State of Oregon Annual Report for Calendar Year 2014
W-6 Technical Committee

Compiled by Shawn A. Mehlenbacher

Oregonians continue to use the PI system extensively. Users include state and federal researchers as well as private seed companies and private individuals. Oregon's requests from 135 users for plant germplasm through GRIN in 2014 make it a major user in the western region, along with California and Washington.

Progress Reports:

1. **Shawn A. Mehlenbacher**, Dept. of Horticulture, Oregon State University, 4017 ALS Bldg., Corvallis, OR 97331

Hazelnut – eastern filbert blight (EFB). In cooperation with Tom Molnar (Rutgers University), tests over several years identified more than 100 accessions with a very high level of EFB resistance. Brooke Peterschmidt Colburn (M.S. thesis) showed that eastern filbert blight resistance from the Spanish cultivar 'Culpla', Serbian cultivar 'Crvenje' and Russian selection OSU 495.072 segregated 1 resistant : 1 susceptible. She mapped all three resistances to the same location on LG6 as 'Gasaway' resistance, and published the results in JASHS. Using disease phenotype data following greenhouse and/or structure inoculation, M.S. student Gehendra Bhattarai found segregation ratios ~1:1 suggesting single dominant gene resistance from OSU 1181.023 (*C. heterophylla* 'Ogyoo' resistance), OSU 1049.030 and OS 1038.008 (Yoder #5 resistance), OSU 1086.053 (*C. americana* 'Rush' resistance). Of 8 selections from a Forestry institute near Moscow, Russia, five (N02, N23, N26, N27, N37) segregated ~1:1: It appears that resistance from N26 maps to LG6, but the others map to different linkage groups. The Serbian cultivar 'Uebov' transmits resistance to about 25% of its offspring. Ph.D. student Golnaz Koma Komaei is continuing the EFB studies. When crossed with susceptible selections, OSU 1187.101 (Holmskij, Russia), OSU 1185.126 (Crimea) and OSU 955.028 (resistance from *C. americana*) transmitted resistance to ~50% of their offspring. Recent tests detected resistance in 15 selections from seeds collected in Turkey. High levels of quantitative EFB resistance have also been detected in a dozen selections of diverse origin.

Hazelnut – incompatibility. A paper published in the Journal of the American Society for Horticultural Science in March 2014 summarized the results of 17 years of incompatibility testing using fluorescence microscopy, including the discovery of six new alleles and determination of dominance relationships among 105 new pairs of alleles. S-alleles were reported for 284 cultivars, 13 interspecific hybrids and 522 selections of diverse origin. Geographical differences in S-allele frequency were noted.

Hazelnut – simple sequence repeat markers. Brooke Peterschmidt Colburn developed 113 new simple sequence repeat (SSR) markers from transcriptome sequences and characterized them using 50 diverse hazelnut accessions. Gehendra Bhattarai developed 366 new polymorphic SSR markers (tri-, tetra-, penta- and hexa-repeats). The 'Jefferson' sequence (115× coverage), assembled from Illumina reads, serves as the reference genome sequence for hazelnut. Genomic DNA of seven other cultivars was also sequenced using Illumina. Alignment of reads from these seven cultivars with the 'Jefferson' sequence allowed in silico comparisons and identification of

polymorphic SSRs. The new polymorphic SSRs were characterized by amplification of 50 accessions with fluorescent primers and sizing with capillary electrophoresis. About 250 are being mapped. Undergrad Colton Ives studied segregation for style color in two progenies, constructed maps for LG5 using SSR markers, and published the results in HortScience.

2. Jeff Leonard, Department of Crop and Soil Science, Oregon State University, Corvallis, OR 97331

Hordeum vulgare 'Golden Promise' (PI 467829) was used in research supported by a grant "Creating a physical map of the barley genome using radiation hybrids" from the Agricultural Research Foundation. The goal of the project is to create a physical map of the barley genome to aid assemblage of the barley genome sequence. This is a pilot project that will develop preliminary data supporting a larger grant proposal to be submitted in collaboration with researchers from the James Hutton Institute. He is now creating the radiation hybrids and expects results by the fall of 2015.

3. Pankaj Jaiswal, Dept. of Botany & Plant Pathology, Oregon State University, 2082 Cordley Hall, Corvallis, OR 97331

He used seeds of *Triticum monococcum* subsp. *aegilopoides* for bulking and performed drought and high salinity (NaCl) response experiments on the plants. They isolated mRNA from treated and control samples, but have not done any trait evaluations so far.

4. Abigail Graham, Department of Horticulture, Oregon State University, Corvallis, OR 97331

Abby is a student in Jim Myers' vegetable breeding project. She received lines of root rot resistant beans from the PI system, and is researching the genetic control of root rot in beans. These lines, reported as resistant in the literature, are being used as resistant checks. Her project will involve using GWAS to identify QTL associated with root rot resistance.

5. Aaron Liston, Department of Botany and Plant Pathology, Oregon State University, 2082 Cordley Hall, Corvallis, Oregon 97331-2902

Accessions requested in 2014 are being used by an undergraduate student conducting her honor's thesis research. The goal is to identify strawberry specimens collected in the South Pacific by the 1934 Mangareven Expedition and now preserved at the Bishop Museum in Hawaii.

Two recent publications from my lab utilized *Fragaria* accessions obtained in previous years: (PI 551572, PI 664465, PI 612489, PI 657873, PI 657872, PI 637967 and PI 657855). A key outcome of this research is the first complete resolution of the genome composition of the progenitors of the cultivated strawberry. This has been a longstanding, difficult question, due to the complex octoploidy (four diploid genomes) of the cultivated strawberry and its direct

ancestors. The woodland strawberry, *Fragaria vesca*, contributed one of the four genomes to the cultivated strawberry. The other three came from a Japanese species, *Fragaria iinumae*. It has been suspected for about 20 years that these two species were involved, and the predominant hypothesis was that each contributed two of the four genomes. Our unexpected result was that there were ancestrally three Japanese strawberry genomes, and only one of the woodland strawberry. However, we also found 48 distinct locations where one of the Japanese strawberry genomes has been replaced by a sequence from the woodland strawberry. Remarkably, this process is unidirectional, with no cases of the woodland strawberry genome replaced by a sequence from a Japanese strawberry genome. This biased replacement has not been previously observed, and it will be of interest to discover if it occurs in other polyploid plants. The practical value of this information is that it will allow scientists evaluating particular gene sequences within the cultivated strawberry to classify them by their genome of origin. For example, we determined that the genes responsible for sex expression (male and female plants) in the direct ancestors of the cultivated strawberries are on two different subgenomes. Plant breeders and geneticists working to improve the cultivated strawberry, as well as anyone working on other crops with polyploid genomes can make use of the POLiMAPS (Phylogenetics Of Linkage-Map-Anchored Polyploid Subgenomes) method developed as part of this research project. POLiMAPS greatly simplifies the analysis of genetic variation in these plants. In addition, it is anticipated that this approach will be applied to resolve the unknown genomic ancestry of other polyploids, including oats, sweet potato and sugarcane. For more details on this research, visit wildstrawberry.org.

6. Jennifer Lorang and Tom Wolpert, Dept. of Botany & Plant Pathology, Oregon State University, 2082 Cordley Hall, Corvallis, Oregon 97331-2902

Drs. Lorang and Wolpert received seed of one *Oryza sativa*, 12 *Sorghum bicolor* subsp. *bicolor*, one *Sorghum propinquum*, and 24 *Zea mays* subsp. *mays* accessions 2014. The *Oryza sativa* line is a parent of a cross from which they have used an F2 population to map genes for fungal toxin sensitivity. This work has been fruitful but has not yet been published. They screened all of the remaining taxa for sensitivity to fungal toxins produced by plant pathogens, in hopes of finding lines to map genes conferring disease susceptibility. None of the lines proved to be useful for further investigations at this time. They noted "the service that the U.S. National Plant Germplasm System provides is crucial for our continued research efforts to fight plant disease."

7. Kelly Vining, Center for Genome Research and Biocomputing, Oregon State University, 3021 ALS Building, Corvallis, Oregon 97331

Two accessions of *Fragaria vesca f. bracteata* accessions were used in the graduate level class “Techniques in Molecular and Cellular Biology.” DNA was extracted and prepared for Illumina genome sequencing by the students in the class. After sequencing was completed at the CGRB, the students explored computational methods for *de novo* genome assembly.

Four accessions of *Mentha* are being used to study gene expression in mint after infection by the fungus *Verticillium dahliae*. The objective is to compare sets of genes expressed in resistant vs. susceptible accessions, and between control plants and *Verticillium*-inoculated

plants, at two time points post-inoculation. Commercially-grown mints are polyploids, and *Mentha longifolia* has been developed as a diploid model to study the genetics of agronomically important traits. Both the *Mentha x piperita* accession ('Black Mitcham' peppermint) and the *Mentha longifolia* subsp. *polyadenia* accession are highly susceptible to *Verticillium* wilt, while the *Mentha spicata* accession (Native spearmint) and the *Mentha longifolia* subsp. *capensis* accession are resistant. The ultimate goal of the project is to identify genes to target for marker-assisted selection in a mint breeding program.

8. Vidyasagar Sathuvalli, Hermiston Ag Research & Extension Center, Oregon State University, 2121 South 1st Street, Hermiston, Oregon 97838

1. Field evaluation of primitive cultivars and foreign varieties. Tubers from 94 different cultivars were obtained from Potato Genebank for their field performance at the Hermiston station. They were planted as four hills. Two primitive cultivars and three foreign varieties looked promising as they produced nice tubers and performed well in storage. He plans to utilize these clones in the breeding program.

2. Identification of new sources of resistance to Columbia root knot nematode (CRKN) and Verticillium wilt (VW). True potato seeds from 46 PIs representing nine different *Solanum* sp. were obtained from the Potato Genebank to screen for resistance to CRKN and VW. The goal is to screen 10 plants per accession. If potential resistant sources are identified, they will be evaluated for their resistance to other major nematode pests.

3. Developing whole genome sequence resource for *Solanum bulbocastanum* clone SB22. *Solanum bulbocastanum* clone SB22 is the source of resistance to CRKN, and the resistance was introgressed into russet potatoes by Dr. Chuck Brown in Prosser, WA. He is currently developing whole genome sequence resources for SB22 through Illumina sequencing. A genome browser is being developed and will be available to public at solanum.cgrb.oregonstate.edu

4. Introgression of high folate from wild *Solanum* germplasm to commercial potatoes. Dr. Goyer's group screened wild germplasm for folate concentration in potatoes and identified ~10 clones from *S. vernei* and *S. andigenum* with high folate concentrations in the tubers. He is planning to introgress high folate genes from these clones to the commercial potatoes.

9. Aymeric Goyer, Hermiston Ag Research & Extension Center, Oregon State University, 2121 South 1st Street, Hermiston, Oregon 97838

Vitamin B9 (a.k.a. folates) deficiency is one of the most widespread nutritional deficiencies worldwide, and is associated with an increased risk of birth defects (*e.g.*, spina bifida, anencephaly), strokes, cardiovascular diseases, anemia, some types of cancers, and impairment of cognitive performance. Most of these deficiencies are due to low folate intake. Vitamin B9-enriched potatoes have the potential to deliver the needed amount of folate to the widest populations. Toward this goal, we have been exploring the natural genetic diversity of folates in various potato germplasm. A MS student was hired as part of NIFA- and WSARE-funded grants to work on pre-breeding and breeding for folate enhancement in potato based on preliminary data obtained from germplasm received from NRSP6. The student has been evaluating folate in new potato germplasm received in 2014, and in potato hybrids obtained by

crossing wild potato germplasm with *Solanum tuberosum*. The materials were received in good condition.

10. Stefan Seiter, Linn Benton Community College, 6500 Pacific Blvd., Albany, OR 97321

Scions of five pear *Pyrus communis* accessions were requested for a Plant Propagation class at LBCC on grafting. The scions were butchered by the student, resulting in no progeny, no significant findings, and no publications.

11. Angela Hoffman, University of Portland, 5000 N. Willamette Blvd., Portland, OR 97203

In May 2014, Dr. Hoffman requested cuttings from branches of *Corylus avellana* 'Ennis' and 'Gasaway'. Her students used the cuttings in a study to learn more about how taxol, methyl jasmonate and other compounds affect EFB spore germination on the tips of the branches. They presented preliminary findings at two conferences: the Murdock Undergraduate Research conference in November 2014 and the American Chemical Society meeting in March 2015. She expects to finish a manuscript on this research in the next year.

12. India Sloat, Philomath High School, 2054 Applegate, Philomath, Oregon 97370

She teaches Botany at Philomath High School, and used the scion wood in a teaching unit on Plant Reproduction and Propagation. Students take a field trip to the USDA Repository and select a type of pear they want to graft. They graft those varieties in the spring and then have an opportunity to plant the surviving trees into the Botany orchard on the high school campus. There are about 45 students in the class.

13. Barbara Hinds-Cook, DLF Pickseed USA, 175 H Street, Halsey, Oregon 97348

The plant germplasm accessions requested from the plant introduction station in Pullman were used in establishing PVP nurseries. One accession each was requested of *Agrostis stolonifera*, *A. stolonifera* var. stolonifera, *Festuca longifolia*, *F. trachyphylla*, and two accessions of *Festuca lemanii*.

14. Matt and Dustin Herb, Oregro Seeds, 33080 Red Bridge Road, Albany, Oregon 97322

The PI and check samples received were used for comparison nurseries of new varieties. He received 20 PI numbers several years ago and has been using them in a program to develop new diploid perennial ryegrasses for forage use in colder regions of the world. These PI numbers were from eastern and northern Europe with the hopes that there would be adequate genetic diversity, coupled with winter hardiness and enhanced dormancy factors. Crosses were made, cycles of selection completed, and they are now in performance trials. They add, "The PI

system is an excellent resource available for researchers, and I appreciate the opportunity to utilize the System".

15. Virginia G. Lehman, Blue Moon Farms, LLC, PO Box 2390, Lebanon, Oregon 97355

She used the fine fescue, crimson clover, mustard, and orchardgrass accessions in morphological measurement nurseries to compare to new experimental varieties to determine if they've made progress in attributes. They are evaluating the cereal ryes and the other clovers to see they can develop something for breeding for cover crops. The Rhodes grass is a species that may help in water conservation. "This note is to express appreciation for the use of the plant germplasm from the US NPGS. The help from the US NPGS is tremendous and greatly appreciated. We consider the germplasm as priceless, and the access to it tremendous".

16. Guy E Meacham, Product Development Manager, J. Frank Schmidt & Son Co., 9500 SE 327th Avenue, P.O. Box 189, Boring, Oregon 97009

Three *Sorbus torminalis* were obtained from the US National Plant Germplasm System. SOR 274.005. They have two test plots under observation, one budded in 2013 & one budded in 2014. Unfortunately takes were low. Only 1 out of 15 in the 2013 plot & 4 out of 15 in the 2014 plot. No detailed evaluations yet. SOR 275.010. They have two test plots under observation. Budding results were better for this clone, 12 out of 15 in 2013 & 14 out of 15 in 2014 grew. These plants grew to about 4' tall had good dark green foliage and will continue under observation. It is the most promising of the 3 clones received so far. SOR 276.008. We have two test plots under observation. In 2013 none of the buds survived, in 2014 3 out of 15 survived. The plants have not yet grown enough to make any detailed observations. They will continue to evaluate all clones through the 2015 growing season & may bud a third test plot of each in August 2015. Keith Warren retired in Fall 2014, and Guy Meacham has assumed his duties.

17. Erica Bakker, Dow AgroSciences, 16160 SW Upper Boones Ferry Road, Portland, Oregon 97224-7744

Threee maize PIs were requested as part of an effort to describe variation for a range of agronomic traits with an objective of mapping the traits and possibly incorporating some alleles in our breeding program.

18. Marie Blanshan, Quality Control Technician, Betaseed Inc., 34303 Hwy 99E, Tangent, Oregon 97389

She ordered seeds of *Solanum americanum, S. dulcamara*, and *S. villosum* to add to the Betaseed herbarum. She needs to be able to compare them to other seeds when she does purity testing to be sure she is identifying correctly.

19. Larry Stauffer, XPlant Labs Inc., 3535 SW Multnomah Blvd., PMB106, Portland, Oregon 97219

The plant introductions received by Xplant Laboratory Inc. from the National Plant Germplasm System (NPGS) during the calendar year 2014 were one of *Corylus avellana* (PI 637885, Zeta), three *Rubus* hybrids (PI 553272 Black Satin , PI 553254 Marion, and PI 618441 Triple Crown), two *Rubus idaeus* subsp. *ideaus* (PI 553384 Meeker and PI 618441 Tulameen), and one *Rubus occidentalis* (PI 553740 Munger). Xplant Laboratory Inc. requested the *Rubus* and *Corylus* for the primary purpose of propagation for sale to Oregon Nurseries. Of the cultivars obtained, all are maintained for potential propagation for sales, with no significant sales to date except for 'Marion' blackberry. In propagating these cultivars, they used culture media and methods as published in the literature and as provided by Barbara Reed of the National Clonal Germplasm Repository in Corvallis, OR. They made some minor modifications in the formulations of the media used for propagation of Rubus and Corylus.

Rubus. Xplant tested both "Blackberry Medium" and "Anderson's Raspberry Medium" as described in Excerpts from the Operations Manual, NCGR-Corvallis 1998 Rubus. These were compared to 2.5 Mesos Rubus Medium (2/26/14 NCGR-Cor. formula) and to MS medium (Phytotech M519) with 2.0 Mesos. Although the studies were not performed in a manner that would support publication, they generally obtained good growth of all *Rubus*, including *Rubus idaeus* subsp. *ideaus* using M519 MS medium supplemented with Mesos ($CaCl_2$, $MgSO_4$ and KH_2PO_4) to yield 2.0 final concentration. Cultivars of Rubus hybrid (blackberry) were typically grown using benzyladenine (BA) at 0.1-0.2 mg/L, whereas both red raspberry and black raspberry cultivars were typically grown using BA at 0.5 mg/L.

Corylus. Xplant began propagating *Corylus* cultivars using medium as described by Yu and Reed, HortScience 30(1): 120-123 1995. This medium is basically DKW medium altered substituting sucrose with 30g glucose and with the addition of 200mg/L Sequestrene Fe. This medium was used with good success until they began using the 2013 NCGR-Cor optimized DKW formula as provided by Dr Reed. They have used the 2013 NCGR-Cor DKW medium formulation successfully since it was provided, with only minor modifications. The first modification we made was to blend the original DKW modification as described by Yu and Reed with the 2013 NCGR-Cor optimized formula. The blends we have used have been 50%/50% of each and 75% NCGR-Cor/25% Original. We chose to use these blends as a "hedge" against human error potentially present when preparing media from scratch (NCGR-Cor formula) as opposed to using pre-weighed media from Phytotech (D2470), modified as described by Yu and Reed. They found that the 75% NCGR-Cor/25% Original Modified DKW blend works well, with essentially no difference in overall growth as compared to the straight 2013 NCGR-Cor. formula. One significant modification made was to reduce the FeEDDHA from 200mg/L to 150mg/L., as growth is as good and smaller cuttings seem to do better on the reduced iron formula. They are now propagating many of the EFB resistant OSU cultivars for sale to Oregon Nurseries/growers, but to date 'Zeta' has only been maintained for use in potential future sales.

20. Devon Bonady, Fern Hill Nursery and Botanical Sanctuary, 78703 Echo Hollow Lane, Cottage Grove, Oregon 97424

Fern Hill nursery received 3 cuttings each of 13 Ribes accessions. The cuttings were rooted in the nursery greenhouse and, as of today, the following have rooted well and been

potted up into potting soil tubes. They will be grown as mother plants and evaluated for fruit production and disease resistance, with the long term goal of propagation for distribution to home gardeners in the Southern Willamette valley through our **nursery business**. The following accessions rooted well: Ribes nigrum 'Ben Nevis' and 'Black Reward', R. petraeum 'Weiss Au Juteborg', R. rubrum 'Champagne' and 'Tatran', R. uva crispa 'Hinnomean Keltaien' and 'Houghton', R. spicatum 'White Versailles' and 'Rovada'. (2)

21. Tom Johns, Territorial Seed Company, 20 Palmer Avenue, Cottage Grove, OR 97424

Accessions of several genera (including *Beta, Lactuca, Phaseolus, Pisum, Cucumis, Daucus, Spinacia, Capsicum, Citrullus, Allium, Brassica, Cucurbita, Solanum*) were requested for evaluation. Seed will be increased of the most promising old cultivars and then offered for sale through their catalog.

22. John Saltveit, Home Orchard Society, 13305 SW Havencrest Street, Beaverton, Oregon 97005

John conducts many trials and writes articles for the Home Orchard Society. He lists these as his findings for 2014: Grafting 'El Dorado' European pear on aronia has led to serious rust issues, and doesn't seem worthwhile. Grafting 'Martha' crabapple onto aronia rootstock gives little productivity and seems a poor match. The few crabapples he got after many years were bitter. Pears seem to do much better, with 'Warren' currently disease-free . 'Jubileum' Hungarian pie cherry is very unproductive. The purple fruits turn red first and birds eat the few on the tree. He is removing the tree from his orchard. 'Danube' (=Erdi Botermo) does much better. Its extra sweetness is helpful in getting the cherries off before the birds. Grabbing them a bit early still leads to good flavor, but it is still not nearly as productive as 'Montmorency'. Biodynamic tree paste seems to have revived his 'Montmorency' tree, which is more productive than it has been in 5 years (less disease and 5x more cherries). He wrote an original article for the Pome News about growing different flowers in the orchard for pollination and diversity (see attachment).

23. John Kallas, Wild Food Adventures, Institute for the Study of Edible Wild Plants and Other Foragables, 4125 N Colonial Ave, Portland, OR 97217

He requested seeds of *Thlaspi arvense* for germination and growth observations. The seeds were initially started in moistened paper towels, then upon germination transferred to 27 cubic cm starter containers using black gold all-purpose potting soil with slow release nutrients. His objective was to get plants to photographically document natural history and potential for food, so he did not record the exact timing, just relative vigor.

a. Ames Iowa: 30982. First to germinate, with second most vigorous growth.
b. South Dakota: 30984. Worst germination. Few and limited germination & growth.
c. Ontario Canada: 31487. Second to germinate, with most vigorous growth.
d. Thuringia, Germany 15735. Poor germination. Few and limited germination & growth.

He summarized by saying that 31487 and 30982 were far superior in germination and growth to 15735 and 30984

24. David Chamberlain, Pacific Northwest Organic Experimenters Club, 10450 NW Cornell Road, Portland, Oregon 97229

He sent me the sad and brief report of this pear germplasm, "Marie Louise D'uccle" (PI 654925 - COR - *Pyrus communis*). The experiment was to see if this germplasm could be used to grow grafting rootstock for increased yields of local varieties. This is a long-term experiment with results not expected for 5 years or more. He received two cuttings which rooted and started growing well. But 6 weeks after they both leafed out, they both dropped their leaves and went limp and died. He wishes he had better report to give, and suspects that the hot temperatures (several days in a row >100F) were too much for the young trees.

25. Ron Barnes, 3875 Lower Klamath Lake Road, Klamath Falls, Oregon 97603

He requested and received four Carica papaya accessions from the Hilo, Hawaii facility. He was interested in determining if papaya could be grown in geothermally heated greenhouses in Klamath Falls, Oregon. Unfortunately, he was unable to germinate any of the seeds that I received. He is sure that this is a reflection of his inability, and not a problem with the seeds. He has remaining seeds and would still like to test papaya as a greenhouse plant, however, he will enlist help from the Hilo folks before he tries germination again.

26. Kim Goodwin, P.O. Box 82, Blachly, Oregon 97412

For *Vigna subterranean,* she submitted this report. In March 2014, I planted the first run of each of the *Vigna* accessions I obtained from the germplasm. These were planted in a greenhouse, in 4" pots, approximately 1" deep, and were brought into the house each night for make sure they did not accidentally freeze. The first runs were fairly attractive to mice, I discovered. I also had four other types of beans and two peas in the greenhouse, in pots, and noticed the mice liked the peas the most. On a side note, the runner beans were completely untouched by mice. After losing about 15% of the Vigna seeds to mice, I checked the rest to make sure they still had seeds, and then kept them covered with hardware cloth and set up mechanical mouse traps. I had no more mouse losses after that adjustment. Two weeks later, the first run still had not germinated. I kept up hope for them, but started a new run with the rest of the seed in mid April - one month later than my first plantings. I kept all of these covered from mice, and did not lose any. I kept them from freezing, like the previous batch - bringing them in until the weather was warm enough that the greenhouse stayed well above 45F all night. The daylight temperatures int he greenhouse went as high at 100 many days. Considering that these plants are from Africa, and used as a dryland covercrop, I assumed they would not tolerate excessive moisture, so I allowed them to dry completely (but not for an excessive amount of time) between waterings. Unfortunately, not one germinated. (That was a disappointment!) In May, I checked the pots, and sure enough, the remainder of the seeds was there. Some had rotted

by that time. That year, I also started two other plants from South Africa, both successfully, so I'm not sure what went wrong with the bambaras (Vigna s.). Temperature, moisture, depth, some sort of germination trigger lacking? Or could the seed have been dead? Temperature and depth seemed like the highest risk factors. Depth-wise, I treated these like a normal bean - but what if they required light to germinate? They are a cover crop, maybe in Africa they are only "scratched in", vs planted? You would think that at least a few would have received enough light to sprout if that were the case. My 100% failure makes me think it was either temperature or seed viability. Before starting these, I unsuccessfully tried to find information online as to how to germinate them. I based my approach off their use in Africa, hoping that would work. As you know, peas and beans are usually pretty easy to germinate. I was surprised by the difficulty of this plant, but would like to try again someday. I've since found a company that sells some online, and plan to contact them about germination requirements, first. Thank you for your work on keeping this program alive!

27. Chris Fowler, 1517 NE 19th Ave., Portland, Oregon 97232

Scions of nine Pyrus communis were requested. He grafted all to Bartlett seedling rootstocks in the Columbia Gorge, and has at least one successful graft of each.

28. Nick Klingensmith, Junction City, Oregon

Budwood of Pyrus accessions was collected at the Corvallis repository last summer, and budded to Pyrus betulaefolia rootstocks. All appear to be compatible with the rootstocks, but it is too early to make any meaningful observations.

29. Pam Milliren, Mandolin Creek Farm, P.O. Box 542, 20220 Long Road, Blodgett, OR 97326

The requested genera included 17 accessions of *Pyrus* (scions), 4 of *Fragaria* (runners), 13 of *Vaccinium* (cuttings) and 6 of *Allium* (seeds). Pear scions were picked up in February for Blodgett's annual "Seedy Saturday" seed and plant exchange, which was attended by 70-some people. They had a grafting party and then the people took their trees home. To her knowledge, all grafts were successful with two exceptions. In Blodgett, they grafted ~ 50 trees, and the rest of the scions went to Camp Westwind, a children's camp on the Oregon Coast, for grafting. The rest of the grafted trees are located in the Central Coast Range area around the Summit, Blodgett, Kings Valley area. She has one at home 'Aurora' which is doing well. She wanted a pear that would do well in their variable climate, stores well, and is good for canning and drying. This particular tree will produce more scions for her in the future. I asked the curator of what varieties needed conservation the most and he chose these 17 varieties to send to our event.

The 4 *Fragaria* are growing well, and she hopes to pick strawberries from them soon. They did not seem to be much harmed by the cold, freak ice storm in November 2014, that got down to 20 °F, which did damage to 250,000 surrounding acres of forest, breaking mature trees in half; they are now being clearcut. Strawberries at her elevation are never ready until early

July, so she cannot comment on their taste yet. She wanted a good fresh eating berry as a first priority, secondary for freezing, third for flavor in canning (syrups and jams). Later down the road she hopes to be selling some of them at Farmer's Market and a farm stand.

The *Vaccinium* cuttings were collected as green twigs in August and she kept them in flats, used a rooting hormone, with high humidity tents, and over half rooted successfully. Then they had the freak severe ice storm which lasted 19 hours, dropping thousands of trees here on our farm and surrounding region, and we were trying to save everything else (like barns) and I forgot about the blueberries to cover them with straw, blankets etc. The sole survivor is one "Duke". The curator said to try the green twig, but that I might be better off getting dormant cuttings and trying again if these did not work.

The *Allium sativum* seeds were planted this spring and are currently about 6" high. All of them seem to be growing well. Her main goal with these was taste and storability, giving priorities to varieties that need to be conserved.

The one *Cucurbita moschata* requested is "Canada Crookneck", which was planted in late May. She grew this variety before when she lived on a 40 acre farm in northern British Columbia, and it was always one of her best producers. Ten years ago, it was only available through GRIN, and this year she again ordered through GRIN. She notes that this variety does well and always produces, in all types of weather: wet and cold, dry and hot. She likes the small seed cavity, so more of the squash is usable. The flavor is wonderful, the meat dense with a bit of a nutty taste. It is a rare variety and she would like to help continue its existence.

She adds, "Thank you once again for letting farmers get germplasm from your facilities for multiple reasons. I do not wish to cross breed varieties, as my thing is preservation, but others I know are doing work on with varieties received from GRIN to create traits for various things like resistance to diseases, better traits for short season, but good flavor. I recently sent some corn seed to GRIN from Dr. Arvo Kallio (deceased), the University of Alaska botanist that developed several crops for use in Alaska. It was thought this particular variety was extinct, but I received some many years ago. It is a 45 day sweet corn, and hopefully GRIN can utilize that for someone else down the road. … Thank you GRIN for sending scions, seeds and so forth. It is very much appreciated, and in some cases the only source."

30. Dan Rinke, Johan Vineyards, 4285 N. Pacific Highway, Rickreall, Oregon 97371

He received apple cuttings in January 2014 and had really good take after grafting to M7 rootstock. The purpose is to evaluate the economic viability of 7 different varieties. He hopes to have more to report in the future.

31. Chad Finn, Research Geneticist, USDA-ARS, HCRL, 3420 NW Orchard Ave., Corvallis, OR 97330

He requested fig accessions as private citizen, successfully propagated them from cuttings, and established the resulting plants in the ground at his house north of Corvallis.

32. Henry Hunt, Valley Crest Orchards and Stuck Turtle Ciders, 5515 Alder Road, Hood River, Oregon 97031

Evaluations of Pyrus accessions continues. He filed this progress report.

"We have been trialing alternative pear varieties on our farm in the Hood River Valley over the last few years. Our main purpose is to assess their suitability for production and cidermaking from fruit grown on our site. Additionally we are hoping to find varieties that can fill niche, specialty markets in local grocers and farmers markets. Thus far, we have received a number of perry pear scions as well as a few red fleshed pear scions and a non-communis *Pyrus* (Golden Spice) for cidermaking. As we have only one year of growth on the wood received last year, we have no assessment of fruit quality. However, last year was something of a test winter with near zero temperatures at the beginning of November and I can say the varieties received last year (Red fleshed and Golden Spice) all came through, even after having taken and grown vigorously out of the grafts. Each variety was grafted onto a ten to fifteen year old Red Bartlett (the tree was heavily de-limbed to allow for a full tree of each variety) on OHxF-97 at four or five places in April 2014. Despite vigorous growth on each variety, the winter caused minimal damage to the new growth and we will be able to continue multiplying this variety on our site.

"Last year we also received scions of seven elderberry varieties. Regrettably, these did not come to fruition. The scions were received very late (I believe late May-ish) and were cuttings in full flower, poorly suited to grafting. Given the timing and state of the scions, we were unable to get anything to stick. This could also be a problem with the physiology of *Sambucus* as they are perhaps not particularly well-suited to typical grafting techniques.

"I would like to say that the accessions we have received from Corvallis have been instrumental in allowing our operation to confront the changing landscape of farming in our area by letting us explore new revenue streams and potentially diversifying our family farm. I hope this program continues as an indispensable asset to growers across the country."

33. Richard Harrington, Harrington Farms, P.O. Box 192, Butte Falls, Oregon 97522

In his request for oat germplasm in December, 2014, he stated: "Winter hulless oat varieties are not commercially available to the small US farmer. Active research and release of new varieties takes place in Wales and in Czechoslovakia, but these are not licensed for sale in the US. Four of the requested varieties are from the Welsh breeding program, but have been superseded by more recent proprietary releases. The descriptors listed by GRIN for these do not include disease susceptibility, lodging, or height. Comparing yields of these oats under local climatic conditions will identify which, if any, of these have commercial promise."

Subsequent to that request, he discovered that the most recently released Welsh oats could be obtained from the John Innes Centre in England, and he requested seeds. These cultivars are growing now, and hopefully will be crossed shortly with a highly disease resistant, outstandingly cold-tolerant hulled variety to eventually result in a tough hulless oat suitable for southern Oregon conditions. All Welsh oats listed as "winter" are suspect as to the extent of their hardiness because UK winters are much milder than his, and there is no information given on stem rust resistance, hence the need to breed a better hulless oat beyond what the Welsh program has produced to date. The Welsh oats he received from the NSGC will not be utilized further because they have been superseded by more recent releases.

34. Peter Cersovski, Linn Acres, 635 Crimson Way, Harrisburg, Oregon 97446

Seeds of pea and maize were requested. W6 15249 (Marx 228) pea segregates for what he believes is the af gene because not all the peas are the "parsley" type leaf. The corn accessions are inbred lines that he used in sweet corn breeding, mostly crosses of sweet by field corn for the development of populations. The only noteworthy item among the maize accessions is the ex-PVP field corn inbred G80 (P.I. 601037). While early, it did poorly in western Oregon due to a lack of husk cover and resulting significant corn earworm damage.

35. Dan Armstrong, 2788 Riverview Street, Eugene, Oregon 97403

Accessions of *Chenopodium quinoa* were requested for continuing evaluation. He filed this report on GROWING QUINOA IN THE WILLAMETTE VALLEY: THE SECOND YEAR (2014-15). This experiment is in its second year and seeks to explore the earliest date for planting *Chenopodium quinoa* in the Willamette Valley for use as a commercial crop.

Chenopodium quinoa has been grown in the Willamette Valley for more than twenty years, but only for specialty seed production, never as a commercial crop. There are several reasons for this, some related to the commercial market and some related to production problems. This experiment seeks to explore some of the production related problems.

The main production problems for growing commercial quinoa in the Willamette Valley are (1) infestation by lygus bugs (common and prevalent in the Willamette Valley) and (2) the late (mid-September) harvest date. In the case of the lygus bugs, they become most dangerous to quinoa after the grass seed harvest in July, when the lygus bugs migrate from the harvested grass seed fields to other plant varieties - *Chenopodium quinoa* being one migration target. The September harvest is problematic because of moisture increases in the air and the higher likelihood of rain, both of which can become problems when allowing the seed to dry in the field. By finding a shorter-term quinoa and/or one that can be planted earlier and also be harvested earlier could conceivably avoid both the wet weather of September and the July attack of lygus bugs. The experiment was designed with these problems in mind.

The 2013-14 experiment was run from October 2013 through September 2014. Six varieties were planted in the middle of each month, October through May. The earliest planted survivor was a variety from Chloe, Chile called 'Chadmo' planted on March15, 2014. Only one such plant survived to produce seed. All six varieties planted in mid-April survived and produced seed. The final report is posted at www.mudcitypress.com/beanandgrain20.html.

The 2014-15 version of the experiment is using five varieties of *Chenopodium quinoa*. One variety comes from Philomath breeder Frank Morton. It's called Brightest Brilliant Rainbow. Two varieties come from the Seed Bank at Iowa State (PI 510533 and PI 510547). There are two Chadmo plantings in the experiment this year: one from the original seed used in 2013-14 and one from the seed harvested from the March 2014 planting of Chadmo. The fifth variety is seed from last year's April planting of PI 634919. Thus three varieties are new to the experiment, one is a replanting of the original Chadmo, and two are plantings from seed produced in the first year of the experiment. The planting dates in the current trial are: September 16 and October 10 in 2014, and February 17, March 7, March 26, April 21, and April 22 in 2015.

Results to Date:
While the experiment must continue through the harvest of all maturing plants, as of June 15, 2015 the results are as follows:

1. September 16 plantings showed germination in all varieties, but only two plants lasted past October.

2. October 10 plantings had germination in all but the Brightest Brilliant Rainbow.

3. The two September plants and the October sprouts grew well but very slowly until November 14 when temperatures dropped to the low 20s. All plants were dead by November 19 after two consecutive days of 21 °F.

4. The February 17 planting had germination in all varieties except Brightest Brilliant Rainbow and PI 510533. As of June 15, twenty of these sprouts are full plants. The seedlings survived 10 days of frost in March, including two days of 28 °F. These plants have significant seedless heads now. This is very early and a very surprising result. The February survivors are very surprising and are doing quite well. They may be ready for harvest before August 1. They are clearly an anomaly caused by unusual late February and early March weather.

5. The March 7 planting had germination again in all varieties except Brightest Brilliant Rainbow and PI 510533. The weather was cool but not cold, in the mid-30s at night. Only two plants remain and have begun to build early seed heads.

6. The March 26 planting is much like the March 7 planting. All varieties germinate but Brightest Brilliant Rainbow and PI 510533. However, only four plants are still alive in June. They have immature seed heads.

7. The April 21 plantings had high germination rates in all varieties. Almost all the plants matured to two-feet tall as of June 15. Mid-April has proven to be the most successful planting time for all the quinoa, this year and last.

8. Lygus bugs are not currently attacking any of the plants. This is likely to change in another month, and he will continue to monitor this.

36. Preston Alexander, Alexander Farms, 885 SW Stringtown Road, Forest Grove, OR 97116

Requested an extensive list of *Phaseolus* accessions
Our project is examining different beans to see which will work in our area. We want to focus mainly on snap beans, but want to revive some old varieties, and introduce new ones to the market. We will also grow some beans for the dry market, and want to introduce new and interesting varieties. We are mostly interested in Pole beans, but this year we are also planting bush beans to compare the yield and cost effectiveness. Last year we planted 175 varieties, mostly Phaseolus vulgaris, but we also tried Phaseolus acutifolius, P. dumosus, P. coccinius, and some Lima beans. We found that the P. acutafolius grew well, but produced low yields; it might be a good ground cover as it required little water. The dumosus and coccinius failed to produce, and the Lima beans were too late. We also found that many of the accessions that originated from the equatorial countries germinated and grew well, but failed to produce seed. This year we are focusing on accessions that originated from the U.S., hoping that more will produce beans. "This material will be used to plant a matrix of different beans under organic conditions. We will look for US cultivars with improved flavor and texture for the fresh market. Phaseolus: This

material will be used for a comparative study to see which USA sourced cultivars do best in our environment.

Publications:

Colburn, B.C., S.A. Mehlenbacher, V.R. Sathuvalli and D.C. Smith. 2015. Novel sources of eastern filbert blight resistance in hazelnut accessions 'Culpla', 'Crvenje' and OSU 495.072. J. Amer. Soc. Hort. Sci. 139:191-200.

Govindarajulu, R., M. Parks, J.A. Tennessen , A. Liston, and T.-L. Ashman. 2015. Comparison of nuclear, plastid and mitochondrial phylogenies and the origin of wild octoploid strawberry species. American Journal of Botany 102:544-554.

Goyer A, Sweek K. 2011. Genetic diversity of thiamine and folate in primitive cultivated and wild potato (*Solanum*) species. *Journal of Agricultural and Food Chemistry* 59: 13072-13080.

Goyer A, Bamberg J. 2012. Genetic diversity of thiamine and folate in primitive cultivated and wild potato (*Solanum*) species. Annual Meeting of the Potato Association of America. Denver, CO, August 2012.

Ives, C., V.R. Sathuvalli, B.C. Colburn and S.A. Mehlenbacher. 2014. Mapping the incompatibility and style color loci in two hazelnut progenies. HortScience 49:250-253.

Mehlenbacher, S.A. 2014. Geographic distribution of incompatibility alleles in cultivars and selections of European hazelnut. J. Amer. Soc. Hort. Sci. 139:191-212.

Mehlenbacher, S.A., D.C. Smith and R.L. McCluskey. 2014. 'Wepster' hazelnut. HortScience 49:346-349.

Navarre R, Thornton M, Goyer A, Hellmann H. 2014. Consumer-oriented potatoes: Developing Tri-State varieties with superior appearance and nutritional value. In: Progress Reports for the Northwest Potato Research Consortium.

Tennessen, J.A., R. Govindarajulu, T.-L. Ashman, and A. Liston. 2014. Evolutionary origins and dynamics of octoploid strawberry subgenomes revealed by dense targeted capture linkage maps. Genome Biology and Evolution 6:3295-3313.

Appendices are two articles by John Saltviet of the Home Orchard Society.

Are you Growing Flowers in your Orchard?

By John Saltveit

Member, Home Orchard Society

A few years ago my mother in law was making fun of me by saying that there was not a single plant in my garden that I couldn't eat. She mostly grows plants for the flowers. Then my wife got a shocker: I bought a ceanothus plant. Pretty? Yes. Native? Yes. Easy to care for? Yes. Evergreen? Yes. But not edible. She couldn't believe it. In the years since, I have bought more non-edible plants. Don't get me wrong. I am still mostly about having a garden of eatin'. However, I think having flowers can be quite a bonus to an edible garden.

The first thing that attracted me to growing flowers was realizing that I needed pollinators. When I say attracting pollinators, I don't mean that it's the same as having two varieties of apples. What I mean is that having flowers will bring in insects that will also pollinate your fruit trees. It's optimal to have plants that flower throughout the year, even covering as much of the winter as you can. Having different flowering times for your edibles will keep the pollinating insects in your garden so that they lay their eggs and breed new generations. Then you will have more dependable pollination. My fruit set is

many times better than it was before I started growing flowers. To get the insects into your yard before your flowering plants, you want something that blooms just before your first fruit tree, something that covers any gaps in between your blossoms, and even afterwards. To do that, you optimally want about a square yard of flowers. It also helps to have a nice scent. Native flowers tend to attract our native blue orchard mason bees better than many exotics because the mason bees know what they are and are used to them. Remember that we want a variety of pollinating insects because things like tomatoes, blueberries, kiwis, and zucchinis need other pollinators.

Then I realized that pollinators weren't the only insects that I was trying to attract. Some insects come into the garden and eat the bugs that eat our plants. They are on our "team". The most famous is the lady bug or lady beetle, which eats aphids among other pests. Other great teammates are syrphid flies, hover flies, lace wings, and minute pirate bugs. Members of the carrot (umbelliferae) family help attract many allies. Some of the positive insects are so small that you can't see them as they parasitize apple maggots and codling moths. In addition, daisy looking flowers also attract many helpful insect friends. Even something as scary as a yellow jacket wasp is a meat eater, meaning he eats codling moths, cabbage moths, aphids and other pests of our edible crops. In addition, hummingbirds come to drink nectar from flowers, but will also eat insect pests in the garden.

Remember that flower plants are mostly unrelated to our fruit trees. That means that they add botanical diversity to our gardens, and thereby provide a mix of microbiology so that no disease or pest can easily take over the garden. In addition, their exudates and mycorrhizal fungi improve the structure and microbiological soil food web, improving the nutrition of our plants and their natural defenses. They can also fit in nicely between the trees to make a natural food forest landscape. In addition, many flowering plants, such as nasturtium, dandelion, campanula, mallow, and Jerusalem artichoke have edible parts.

Don't forget the obvious: flowers are beautiful. Flowers can make your spouse or neighbors more tolerant of your fruits and vegetables. In many cases, they can help to get the homeowner's association off your back. They can make the hard work that you do to provide food feel worth it even during the hard times. Some, like silverberry, jasmine and daphne aren't that obviously beautiful but their fragrance is heavenly. Some attract cute little birds that sing beautiful songs, catch insect pests, and provide free phosphorus to your soil.

Some flowers provide other useful help. Some can be used as medicine, such as Echinacea, St. John's wort, or passionflower. Some are culinary herbs, like rosemary, saffron crocus and savory. Some, when planted in the drip line of fruit trees, help the soil to "wake up" after winter and provide a barrier to rodents who might want to gnaw on the tree trunk, like daffodils and tulips. Some like dandelion, plantain, dead nettle, and sow thistle, are unknown vegetables. Some like horsetail, valerian and yarrow provide useful nutrition to the soil.

Flowers provide many useful functions in the home orchard. Instead of saying "I don't have time for flowers", you'll someday say, "Of course I have flowers in my orchard. Let me show you why."

Hey Bud, Try Grafting in the Summer

By John Saltveit, Home Orchard Society member

Several years ago, I took the whip and tongue grafting classes that the HOS teaches in late winter, and I gradually learned to graft. Later on, I found out about budding. I tried to bud graft one summer and it failed. My conclusion was that I was genetically incapable of budding. A few years later, Jerry Shroyer convinced me to come to the class again. This time I listened to what he was saying, and it actually worked. Here are some things that I have learned about budding.

Budding means taking exactly one bud from a variety and placing it into the branch of another tree. It is usually done in August and September here in the Pacific Northwest, and commercial operations use it almost exclusively. In chip budding, you take the bud and cut out an area on the bark of the new tree that fits the size of the bud from the old tree. In T-budding, you make a slice in the form of the letter T in the bark of the new tree, and tuck the bud in. In both of these techniques, you tie the bud up to keep in tightly in place and prevent desiccation. Normally, you won't see if the bud grew until the next spring when the new growth appears.

It is better to use newer buds and branches. When taking your buds, it is better to get your bud sticks off of new wood from this year. Buds on old wood are less likely to grow. In addition, it is more successful to graft onto new wood from this year, because when the bark starts to slip, the bud can fit and grow more readily into its new home.

Many people think that you don't need to learn how to bud if you can whip and tongue graft. That may be true if you only graft once or twice a year. I thought I would graft only a few times in my life, but now I have been making 20 or more grafts in the spring and 20 or more bud grafts in the summer for many years, and I'm glad I'm able to do that. My family gets a much wider variety of fruit throughout the year because of what I've learned. In addition, if you can bud, you can add a variety to a tree in the off season, so more than one variety can be added to a tree during the year. Budding only uses one bud, so you remove much less of the tree than you would if you whip and tongue, cleft, or bark grafted. As such, you can make many grafts off of one tree.

At first, many people think that you already know what varieties you like. However, every year I eat a delicious new variety of fruit and I'm convinced that I need to grow it on a regular basis. Some varieties don't really reach their full flavor and nutrition unless you grow them in great soil without synthetic chemicals and let them ripen to perfection. I have tried some varieties in stores and felt that they weren't really worth growing. When I tried them in good organic soil, it was a spiritual experience. With budding, you can try many varieties of types of fruits, and just keep the ones that make you happy. Some will store well, resist diseases, look pretty, or provide full nutrition. You don't really know until you actually grow them. I have gotten rid of some fruit varieties and bud grafted in better ones. Please remember that the National Clonal Germplasm Repository in Corvallis can get you many varieties of pear and other fruits. Not only will they send some scion varieties to you completely for free so you can graft them, we also sometimes get varieties of scions from them at the HOS Fruit Propagation Fair/Scion Exchange in the spring.

Some people have found that chip budding or T-budding works better for them. I haven't really found one method to be better than the other. I use both so I'll continue to be able to do them in the future. Some species and varieties will only take one method or will prefer it. People grafting paw paws are frequently urged to chip bud or whip and tongue graft, but T-budding will often prove unsuccessful. I have found budding to be much more difficult in my Asian pear tree than whip and tongue grafting. However, with citrus and stone fruits, budding is recommended over whip and tongue grafting.
One technique I will recommend is to sometimes cut off the branch above the bud before you see the bud growing. Although this is not standard technique, I have often see a healthy looking bud stagnating until I cut the upper branch off, at which point it decides that it better start to grow because that is all it has left. I will generally not do that if the bud doesn't look too viable or if it is dried up, because it still probably won't grow. I especially use this technique if the upper branch is not valuable to me anymore anyway.

If there are aggressive buds of the non-target variety growing below the bud you grafted, you need to channel the flow of nutrients into the bud you want. At first, I would absolutely remove the last vestige of anything growing below the bud. Later I realized that some of those branches died out and they didn't grow very fast. Now I cut off most of the green growing buds from the non-intended variety,

but leave a small portion. This way the branch is still growing and healthy, and it gets some more photosynthesis, but until I see the bud really taking over the branch, I won't wipe them out. Sometimes I have seen the healthy bud growing, and then suddenly wither. One technique that I have used successfully is to tie an old fruit sock around that branch below the bud. Many times there are slugs, stink bugs or other attacking pests that are seeking that fresh new growth out of the bud. With the fruit sock tied around it, an uncomfortable barrier to the bud is in place, and many buds have been saved. One interesting development that I have found is that parafilm seems to work better for budding than rubber bands. I wasn't sure until I switched both ways: from rubber bands to parafilm and from parafilm to rubber bands. Jafar, our vice president graciously offered to let me try some and they worked really well. When I ran out last summer, I went back to rubber bands, and this spring my buds didn't take quite as well. I think it is because there is wax in the parafilm and it tightly wraps the moisture in the bud better.

I have also found some unusual effects of budding and other forms of grafting. When I graft pears onto quince, they seem to be very yellow and seem to be lacking in nitrogen. The quince that is still on the tree is a much darker green than the pear, but pear on other rootstocks don't seem to be quite as yellow. Another effect is that pears on aronia seem to get more disease than pears on Old Home/Farmington rootstock. This could perhaps due to the incomplete compatibility between aronia and pear, as there is with some kinds of quince as rootstock for pear.

I am very glad that I eventually learned how to bud, and I think that most enthusiastic orchardists will be very glad they learned as well. We teach a budding class on the first Saturday of August in the HOS Arboretum. It's free and combined with other activities that day, such as classes, fruit tasting and pot lucks. I urge you to come and make it a part of your repertoire.