strawberry in collaboration with Dr. Dan Sargent. These primers and additional strawberry primers developed in our lab will be tested for polymorphism in parents of 'Delmarvel' x 'Selva' strawberry mapping population available from Dr. Kim Lewers.

Pyrus - Primer pairs were designed for 18 pear EST sequences obtained from GenBank and the optimum annealing temperature was determined by gradient PCR. The SSR primers amplified a product in eight cultivars of *P. communis*, three cultivars of *P. pyrifolia* and one *Pyrus* hybrid. Out of 15 primer pairs that amplified fragments of the expected size, 9 are polymorphic. We are using these 10 polymorphic SSRs to fingerprint 60 accessions of pear.We are collaborating with Lobke Vanwynsberghe in using microsatellite markers to study genetic diversity in the Malaceae family.

Humulus - Sixteen EST-SSR primer pairs were designed in hops. They were used to study genetic diversity in 48 accessions of European and wild American hops.

Vaccinium – Graduate student Peter Boches developed SSRs from and EST library of 'Bluecrop' floral buds provided by Dr. Lisa J. Rowland. He also implemented a protocol for SSR-enrichment of a genomic library in 'Bluecrop' which led to the development of an additional 10 robust SSRs to the previous 20 EST-SSRs. Cross-species amplification was evaluated in nine taxonomic sections of the genus *Vaccinium* using 44 EST-SSR primer pairs. EST-SSR loci originating in *V. corymbosum* were most easily amplified in section *Cyanococcus* and least easily amplified in section *Oxycoccos*. Phylogenetic inference based on SSR analysis using 5 EST-SSRs indicated that *V. elliottii* is divergent from *V. corymbosum*.

New Tree Fruit and Nut Accessions

By Joseph Postman

Corylus – Seed of wild *C. avellana* was collected in the Republic of Georgia (4 accessions) and 1 seedlot of *C. americana* was received from the state of Illinois. Seedlings of *C. colurna* (1 accession) and *C. avellana* (4 accessions) generated from seed collected in Armenia in 2002 were planted in our field collection. Four cultivar releases were received from Oregon State University.

Cydonia – Seed of wild *C. oblonga* was received from the trans-Caucasus region including 1 from Armenia and 2 from Georgia. Seedling populations from each of these have been established. The old American quince cultivar 'Meech's Prolific', the Russian 'Aromatnaya' and the Iranian 'Isfahan' were added to the clonal collection in 2004. The NCGR *Cydonia* collection now includes 67 named cultivars and 46 seedling selections from many geographic regions.

Mespilus – Seed from wild medlar populations were collected in Georgia. We are attempting, with difficulty, to germinate representative samples.

Pyrus – Seed of *P. salicifolia* (4 accessions) were collected in the Republic of Georgia, and seed of *P. communis* ssp. caucasica (14 accessions) were collected in Georgia and Armenia. John Wells donated seed of *P. betulifolia* (Du Li) that he brought from Shaanxi, China, and is reputed to be useful as a cold-hardy and dwarfing rootstock for Asian pears. Nearly 2 dozen interesting pear clones were released from Beltsville quarantine and received at NCGR in

2004 including samples from India, Pakistan, and Turkmenistan. Several long-lost heirloom cultivars were located and propagated. Several English perry pears not available in North America have been received as provisional quarantine releases.

Plant Pathology
By Joseph Postman

Corylus – New accessions were tested for ApMV (30 samples). All were negative. Eeastern Filbert Blight has been found nearby in Corvallis, within 2 miles of NCGR Corylus field collection. The *Corylus* collection is scouted for symptoms using mobile pruning tower several times/year and as of March 2005 EFB has not been observed at NCGR.

Fragaria – The Strawberry virus collection used by Yannis Tsanetakis and Bob Martin to characterize pallidosis disease, strawberry necrotic shock virus (distinct from TSV), and to associate Apple *mosaic virus* with strawberry leaf curl disease. PCR based diagnostic tools are in place in Martin's lab and serological tests are under development.

Mentha – In collaboration with Yannis Tsanetakis and Bob Martin, we detected 6 viruses in our mint collection, 3 of which are new to science. Three viruses not reported previously from mint in North America were detected in a variegated *Mentha* × *gentilis* clone.

Rubus – Nearly 1500 samples were tested by ELISA. The screenhouse collection was tested or re-tested for apple mosaic, cherry leafroll, raspberry bushy dwarf, and tobacco ringspot viruses. Cherry leafroll not detected, clearing one of the hurdles to distribution of *Rubus* to the EU.

Sambucus – Cherry leafroll was confirmed in many accessions, providing good positive controls for future ELISA testing.

Vaccinium - The NCGR field collection was monitored twice by ELISA during the growing season for blueberry scorch and blueberry shock viruses. For first time in 5 years blueberry scorch was not detected in the collection. Blueberry shock however was found in two plants which were subsequently destroyed. This pollen-borne virus has become well established in the Corvallis area and will be an annual concern.

Virus Germplasm Collections
By Joseph Postman

The Repository's collection of germplasm borne viruses and virus-like pathogens has become a valuable resource for fruit plant certification programs, disease diagnostic labs and pathogen research projects. During the past 8 years, we have shipped 248 plant or tissue samples specifically for their virus isolates. Nineteen of these samples were shipped in 2004. In the most recent proceedings of the ISHS International Symposium on Small Fruit Virus Diseases 4 papers acknowledged samples received from the Corvallis Repository. We presently maintain 70 pome fruit clones, 44 *Fragaria* clones, 20 *Rubus* clones, 14 *Vaccinium* clones, and smaller numbers of *Mentha*, *Humulus*, *Ribes* and *Corylus* clones as virus positive control isolates.

Field Operations
By Joe Snead

Diseases are playing an ever increasing role in the field operations. Eastern filbert blight is present in the Willamette Valley. Strikes were confirmed last year within 2 miles of the Repository. Now we are closely monitoring our trees. To date no evidence of the disease has been detected in our hazelnut orchard. Last spring we put on five cover crop sprays. Blueberry scorch virus was not detected in 2004 but blueberry shock virus is showing up. It is pollen born and much harder to control. For the last two springs the field crew has successfully controlled *Ribes* Cane Borer using mating confusion.

Several new plantings were added this last year including an edible *Lonicera* (honeysuckle) planting. The area will accommodate up to fifty accessions with 18 presently established. A new red raspberry plot with raised bed was established with room for two hundred accessions and about 60 have been planted. A smaller plot with room for 50 black cap raspberries was established and 12 accessions are planted. An area was surveyed and rows marked out for *Pyrus* species, Cydonia, Mespilus and other minor genera.

Seed Program
By Jack Peters

The Seed Testing Laboratory at the NCGR is in the second year of operation. The initial first two phases of operation were successfully completed: I) Get the facility equipped with the seed testing equipment, instruments and accessories necessary to operate a functional seed lab, II) Go through the 3,000 seed accessions on site and make sure they are all properly cleaned, counted, packed, labeled, and stored. All existing seed accessions were processed during 2004.

The third phase (III) of the seed project is 'Test – Preserve – Increase – Evaluate – Improve – Disseminate.' Those activities are now underway:

1. To check viability of the seed collection using Germination Tests, Tetrazolium Tests, or Excised Embryo Tests.
2. To enter, clean, count, test and store new seed accessions as they arrive at the Repository.
3. To prepare and send subsets of seed germplasm to Fort Collins for off-site storage.
4. To initiate a workable seed increase program for samples with low seed counts..
5. To investigate new and improved methods for germination, breaking seed dormancy, seed storage techniques and seed longevity issues.

Viability tests were completed in 2004 on the all of the designated 'core' accessions and highly requested accessions for all of the major genera at the Repository. Three genera have had *all* seed accessions evaluated for viability via the TZ Test in 2004, and viability testing in progress for *Pyrus*.:

Genus	Accessions	Avg. Viability (%)
Fragaria	375	70
Humulus	248	45
Mentha	53	75

Screenhouse/Greenhouse Collections
By Jim Oliphant and Missy Fix

- Propagation and regeneration of 719 accessions, especially *Fragaria* and *Rubus*.
- Successful control of root weevil and cyclamen mite infestations through a sustained IPM plan.
- Improved sanitation throughout facilities with an emphasis on weed control and suppression of powdery mildew, fungus gnats, and two-spotted mite.
- Installation of new acid-injection water supply for screenhouses and deionized water supply

for greenhouse propagation to reduce water alkalinity and stabilize soil pH.

- Development of a strategy for maintaining the primary *Vaccinium* collection under screen.

Clonal Accessions maintained in the Greenhouses and Screenhouses as of March 2005

	Total # Accessions	Core		Available		Single Plants With No Back-Up	
		# Ac.	%	# Ac.	%	# Ac.	%
Actinidia	133	61	0	131	98	27	20
Corylus	155	43	28	136	88	67	43
Fragaria	1325	517	39	1270	96	597	45
Humulus	283	87	31	264	93	132	47
Mentha	439	51	12	436	99	288	66
Pycnanthemum	32	20	62	32	100	0	0
Pyrus	335	20	6	189	56	131	39
Ribes	401	208	52	342	85	79	20
Rubus	735	253	34	688	94	52	7
Vaccinium	432	218	50	400	93	126	29
Other[2]	93	12	13	53	57	67	72
Total	**4363**	**1429**	**33**	**3941**	**90**	**1566**	**36**

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

Plant Distribution

By Bruce R. Bartlett

- 3,091 items were shipped as seeds, cuttings, runners, scionwood, rooted plants, tissue culture and DNA.
- 308 tissue cultured accessions were sent to the National Center for Genetic Resources and Preservation (NCGRP) in Ft. Collins, Colorado as backup. This is 91% of all tissue culture accessions shipped to domestic requestors.
- 73% of accessions requested in 2004 have been shipped.
- 17% of all items shipped were sent to foreign requestors.
- Requests for DNA samples of our accessions began in 2003 and has increased in 2004 from 80 accessions (3%) to 562 (18%) of the total number of accessions shipped.
- Scionwood (24%), Seed (15%) and DNA (13%) were the top three forms sent to domestic requestors.
- DNA (42%), Hard Cuttings (16%) and Seed (15%) were the top three forms sent to foreign requestors.
- *Pyrus, Fragaria* and *Vaccinium* were our most requested crops, in that order.

Data/Computer Operations

By Douglas Cook and Kim Hummer

This year there were 465 new accessions and other related data categories added to GRIN (1748 Accession Names, 545 Habitat, 130 Narratives, 839 Pedigree, 1 Quarantine, 1109 Source, 1473 Source Member and 425 Vouchers). There were 1351 new Inventory items, 1637 Inventory

Actions and 2051 Observations added to GRIN. For Distribution there were 725 Orders, 6289 Order Items, 896 Order Actions and 165 Cooperator records add. Among 111 existing accession records, and other sub-categories, modifications were made during the year (447 Accession Name, 13 Habitat, 505 Narratives, 823 Pedigree, and 955 Source). There were 3573 Inventory, 3748 Inventory Action and 40 Cooperator records modified.

A new DELL Poweredge 400SC fileserver with a Windows® Server 2003 OS was brought online. Six new workstations were added. An outside contractor performed the install and configuration of the new fileserver.

Publications 2004

Journal Articles and Websites

1. **Hummer, K**. 2004. Pawpaw. Register of Fruit and Nut Varieties, List 42. HortScience. 39(6):1512.
2. **Hummer, K.** and A. Sabitov. 2004. Genetic Resistance to Currant Borer in *Ribes* Cultivars. J. Amer. Pom. Soc. 58(4):215-219.
3. **Hummer, K.E., Postman, J.D.** 2004. Website for the American Pomological Society – Rev. http://americanpomological.org.
4. **Hummer, K.** 2004. First International *Humulus* Symposium.Chronica Hort. 45(1)22-23.
5. Kovalchuk I. Y. and **B.M. Reed**. 2004. *In Vitro* Cold Storage: A Reliable Method Of Stone Fruit Germplasm Preservation. In: Proc. Intern. Sci. Conf. The Strategy of Scientific Ensuring of Horticulture: Reality and Perspectives. Almaty Agricultural University, 2004. P. 136-140. (in Russian).
6. **Postman, J. D**. 2004.An Evergreen Huckleberry Industry near the Oregon Coast in the Early 20th Century. J. Amer. Pom.Soc. 58(3):147-151.
7. **Postman, J. D**., Tzanetakis, I.E., Martin, Robert R. 2004. First Report of Strawberry Latent Ringspot Virus in *Mentha* From North America. Plant Disease. 88:907.
8. **Reed, B.M**. 2004. Strategies for Producing and Maintaining Clean Cultures. Educational web presentation. http://www.ars-grin.gov/cor/
9. **Reed, B.M.** 2004**.** Cryopreservation by Encapsulation Dehydration. Educational web presentation. http://www.ars-grin.gov/cor/
10. **Reed, B.M.** 2004**.** Cryopreservation by Slow Cooling. Educational web presentation. http://www.ars-grin.gov/cor/
11. **Reed, B.M.** 2004**.** Cryopreservation by Vitrification. Educational web presentation. http://www.ars-grin.gov/cor/
12. **Reed, B.M.** 2004. Working with Tissue-Culture Bags for Germplasm Storage. Educational web presentation. http://www.ars-grin.gov/cor/
13. **Reed, B.M.**, A. Meier-Dinkel, I. Kovalchuk, S. Pluta, E.E. Benson. 2004. Evaluation of critical points in technology transfer of cryopreservation protocols to international plant conservation laboratories. CryoLetters. 25:341-352.
14. Kusharenko, S. V., I.Y. Kovalchuk, T.T. Turdiev and **B.M. Reed**. Cryopreservation of Fruit and Small Fruit Germplasm by Vitrification. In: Proc. Intern. Sci. Conf. The Strategy of Scientific Ensuring of Horticulture: Reality and Perspectives. Almaty Agricultural University, 2004. P. 150-154. (in Russian).
15. Sabitov, A. and **K. E. Hummer.** 2004. Summary of Currant Cane Borer Research at the USDA ARS NCGR in Corvallis, Oregon, United States during 2003-2004. *Защита растений* УДК634.72.632.9 pp. 457-462 in: Genetic Resources of Plant-Growing in the Far East, Vladivostok: Dalnauka.

Collection Summaries

National Clonal Germplasm Repository - Corvallis
phone: (541) 738-4200 webpage: www.ars-grin.gov/cor
Curator: Kim Hummer email: khummer@ars-grin.gov

Code	Genus	Commonname	Available Accessions: Plants	Available Accessions: Seed	Inventory on Site*: Plants	Inventory on Site*: Seed	Inventory on Site*: Invitro	Unique Accessions: (in total)	Unique Accessions: (available)
				** MAJOR GENERA **					
ACT	Actinidia	**Hardy Kiwi**	131	10	153	19	0	154	131
COR	Corylus	**Hazelnut (Filbert)**	634	0	781	0	40	603	529
FRA	Fragaria	**Strawberry**	1286	278	1327	340	208	1480	1372
HUM	Humulus	**Hops**	281	197	699	234	90	520	265
MEN	Mentha	**Mint**	452	48	482	34	155	483	463
PYR	Pyrus	**Pears**	1520	143	1915	308	242	1808	1404
RIB	Ribes	**Currant/Gooseberry**	730	359	788	418	49	967	811
RUB	Rubus	**Blackberry/Raspberry**	711	919	783	970	194	1666	1469
VAC	Vaccinium	**Blueberry/Cranberry**	562	682	628	562	117	1231	1113
** Subtotal **			6307	2636	7556	2885	1095	8912	7557
				** MINOR GENERA **					
AME	Amelanchier	**Shadbush**	17	24	8	44	9	66	40
ARB	Arbutus	**Madrone**	2	4	5	4	0	9	5
ASI	Asimina	**Pawpaw**	80	0	83	5	0	49	46
CEA	Ceanothus	**Buckbrush**	0	17	0	33	0	35	17
CYD	Cydonia	**Quince**	88	11	115	13	0	80	59
ERI	Eriobotrya	**Loquat**	0	0	0	0	0	0	0
ESC	Escallonia	**Redclaws**	1	0	1	0	0	1	1
GAU	Gaultheria	**Salal**	9	19	9	13	0	31	27
GAY	Gaylussacia	**Black Huckleberry**	5	4	5	8	0	14	9
HOL	Holodiscus	**Ocean Spray**	0	2	1	2	0	3	2
JUG	Juglans	**Butternut**	35	0	72	3	0	61	24
LON	Lonicera	**Honeysuckle**	25	28	30	28	0	52	46
MES	Mespilus	**Medlar**	21	8	26	12	0	36	26
PER	Peraphyllum	**Wild Crabapple**	2	4	2	3	0	6	5
PYC	Pycnanthemum	**Mountain Mint**	37	38	37	50	31	89	65
SAM	Sambucus	**Elderberry**	34	90	35	71	0	129	108
SOR	Sorbus	**Mountain Ash**	120	73	129	156	0	229	138
** Subtotal **			476	322	558	445	40	890	618
*** Totals ***			6783	2958	8114	3330	1135	9802	8175

* Note - Does Not include Dead, Closed, Misidentified or Material Transfered to Another Repository.