ANNUAL PROGRESS REPORT

REGIONAL PROJECT W-6

1995

(CY 1994)

NATIONAL CLONAL GERMPLASM REPOSITORY

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Xiaoling Yu, Research Assistant, OSU

Facilities

Dennis E. Vandeveer

Work has been continuing on the pre-engineered building at the north farm. Power has been connected to the building and the new diesel fuel tank has been fully installed. We still have to finish installation of the roll-up doors and finish walls in the office area and rest room. When complete, this building will provide storage for farm equipment, shelter for field workers, a small shop area and a small pesticide/herbicide mixing area.

In our main building complex work is underway to convert a storage area into a seed storage room. The seed collections will then be protected by both fire alarm and motion detectors for security measures. Greenhouse reglazing and screen-house painting are scheduled for this summer. A new soil holding bin has been constructed. New stairs have recently been installed in the wood shop giving access to a storage area. The new stairs now comply with OSHA regulations.

Screenhouse and Tubehouse Improvements

Lisa Hunt

The strawberry screenhouse benches were revamped during the winter of 93-94 by making taller bench legs (sawhorses) to raise the bench tops to a comfortable working height, no more aching backs! Using the old bench legs (short sawhorses) and some treated lumber, more bench space was added to the large tubehouse by making some of the benches wider. This gave us more bench space for plants waiting to be planted in the field and for backup plants. We also had a new water line installed underground from the pump house to the tubehouse area, now we actually have enough water pressure to water all of these plants!

Our large shadetube was fenced with 1 x 2 hardware wire to keep those pesky squirrels out. No more planting peas in my pots! We also added doors and vents on each end for better climate control. A new irrigation controller was installed to control half of the screenhouses. This has mechanical settings rather than a digital display and is very easy to program and read the entire program at a glance. It also does not lose it's memory during power outages.

Staffing Changes

Kim E. Hummer

We have recently hired a permanent part-time Computer Specialist. We welcome Mr. Douglas Cook on board to take care of the Repository computer base, hardware and software. Brian Courtney, our Computer Specialist-Trainee, will be tending the GRIN data, while we work Doug into the data management system over the next year.

We have two visiting scientists at the Repository during FY 1994 and FY 1995. Mr. Yongjian Chang, is studying the effects of abscisic acid and cold hardening on Rubus meristems, to further the earlier work of Dr. Barbara Reed.

Dr. Stan Pluta, Ribes Breeder from Skiernewiece, Poland, will be studying the Ribes collection at the Repository from May to August, 1995. He will be working with the Repository staff to

collect morphological descriptors on the many new species which are now represented in the field planting. He is also carefully evaluating the Ribes cultivar collection for useful horticultural traits.

During FY 1994 Bruce Bartlet received a promotion and Barbara Reed, Joseph Postman, Judy Flynn, and Lisa Hunt received awards for special efforts in the repository behalf.

In November 1994, Wes Messinger successfully defended his M.S. thesis entitled: Molecular systematic studies in the genus Ribes, family Grossulariaceae. He is now working as a part-time Research Assistant in the Oregon State Department of Agriculture, Plant Conservation Biology Program. This spring Wes is also helping teach a course in Population Genetics through the Forestry Department at Oregon State University.

We expect that Derek Peacock, Piyarak (Muk) Tanprasert, and Mohan Kuman will be defending their theses by the end of this summer.

New ELISA for Strawberry Mild Yellow Edge Virus

Joseph D. Postman

There is finally antiserum available against the potexvirus associated with mild yellow-edge disease of strawberry, thanks to the efforts of Dr. Bob Martin's lab at Agriculture Canada in Vancouver, British Columbia. Bob supplied us with antisera early in 1994 that allowed us to index our strawberry germplasm collection for this "elusive" virus. It was elusive in that detection required tedious leaf-grafting onto sensitive strawberry indicator clones. Symptoms on the indicator plants are not always dramatic, and mild strains of the virus may be detected.

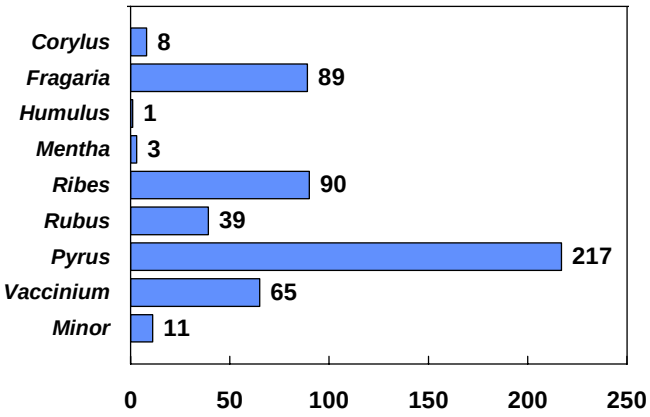
With this new ELISA, we detected mild yellow edge virus in many plants that had tested negative by bioassay. During the summer of 1994, more than 750 accessions were tested, and 132 were found to be infected! Among the mild yellow-edge infected strawberries were 67 clones collected in the wild at 23 different sites in Chile during recent expeditions, and 27 cultivars in quarantine from Japan.

New Mentha Accession

Henrietta Chambers

The Repository has recently received *Mentha satureioides* from Peter Cuneo, Mount Annan Botanic Garden, NSW, Australia. This species is endemic to NSW, Queensland and Victoria and it is the first accession of this taxon for us.

USDA-ARS NCGR
New Acquisitions 1994



523 Total New Inventory Items

New Accessions Summary Report 06/02/95
Ordered by Taxon
01/01/1994 to 12/31/1994

New MAJOR Genera Accessions

Corylus Accessions

Number	Local	Taxon	Country of Origin
(1.)	596	C. avellana L.	Kyrgyzstan -- Jalal-Abad
(2.)	597	C. avellana L.	Kyrgyzstan -- Jalal-Abad
(3.)	598	C. avellana L.	Kyrgyzstan -- Jalal-Abad
(4.)	599	C. avellana L.	Kyrgyzstan -- Jalal-Abad
(5.)	600	C. avellana L.	Kyrgyzstan -- Jalal-Abad
(6.)	601	C. avellana L.	Kyrgyzstan -- Jalal-Abad
(7.)	603	C. avellana L.	Kyrgyzstan -- Jalal-Abad
(1.)	602	C. sp.	Kyrgyzstan -- Jalal-Abad

Fragaria Accessions

Number	Local	Taxon	Country of Origin
(1.)	1335	F. chiloensis (L.) Duchesne	Canada -- British Columbia
(2.)	1336	F. chiloensis (L.) Duchesne	Canada -- British Columbia

(3.)	1310	F. chiloensis (L.) Duchesne	United States -- California
(4.)	1311	F. chiloensis (L.) Duchesne	United States -- Washington
(5.)	1312	F. chiloensis (L.) Duchesne	United States -- Washington
(6.)	1313	F. chiloensis (L.) Duchesne	United States -- Washington
(1.)	1330	F. chiloensis subsp. pacifica Staudt	United States -- Oregon
(1.)	1332	F. hybrid	Canada -- British Columbia
(1.)	1274	F. sp.	Japan --
(2.)	1275	F. sp.	Japan --
(3.)	1276	F. sp.	Japan --
(4.)	1277	F. sp.	Japan --
(5.)	1278	F. sp.	Japan --
(6.)	1279	F. sp.	Japan --
(7.)	1280	F. sp.	Japan --
(8.)	1281	F. sp.	Japan --
(9.)	1282	F. sp.	Japan --
(10.)	1283	F. sp.	Japan --
(11.)	1284	F. sp.	Japan --
(12.)	1285	F. sp.	Japan --
(13.)	1286	F. sp.	Japan --
(14.)	1287	F. sp.	Japan --
(15.)	1288	F. sp.	Japan --
(16.)	1289	F. sp.	Japan --
(17.)	1290	F. sp.	Japan --
(18.)	1291	F. sp.	Japan --

New Accessions Summary Report 06/02/95
Ordered by Taxon
01/01/1994 to 12/31/1994

Number	Local	Taxon	Country of Origin
(19.)	1292	F. sp.	Japan --
(20.)	1293	F. sp.	Japan --
(21.)	1294	F. sp.	Japan --
(22.)	1295	F. sp.	Japan --
(23.)	1296	F. sp.	Japan --
(24.)	1297	F. sp.	Japan --
(25.)	1298	F. sp.	Japan --
(26.)	1299	F. sp.	Japan --
(27.)	1300	F. sp.	Japan --
(28.)	1301	F. sp.	Japan --
(29.)	1302	F. sp.	Japan --
(30.)	1303	F. sp.	Japan --
(31.)	1304	F. sp.	Japan --
(32.)	1305	F. sp.	Japan --
(33.)	1306	F. sp.	Japan --
(34.)	1307	F. sp.	Japan --
(35.)	1308	F. sp.	Japan --
(1.)	1309	F. vesca L.	Italy -- Pimonte
(1.)	1334	F. vesca subsp. bracteata (A.A. Heller) Staudt	Canada -- British Columbia
(1.)	1273	F. virginiana Duchesne	United States -- Tennessee
(1.)	1333	F. virginiana subsp. platypetala (Rydb.) Staudt	Canada -- British Columbia
(2.)	1337	F. virginiana subsp. platypetala (Rydb.) Staudt	Canada -- British Columbia
(3.)	1331	F. virginiana subsp. platypetala (Rydb.) Staudt	United States -- Oregon
(1.)	1262	F. x ananassa Duchesne	Italy --
(2.)	1263	F. x ananassa Duchesne	Italy --
(3.)	1264	F. x ananassa Duchesne	Italy --
(4.)	1265	F. x ananassa Duchesne	Italy --
(5.)	1266	F. x ananassa Duchesne	Italy --
(6.)	1267	F. x ananassa Duchesne	Italy --
(7.)	1261	F. x ananassa Duchesne	Japan --
(8.)	1268	F. x ananassa Duchesne	Japan --
(9.)	1269	F. x ananassa Duchesne	Japan --
(10.)	1270	F. x ananassa Duchesne	Japan --
(11.)	1271	F. x ananassa Duchesne	Japan --
(12.)	1272	F. x ananassa Duchesne	Japan --
(13.)	1321	F. x ananassa Duchesne	Europe --
(14.)	1322	F. x ananassa Duchesne	Europe --
(15.)	1323	F. x ananassa Duchesne	Europe --
(16.)	1324	F. x ananassa Duchesne	Europe --
(17.)	1325	F. x ananassa Duchesne	Europe --
(18.)	1326	F. x ananassa Duchesne	Europe --
(19.)	1328	F. x ananassa Duchesne	Europe --
(21.)	1329	F. x ananassa Duchesne	Europe --
(22.)	1314	F. x ananassa Duchesne	United States --
(23.)	1315	F. x ananassa Duchesne	United States -- California
(24.)	1316	F. x ananassa Duchesne	United States -- California

New Accessions Summary Report 06/02/95
Ordered by Taxon
01/01/1994 to 12/31/1994

Number	Local	Taxon	Country of Origin
(25.)	1317	F. x ananassa Duchesne	United States -- California
(26.)	1318	F. x ananassa Duchesne	United States -- California
(27.)	1319	F. x ananassa Duchesne	United States -- California
(28.)	1320	F. x ananassa Duchesne	United States -- California

Humulus Accessions

Number	Local	Taxon	Country of Origin
(1.)	806	H. lupulus L.	United States -- Oregon

Mentha Accessions

Number	Local	Taxon	Country of Origin
(1.)	692	M. longifolia (L.) Huds.	Kyrgyzstan -- Jalal-Abad

Pyrus Accessions

Number	Local	Taxon	Country of Origin
(1.)	2530	P. communis L.	South Africa --
(2.)	2528	P. communis L.	United States -- Louisiana
(3.)	2529	P. communis L.	United States -- Louisiana
(4.)	2519	P. communis L.	United States -- Maryland
(5.)	2517	P. communis L.	United States -- Oregon
(6.)	2518	P. communis L.	United States -- West Virginia
(1.)	2516	P. hybrid	United States -- Flroida
(2.)	2531	P. hybrid	United States -- Georgia
(3.)	2526	P. hybrid	United States -- Louisiana
(4.)	2524	P. hybrid	United States -- Louisiana
(5.)	2527	P. hybrid	United States -- Missouri
(6.)	2525	P. hybrid	United States -- Tennessee
(7.)	2523	P. hybrid	United States -- Texas
(1.)	2520	P. korshinskyi Litw.	Kyrgyzstan -- Jalal-Abad
(2.)	2521	P. korshinskyi Litw.	Kyrgyzstan -- Jalal-Abad
(3.)	2522	P. korshinskyi Litw.	Kyrgyzstan -- Jalal-Abad
(1.)	2515	P. sp.	United States -- Idaho

Ribes Accessions

Number	Local	Taxon	Country of Origin
(1.)	948	R. grossularia L.	United Kingdom --
(1.)	1009	R. howellii Greene	United States -- Washington
(1.)	976	R. nigrum L.	Canada -- Ontario
(2.)	946	R. nigrum L.	Finland --
(3.)	982	R. nigrum L.	Former Soviet Union --
(4.)	983	R. nigrum L	Former Soviet Union --
(5.)	997	R. nigrum L.	Former Soviet Union --
(6.)	999	R. nigrum L.	France --
(7.)	971	R. nigrum L.	France --
(8.)	967	R. nigrum L.	Netherlands --
(9.)	966	R. nigrum L.	Sweden --
(10.)	968	R. nigrum L.	Sweden --
(11.)	980	R. nigrum L.	Sweden --
(12.)	998	R. nigrum L.	Sweden --
(13.)	984	R. nigrum L.	UNKNOWN --
(14.)	985	R. nigrum L.	UNKNOWN --
(15.)	986	R. nigrum L.	UNKNOWN --
(16.)	987	R. nigrum L.	UNKNOWN --
(17.)	988	R. nigrum L.	UNKNOWN --
(18.)	990	R. nigrum L.	UNKNOWN --
(19.)	991	R. nigrum L.	UNKNOWN --
(20.)	992	R. nigrum L.	UNKNOWN --
(21.)	993	R. nigrum L.	UNKNOWN --
(22.)	994	R. nigrum L.	UNKNOWN --
(23.)	995	R. nigrum L.	UNKNOWN --
(24.)	996	R. nigrum L.	UNKNOWN --
(25.)	1000	R. nigrum L.	UNKNOWN --
(26.)	1001	R. nigrum L.	UNKNOWN --
(27.)	1002	R. nigrum L.	UNKNOWN --
(28.)	1003	R. nigrum L.	UNKNOWN --
(29.)	1004	R. nigrum L.	UNKNOWN --
(30.)	1005	R. nigrum L.	UNKNOWN --
(31.)	1006	R. nigrum L.	UNKNOWN --
(32.)	965	R. nigrum L.	UNKNOWN --
(33.)	969	R. nigrum L.	UNKNOWN --
(34.)	970	R. nigrum L.	UNKNOWN --
(35.)	972	R. nigrum L.	UNKNOWN --
(36.)	973	R. nigrum L.	UNKNOWN --
(37.)	974	R. nigrum L.	UNKNOWN --
(38.)	975	R. nigrum L.	UNKNOWN --
(39.)	981	R. nigrum L.	UNKNOWN --
(40.)	964	R. nigrum L.	United Kingdom --
(41.)	977	R. nigrum L.	United Kingdom --

Ordered by Taxon
01/01/1994 to 12/31/1994

Number	Local	Taxon	Country of Origin
(42.)	978	R. nigrum L.	United Kingdom --
(43.)	979	R. nigrum L.	United Kingdom --
(44.)	989	R. nigrum L.	United Kingdom --
(45.)	1007	R. nigrum L.	United Kingdom --
(46.)	962	R. nigrum L.	United Kingdom -- England
(47.)	963	R. nigrum L.	United Kingdom -- Scotland
(48.)	1008	R. nigrum L.	United States -- Oregon
(1.)	945	R. sanguineum Pursh	Former Soviet Union --
(1.)	947	R. sp.	UNCERTAIN --
(2.)	949	R. sp.	UNCERTAIN --
(3.)	950	R. sp.	UNCERTAIN --

Rubus Accessions

Number	Local	Taxon	Country of Origin
(1.)	1776	R. caesius L.	Unknown --
(1.)	1785	R. chamaemorus L.	United Kingdom -- England
(1.)	1782	R. hybrid	United States -- Florida
(1.)	1778	R. idaeus L.	United States -- New Hampshire
(2.)	1779	R. idaeus L.	Unknown --
(1.)	1777	R. sp.	Costa Rica --
(2.)	1781	R. sp.	United States --
(3.)	1780	R. sp.	United States -- Texas
(1.)	1786	R. strigosus Michx.	United States -- Wyoming

Vaccinium Accessions

Number	Local	Taxon	Country of Origin
(1.)	1189	V. alaskense Anderson	Canada -- British Columbia
(1.)	1187	V. macrocarpon Aiton	United States -- Ohio
(1.)	1185	V. myrtillus L.	Italy -- Pimonte
(2.)	1188	V. myrtillus L.	United Kingdom -- England
(1.)	1175	V. sp.	United States -- Oregon
(2.)	1176	V. sp.	United States -- Oregon
(3.)	1177	V. sp.	United States -- Oregon
(4.)	1178	V. sp.	United States -- Oregon
(5.)	1179	V. sp.	United States -- Oregon
(6.)	1180	V. sp.	United States -- Oregon
(7.)	1181	V. sp.	United States -- Oregon
(8.)	1182	V. sp.	United States -- Oregon
(9.)	1183	V. sp.	United States -- Oregon

Number	Local	Taxon	Country of Origin
(10.)	1184	V. sp.	United States -- Oregon
(1.)	1186	V. uliginosum ssp. occidentale (A. Gray) Hulten	UNKNOWN --
(1.)	1159	V. virgatum Aiton	United States -- Florida
(2.)	1160	V. virgatum Aiton	United States -- Florida
(3.)	1161	V. virgatum Aiton	United States -- Florida
(4.)	1162	V. virgatum Aiton	United States -- Florida
(5.)	1164	V. virgatum Aiton	United States -- Florida
(6.)	1165	V. virgatum Aiton	United States -- Florida
(7.)	1166	V. virgatum Aiton	United States -- Florida
(8.)	1167	V. virgatum Aiton	United States -- Florida
(9.)	1168	V. virgatum Aiton	United States -- Florida
(10.)	1169	V. virgatum Aiton	United States -- Florida
(11.)	1170	V. virgatum Aiton	United States -- Florida
(12.)	1171	V. virgatum Aiton	United States -- Florida
(13.)	1172	V. virgatum Aiton	United States -- Florida
(14.)	1163	V. virgatum Aiton	United States -- Georgia

New MINOR Genera Accessions

Asimina Accessions

Number	Local	Taxon	Country of Origin
(1.)	8	Asimina longifolia	United States -- Florida
(1.)	19	Asimina longifolia Kral	United States -- Florida
(1.)	9	Asimina parviflora	United States -- Florida
(2.)	10	Asimina parviflora	United States -- Florida
(3.)	11	Asimina parviflora	United States -- Florida
(4.)	24	Asimina parviflora	United States -- Georgia
(5.)	25	Asimina parviflora	United States -- Georgia
(1.)	28	Asimina sp.	United States -- Florida
(1.)	13	Asimina tetramera Small	United States -- Florida
(2.)	14	Asimina tetramera Small	United States -- Florida
(3.)	15	Asimina tetramera Small	United States -- Florida
(4.)	16	Asimina tetramera Small	United States -- Florida
(5.)	17	Asimina tetramera Small	United States -- Florida
(6.)	18	Asimina tetramera Small	United States -- Florida
(1.)	20	Asimina triloba	United States -- Georgia
(2.)	21	Asimina triloba	United States -- Georgia
(3.)	27	Asimina triloba	United States -- Maryland
(4.)	22	Asimina triloba	United States -- Mississippi
(5.)	23	Asimina triloba	United States -- Mississippi
(1.)	12	Asimina triloba (L.) Dunal	Unknown --

Number	Local	Taxon	Country of Origin
(1.)	26	Asimina x nashii K.	United States -- Georgia

Pycnanthemum Accessions

Number	Local	Taxon	Country of Origin
(1.)	101	Pycnanthemum pycnanthemoides (Leavenw.)Fern.	United States -- Virginia

Sorbus Accessions

Number	Local	Taxon	Country of Origin
(1.)	236	Sorbus scopulina cascadensis (G. Jones) C. Hitchc.	United States -- Washington

New OTHER Genera Accessions

Castanea Accessions

Number	Local	Taxon	Country of Origin
(1.)	4	Castanea sp.	Australia --
(2.)	5	Castanea sp.	Australia --
(3.)	6	Castanea sp.	Australia --
(4.)	7	Castanea sp.	Australia --
(5.)	8	Castanea sp.	Australia --

Crataegus Accessions

Number	Local	Taxon	Country of Origin
(1.)	199	Crataegus pontica	Kyrgyzstan -- Jalal-Abad
(1.)	197	Crataegus sp.	Kyrgyzstan -- Jalal-Abad
(2.)	198	Crataegus sp.	Kyrgyzstan -- Jalal-Abad

PLANT DISTRIBUTION

Bruce R. Bartlett

The NCGR in Corvallis continues with its mission to distribute plant germplasm within the United States and at the international level. At the time of this printing, we have distributed, for 1994, a total of 1,941 items as seeds, cuttings, runners, scionwood, rooted plants and tissue culture. This number represents 77% of the total number of items requested (2,507) for 1994.

The diverse nature of plant accessions at NCGR-Corvallis present an ongoing challenge to fill all requests in a timely manner. Items therefore, may be pending for as long as three years. The coordination of foreign import permits (IP), seasonal availability and slow growth of some accessions all contribute to delays in plant shipment. Thirteen percent of 1994 requested plants are still pending and 9% are listed as not available. Shipment records from 1992, 93 and 94 show that a total of 75% to 80% of plant requests will eventually be shipped. A developing trend shows that as much as 20% of items requested in a given year will not be shipped. The unavailability of a given accession when requested and complications associated with IP's account for most of the reasons why items will not be shipped. We continue to work with all requestors in improving plant shipment.

The total number of items requested has been remarkably stable since 1993 (2,513 for 1993 and 2,507 for 1994)(Figure). As of this printing, items requested for 1995 appear to follow the trend of the last two years. In 1994 foreign requestors asked for approximately 25% of all items ordered. This has been the trend since 1992 and continues to the present.

Over the past three years (1994-92) accessions from *Fragaria*, *Pyrus*, *Rubus* and *Ribes* were the most often requested in descending order based on a percentage of the total number of items requested (Fig.). However, in 1994 *Ribes* was the most often sought genus and *Fragaria* was fourth. The number of *Mentha* accessions requested has dropped from 307 in 1992 to 107 in 1994. Requests for our other major and combined minor genera have varied only slightly over the past three years.

TISSUE CULTURE/BACTERIOLOGY/CRYOPRESERVATION

Barbara M. Reed

Techniques for hazelnut tissue culture, including multiplying, rooting and transfering to the greenhouse were developed by former graduate student Dr. Xiaoling Yu and are now in use at a local tissue culture company for producing ornamental hazelnut trees. These techniques will also be useful to nurseries and plant breeders for multiplying new cultivars or for use in germplasm storage. Prior to these developments it was very difficult to start and multiply hazelnut cultures. Our initial basic research on regeneration of hazelnut from callus cultures may be useful to future genetic

engineering efforts by plant breeders. Dr. Yu has relocated to the San Francisco area where she hopes to find post-doctoral opportunities in tissue culture or genetic engineering.

Approximately 100 Rubus, 75 Fragaria cultures, and misc. cultures of other genera started this summer were placed in cold storage this fall. Research technician Jeanine DeNoma coordinated the help of Saturday Academy Intern Jessica Mentzer, ARS research apprentice Kimberly Hendricks and OSU student lab assistant Christina Rodriguez in keeping the transfers, repropagation and storage of the 1500 accession in vitro cold-storage collection on schedule.

Graduate student Mohan Kumar is progressing on his project to use RAPDS for determining if variation occurs in strawberries grown on high cytokinin concentrations. He is working on the RAPDS in the laboratory of Dr. Reed Barker, National Forage Seed Research Laboratory.

Requests for plants in tissue culture are coordinated by technician Carolyn Paynter. Materials are removed from cold storage and repropagated as needed to provide healthy material for shipping. Recent shipments have headed to several of the states of the former Soviet Union.

Bacteriology

Procedures for detecting internal bacterial contaminants of tissue cultures, screening of bacterial cultures for antibiotic susceptibility and treating plant cultures with antibiotics to eliminate the bacterial contaminants, methods developed for mint by Dr. Patricia Buckley, are being applied to strawberry and hazelnut cultures. Bacterial contaminants are a continual problem for in vitro culture, but screening, detection and treatment are often haphazard in labs and industry. Lack of knowledge about microbiology prevents proper use of antibiotics in many labs. These papers will provide guidelines for novice microbiologists. This information has already aided in the cleanup of the NCGR Mentha collection, has provided information to help two small commercial labs, and assisted a biotechnology company in its in vitro efforts.

Graduate student Muk Tanprasert has completed diagnostic tests to identify bacteria from strawberry explants and has begun antibiotic testing. High school student Jessica Mentzer, a Saturday Academy Intern from last summer, is working with Dr. Reed on a bacteriology project with Corylus explants as her school schedule permits.

Cryopreservation

Last year, with Dr. M.N. Normah (on sabbatical from Malaysia), we developed a method for cryopreserving embryonic axes of hazelnut seeds. With Research Assistant Dr. Xiaoling Yu we developed procedures for improving the growth of axes following cryopreservation. Previously, hazelnut seeds could be stored for less than one year and could not be cryopreserved. These studies found that whole seed could be frozen and the embryonic axis remained alive, but the cotyledons were damaged. By removing the axis after freezing and culturing it in vitro, plants could be recovered. The axes could also be removed and frozen separately. Dormant seed axes would not produce plants but if the seed were stratified for two weeks, the axes could be removed, dried and frozen, and plants could be recovered in vitro. This provides a reliable storage method for hazelnut

seed. With the assistance of technician Jeanine DeNoma and graduate student Jie Luo, we have now stored approximately 300 embryonic axes of each of two species, Corylus colurna and Corylus americana, from seed collected from species groves on the Oregon State University Research Farm. As seed of other species becomes available we will add them to the liquid nitrogen storage collection.

Jie Luo is continuing research on Ribes cryopreservation. Dr. Reed is collaborating with Dr. Erica Benson, University of Abertay, Dundee, Scotland and Dr. Rex Brennan, Scottish Crop Research Institute, Invergowrie, Scotland on a NATO grant for "Physical and morphogenic studies of cryopreserved Ribes germplasm". She recently returned from Scotland where the team worked with seven different Ribes genotypes. The team members will visit the Repository in August to conclude the project.

Efforts are also underway to continue screening the Pyrus collection for cryopreservation survival, and to store the genotypes with greater than 50% survival in the screening tests. Jeanine DeNoma, Jie Luo and Yongjian Chang are assisting with this project. Several genotypes have been sent to Leigh Towill at the National Seed Storage Lab in Fort Collins, CO for long-term storage.

1994 Virus Indexing Summary

Joseph D. Postman

The virus status of the eight major NCGR-Corvallis genera are summarized in the table below. More than 80% of clonal accessions of *Corylus*, *Pyrus* and *Rubus* have tested negative for common viruses. Collections with largest percentage of virus **infected** clones include *Fragaria* and *Ribes* at 18% and *Pyrus* at 12%. *Humulus* and *Mentha* receive very little virus indexing effort, and *Ribes* has been delegated to lower priority than the other small fruit genera. At the end of 1994, 64% of the 4700 clonal accessions of our 6 major fruit and nut genera were available as virus tested plants. Genus specific comments follow.

Corylus - Apple mosaic is the only reported virus of this genus and is relatively easy to eliminate by heat therapy. About 90% of the collection has either tested negative for ApMV, or has been successfully processed through the virus elimination program.

Fragaria - New antisera against strawberry mild yellow-edge virus, which became available from Dr. Bob Martin in 1994, has allowed us to identify a large number of infected clones which defied detection by the less sensitive bioassay used previously.

Humulus and Mentha - No efforts to detect viruses in 1994

Pyrus - No virus indexing efforts in 1994. Work in earlier years has successfully eliminated viruses from almost 400 infected accessions. Efforts during 1994 were concentrated on small fruits. A permit was received to assist the Beltsville quarantine facility by processing thirty clones through heat-therapy and meristem culture during 1995 in an effort to expedite the movement of trees through quarantine.

Ribes - Collection moved to field where reinfection of plants by insect-borne viruses cannot be controlled. Little effort is being expended on routine indexing. A collection of plants in post-entry quarantine is being processed through heat-therapy and meristem culture in an effort to eliminate possible undetected exotic viruses prior to release from quarantine.

Rubus - Routine testing of new accessions and heat-treated plants for graft and sap-transmissible viruses. ELISA testing of collection using new sensitive antisera against tobacco streak virus.

Vaccinium - Periodic monitoring of our field collections for blueberry scorch carlavirus and blueberry shock ilarvirus, two recently identified viruses spreading in the Pacific Northwest, has failed to detect any infected plants in our collection. Assisted the Oregon Small Fruit Certification Program in 1994 by testing about 150 grower samples for 4 blueberry viruses by ELISA.

Long Range Plan

Executive Summary

Mission

We are a genebank for invaluable clonal plant resources. We will preserve this diverse living germplasm for all people for all time.

Motto

Plant diversity for a diverse future.

Guiding Principles

- Preserve diverse genotypes of assigned genera of temperate fruit and nut crops.
- Encourage free international exchange of plant germplasm.
- Operate and act safely with consideration for all employees, collaborators, and the public.
- Operate and act without discrimination to race, color, religion, sex, national origin, age or handicap.

Goals - Eight major goal areas have been identified by the Repository staff:

- Collection-preservation: To preserve assigned clonal plant collections in good health and identity.
- Administration-workplace: To effectively manage resources to operate USDA-ARS NCGR.
- Information management: To collect, organize, and provide accurate information on plant resources.
- Distribution: To provide plant genetic resources to researchers world-wide.
- Pathology: To identify and eliminate germplasm-born pathogens.

- New acquisitions-collections: To locate, collect, and obtain plants that represent world diversity of assigned genera.
- Research: To improve the preservation of the collection, gather information and collaborate with other scientists on crop development.
- Public Relations: To inform and serve the public.

Current Program

The unit is funded through two CRIS assignments.
Collection, Preservation Distribution and Documentation ....
CRIS 5358-15000-011-00D

The major CRIS is assigned to preserve, collect, distribute, and evaluate genetic resources of thirty assigned predominantly temperate climate genera. These genera fall into the general categories of small fruits, tree fruit, nuts, and agronomic crops.

Many countries and every state in the US produces small fruit crops of those assigned to the Corvallis Repository. Strawberries rank in the top 20 most valuable commercial agricultural crops in the country. Pears, hazelnuts (filberts), hops, and mint, while being crops of regional commercial importance, are also of increasing interest throughout the country. These high value specialty crops assigned to the Corvallis Repository offer important and healthy needed variation to our diet and add unique flavors for food products. The fresh and processed value of these crops is significant to domestic markets and international trade. Nursery crop production is also a significant market.

Alternate Germplasm Storage Technologies ....
CRIS 5358-15000-014-00D
Development of efficient methods for germplasm preservation is a high priority throughout the world. Alternative storage and back-up technology is needed to safeguard the traditional preservation methods of orchards, fields, screenhouse and greenhouse-grown plants. These alternative technologies may be labor, space, and cost efficient. In vitro techniques aid in virus elimination when combined with thermotherapy. Virus tested in vitro cultured plants provide clean material for plant distribution, satisfying many quarantine regulations.

Research Highlights

- Modification of in vitro culture media to initiate, grow and root blueberries, pears, and hazelnuts.
- Effect of cryoprotectants, abscissic acid, acclimatization and other factors on survival of meristems under cryogenic conditions
- Cold storage of in vitro plantets of pear, strawberry, and raspberry.

- Elimination of internal contaminants from in vitro cultures of mint
- Cryogenic preservation of hazelnut seeds and embryonic axes.
- Testing and elimination of viruses in hazelnuts, strawberries, pears, currants, gooseberries, blackberries, raspberries, cranberries, and blueberries.
- Taxonomy and cytology of strawberries, raspberries, currants, gooseberries, mint, and wild relatives.
- Seed germination requirements of blackberries and raspberries.
- Restriction site mutations in the nuclear and chloroplast genome of currants and gooseberries.

Resource Needs

Level or decreasing base funds are predicted for the next several years. With increased utilities and salaries, temporaty or seasonal employees will be lost. New acquisitions will not be increasing as rapidly as would be desired for the optimum germplasm preservation, however, a place for significant genotypes and species will be available in the collection.

Significance

A. Relevance of Proposed Work to USDA Program Objectives. What part of the ARS Strategic Plan do these goals address?

Four ARS strategic plan codes directly address the mission, objectives and action taken at the Corvallis Repository. The USDA is mandated by law to preserve genetic resources for crops with economic importance to the US. The Repository serves a combined commodity group with a US farm gate production value of more than $X.X billion annually.

2.1.1.2 Plant Germplasm Acquisition
2.1.1.3 Germplasm Conservation and Preservation
2.1.1.4 Plant Germplasm Characterization
2.1.2.5 Plant Germplasm Evaluation

B. Relevance to Long-Range improvements in Agriculture:

The collections at our unit provide the foundation on which crop improvement is based. The "raw materials" in our collections are available for traditional breeding techniques, or for molecular techniques such as gene splicing. Our collections are reservoirs for genes enhancing yield, quality, resistance to pests or diseases. This gene pool may provide alternatives to the pesticides and fertilizers presently in use. The collections are a potential pharmacy of medicinal applications for researchers investigating anti-viral or other beneficial drugs.

Farm Gate Values of crops assigned to the NCGR Corvallis ($ million)

Corylus -	hazelnuts (US 1987)	21
Fragaria -	strawberries(US 1989)	519
Humulus -	hops (US 1992)	150
Mentha -	mint (US 1989)	112
Pyrus -	pears (US 1989)	251
Ribes -	currants/gooseberries	2
Rubus -	blackberries/hybrids	55
	raspberries	100
Vaccinium -	highbush blueberries (US 1990)	104
	cranberries (US 1988)	186
Nursery Crop Production (our genera)		200
		(Total $ 1.7 billion)

NCGR VISITORS for 1994

Jan 11	Kostya Cuayka, t. Kiev, Ukraine
Feb 9	Abdel-Rahman Hashem Bassiouny, E. Delta Ag. Res. Sta., Egypt Mamdouh El-Sayed Morsi El-Shamy, Sakka Res. Sta., Egypt Mohamed Ali Mousa Eid, Ismaellia Res. Sta., Egypt Mohamed Husien Eskander, Rancher, Egypt
Feb 14	Kareen Sturgeon + 15 Students, Linfield College, McMinnville, OR
Mar 15	David Ashtoo, Florel Hill Miltogray NDV Australia Peter Stiles, (same as above)
Mar 20	Jon Mittaila, Romania
Apr 15 - May 15	Drs. Ruchira Pandey & Neelam Sharma, Indian Bureau of Plant Genetic Resources, New Delhi, India
Apr 25	Kaim Berg, Laxmaus Akarp, Lund, Sweden
Apr 29	Laura & Mary Jo Toledo, Univ. Nac. Che., Argentina
May 5	Larry Hill, 20 students from Highland View Middle School, Corvallis, OR
May 10	Mohamed Khalifa, ARC, Giza, Egypt
May 11	Julie Gust Boy Scout troop, 5-7 boys
May 13	Willamette Valley Beekeepers, 50-60 people

May 24	Martin Thingvold, Ag. Dept., Linn Benton Comm. Coll., Albany, OR 20 students
May 25	Philomath High School, Philomath, OR . 15 students approx.
Jun 6	Daniel Kirschbaum, Tucoman, Argentina
Jul 7	M. Ownsu-Akyan, CRI, Kumasi, Ghana, WIA Farhan Shabbir, Pakistan Mohammad Igbal, " Mimeun Bourzig, Mamva, Morocco Abatcha W. Baga, Nigeria A.B. Salit, Tamole
Jul 8	Roy Hart, New Zealand
Jul 12	Robin B. Hirch, Florida Museum of Natural History, Gainesville, FL Paul M. Catling, Agriculture Canada, Ottawa, Canada
Jul 15	Catherine A. Offord, Mt. Anan Botanic Garden, Sydney, Australia H. L. Barrawes, Universidad du Boriupan, Chile Alesandro Rodriguez, Chile
Jul 22	Robert Sarran, Australia Ken Jenvey, Australia B.J. Smith, Victoria, Australia Peter Nankervis, " Gary Nankervis, "
Jul 28	Inger Hjalmarssun, Sweden Dr. Chung-Chu Nee, Dept. Horticulture, Taiwan Lih-Jen Nee, Taichung, Taiwan
Aug 4	M.H. Pamhnar, Karachi, Pakistan Mrs. Farromaar Panhwar, " Carl Johenussen, Univ. OR, Eugene, OR
Aug 5	David M. Humbo, Agriculture Canada, Harrow, Ont., Canada Chieri Kuboda, Japan
Aug 6	Ned Garvey, U.S. National Arboratum, Washington D.C. Robert D. Marchard, Holden Arboratum, Chicago, Illinois
Aug 10	Eight tours (115 people) as part of the American Society of Horticultural Scientists Meeting.

Aug 17	Christopher Chambers, Ibadan, Nigeria
Aug 24	Liang Weijian, Economic Forestry Institute of Liaoning Prov. Dalian, China
Aug 26	Paul Glucina, Hort Research, Auckland, New Zealand Dorian Scott, "
Aug 30	Dr. Manju Uprety, NBPURN, New Delhi, India Brham Parkash Dahiya, National Bureau of Plant Genetic Resources, Pusa, New Delhi, India
Sept 6	Ferrin Laguarda., Valencia, Spain
Sept 26	Stephen Leivers, South Africa
Sept 30	Josef Wysrymski, Poland
Oct 6	Agarwal, P.C., NBPGR, New Delhi, India Singh Charan, " Jalli Radhamani, " Serwan Lakhaupaul, " Pratikhe Brahmi, " Kamala Veirkateswam, "
Nov 11	Sergei Kolkov, Yalta
Nov 12	Fabian Setzke, Dusseldorf, Germany Sheng Ke Xi, Chinese Academy of Forestry, Beijing, China T. Byambadoy, Ministry of Fd. & Ag., Taanbaatar, Mozola
Nov 18	Vadim Molodkin, Vavilov's All Russia Inst. of Pl. Ind., St. Petersburg, Russia O. A. Ragah, Ag. Univ. of Norway, Norway 30 OSU students and instructor, Charles Boyer , of OSU Horticulture class
Nov 29	Lingxiao Zhang, China
Dec 1	Work Unlimited Class, 6 students Stella Galagher, Crescent Valley High Sch. & Oregon State University class, 13 students and instructors.

Aside from all noted above we have had visitors from throughout the United States too numerous to name in this document.

TRAVEL/MEETINGS and TALKS FOR 1994

Nov 1	Kim Hummer attended NCR-22 Small Fruits Meeting, Washington, DC
Nov 2	Barbara Reed to Criobiology Congress & 2nd Gen. Assembly of Spanish Interdisciplinary Soc. of Criobiology, Oviedo, Spain
Nov 15	Kim Hummer to RL/LAO Meeting, Napa, CA
Nov 17	Joseph Postman attended Annual Conference for Small Fruit Research, Pasco, WA
Jan 4	Joe Snead, Lisa Hunt, & Raymond Gekosky attended Pesticide Use t training (Or. Dept. of Ag.) in Portland, OR.
Feb 1	Joseph Postman went on a site visit to Germplasm Research Information Network in Baltimore, MD.
Mar 6	Kim Hummer attended Legislative Training in Washington, D.C.
Mar 28	Joseph Postman & Joe Snead, went on Site Visit to Davis, CA.
May 6	Dennis Vandeveer attended Laboratory Safety Training, Phoenix, AZ
May 17	Dennis Vandeveer went to Trane Oregon Training in Refrigeration Handling & EPA Certification Training in Portland, OR.
May 30	Judith Flynn attended Professional Excellence Seminars in Portland, OR.
Jun 3	Barbara Reed, Tissue Culture Assoc. Meeting & International 8th Congress on Plant Cell & Tissue Culture Meeting, N.Carolina, USA, Rome & Florence, Italy.
Jun 25	Joseph Postman, 16th International Symposium on Virus Diseases of Temperate Fruit Crops, Rome, Italy
Jun 26	Kim Hummer, CAC & PGOC Meetings & Site Visit to Plant Quarantine, Washington, D.C.
Jul 5	Kim Hummer, W-6 Technical Committee Meeting, Pullman, WA
Aug 1	Brian Courtney, Germplasm Resources Information Network Meeting, Beltsville, MD
Aug 5	Wes Messinger to American Institute of Biological Science Meeting, Knoxville, TN

Aug Dr. Barbara Reed & Jeanine DeNoma chaired sessions at the Apprenticeship in Science & Engineering Symposium sponsored by the Saturday Academy at Willamette University, Salem, OR.

Sep 27 Dennis Vandeveer, Refrigerator Training, Portland OR

SPECIAL AWARDS, INVITATIONS, AND TRIPS IN 1994

Nov 2 Dr. Barbara Reed accepted all expenses paid invitation to present a paper at the Criobiology Congress & 2nd Gen. Assembly of Spanish Interdisciplinary Society of Criobiology .

1994 Dr. Barbara Reed served on the Plant Division Planning Committee for the Society for In Vitro Biology & organized workshops for the 1994 meetings. June 1994 Dr. Reed was elected Secretary of the Plant Division.

Apr 13 Dr. Bruce Bartlett received a USDA award for, "Superior performance in reducing the backlog of germplasm requests, expediting procedures and developing new protocols for improving plant distribution.

Sep 7 Lisa Hunt received a USDA award for, "Initiation of new cultural proceedures that produced superior screenhouse plant collections. The excellent condition aids our staff and researchers nation wide in their missions".

Oct 13 NCGR was 1994 Employer of the Year Award (for the work assignments of two employees with developmental disabilities employed at NCGR), The Arc of Benton County-A United Way Agency.

Oct 14 Dr. Barbara Reed was awarded a USDA award, "For superior research in developing the first laboratory technique for long term preservation of *Corylus* seed.

Oct 21 Judith Flynn received a USDA award , "For initiative and superior action in coordinating visiting scientists, tour groups and the general public and enhancing the public relations effort at the NCGR, Corvallis, Oregon.

Jan 12 Joseph Postman received a USDA award, " For time, effort, and assistance beyond assignment to improve the local area network at the Repository, and for personal assistance to insure that each staff member has access to needed information systems.

FOREIGN TRAVEL REPORTS

A. **Barbara M. Reed**

1. Research Plant Physiologist, USDA-ARS NCGR-Corvallis, OR 97333

2. Countries Visited, Dates: Italy, June 9-27, 1994

3. Purpose: To attend the VIII International Congress on Plant Tissue and Cell Culture in Firenze, Italy, present a poster and assist with a workshop on cryopreservation and visit IPGRI in Rome to discuss in vitro storage and cryopreservation of plant germplasm.

4. Summary: The meeting was well attended by European Scientists with a few US and Japanese also in attendance. The plant cryopreservation group was relatively small but there were many interested in micropropagation.

B. **Joseph D. Postman**

1. Plant Pathologist, USDA-ARS NCGR-Corvallis, OR 97333

2. Italy, June-July 1994

3. Purpose: Attend the 16th International Symposium on Virus Diseases of Temperate Fruit Crops in Rome and visit pomology/pathology research stations.

4. Summary: Joseph presented a paper entitled: Elimination of Apple Scar Skin Viroid from Pears by In Vitro Therapy, and interacted with pathologists from around the world who specialize in fruit tree and small fruit virus diseases. Following the week long symposium, he traveled to Bologna to visit Professor Silviero Sansavini at the Dipartimento di Colture Arboree, University degli Studi di Bologna. Prof. Sansavini arranged for Joseph to visit the University's germplasm plots, and fruit tree breeding program at Cadriano, a nursery certification program in Ferrara, and their plant pathology institute in Faence. During the field tours Joseph was able to observe MLO diseases of pear and raspberry that do not occur in the U.S. and which have quarantine significance, and to identify potential collaborators for future germplasm evaluation projects.

COMMITTEES, OTHER ASSIGNMENTS, ACTIVITIES, AND NEWS

Henrietta Chambers

Member, National Clonal Germplaslm Repository Technical Committee

Kim E. Hummer

Chair, American Society for Horticultural Science (ASHS) Genetics and Germplasm Working Group

Member, Fruit Breeding Working Group ASHS

Ex-officio, *Pyrus* Crop Germplasm Committee, Small Fruits Germplasm Committee, Woody Landscape Germplasm Committee

Ex-officio, National Clonal Germplasm Repository Technical Committee

Vice Chair, Plant Germplasm Operations Committee

Member, Total Quality Management Coordinating Committee, USDA-ARS-PWA

Member, Foundation Plant Materials Board, Crop Sciences, Oregon State University

Member, California Fruit Tree, Nut Tree and Grapevine Improvement Board

Member, W-6 Western Region Germplasm Technical Committee

Courtesy Assistant Professor in the Department of Horticulture, Oregon State University, Graduate Faculty

Courtesy Assistant Professor in the Department of Botany and Plant Pathology, Oregon State University, Graduate Faculty.

Joseph D. Postman

Ex-officio, *Pyrus* Crop Germplasm Committee.

Represented NCGR at Linn Benton Fall Fruit Show, LBCC Campus, Albany, OR

Represented NCGR at Linn Benton Community College Job Fair, LBCC Campus, Albany, OR

Member, Germplasm Resources Information Network Advisory Committee

Barbara M. Reed

Member and Tissue Culture Representative, Germplasm and Genetics Working Group, American Society of Horticultural Science.

Member, Plant Program Committee, Society for In Vitro Biology.

Secretary/treasurer of the Plant Division, Society for In Vitro Biology.

Member, Student Awards Committee, Society for In Vitro Biology.

Courtesy Assistant Professor, Department of Horticulture, Oregon State University

Honorary member, Spanish Society for Cryobiology

Maxine M. Thompson

National Clonal Germplasm Repository Technical Committee

Juglans Crop Germplasm Committee

NCGR PUBLICATIONS

Buckley, P. M. and **Reed**, B. M. 1994. Antibiotic susceptibility of plant-associated bacteria. HortScience 29:434. Abstr.

Chambers, H. L. and **Hummer**, K. E. 1994. Chromosome counts in the *Mentha* collection at the USDA-ARS National Clonal Germplasm Repository. Taxon 43:423-432.

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