

**ANNUAL PROGRESS REPORT  
REGIONAL PROJECT W-6  
CY2001  
USDA – ARS**

**National Clonal Germplasm Repository  
33447 Peoria Road  
Corvallis, Oregon 97333-2521  
Telephone: 541.750.8712  
Fax: 541.750.8717  
[hummerk@bcc.orst.edu](mailto:hummerk@bcc.orst.edu)  
<http://www.ars-grin.gov/cor>**



**Jodi Jackson works with the Native  
American Hop Collection**

**Federal Staff**

**Bruce Bartlett**, Ag. Sci. Res. Tech., Plants  
**Emily Beezhold**, Bio. Aid, Plants  
**Douglas Cook**, Computer Specialist  
**Judith Flynn**, Program Assistant/Secretary  
**Jeffrey D’Achino**, Biological Aid  
**Raymond Gekosky**, Ag. Sci. Res. Tech.  
**Kim Hummer**, Research Leader/Curator  
**Cash Mitchell**, Ag. Science Aid, Plants  
**Jodi Jackson**, BioSciTech, Plants (Temp)  
**James Oliphant**, Ag. Sci. Res. Tech, Plants  
**Carolyn Paynter**, Bio. Sci. Lab Tech., Plants  
**Joseph Postman**, Plant Pathologist/Curator  
**Robert Pucillo**, Farmer (Temp)  
**Barbara Reed**, Plant Physiologist  
**Joe Snead**, Ag. Sci. Res. Tech., Plants  
**Dennis Vandev eer**, Maintenance Technician

**Students, Interns and Volunteers**

**Hailu Aynalem**, OSU Graduate Student  
**Angela Burright**, OSU Lab Work Study  
**Travis Davidson**, OSU Field Work Study  
**Boyan Dobrev**, OSU Greenhouse Work Study  
**Jason Fumasi**, OSU Field Work Study

**Simon Hare**, OSU Distribution Work Study  
**Warren Harrington**, Volunteer  
**Malia Hee**, Lab Volunteer  
**Deven Holmgren**, Lab Volunteer  
**Karen Kraxberger**, OSU Lab Work Study  
**Francis Lawrence**, Collaborator  
**Beth Liegel**, Greenhouse Volunteer  
**Katy Lindstrom**, OSU Bio Lab Aid  
**Karen McGuire**, Volunteer, Office  
**Juarez Muarez**, Volunteer  
**Annie Moss**, High School Volunteer  
**Nese Okut**, Volunteer  
**Deric Picton**, OSU Graduate Student  
**David Rodriquez**, Volunteer  
**Elizabeth Rossi**, Saturday Academy Student  
**Rebecca Terpack**, OSU Office Work Study  
**Donna Thurman**, Biol. Science Aid, Plants  
**Tony Tomlinson**, Volunteer  
**Noah VonBorstel**, OSU Lab Work Study  
**Jonathan VanDyke**, OSU Compt. Wk St  
**Nan Wang**, OSU Graduate Student  
**Jennifer Wiest**, High School Volunteer  
**Veronika Yakovleva**, Volunteer  
**Brian Yoss**, OSU Office Work Study  
**Matthew Zlatnik** High School Volunteer

## Staff and EEO/CR

During CY 2001, we employed 16 federal personnel. About one third of our federal work force was female. This past year the unit supported 16 graduate, undergraduate, or high school students, nine of which are female, through work-study, internship or other programs.

During the course of the year we trained one Oregon Jobs Plus candidate (returning to work after welfare), and a physically challenged (multiple sclerosis) African-American individual returning to the workplace. We also provided a two-week laboratory training and greenhouse training for a mentally challenged individual who had had a brain aneurysm. We worked with a blind individual, training him in the optical scanning technology for digitizing plant information records. This individual was supported through an Oregon State program from August through December, 2001. We had one Asian, two Russians, one Turk, and one Ethiopian on staff at the Repository in 2001.

Joe Snead, our Field Manager was placed on unclassified assignment pending resolution of a worker's compensation claim that he filed. During this time Ray Gekosky, Field Technician, was given a temporary promotion to Field Manager, and Bob Pucillo, a Wage Grade Farmer, was hired through a full-time term appointment. In October 2001, Joe's claim was resolved and both Joe and Ray returned to their previous assignments.

We obtained a grant from the Hop Research Council for evaluation of hop seed genetic resources. We hired a temporary full-time Biological Science Technician, Jodi Jackson, to work on this assignment. Looking towards the future, the FY 2002 budget has brought us additional funding with the specification to hire a permanent Plant Geneticist (SY). We are in the process of recruiting for this position. With this recruitment our unit will have 4 SY positions.

## Budget

For FY 2002 a base funding increase was specified by Congress for genetic resource programs. Peter Bretting, our Program Leader for Germplasm, distributed a funding increase of \$225 K to our unit, bringing our "net to unit" total to \$1.2 million. With this funding increase our specific objectives were directed to include expanding the genetic marker analytical capability for characterization; modify current protocols or develop new methods for genetic resource characterization; expand the scope and volume of genetic data management; coordinate conservation efforts with other sites in the National Plant Germplasm System.

We received \$103,442 non-base and extramural funding

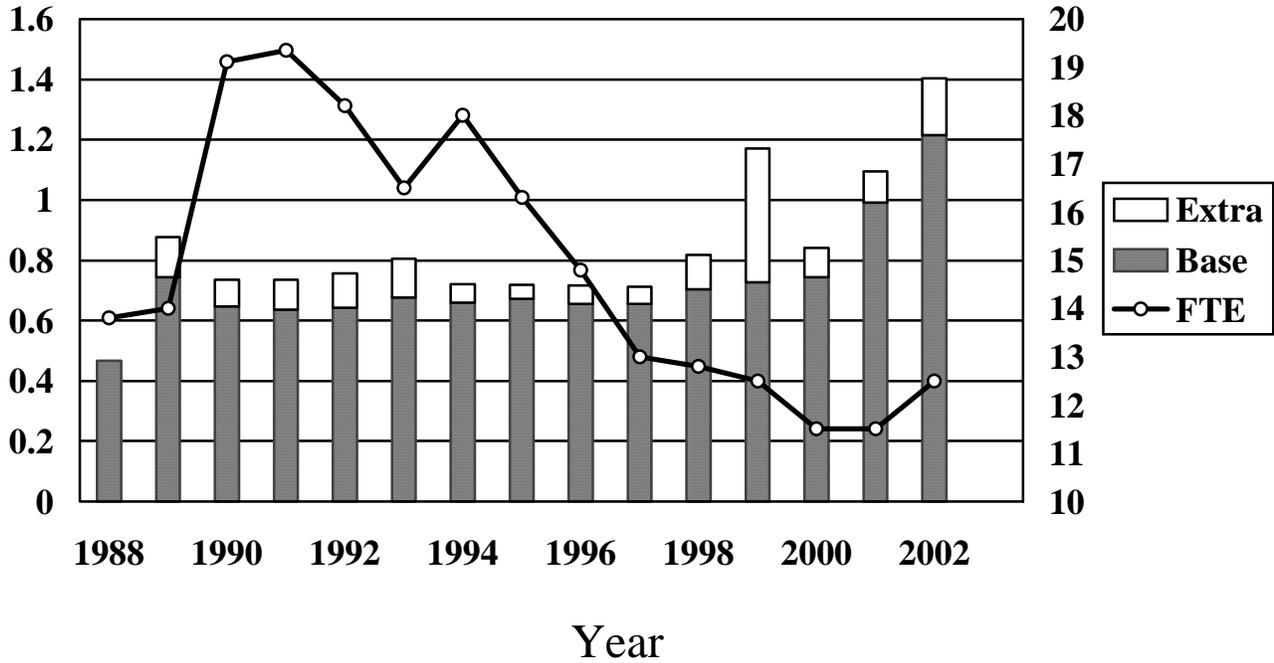
### FY 2001 Non-base ARS and Extramural funding

\$\$	Purpose	Source of Funding
29,576	ADA Repair of bathrooms	PWA
4,000	Evaluation of oil to control mildew in <i>Ribes</i>	NW Center for Small Fruits
11,500	Pear evaluation for viroids	USDA Germplasm Evaluation grant
2,866	College intern	USDA ARS Research Apprentice
2,500	<i>Rubus florican</i> /primocane in vitro	North American Bramble Growers
38,000	Evaluation of N. American hop seeds	Hop Research Council
15,000	Barbara Reed Grant for Kazakhstan training	Foreign Agriculture Service
103,442	Total	

# Funding and Staffing at the NCGR Corvallis

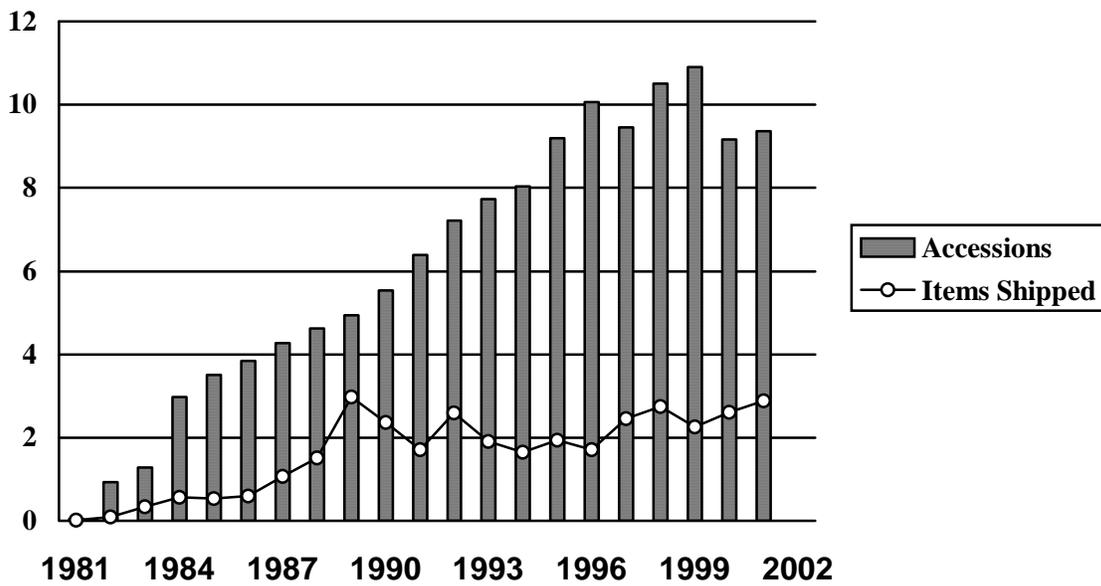
Funding in \$ million

Federal FTE



# Total Accessions and Distribution

Amount in 1,000



## **New Accessions**

During CY 2001, on GRIN our unit created 1922 new accession, inventory, and observation records and 3792 new distribution and cooperators records. We increased our plant and seed collections by 207 new accessions and 386 new inventory items; we received 232 plant requests and 2478 accessions were shipped. About one fourth of our distribution continues to be sent to foreign countries. We distributed plant material to 16 countries. Domestic and foreign plant shipping has become very complicated since September 11, 2001. Besides complying with quarantine regulations, we now must search the best way for shipment for each country. Since September 11, 2001, we have successfully shipped 437 accessions to Chile, Czech Republic, France, Italy, Poland and the United States.

Kim Hummer traveled to the Primorsky and Khabarovsk Territories in the Russian Siberian Far East during August 2001 on a USDA Plant Exploration Grant. She collaborated with Nick Vorsa, of Rutgers University and with Andrey Sabitov, Irina Vvedenskaya, and Pavel Cherbukin of the Vavilov Research Institute (VIR) in Vladivostok and Vera Funtova from VIR in St. Petersburg. The VIR station provided a renovated 4-wheel drive army transport vehicle to traverse the back roads to access the wild collections in the two regions. The trip traversed about 3000 km in the two territories during 21 days. The scientists collected 111 accessions of 32 species and 22 genera of temperate fruit, nut, and specialty crops. These accessions were shared and divided and are now preserved at the VIR stations and in the Corvallis Repository. The accession and inventory data have been uploaded to the GRIN system for public access. This trip has resulted in several additional exchanges of plant germplasm with Russian scientists both in St. Petersburg and in Vladivostok.

## **Field Report for 2001**

By: Ray Gekosky

A few major field projects were initiated during the summer, including the trellising of the *Actinidia* and the hedging of the *Pyrus*.

### ***Actinidia***

The T-bar trellis system was completed with plans to begin vine training in the spring of 2002. The plants have been in the ground through two summers without any pruning or training management. Many vines are five to eight feet in length with multiples for each plant. They are ready for training and will be dormant pruned this winter to the best three or four vines and in the spring the best vine will be selected. Frost protection irrigation was installed for the early spring frosts. We will be using aluminum pipe with 7foot risers secured to our middle wires. A thermostat has been attached to one of our well pumps.

### ***Pyrus***

Hedging of the orchard began in July and we were able to head back fifty species rows (approximately 40% of the orchard) before the rains returned. The trees (20-25ft) were topped at 12 to 14 ft and were side-hedged to within our herbicide strip. We maintain a 6 ft turf strip in between the rows. Many of the trees could not be topped with the hedger because the trunk diameters were too thick at the desired cutting height. We used a pruning tower with hydraulic attachments (chain saw and lopper) for these trees, which added much time to the entire process. We hope to have the orchard completely hedged by the end of the 2002 summer. With the hedger and recently acquired pruning tower it will be feasible to maintain the trees at a controllable height of 12 to 15 ft.

Another lesser, but important and necessary project was initiated in the pear field. Our main irrigation valves have been leaking for years. Water conservation became more important due to the dry winter. Our longtime irrigation supplier closed doors for good and it became a difficult task to locate the types of valves needed for replacement. The valves were dug up and replacements were finally found and purchased with yearend (September) money. These butterfly valves will be installed before the 2002 irrigation season. This should alleviate a fair amount of water wastage and it will also help in supplying a more accurate amount of water to the trees.

Other pear maintenance included dormant copper spraying, a spray for codling moth, roundup and pre-emergent spring spraying, and roundup sprays on the remnant rootstocks from the removed trees.

### **North Farm Fence Line**

The field fence had to be cut to open it up for the utility company to fall a big dead fur tree. It definitely compromised the great professional job done on the fence, but we secured it as best we could with tensioners at every wire, which got it close to its original tension.. We spent a considerable amount of time cleaning up the fence line, after a few years of neglect. The east and south lines are bordered by a heavily wooded area and can get overgrown quite quickly. Fallen trees were cut up, low hanging branches were pruned, blackberry bushes were cut out, and approximately 8 ft to the outside of the fence (our boundary line) was mowed all around. A 4 ft spray strip along the fence line was maintained with a roundup pre-emergent spray mixture.

### **New Equipment**

A propane weed burner that attaches to a tractor's three-point hitch was purchased in October. It has a 120gallon tank, with burners on two sides that are adjustable for row spacing. It can be used for 4 to 5 hours before refueling. In the future we hope to purchase a 500 gallon tank and pump to refuel from, instead of being delivery dependent for smaller unknown amounts. This is an alternative method for weed control and will be incorporated into our integrated pest management approach. Brand new aluminum pipe irrigation (Gheen brand) was assembled over the winter. This new pipe allowed us to solid set most of our fields, which freed up time to get some of these needed summer projects underway.

### **North Farm Development**

Plans have been developed and proposed by ARS horticulture and facilities personnel for a new office, greenhouses, and a shadehouse structure. These plans are tentative and mostly undecided upon at this point, although the new shadehouse has already been added in support of the IR-4 project. These current and proposed structures are all located adjacent to existing buildings near the entrance to the farm.

Two gates were purchased a few years back to install on the north line for easier access and maintenance of the fence, and our outside boundary. This will be bidded-out and completed in 2002, now that we have the money to do it. Our pipe irrigation racks were removed to make way for more shadehouse and greenhouse development. New cedar racks were built and installed by both our field crew and facilities personnel from the other ARS units in town. These racks are now located adjacent to the *Humulus* (hops) field on the back of the farm.

Two acres of unused land have been planted with *Lonicera* (honeysuckle) by the state farm crew, with a little help from us. This is in addition and adjacent to the established one acre planting farmed by the

state crew, in support of Maxine Thompson's seedling evaluation project. The state crew will be farming the entire planting with some coordinated efforts between us.

### Facilities 2001

By: Dennis Vandevveer

Security is of the highest priority. We are continually investigating ways to increase physical security at NCGR. We have increased lighting in the screenhouse areas. At the time of this writing additional metal halide lighting has been installed at the North farm gate. Two mercury vapor lights have been installed at the NCGR South Gate area and a 400-watt metal halide light has been installed in the fuel tank area. In cooperation with OSU additional lighting is scheduled to be installed which will illuminate all tractor barn areas and all field equipment. We recently met with OSU security, Lewis Brown farm manager, Linn County Sheriff's Department and the Oregon State Police concerning security upgrades. The effort goes on concerning energy conservation. All low-pressure sodium light fixtures have been replaced with high-pressure sodium fixtures in the greenhouses. As maintenance is required on building fixture they are upgraded with T8 electronic ballasts.

In January, we installed a gas furnace in the group office. The HVAC system was poorly designed in this area and has always been uncomfortable in the winter months. In February, I spent a great deal of time working on farm equipment and vehicles. One pickup needed a new water pump and complete tune up. Numerous tractors went in to our shop for service and adjustments. In March, we continued our upgrade on the Q-com environmental control system for the greenhouses. Additional controls were added and an additional vent commander was purchased. We experience numerous fire and burglar alarm system problems which were all corrected. In April, we had a failure of one Q-com command unit due to processor failure. The unit was repaired by facilities. We had a long term (8 hr) power outage on a Sunday evening. The generator operated automatically with no problems. Extensive time was spent in cleaning out the junkyard, recycling and disposing of trash. We purchased new refrigeration equipment for the walk in coolers. In May, I worked with the Linn County Sheriff's Department concerning Bio-terrorists threats and had local patrols increased. On the 25<sup>th</sup> and 26<sup>th</sup> we experienced two false fire alarms in the night and on the 27<sup>th</sup> and 28<sup>th</sup> responded to burglar alarms.

In June, the boiler was opened for cleaning. Gas burners we all removed, cleaned and repaired. Both the fireside and the waterside was cleaned and inspected. Performed the annual fire alarm system inspection and testing. In July, upgraded our radio system by adding an additional channel. This allows the field workers to communicate with out interfering with the office staff. The handheld units scan both frequencies for safety reason and the workers can communicate with the office at any time they wish. This is for safety reasons. Repaired two greenhouse roof vents. On screenhouse #8 we installed a new roll up system for winterizing the sides. Conducted our second annual fire inspection with the Corvallis Fire Department. Several minor discrepancies were found and were corrected. In August, we experienced a very dry and warm summer. Our main well is 40 feet. The aquifer level was checked and was found to be at 18 feet. We went on water conservation with minimal landscape watering and stopped all vehicle washing. Performed annual cleaning of the multi-zone. In September, most of month spent discussing ways to improve security. Began researching ways to improve gate and perimeter security. Lighting was looked in to as well as alarm system upgrades were discussed. Both the Linn County Sheriff's Dept. and the Oregon State Patrol are patrolling the area around NCGR and both respond to any burglar alarms. In October, we added two mercury vapor lights in the screenhouse driveway. We added an additional motion detector in the lobby and discussed ways to secure the server. I reviewed all security standard operating procedures and updated as needed. In November, I began winterizing the tractors. The water neutralizer was serviced. Called a door company to investigate panic bars on greenhouse rear doors. Winterized all swamp coolers. In December, replaced UV tube in the

growth room air handler. Turned in screenhouse siding SOW to admin. Increased burglar alarm system capacity for future add on equipment and zones.

### Safety and Security

By: Joe Snead

### **OSU Farm Safety Meeting**

During the last year the repository has represented the ARS at OSU Farm Safety Committee Meetings. The meetings fall on a day when Mike Leahy the Location ARS Occupational Health and Safety Officer can not attend.

### **North Farm Security Meeting**

As the user community grows on the North Farm the need for pesticide safety grows also. In March a North Farm Safety Orientation was held. Ray Gekosky conducted the meeting and Dennis Vandever covered security issues. The meeting was well attended. Ray addressed pesticide recording and posting procedures. He also talked about gate lock up and timing. Dennis explained the security alarm system and how to arm and disarm the system. Methods of getting emergency assistance were also discussed. The annual Worker Protection Training session presented.

### **Annual Pesticide Training**

In February all four of the licensed pesticide applicators went for continuing educational credits in Eugene, Or. This is an annual day and a half training to keep the applicators current on pesticide issues. One of the key issues this year was pesticide drift. With increased encroachment of urbanization on the agricultural lands controlling pesticide drift is becoming more important. The Oregon Department of Agriculture Pesticide division reported that this is the number one complain with the fines resulting. New information about localized inversion layers and volatilization was presented. The times and types of weather conditions that can lead to problems were explained. Information about better nozzles and adjuvant was presented. An emerging practice in Europe and New Zealand is the planting of buffer hedgerows for drift containment. These methods were discussed. Other benefits from hedgerows discussed was reduced erosion from runoff and habitat for beneficials were discussed. We are looking into hedgerow buffers for some areas at the Repository. We have a large frontage to Peoria Rd where drift can be a problem. Both the *Pyrus* and *Corylus* fields are problem areas during spray applications. Both fields have room to plant hedge rows. Plans are being developed for the planting in these areas. On the North Farm there are several areas where homes border our property lines. Our Fence was built 10' inside the property line and the thought is to plant buffer hedgerows in these areas. This is something that will develop over the next several years.

### **Pathogen Testing**

By: J. D. Postman

***Corylus***- 59 accessions tested by ELISA for Apple Mosaic Virus - all negative

***Fragaria*** - 119 samples tested by graft inoculations to Alpine\*

\* 4 new infected accessions identified

- 3 samples tested by sap inoculation to *C. quinoa*

- Humulus*** - 392 samples tested by ELISA:
- 98 accessions tested for American Hop Latent Virus
    - \* 5 samples tested positive
  - 98 accessions tested for Apple Mosaic Ilarvirus
  - 98 accessions tested for Hop Latent Virus\*
    - \* 5 samples tested positive
  - 98 accessions tested for Hop Mosaic Virus
    - \* 7 samples tested positive

***Mentha*** - no pathogen testing in 2001

- Pyrus*** - 110 accessions tested by graft inoculation to *Malus micromalus*
- 51 accessions tested by graft inoculation to Nouveau Poiteau\*
    - \* 1 new infected accession identified
  - 42 accessions tested by graft inoculation to *Pyronia veitchii*\*
    - \* 3 new infected accessions identified

- Ribes*** - 28 accessions noted with veinbanding symptoms in 2001
- 51 PCR assays by A.T. Jones, SCRI in 2000 using primers for newly identified badnavirus associated with gooseberry veinbanding. All plants except 1 identified as infected at NCGR based on greenhouse symptoms tested positive by PCR for this virus.
  - 117 black currant accessions were examined by S. Pluta for Black Currant Reversion Virus-like symptoms - 12 suspicious accessions noted

- Rubus*** - 14 graft inoculations to *R. occidentalis* 'Munger' \*
  - \* 2 new infected accessions identified.

- Vaccinium*** - 2093 ELISA and PCR Assays:
- 6 accessions tested negative by PCR for phytoplasmas by Agdia Inc.
  - 469 samples tested by ELISA for Blueberry Scorch Carlavirus\*
    - \* 2 infected accessions detected in field planting.
  - 367 samples tested by ELISA for Blueberry Shock Ilarvirus
  - 357 samples tested by ELISA for Blueberry Leaf Mottle Virus
  - 365 samples tested by ELISA for Blueberry Shoestring Virus
  - 173 samples tested by ELISA for Tobacco Streak Virus (primarily cranberries)
  - 356 samples tested by ELISA for Tomato Ringspot Virus

## Summary of Clonal Collections and Virus Status

	Number of Plants	Percent Virus Tested	Percent Virus Infected	Percent Untested	Core Plants	Percent Tested Core	Percent Virus Infected Core
<i>Corylus</i>	557	86.89	0.72	12.39	173	99.42	0.00
<i>Cydonia</i>	64	25.00	6.25	68.75	45	28.89	8.89
<i>Fragaria</i>	1217	63.52	16.68	19.80	487	81.52	13.76
<i>Humulus</i>	268	52.61	2.24	45.15	82	95.12	3.66
<i>Mentha</i>	428	3.04	3.97	92.99	50	14.00	2.00
<i>Mespilus</i>	21	52.38	19.05	28.57	17	41.18	23.53
<i>Pyrus</i>	1631	77.44	7.66	14.90	199	90.45	7.54
<i>Ribes</i>	640	5.00	11.56	83.44	219	4.11	11.87
<i>Rubus</i>	711	85.94	7.74	6.33	303	88.78	8.25
<i>Vaccinium</i>	542	80.81	0.18	19.00	219	96.35	0.46

"Virus Tested" includes plants that have tested negative for several important viruses, and plants that have been produced by heat-therapy and meristem culture.

This table DOES NOT include duplicate accessions or misidentified plants.

This table DOES include accessions that are not available due to quarantine, insufficient inventory, or virus infection.

### ***Pyrus* Collection**

By: J. D. Postman

#### **A. Genetic and Geographic Representation of *Pyrus* Collection**

1. All major *Pyrus* taxa represented (<http://www.ars-grin.gov/cgi-bin/npgs/html/stats/genus.pl?Pyrus>). Top 6 taxa:

<b><u>Taxon</u></b>	<b><u>Accessions</u></b>	<b><u>Percent of Total*</u></b>
<i>Pyrus communis</i>	901	40.2%
<i>P. sp.</i>	265	11.8%
<i>P. hybrid</i>	186	8.3%
<i>P. calleryana</i>	126	5.6%
<i>P. pyrifolia</i>	116	5.2%
<i>P. ussuriensis</i>	87	3.9%

\* based on 2242 clonal and seed accessions

2. Geographic regions represented - 52 countries or regions (<http://www.ars-grin.gov/cgi-bin/npgs/html/stats/genusgeo.pl?Pyrus>). Top 6 countries:

<u>Country</u>	<u>Accessions</u>	<u>Species Represented</u>	<u>Percent of Total*</u>
United States	903	29	40.3%
France	175	6	7.8%
China	123	11	5.5%
United Kingdom	74	10	3.3%
Italy	72	5	3.2%
Japan	69	6	3.1%

\* based on 2242 clonal and seed accessions

### **B. Pear Clonal Collection:**

- 1596 trees in field - includes some not available due to quarantine
- 1628 clones available for distribution - includes some not yet in field
- 38 non-hardy trees in greenhouse
- 906 pear cultivars/selections available for distribution including:
  - 92 Asian cultivars
  - 623 European cultivars
  - 128 Rootstock selections
  - 70 European x Asian hybrids
- 469 "species" trees available for distribution
- 61 clones maintained in greenhouse as pome fruit pathogen isolates

### **C. Pear Seed Collection**

276 seed accessions total

186 seed accessions available for distribution (seed count > 125 seed threshold)

### **D. Evaluations and Observations**

We received funding from NPGS in 2001 to assay core pears for susceptibility to pear scab in collaboration with Bob Spotts at OSU Hood River. For the scab study, the 200 core clonal genotypes were propagated on seedling rootstock (3 trees each) for greenhouse inoculations, and core trees in the NCGR field collection were evaluated for both leaf and fruit symptoms. We received funding in 2002

for evaluating susceptibility to powdery mildew using the potted core trees already produced.

### **Plant Distribution**

By Bruce R. Bartlett

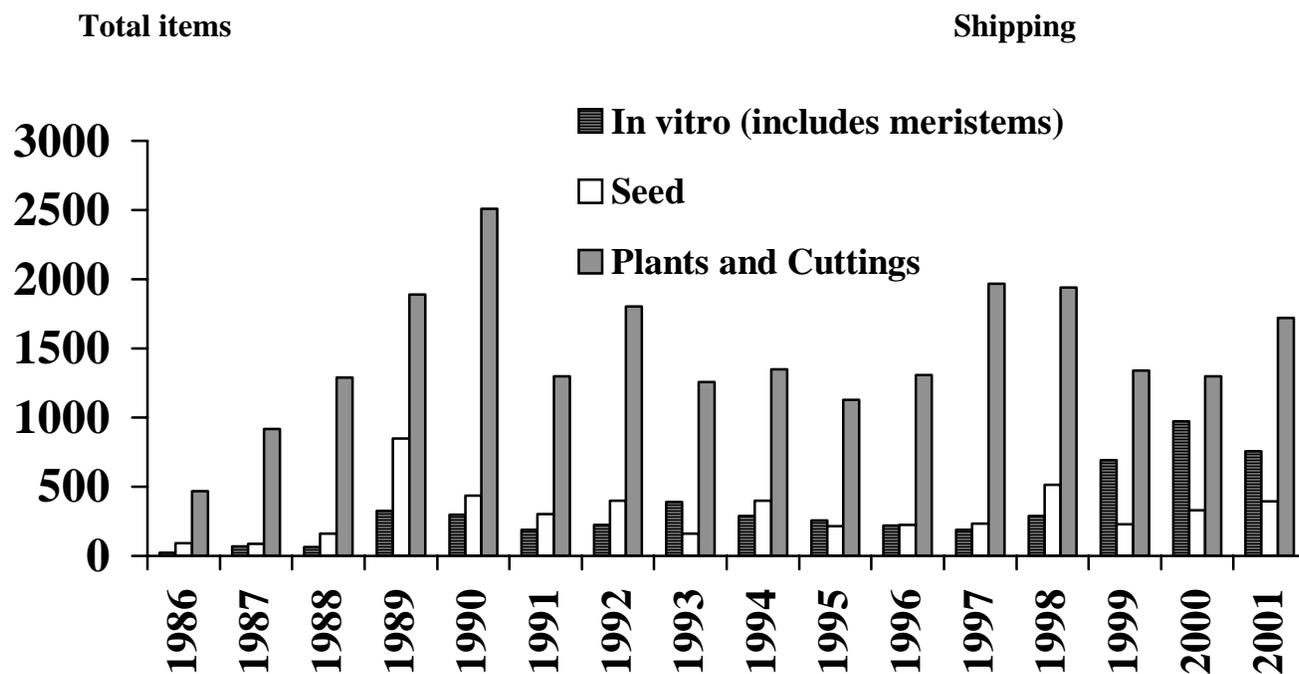
“2001 Highlights”

- 2,875 items were shipped as seeds, cuttings, runners, scionwood, rooted plants and tissue culture. 405 tissue cultured accessions, from eight genera, were sent to the Center for Plant Genetic Resources and Preservation (CPGRP)(formerly NSSL) in Ft. Collins, Colorado as backup.
- 75% of accessions requested in 2001 have been shipped.  
19% of all items shipped were sent to foreign requestors.
- 44% of total accessions shipped in tissue culture form were sent to foreign requestors(not including tissue culture accessions sent to CPGRP)

The NCGR-Corvallis continues to distribute plant germplasm within the United States and at the international level. At the time of this printing, we have distributed 2,469 items as seeds, cuttings, runners, scionwood, rooted plants and tissue culture from 2001 requests (Fig. 4). This represents 75% of the total number of items requested for 2001. Additional material will be shipped in CY 2002 from 2001 requests.

During CY 2001 2,875 plant items were shipped. Sixteen items from request year 1998 were shipped, 41 from 1999, 619 from 2000, and 2,199 from 2001. The total postage paid for domestic and international shipping was \$1,107.98 (Table 2). The total cost for Federal Express was \$947.68 and the total paid to the Oregon Department of Agriculture for 45 Phytosanitary Certificates was \$450.00.

**Fig 1. Number of Items Shipped**



**Table 1: Expenditures for Plant Distribution from 2001-1995.**

Year	Shipped	Postage	FedEx	PC's	Total	Cost per item
2001	2875	\$1,107.98	\$947.68	\$450.00	\$2,505.66	\$0.87
2000	2602	1,159.31	742.14	460.00	2,361.45	0.91
1999	2260	1,222.24	433.73	620.00	2,275.97	1.00
1998	2743	1,037.54	735.41	410.00	2,182.95	0.81
1997	2632	1,622.35	619.73	800.00	3,042.08	1.16
1996	2028	1,656.15	330.06	700.00	2,686.21	1.32
1995	1974	1,523.23	135.78	556.00	2,215.01	1.12

**Computer/Information Management**  
By: Doug Cook and Kim Hummer

No new computer workstation replacements were purchased in this year. In total, fifteen of sixteen workstations operate with Pentium (P2) or higher CPU's with memory at 32 megabytes or higher. One workstation (P1) operates Travel and Attendance Programs. One workstation runs on Macintosh OS 7.5 and the rest (PC P2/P3) on Win95/98/ME/2000. Virus Protection is on all workstations. Minor computer configuration repairs took place.

<b>GRIN Area</b>	<b>Created</b>	<b>Modified</b>
Accession/Inventory/Obs	1,913	2,034
Distribution/Cooperator	3,792	1,166
Total	5,705	3,200

## **Screenhouse/Greenhouse Collections**

**By: Jim Oliphant**

- Propagation and regeneration of 1150 accessions *Fragaria*, *Mentha*, *Rubus*, and *Vaccinium*.
- Rearrangement of *Fragaria* benches to accommodate more accessions. Moved nonhardy *Rubus* to greenhouse. All *Rubus* now at 2 pots per accession.
- Hot water treatment of *Fragaria* and scionwood for pest control.

*Actinidia* is a new genus that is being established in the field. Our plan is to maintain a back-up collection in the screenhouse at least until the field plants are established. Of the 131 clones received 93 are established in the screenhouse.

### ***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. Scionwood of core clones is also grafted and maintained in a greenhouse as needed for tissue culture source material. Currently, 41 accessions are grafted and ready for TC harvest.

### ***Fragaria***

All clonal accessions of *Fragaria* are maintained under screen. We have initiated a 3-year repropagation cycle using runners. In 2001, 574 accessions were runner propagated, hot water treated, and replaced in the collection.

### ***Humulus***

All virus free core clonal accessions of *Humulus* are maintained in the screenhouse. Currently, 132 clones are established in the screenhouse, and an additional 9 virus isolates are maintained in the virus screenhouse.

### ***Mentha***

All clonal accessions of *Mentha* are maintained under screen. We have initiated a 3-year repropagation cycle via cuttings. In 2001, 307 accessions were propagated and replaced in the collection.

## *Pyrus*

Permanent back-up trees of all non-hardy clones, virused clones, and temporary back-up trees of all new young field trees of *Pyrus* are maintained under screen. Of the 96 clones in the screenhouse, 30 are non-hardy and 56 are virus isolates.

## *Ribes*

All core or non-hardy clonal accessions of *Ribes* are maintained under screen. To date, 224 of the 231 core accessions are established in the screenhouse.

## *Rubus*

All clonal accessions of *Rubus* are maintained under screen. We have initiated a 3-year repropagation cycle via cuttings, tip layers, or root division. In 2001, 269 accessions were propagated and replaced in the collection. We are now maintaining all clones as 2 pots per accession to increase security of the collection and have moved the nonhardy accessions to a greenhouse.

## *Vaccinium*

Our goal is to maintain all core, named cultivars, and non-hardy clonal blueberry under screen. Additionally, all lingonberry and cranberry accessions are also maintained under screen. Currently, 337 of an estimated 385 accessions are established in the screenhouse.

### Clonal Accessions maintained in the Greenhouses and Screenhouses as of April 2002

	Total # Accessions	Core		Available		Single Plants With No Back-Up		Square Feet Occupied		Expansion Space		
		# Ac.	%	# Ac.	%	# Ac.	%	Sq. Ft.	% Total	Sq. Ft.	% Total	# Pots
<i>Actinidia</i>	133	0	0	116	87	29	22	420	2.3	0	0	0
<i>Corylus</i>	93	39	42	53	57	23	25	70	0.4	0	0	0
<i>Fragaria</i>	1281	500	39	1213	95	577	45	5369	29.8	595	3.3	180
<i>Humulus</i>	261	78	30	139	53	196	75	630	3.5	0	0	0
<i>Mentha</i>	432	51	12	430	100	233	54	1183	6.6	35	0.2	12
<i>Pycnanthemum</i>	32	20	62	32	100	0	0	175	1.0	35	0.2	10
<i>Pyrus</i>	151	13	9	109	72	70	46	280	1.6	273	1.5	48
<i>Ribes</i>	360	234	65	293	81	42	12	1176	6.5	168	0.9	60
<i>Rubus</i>	728	304	42	672	92	184	25	4358	24.2	278	1.5	132
<i>Vaccinium</i>	383	207	54	364	95	125	33	2548	14.1	308	1.7	106
Other <sup>1</sup>	100	19	19	53	53	77	77	140	0.8	0	0	0
<b>Total</b>	<b>3954</b>	<b>1465</b>	<b>37</b>	<b>3474</b>	<b>88</b>	<b>1556</b>	<b>39</b>	<b>16349</b>	<b>90.8</b>	<b>1692</b>	<b>9.3</b>	<b>548</b>

JMO 04-9-02

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

## Quarantined Plants

At this time we have 144 accessions in quarantine.

Quarantined Plants

At this time we have 144 accessions in quarantine.

### Status of Quarantined Accessions at the Repository

Genus	Federal	State	In-House
<i>Actinidia</i>	8		
<i>Corylus</i>	7	25	
<i>Humulus</i>	13		
<i>Mespilus</i>	1		
<i>Pyrus</i>	42		
<i>Ribes</i>	3		33
<i>Rubus</i>	4		
<i>Vaccinium</i>	8		
Totals	86	25	33

JMO 04-09-02

### Invitro Laboratory Report 2001

By: Barbara Reed

#### Tissue culture:

The tissue culture lab continues to initiate, multiply, store, and maintain and distribute cultures of many accessions in vitro. Accessions are added to the collection as time permits. Each summer we employ high school students through the Saturday Academy program. These students learn basic tissue culture skills and help us to collect and initiate additional accessions into culture. Duplicate cultures are sent to NCGRP in Fort Collins, CO.

### In Vitro Collection Status as of December, 2001

<i>Genus</i>	<i>Total in vitro</i>	<i>Meristems Cryopreserved</i>	<i>Axes/Pollen Cryopreserved</i>
<u><i>Corylus (Hazelnut)</i></u>	36	0	6 axes/63 pollen
<u><i>Fragaria (Strawberry)</i></u>	179	0	
<u><i>Humulus (Hops)</i></u>	91	7	12 pollen
<u><i>Mentha (Mint)</i></u>	196	0	
<i>Pycnanthemum (Mountain Mint)</i>	9	0	
<u><i>Pyrus (Pear)</i></u>	232	106	36 pollen
<u><i>Ribes (Currant, Gooseberry)</i></u>	41	4	
<u><i>Rubus (Raspberry, Blackberry)</i></u>	199	47	
<u><i>Vaccinium (Blueberry, Cranberry)</i></u>	151	0	
Total	1134	164	6 axes/111 pollen

We receive tissue-cultured accessions by mail in various containers and they are often contaminated due to rough handling during shipping. In response to our observations of these cultures and questions from others on shipping of plant tissue cultures, Barbara Reed, Carolyn Paynter and Bruce Bartlett developed a poster on shipping procedures that was presented at the Society for In Vitro Biology annual meeting in St. Louis, MO. The poster described our methods of packaging the plants in heat-sealed bags on firm

medium, folding, wrapping, double boxing, and the needed permits and paperwork required for international shipping.

### **Cryopreservation:**

We are collaborating with the laboratory of Dr. E.E. Benson at the University of Abertay in Dundee Scotland on *Ribes* cryopreservation. In this project 18 genotypes of 9 species from NCGR were successfully cryopreserved in a pilot project long-term genebank at the University of Abertay. Only 4 of the 22 genotypes had low or no recovery from the cryopreservation procedure used. This is a confirmation that the cryopreservation techniques developed at NCGR are valid for use with a wide range of *Ribes* germplasm. Additional collaborations with Dr. Benson are anticipated. Several factors play a role in the success of cryopreservation protocols (Reed et al., 2001). Source-plant status, personnel, cryogenic facilities, and culture conditions are the most likely causes of variation when validating cryopreservation methodologies in different locations. In a large-scale cryobanking operation performed without replication it may be difficult to distinguish differences in viability due to human error, source plant physiology, and genotype variability. The results of this study indicate that, although many factors reduce viability, simple monitoring of key steps in the procedure may indicate the source of the problem and the likely remedy for individual genotypes. We will repeat parts of this screen at NCGR in 2002.

A special international project on the cryopreservation of *Ribes* was initiated with funding from the Scientific Cooperation Research Program of the USDA Foreign Agricultural Service. Scientists from Kazakhstan, Germany, Poland, and the UK were trained in meristem cryopreservation techniques during a 2-week workshop in May. These scientists will be monitored for two years and assisted in perfecting the techniques in their own laboratories so that clonal germplasm can be placed in long-term LN storage in those countries. *Ribes* was chosen as a test genus as it is an important crop in those countries. More information on this project is available on our website.

North America Bramble Growers Association provided funds for a summer high school student intern for a research project on raspberry cultures. Elizabeth Rossi and Mauricio Juarez, Saturday Academy Apprentices, worked on the project this summer. Together with Joseph Postman the students dissected meristems from other greenhouse raspberry plants and determined how well they grew on medium with regular iron and compared to medium with added sequestrene iron. No significant differences were noted for the initial growth, however the resulting plants grown on the sequestrene medium were much greener than those on the standard medium. The students presented their results at the Saturday Academy Symposium in August.

We continued our collaboration with Reed Barker on grass cryopreservation. In the original study Yongjian Chang and Barbara Reed determined optimal cryopreservation methods for *Lolium* and *Zoysia* grasses (Chang et al., 2000). With these methods and the assistance of Nan Wang (MS student) and Jeff D'Achino (undergraduate research apprentice) we cryopreserved 23 *Cynodon* (Bermuda grass) accessions in 2001 and will do a similar number of *Lolium* (Rye grass) accessions in 2002.

The hard work of two summer apprentices (ARS and Saturday Academy) came to fruition with the publication of "Pear Seeds Retain Viability after Liquid Nitrogen Immersion" (Barbara M. Reed, Sara Schwanke and Rebecca Shala, 2001). Sara Schwanke (South Salem High School) did preliminary studies with TZ and pear seed stored in our -20 freezers. Rebecca Shala (Corvallis High School) continued the study using fresh seed from the NCGR field. Together their studies showed that pear seeds retain their viability and actually have improved germination following LN storage.

Abstract: Cryopreservation in liquid nitrogen (LN) is relatively routine for many small, desiccation tolerant (orthodox) seeds. Seeds of *Pyrus* species are considered orthodox but have not been evaluated for LN storage. Freshly collected seeds of *P. communis* L ('Bosc') were evaluated for viability after exposure to LN for 30 min and four immersion and removal treatments: Direct immersion and direct removal, direct immersion and 2 min in LN vapor phase before removal, 1 min in vapor phase before immersion and direct removal, 1 min vapor phase before immersion and 2 min vapor phase before removal. Seed moisture content was 7.86 %. Fresh 'Bosc' seed viability evaluated by 2,3,5 - triphenyltetrazolium chloride (TZ) and greenhouse germination tests remained high (87-100%) following four types LN treatments, compared to the controls (77-87%). Differences in viability were small and TZ results showed no significant differences among the LN treatments. Direct LN immersion and removal resulted in significantly more greenhouse-germinated 'Bosc' seeds than the other treatments and fewer control seeds germinated than any LN treated seeds. LN exposure caused no physical damage to the seeds.

Viability and germination of 'Bosc' pear control seed and seed subjected to four liquid nitrogen immersion and removal treatments including 30 min exposure to liquid nitrogen (LN) as determined by triphenyltetrazolium chloride (TZ) and germination tests.

<u>LN Immersion and removal treatments</u>					
Viability test	D <sup>z</sup> in, D out	D in, VP out	VP in, D out	VP in, VP out	Control not frozen
TZ <sup>y</sup>	87 <sup>a</sup>	93 <sup>a</sup>	90 <sup>a</sup>	97 <sup>a</sup>	87 <sup>a</sup>
Germination <sup>x</sup>	100 <sup>a</sup>	93 <sup>b</sup>	87 <sup>b</sup>	83 <sup>b</sup>	77 <sup>c</sup>

<sup>z</sup> D = direct immersion or removal from liquid nitrogen. VP = held in the vapor phase of liquid nitrogen for 2 min prior to immersion or 1 min after removal from liquid nitrogen.

<sup>y</sup> Viability evaluated after 4 hr in TZ. n = 30

<sup>x</sup> Germinated in the greenhouse following 8-wk stratification, evaluated after 5 wk.

Means in a row followed by different letters are significantly different at  $P \geq 0.05$  by Duncan's multiple range test. n = 30.

### **Awards 2001**

By: Judith Flynn

Ray Gekosky – For Outstanding Management of the Corvallis Repository Field Plant Collections During Summer 2001.

Kim Hummer – 2001 Super Supervisor Award: In Recognition of Outstanding Support of Employees with Disabilities at the USDA. Presented by: Association For Persons With Disabilities In Agriculture. Fall 2001.

Bob Pucillo – For Extra Effort in the Performance of Field Plant Collection Maintenance at the Corvallis Repository During Summer 2001.

Donna Thurman – Through Her Extra Effort and Dedication, Donna Thurman has maintained the health, integrity and value of the screenhouse germplasm collections at NCGR-Corvallis.

### **Travel 2001**

By: Judith Flynn

Joseph Postman, Joe Snead, Deric Picton and Richard Moyer – To attend the Small Fruit Disease Workers Meeting. (Small Fruit Disease Workers Annual Meeting, Timberline, OR, Jan. 11-12, 2001.)

Kim Hummer - To give three presentations and serve on panel discussion session at 5<sup>th</sup> North American Strawberry Growers Assoc. Meeting and North American Strawberry Conference Meeting. (5<sup>th</sup> North American Strawberry Conference, Niagara Falls, Canada; Jan. 11-17, 2001.)

Kim Hummer - To participate in Hop Research Council Meeting and give presentation on Repository Hop Germplasm Preservation. (Hop Research Council Meeting, Seattle, WA, Jan. 22-24, 2001.)

Joseph Postman – To give Presentation at Pear Research Review Meeting and Pear Crop Germplasm Committee Meeting. (Pear Research Review Meeting and Pear Crop Germplasm Committee Meeting, Hood River, OR, Feb. 14-17, 2001.)

Kim Hummer – To report to Stakeholders Meeting called by Phyllis Johnson and the Liaison Committee for National Plant Germplasm Quarantine Office. (Stakeholders Meeting and Liaison Committee for National Plant Germplasm Quarantine Office, Beltsville, MD, Feb. 27-Mar. 4, 2001.)

Nick Vorsa – To attend NCGR-Corvallis Technical Committee Meeting – on site review of the Repository. (Corvallis Technical Committee Meeting, Corvallis, OR, May 7-10, 2001.)

James Luby - To attend NCGR-Corvallis Technical Committee Meeting – on site review of the Repository. (Corvallis Technical Committee Meeting, Corvallis, OR, May 7-10, 2001.)

Danny Barney - To attend NCGR-Corvallis Technical Committee Meeting – on site review of the Repository. (Corvallis Technical Committee Meeting, Corvallis, OR, May 7-10, 2001.)

James Ballington - To attend NCGR-Corvallis Technical Committee Meeting – on site review of the Repository. (Corvallis Technical Committee Meeting, Corvallis, OR, May 7-10, 2001.)

Kim Hummer – To give presentation to the California Rare Fruit Grower’s Meeting, San Diego Chapters and to visit Roger Meyer’s *Actinidia* Collection. (San Diego and Escondido, CA, May 10-12, 2001.)

Andreas Meier-Dinkel, Gulnar Karycheva, Irina Kovalchuk, Stan Pluta, Graham Sherlock, To attend Critical Point Evaluation of Cryopreservation Protocols for Plant Germplasm Conservation Workshop. (Critical Point Evaluation of Cryopreservation Protocols for Plant Germplasm Conservation. Corvallis, OR, May 12-25, 2001.)

Joseph Postman – To do Pomology work at the National Agricultural Library. (Beltsville, MD., June 3-10, 2001.) and attend and present a report on virus activity at NCGR-Corvallis at the WCC-20 Meeting of Small fruit & Tree Fruit Virologists. (Kearneysville, WV. June 11-14, 2001.)

Barbara Reed – To Attend Society of In Vitro Biology Meeting (Society of In Vitro Biology Board Meeting. St. Louis, MO. June 14-23, 2001.) to present a poster “Shipping Procedures for Plant Tissue Cultures” and attend Plant Germplasm Operations Committee Meeting. (W-6 Technical Advisory Committee Meeting. Ft. Collins, CO, June 24-27, 2001.)

Joseph Postman – To attend and give report on NCGR-Corvallis activities to Clonal Review, W-6 Technical Advisory Committee, Plant Germplasm Operations Committee. (W-6 Technical Advisory Committee Meeting. Ft. Collins, CO, June 24-28, 2001.).

Kim Hummer - To attend and give report on NCGR-Corvallis activities to Clonal Review, W-6 Technical Advisory Committee, Plant Germplasm Operations Committee. (W-6 Technical Advisory Committee Meeting. Ft. Collins, CO, Jun 24-28, 2001.).

Kim Hummer – To attend and present at the Annual ASHS Meeting. (Annual ASHS Meeting. Sacramento, CA, Jul 21-24, 2001.)

Deric Picton - To Present Poster, “Identification of Markers Linked to the CR Gene in *Ribes* Conferring Immunity to *Cronartium Ribicola* at the Annual ASHS Meeting. (ASHS Meeting. Sacramento, CA, Jul 21-24, 2001.)

Jodi Jackson – To attend Hop Research Council Meeting and Assist in presenting the NCGR-Corvallis Hops Report. (Hop Research Council Meeting, Yakima, WA, Jul 30- Aug 1, 2001.)

Joseph Postman - To attend Hop Research Council Meeting and present the NCGR-Corvallis Hops Report. (Hop Research Council Meeting, Yakima, WA, Jul 30- Aug 1, 2001.)

Kim Hummer – To present, “Antioxidant Compounds in *Rubus* and *Ribes* at the 8<sup>th</sup> International *Rubus/Ribes* Symposium. (8<sup>th</sup> International *Rubus/Ribes* Symposium. London and Edinburgh, UK, Jul 3-13, 2001.)

Barbara Reed – To present talk, “Cryopreservation of Apical Meristems for Plant Germplasm Conservation.” at the SLTB/Cryobiology Meeting. (SLTB/Cryobiology Meeting. Edinburgh Jul. 27-Aug 1 and consult with Dr. E.E. Benson, Dundee, UK, Aug 2-9, 2001.)

Kim Hummer – Plant Exploration to Vladivostok, Russia. (Vladivostok, Russia, Aug 5-27, 2001.)

Nick Vorsa - Plant Exploration to Vladivostok, Russia. (Vladivostok, Russia, Aug 5-27, 2001.)

Douglas Cook – Hops Plant Exploration. (North Dakota and Kateowa Beach & Brandon, Canada, Aug 19-25, 2001.)

Kim Hummer – To make a presentation at The University of Massachusetts Historic Orchard Workshop. (UMASS Historic Orchard Workshop. Traverse City, MI, Sept 10-15, 2001.)

Joseph Postman – To attend and participate in the 2<sup>nd</sup> International Pawpaw Conference. (2<sup>nd</sup> International Pawpaw Conference. Frankfort, KY, Sept 20-25, 2001.)

Dennis Vandever – To attend Plant Engineering & Maintenance Show. (Plant Engineering & Maintenance Show. Seattle, WA, Sept 26-27, 2001.)

Douglas Cook – Hops Plant Exploration. (North Dakota and Katepwa Beach, Melville, Virden and Molden, Canada, Oct 6-16, 2001.)

Joseph Postman – To deliver hazelnut trees to our backup repository and consult with National Park Service staff about historic pear trees at Manzanar Historic Site. (Parlier & Independence, CA, Oct 15-18, 2001.)

Kim Hummer – To attend and present summaries and an invited talk to the Small Fruit Researchers Meeting. (Small Fruit Researchers Meeting. East Lansing, MI, Oct 23-27, 2001.)

Kim Hummer – To attend California Rare Fruit Grower's Meeting and to study at Rancho Santa Anna Botanical Garden. (California Rare Fruit Grower's Meeting and visit Rancho Santa Anna Botanical Garden. San Diego Area, CA, Nov 15-18, 2001.)

Kim Hummer – To attend Northwest Center for Small Fruit Research Meeting. (Northwest Center for Small Fruit Research Meeting. Boise, ID, Nov. 26-28, 2001.)

### **Foreign Travel Reports for CY01**

1. **Barbara M. Reed**  
United Kingdom

Edinburgh, Scotland, UK  
July 29 – August 1, 2001  
SLTB/Cryobiology Meeting 2001

Dundee, Scotland, UK  
August 2-8, 2001  
Research collaboration with Dr. Erica Benson and meet with researchers at UAD, SCRI, and University of Dundee, and work on projects connected to the USDA-FAS Scientific Cooperative Research Program Grant.

The presentation, "Cryopreservation of Clonal Germplasm" was part of a symposium on germplasm preservation at the combined Society for Low Temperature Biology and Society for Cryobiology Meeting. The activities of ARS were highlighted in my talk. Dr. E.E. Benson and I are collaborating on several projects involving *Ribes* and *Corylus*. We developed further plans and met with other researchers in the area in order to broaden the collaboration.

This trip was interrupted by a bomb threat on the flight so I missed the first day of the meeting and arrived just in time for my talk.

2. **Kim E. Hummer**  
Primorsky and Khabarovsk Regions of Russia  
August 5 – 28, 2001

This trip was funded through an USDA Plant Exploration Grant trip. I collaborated with Dr. Nick Vorsa, Rutgers' University and with Dr. Andrey Sabitov, Dr. Irina Vvedenskaya, and Pavel Cherbukin, Vavilov Research Institute (VIR) in Vladivostok and Dr. Vera Funtova, VIR in St. Petersburg. The VIR station provided a renovated army transport vehicle to traverse the back roads to access the wild collections in the two regions. We collected 111 accessions of 32 species and 22 genera of temperate fruit, nut and specialty crops. These accessions were shared and divided and are now preserved in the VIR stations and in NCGR-Corvallis. The accession

and inventory data have been uploaded to the GRIN system for public access. This trip has resulted in several additional exchanges of plant germplasm with Russian Scientists both from St. Petersburg and Vladivostok.

### **Lectures Provided by NCGR Staff in CY 01**

Joseph Postman, 2001. The National Clonal Germplasm Repository - tour and discussion. North American Fruit Explorers, Carver & Corvallis, Oregon. September 12-14. (No travel involved).

Kim Hummer – Taught AP Biology Class, “Genes at the NCGR.” Corvallis High School, Corvallis, OR. November 2, 2001.

### **Training 2001**

By: Judith Flynn

All NCGR Staff – Disaster Preparedness Training – Benton County Sheriff. January 28, 2002; NCGR Library.

Joe Snead, Bruce Bartlett, Ray Gekosky, Jim Oliphant - 3<sup>rd</sup> Annual Small Fruit Grower’s Workshop; 03-22-2001; WA St. University; Vancouver, WA.

Bruce Bartlett, Jim Oliphant, Ray Gekosky, Joe Snead - PNW Integrated Pest Management Short Course; 02-01-2001; OSU/Lane County Extension Service.  
Oregon Hort Society Mtg. IPM in the next century; 01-30-2001; NW Agriculture Show; sublimity, OR.

Joe Snead - Getting started with Access '97. 01-22-2001 & 02-05-2001; Linn-Benton Community College, Albany, OR.

Ray Gekosky - Word for Beginners . 02-14-2001; Linn-Benton Community College, Albany, OR.

Ray Gekosky - Windows '98 File Management. 02-14-2001; Linn-Benton Community College, Albany, OR.

Dennis Vandever - Washington State Plant Engineering & Maintenance Show; 09-26-01; Stadium Exhibition Center, Seattle, Wa.

### **Community Outreach, and Visitors to NCGR 2001**

By: Judith Flynn

The National Clonal Germplasm Repository-Corvallis staff toured 285 people through the Repository during Calendar Year 2001. We noticed having fewer folks visit this year as compared to 2000’s numbers. Certainly the events of September 11, 2001 had an effect on travel everywhere. Guests arrived in small groups including the two Korean scientists, the OSU Seed Certification Laboratory, Stayton High School Horticulture Class to large groups of 25 people each including Philomath High School Horticulture class, Oregon State University Horticulture III class, the Small Fruit Berry Growers. The Lebanon Middle School Students visiting on December 5, 2001, worked doing some hands-on projects in the headhouse under the supervision of Jim Oliphant and Joseph Postman. Nursery folks (75) from groups of small fruit growers, backyard orchard hobbyists and the Home Orchard Society toured the Repository on September 14, 2001. The graph below illustrates the diversity of visitors touring the National Clonal Germplasm Repository throughout the year 2001.

## Publications 2001

### Journal Articles

1. **Hummer, K. E.** 2001. Hazelnut genetic resources at the Corvallis Repository. *Acta Horticulturae* 556:21-24.
2. **Hummer, K. E.** 2001. Historical notes on hazelnuts in Oregon. *Acta Horticulturae* 556: 25-28.
3. **Reed, B. M. and K. E. Hummer.** 2001. Long-term storage of hazelnut embryonic axes in liquid nitrogen. *Acta Horticulturae* 556: 177-179.
4. **Hummer, K. E. and D. Picton.** 2001. Oil application reduces powdery mildew severity in red and black currants. *HortTechnology* 11(3):27-28.
5. **Reed, B.M., D. Dumet, J.M. DeNoma** and E.E. Benson. 2001.
6. Validation of cryopreservation protocols for plant germplasm conservation: A pilot study using *Ribes* L. *Biodiversity and Conservation*. 10:939-949.
7. **Reed, B.M.** 2001. Implementing Cryogenic Storage of Clonally Propagated Plants. *CryoLetters*. 22: 97-104.
8. **Chang Y. and B.M. Reed.** 2001 Preculture Conditions Influence Pear Cryopreservation and Cold Hardiness. *HortScience*. 36: 1329-1333.
9. **B.M. Reed, S. Schwanke, and R. Shala.** 2001. Pear seeds are viable after liquid nitrogen immersion. *HortScience*. 36: 1121-1122.
10. **Postman, J.D., K.B. Johnson, R. Jomantiene, J.L. Maas, and R.E. Davis.** 2001. The Oregon hazelnut stunt syndrome and phytoplasma associations. *Acta Horticulturae* 556:407-409.
11. **Gulen, H., Arora, R., Kuden, A., Krebs, S.L., and Postman, J.** 2002. Peroxidase isozyme profiles in compatible and incompatible pear-quince graft combinations. *J. Amer. Soc. Hort. Sci.* 127(2):152-157.

### Book Section

**Postman, J.D. 2002.** Hazelnut diseases caused by viruses. p. 49 in B.L. Teviotdale, T.J. Michailides and J.W. Pscheidt (eds.) *Compendium of Nut Diseases in Temperate Zones*. APS Press, American Phytopathological Society, St. Paul, MN.

### Abstracts:

1. Moyer, R. A., **K. E. Hummer**, R. E. Wrolstad, and C. E. Finn. 2001. Anthocyanins, Phenolics and Oxygen Radical Absorbing Capacity of Berry Germplasm. *HortScience* 36(3): 489.
2. **Picton, D. and K. E. Hummer.** 2001. RAPD markers for the *Cr* gene for white pine blister rust resistance in *Ribes*. *HortScience* 36(3):489.
3. **Hummer, K. 2001.** What's here and what's new in *Ribes* Germplasm in North America. NASGA-TIRA
4. **Hummer, K. 2001.** What's up, Doc? Present *Ribes* research in North America. NASGA-TIRA
5. **Hummer, K. 2001.** White pine blister rust research update. NASGA-TIRA.
6. **Hummer, K. E. and D. Picton.** 2001. White Pine Blister Rust Resistance Screening of *Ribes* Germplasm. 8<sup>th</sup> International *Rubus* and *Ribes* Symposium Proceedings. OP 17
7. Moyer, R. , **K. Hummer**, R. Wrolstad, and C. Finn. 2001. Antioxidant compounds in diverse *Rubus* and *Ribes* germplasm. 8<sup>th</sup> International *Rubus* and *Ribes* Symposium Proceedings. P 54
8. **Reed, B. M. and K. E. Hummer.** 2001. Genetic Stability of in vitro cultured strawberries. Proceedings of the Strawberry Research Workers Conference.

9. **Hummer, K. E.** and M. M. Thompson. 2001. Clonal Genetic Resources in the U. S. National Plant Germplasm System. Proceedings of the Australian Fruit Growers Conference. July.
10. Sabitov, A. S., I. O. Vvedenskaya and **K. E. Hummer**. 2001. *Ribes* from the Russian Far East: Perspectives for breeding. . 8<sup>th</sup> International *Rubus* and *Ribes* Symposium Proceedings. P 17.
11. **Postman, J. D. and K. E. Hummer**. 2001. Corvallis Oregon Regional Pawpaw Trial in Distress. The second international pawpaw conference. September 21-22, 2001. Frankfort, KY. P 13.
12. **Reed, B. M., C. L. Paynter, and B. Bartlett**. 2001. Shipping Procedures for Plant Tissue Cultures. *In Vitro Cellular and Developmental Biology* 37
14. **Reed, B.M.** 2001. Cryopreservation of Apical Meristems for Plant Germplasm Conservation. Joint meeting of the Society for Cryobiology and the Society for Low Temperature Biology. Cryobiology.

#### Web Sites

- Important updates were made to NCGR Home Page and *Pyrus* resources page.
- Added historic USDA pomological watercolors to GRIN voucher record, and developed a web resource for historic images of Repository genera.
- *Cydonia* and *Mespilus* resource pages were added to the NCGR website.
- Repository catalogs on the website are updated several times a year.  
<http://www.ars-grin.gov/cor>
- Pear cultivars on the Brooks and Olmo list are linked to NPGS GRIN accession records.  
<http://hortweb.cas.psu.edu/aps/>

**Hummer, K.E. and J.D. Postman**. 2001. Web Site for the American Pomological Society.  
<http://hortweb.cas.psu.edu/aps/>.

Okie, W.R. and **J.D. Postman**. 2002. A directory of cultivars listed in the 'Brooks and Olmo' Register of Fruit and Nut Varieties since 1994. <http://hortweb.cas.psu.edu/aps/register.html>.