

# California Annual Report to the W-6 Technical Committee for distribution year 2014

June 18, 2015

by Dan E. Parfitt

532 requests for plant introductions from California users were filled by the NPGS in 2014, representing 515 different users, an 18% increase over 2013. Figure 1 shows the usage of germplasm in California from the National Plant Germplasm System expressed by the number of requests for California from 1993 to the present. The request level for this year was about average for recent years.

Collection of germplasm information: The collection methodology was similar to that used last year. All requests were sent via e-mail. I did not attempt to query those requesters that did not have or provide an e-mail address (almost all requesters are providing e-mail addresses at this time). 521 queries were sent. Some requesters had multiple requests and these were consolidated into a single query. 9% of the e-mail addresses bounced back (either the addresses were no longer valid or the recipients filters blocked them), similar to last year. 56 responses were received, a few less than last year, for a 10.7 % response rate, a substantial reduction from prior levels (Fig. 2). Comments from the respondents are provided below. 88% of recipients that received delivered e-mails did not respond, more than last year's value of 83%.

The distributed germplasm was used in a wide variety of applications, from basic research to home gardening. No single crop or crop group was especially requested. Much of the germplasm continues to be used for commercial breeding or research (University or USDA), but a significant number of the requests were for materials to be used in molecular/biochemical studies, but less than last year. Fewer respondents reported on clonal (fruit/nut) germplasm than in the past. Several members of the California Rare Fruit Growers requested materials for distribution to their members as in past years. A summary of the replies is provided below to show the nature of germplasm use. Several respondents replied that they had not received any

germplasm in 2014, although their requests were indicated on the inventory record.

The Viticulture Department at UC Davis continues to maintain grape collections for teaching and research. Several Plant Science fruit and nut germplasm collections continue to be maintained (almond, walnut, pistachio, pecan, cherry, peach, apricot, persimmon), but as noted previously there is no formal mechanism for ensuring their continued protection and the Pis that assembled and/or used them are retired, retiring soon, or have left the University.

Figure 1. Requests for NPGS Germplasm from California

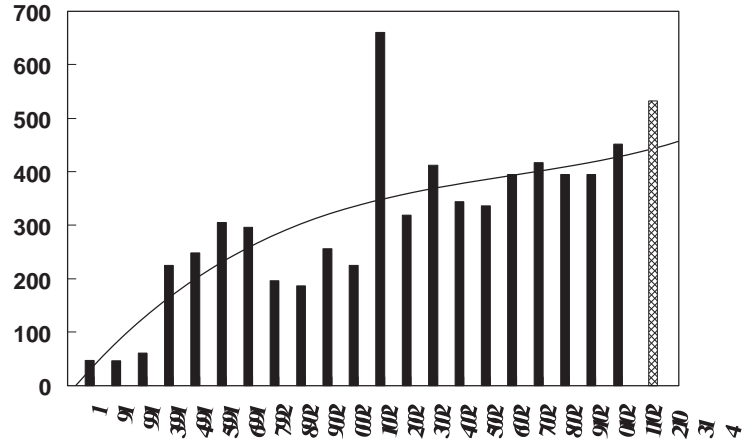
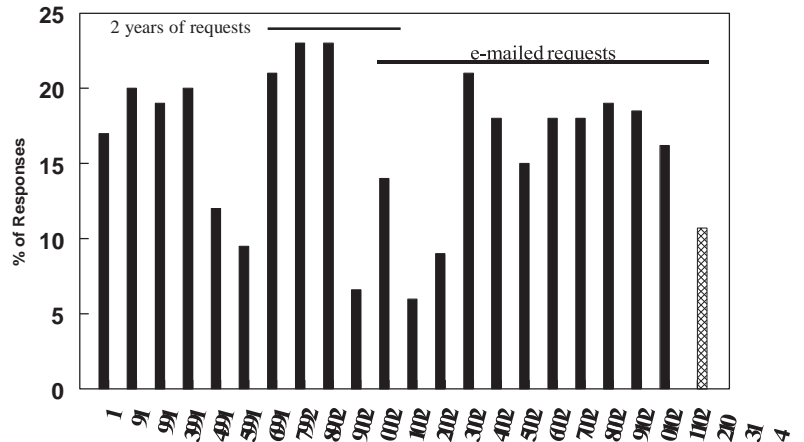


Figure 2: % of Responses



The Department of Botany and Plant Science at UC Riverside maintains several collections of *Citrus* germplasm for cultivar evaluation and disease related research, as well as collections of avocado, cherimoya, and persimmon. Annual reports from the UC Davis Seed Biotechnology program may be accessed at [http://sbc.ucdavis.edu/publications/annual\\_reports.html](http://sbc.ucdavis.edu/publications/annual_reports.html) and other SBC information at <http://sbc.ucdavis.edu/>. The Tomato Genetic Resources Center activities complete report can be accessed at <http://tgrc.ucdavis.edu/reports.aspx> and TGRC activities at <http://tgrc.ucdavis.edu/index.aspx>.

Narratives and publications are provided below. Italics highlight items that may be of particular interest to the reader. Items in red are my comments. A set of more extensive reports is provided at the end of the report.

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## **Publications:**

### From Beiquin Mou

- Knepper, C. and B. Mou. 2015. Semi-high throughput screening for potential drought-tolerance in lettuce (*Lactuca sativa*) germplasm collections. J. Vis. Exp. (98), e52492, doi:10.3791/52492
- Kwon, S. J., I. Simko, B. Hellier, B. Mou, and J. Hu. 2013. Genome-wide association of 10 horticultural traits with expressed sequence tag-derived SNP markers in a collection of lettuce lines. The Crop Journal 1: 25-33.
- Lafta, A. and Mou, B. 2013. Evaluation of lettuce genotypes for seed thermotolerance. HortScience 48: 708-714.
- Mou, B. 2008. Evaluation of oxalate concentration in the U.S. spinach germplasm collection. HortScience 43: 1690-1693.
- Mou, B., S. Koike., and L. du Toit. 2008. Screening for resistance to leaf spot diseases of spinach. HortScience 43: 1706-1710.
- Mou, B. 2008. Leafminer resistance in spinach. HortScience 43: 1716-1719.
- Mou, B. 2007. Leafminer-resistant spinach germplasm 03-04-9. HortScience 42 (3): 699-700.
- Hu, J., B. Mou, and B.A. Vick. 2007. Genetic diversity of 38 spinach (*Spinacia oleracea* L.) germplasm accessions and ten commercial hybrids assessed by TRAP markers. Genetic Resources and Crop Evolution 54: 1667-1674.
- Mou, B., S. Koike, and L. du Toit. 2006. Screening for resistance to Stemphylium leaf spot of spinach. Proceedings of the International Spinach Conference, 13-14 July 2006, La Conner, WA.
- Mou, B. 2005. Genetic variation of b-carotene and lutein contents in lettuce. Journal of the American Society for Horticultural Science 130(6): 870-876.
- Mou, B. and C. Bull. 2004. Screening lettuce germplasm for new sources of resistance to corky root. Journal of the American Society for Horticultural Science 129(5): 712-716.
- Mou, B. and Y.B. Liu. 2004. Host plant resistance to leafminers in lettuce. Journal of the American Society for Horticultural Science 129 (3): 383-388.
- Mou, B., E.J. Ryder, J. Tanaka, Y.B. Liu, and W.E. Chaney. 2004. Breeding for resistance to leafminer in lettuce. Acta Horticulturae 637: 57-62.
- Mou, B. and Y.B. Liu. 2003. Leafminer resistance in lettuce. HortScience 38(4): 570-572.
- Mou, B. and E.J. Ryder. 2003. Screening and breeding for resistance to leafminer (*Liriomyza langei*) in lettuce and spinach. p. 43-47. In: Th. J.L. van Hintum, A. Lebeda, D.A. Pink, and J.W. Schut (eds.) Proceedings of the Eucarpia meeting on leafy vegetables genetics and breeding, Noordwijkerhout, the Netherlands, March 19-21, 2003. Centre for Genetic Resources, the Netherlands (CGN), Wageningen, the Netherlands.

### From Jorge Dubcovsky

[We published a large global study on stripe rust resistance using 850 accessions from the NSGC](#)

Maccaferri, M., J. Zhang, P. Bulli, Z. Abate, S. Chao, D. Cantu, E. Bossolini, X. Chen, M. Pumphrey, and J. Dubcovsky. 2015. A genome-wide association study of resistance to stripe rust (*Puccinia striiformis* f. sp. tritici) in a worldwide collection of hexaploid spring wheat (*Triticum aestivum* L.). G3 5:449-465.

[In collaboration with E. Akhunov and the IWGSX we published a large wheat haplotype study using SNGC accessions](#)

Jordan, K.W., S. Wang, Y. Lun, L. Gardiner, R. MacLachlan, P. Hucl, K. Wiebe, D. Wong, K.L. Forrest, A.G. Sharpe, C.H.D. Sidebottom, N. Hall, C. Toomajian, T. Close, J. Dubcovsky, A. Akhunova, L. Talbert, U.K. Bansal, H.S. Bariana, M.J. Hayden, C. Pozniak, J.A. Jeddloh, A. Hall, E. Akhunov, IWGS Consortium. 2015. A haplotype map of allohexaploid wheat reveals distinct patterns of selection on homoeologous genomes Genome Biology 16:48

[We deposited all our germplasm in the NSGC](#)

Bonafede, M.D., G. Tranquilli, L.A. Pflüger, R.J. Peña, and J. Dubcovsky. 2015. Effect of allelic variation at the Glu-3/Gli-1 loci on breadmaking quality parameters in hexaploid wheat (*T. aestivum* L.). *Journal of Cereal Science* 62:143-150. IRS: PI 672837 - PI 672839; GPC-B1 mutants: PI 673410 - PI 673415. 10 NILs Glu-A3 & Glu-B3 alleles: PI 674000 - PI 674009.

From D.E. Parfitt

Parfitt, D.E., K. Yonemori, C. Honsho, M. Nozaka, S. Kanzaki, A. Sato, M. Yamada. 2015. Relationships among Asian persimmon cultivars, astringent and non-astringent types. *Tree Genetics Genomes* 11(2): 24 (9 pages)

### **Narratives from recipients concerning germplasm observations and the value of NPGS.**

Patrice Dreckmann, Rainbow CA  
Rainbow Heights Nursery

See attached report

Mark Miner, San Diego CA

See attached report

Ockert Greyvenstein, Guadalupe CA See attached report Roy

Wiersma, Alta Loma CA

See attached report

Bequin Mou, USDA-ARS Salinas CA

We requested and received seeds of the U.S. Spinach germplasm collection last year. We have used the seeds in our study and screening for tolerance to drought and salinity in spinach. The germplasm is very important and valuable in our effort to find the traits and source of tolerance to abiotic stresses and adapt spinach to climate change and global warming.

See publications in publication list

Ibrahim F. Michael, Fresno CA  
Michael Tech. Charitable Org.

*We have been growing the cactus provided by Gabriela Romano and then Karen Wells at the Parlier station since five years in our tissue culture laboratory in Fresno as part of our charity work.*

*We have just this year sent plantlets to Egypt to help them grow forage plants in the reclamation land. We are now in the process of hosting a group from Ethiopia who will come and stay with us for a few weeks to train in tissue culture work on cactus and how to plant cactus as a crop for forage in their country. Your support was invaluable in these projects to help countries in arid and semi arid areas of the world. We also could not have done this important work without the help of Jerry Sirimian in the Parlier station.*

Rick Machado, Menifee CA

We received tubers last year, and because of the GRIN program we have been successfully breeding potatoes for over 15 years now.

All tubers arrived healthy and on time for spring planting. They have all grown well the first year, and after we have multiplied the original tuber, we put the progeny through a series of heat/drought tests. These tests involve the limited use of water, using a summer growing season, not mulching, not fertilizing, using drip irrigation with emitters spaced a long distance away, and forcing them to grow and multiply far outside of their comfort zone.

As of now, we have about 10 entirely new varieties that perform from fair to well in these stress tests. Most of the new varieties have an s.chacoense background, and colors range from white to dark blue, with flesh color also changing from white to dark blue. We will further press forward with additional tests, which involve intensifying the soil temperatures. So far, we have grown modest size yields with temps up to 125f.

*Without GRIN, it would have never been possible, period. The world is far richer for this program, and we continue to stay involved with them, and this year have several hundred plants from GRIN TPS. We thank them for their hard work, dedication and continued help.*

Eric LoPresti, Entomology UCD

I have been using the *Chenopodium vulvaria* seeds in collaboration with John Beck at the Albany, CA USDA facility.

I am still growing the *Trichostema dichotomum* and *T. laxum* accessions and will be crossing them with *T. laxum* and *lanceolatum* to look at incompatibility within the genus (there may be some intraspecies incompatibilities in *T. laxum* in Lake/Napa counties in CA).

Paul Bingham, Carlsbad CA

As a member of the San Diego chapter of the California Rare Fruit Growers (CRFG), I am testing rare and heirloom stone fruits for suitability in our low-chill hour southern California climate. The NPGS was gracious enough to supply about 30 varieties of scion wood for this project in Spring of 2014, but the drought conditions and unseasonably hot dry weather in late April and through most of May 2014 were devastating. Of the 150 grafts made from some 30 different scion varieties received from the NPGS, only 4 survived. None of the PI material was successful.

I am extremely happy that the NPGS continues to make scion wood available. The order #262913 for replacement scions was placed in Fall 2014. It arrived in early February of 2015. The following PI accessions were part of that order:

- PI 125598, Kaisi (seedling), *Prunus armeniaca*
- PI 316519, Palummella, *Prunus armeniaca*
- PI 91456, Belsiana, *Prunus cerasifera*
- PI 673750, 89,10-44, *Prunus* hybr.
- PI 673751, 89,10-59, *Prunus* hybr.
- PI 673752, 89,10-51, *Prunus* hybr.
- PI 673528, Miller's Late, *Prunus persica*
- PI 673557, Cascata 519, *Prunus persica*
- PI 129678, Stanwick, *Prunus persica* var. *nucipersica*

Since many of these are from Brazil, India, Italy, Morocco and Pakistan (all places with warmer winters than most stone fruit sources), there is a great deal of promise in finding new varieties to succeed for us here.

Grafting commenced soon after arrival and the success rate I am happy to report this year has been very good indeed, most showing remarkable growth. Successes are as follows on the rootstock types noted:

PI 316519, Palummella, *Prunus armeniaca*: (3) on Nemaguard peach, (1) on Lovell peach

PI 91456, Belsiana, *Prunus cerasifera*: (1) on M2624 plum

PI 673750, 89,10-44, *Prunus* hybr.: (2) on M2624 plum, (1) on Lovell peach

PI 673751, 89,10-59, *Prunus* hybr.: (1) on M2624 plum, (1) on Lovell peach

PI 673752, 89,10-51, *Prunus* hybr.: (1) on Lovell peach

PI 673557, Cascata 519, *Prunus persica*: (2) on Lovell peach

PI 129678, Stanwick, *Prunus persica* var. *nucipersica*: (3) on Lovell peach

Only PI 125598 ("Kaisi" *Prunus armeniaca*) and PI 673528 ("Miller's Late" *Prunus persica*) grafts did not survive. I have already reordered these for next year.

Trials will begin this fall when all of these successful plants now in containers will be planted in 35 fellow volunteer CRFG members' yards. All 7 climate zones in San Diego County will be represented in the trials. In many of these locations we have weather station equipment or data loggers in the trees to record chill hours. Our findings will be documented and we anticipate publishing those in an upcoming CRFG quarterly.

*Many of the places these PI accessions come from originally are now inaccessible or too dangerous to visit. On behalf of my fellow CRFG members, we would like to thank you and everyone at the NPGS and Western Regional Plant Introduction Station for maintaining this precious germplasm inventory and for making this resource available for our research.*

Zabi Sarpas, CSU Fullerton  
Mission Viejo CA

The NPGS system has been wonderful for our biology and plant research lab here in Cal State Fullerton University. We use the germplasm to test various attributes of Pomegranates such as weight, color, spread, vigor, tree size, fruit quality, fruit size, and many other qualities. Also we test their relation to the environment such soil ph, soil types, drought tolerance and root rot tolerance to note a few. The germplasm that UC Davis provides is beneficial to California economy, California farmers and California consumers of pomegranates. We like to thank the NPGS and UC Davis for the research opportunities that the germplasm will provide us.

Micah Freeman, Ecology and  
Evolution, UC Davis

I am currently using seeds from two species (*Physalis angulata*, *Solanum americanum*) stored in the NPGS seed bank for a comparative study of defense evolution in island and mainland plant populations. In the absence of readily available, local natural populations, the NPGS provides an invaluable resource for conducting ecological and evolutionary research. My work involves comparative methods, and the diversity of species maintained by the NPGS is crucial for research like mine.

Cindy Fake, UC Coop Ext.  
Auburn CA

Report on Germplasm received by UC Cooperative Extension, Placer & Nevada Counties

Germplasm requests from UCCE Placer/Nevada are used by local commercial growers to test varieties that might suit our small-scale, direct market farming system. Most of the germplasm received has been cuttings. These are generally rooted in high tunnels and then planted out in the field.

We have received a variety of germplasm from both Davis and Corvallis over the last seven years. From the Davis repository, this includes fig, *Ficus carica*; persimmon, *Diospyros kaki*; pomegranates, *Punica granatum*; table grapes, *Vitis vinifera* and *V. rotundifolia*. From Corvallis, we received pear, *Pyrus communis*; blueberry, *Vaccinium corymbosum* and hybrids; blackberry, *Rubus occidentalis* and hybrids; and serviceberry, *Amelanchier* spp. For the most recent germplasm requests (2013/14, 2014/15), we do not yet have production results.

Results have been mixed. Although cuttings generally arrive in good condition, growers do not always have the time or means to get them into appropriate propagation media and conditions in a timely manner. Generally, growers have been more successful with cuttings received from the Davis Germplasm Repository, perhaps because of a more similar climate.

We received a variety of fig cultivars in 2008 and 2009, which were divided among 5 growers. Two growers succeeded in rooting and planting cuttings and bringing fig cultivars Verdal Longue, Marabout, and Panchée to production. One grower in Penryn has sold small quantities of these figs in local farmers' markets for two years. He has also propagated cuttings from the original trees and increased his orchard size as well as sharing them with several other growers interested in producing specialty fig varieties.

Other fig varieties have not been as successful. Some growers were unable to get cuttings to root, perhaps due to lack of appropriate propagation conditions. Two growers had only one surviving fig, one a Mission, the other a Monstreuse, but neither have been productive enough for commercial sale. Two growers in colder locations reported that they lost their fig seedlings to freeze damage. Some came back, but they were not productive and were removed.

We also received table grape cultivars in 2009 and 2012. Two growers have succeeded in rooting and planting Fresno cuttings and bringing them to production. (Vinifera Fresno 35-75, 32-139, 35-33 and 32-68). The grower who received cuttings in 2009 reports good production and flavor, but has not sold any fruit. The grower who received cuttings in 2012 removed all fruit until this year to allow the plants to establish. He received a total of 10 cuttings of four cultivars, and since they were very long, was able to cut them in half and has 20 vines. He reports a good fruit load and plans to harvest fruit this year.

I have not received information from most of the growers who received pomegranate cuttings. One grower reports that only one pomegranate cutting survived and is producing, but he is unsure which cultivar it is. Another reported that no pomegranates survived. I have no reports from growers who received persimmons.

Growers have had less success with germplasm from Corvallis. Growers had no success with blueberry, blackberries, nor the 2012 orders of Serviceberry. We received a number of pear cultivars in 2011 and 2012. The two growers who received Pyrus cuttings in 2011 were not successful in grafting, perhaps due to timing. We reordered many of the same cultivars in 2012. From the 2012 cuttings, the same two growers were successful in grafting Beurre Hardy, El Dorado, and Abbe Fetel. However, several years of bad fireblight killed most of the trees. Only one Abbe Fetel is still alive.

Some of the lack of success may be attributed to growers not using optimal propagation techniques. Some may be the timing of receipt and adverse weather. Several growers reported the cuttings to be too dry, and did not root. We generally received cuttings that were viable, but growers may have not planted them as soon as needed, nor monitored relative humidity and soil moisture carefully enough for successful propagation. Those who succeeded have all had high tunnels or greenhouses and were able to provide optimal growing conditions for cuttings. For future germplasm requests, we will give priority to those with high tunnels or greenhouses for propagation.

We appreciate the opportunity for this access to germplasm to increase the breadth of fruit varieties produced in this area. The figs have been the most successful, and the fact that cuttings are being shared among growers shows that the growers find this a valuable program.

Greg Walker, Entomology, UC Riverside

Report on PI 482420 - Cucumis melo subsp. melo - TGR 1551 - Zimbabwe

*Our laboratory studies plant resistance to phloem sap-feeding insects. TGR 1551 has long been known to be resistant against melon aphid, Aphis gossypii, and our studies have focused on determining the mechanism of resistance. We use electrical penetration graphs (EPG) to monitor the feeding behavior of A. gossypii on TGR 1551 and an aphid-susceptible commercial melon variety, Iroquois. Similar to previous studies in the literature, we found that the aphid readily reaches and penetrates phloem sieve elements with its stylets on both TGR 1551 and the susceptible cultivar; however, after penetration of a sieve element, the aphids behave differently on TRG 1551 and the susceptible cultivar. Following penetration of a sieve element in the susceptible cultivar, the aphid typically salivates into the sieve element for about one minute and then engages in a long bout (an hour or more) of ingestion of phloem sap from the sieve element. In contrast, following penetration of a sieve element of TGR 1551, the aphid typically salivates for an extended period of time (30-60 minutes) and then withdraws its stylets without having ingested any phloem sap. We currently are testing the hypothesis that phloem occlusion by P-proteins is responsible for the failure of aphids on TGR 1551 to make the transition from salivation to ingestion, and the results so far indicate that this hypothesis is correct. We tested the hypothesis by instantaneously freezing the aphid and leaf with liquid nitrogen as soon as the aphid's stylets penetrate a sieve element (determined by monitoring by EPG), and*

*then we process the sample for examination by confocal laser scanning microscopy which we use to examine the penetrated sieve element. In all the samples taken so far from TGR 1551, P-protein occludes the sieve elements that are penetrated by the aphids stylets, suggesting that phloem occlusion is responsible for the failure to ingest sap on TGR1551. To demonstrate a cause-and-effect, we treated the phloem with a calcium channel blocker to prevent P-proteins from forming occlusions (P-protein occlusion depends on calcium channels opening allowing an influx of calcium into the sieve element). So far, our results show that when we prevent P-protein occlusion with a calcium channel blocker, the aphids can now successfully ingest phloem sap from TGR 1551. This demonstrates that P-protein occlusion forms at least one of the mechanisms that makes TGR 1551 resistant against A. gossypii. Furthermore, the differential response of A. gossypii to TGR 1551 and the susceptible cultivar is not due to the P-proteins themselves but rather to the calcium channels that control P-protein occlusion.*

*We could not have done this work without the TGR 1551 seeds that we have received from the National Plant Germplasm System. The literature suggested that TGR 1551 would be an ideal candidate for our studies on the effect of P-protein occlusion on aphid feeding, and the National Plant Germplasm System is one of the few sources if not the only source of TGR 1551. Our results provide the first experimental evidence that differences in the phloem occlusion system among different genotypes of the same crop species can determine resistance or susceptibility to an aphid.*

Tyler Weeks, San Francisco CA

I want to thank you and the U.C. Davis Dept. of Plant Sciences for the scion wood samples that were sent to me in 2014. The samples that were sent to me were of good quality. I requested quite a list believing that most of my requests would be denied. I was surprised to find that most of the samples that I had requested arrived. Before ordering I researched varieties of fig trees that would flourish in cool climates. A good number of the samples grew roots with my persistent care and then leaves. I documented the process taking photos of all of the stages. However, North Beach in San Francisco appears to be the wrong location for this experiment. The majority of the samples have survived to become little trees, though they are pretty much the same size as they were when they were mailed to me. Good scion wood, good program, bad location for growing figs.

I think that this program is truly unique and valuable. In the not so distant future I hope to purchase a plot of land in a warmer area and continue the project. I would love to request samples from U.C. Davis again when I have more space and higher temperatures. This is a program of great value.

Jenny Smith, USDA- NCGR-Davis

In 2014, I received cuttings of 55 kiwifruit accessions from the Corvallis repository for propagation material since the hardy kiwifruit collection has been transferred from the Corvallis repository to the Davis repository. These cuttings were to attempt to establish accessions that failed in the first attempt in the previous year. Also, I collected cuttings of 95 olive accessions, as an observation order from our own collection in Davis, to produce plantlets for a project with the USDA ARS CPGRU on screening for olive knot resistance. I have not included the numbers for replenishment orders within our own unit, although those orders are listed in GRIN. I can give those if needed though. Please let me know if you have any questions.

Tim Daly Jr., San Jose CA

I received both fig and plum budwood from you last year. I attempted to root the fig cuttings in moist potting soil, but failed. The plum budwood I grafted to an old Santa Rosa tree and a pluot tree in the yard. About half of the grafts took, giving me some of each variety. They grew and produced leaves. I was excited! However, for some reason, this spring, none of the buds has opened yet, though the rest of the tree has leafed out normally. I fear the worst.

**Lack of chilling in this low chill year?**

James McCulloch, Newport Beach CA

I am a member California Rare Fruit Growers in Orange County, California. The bud wood I received is used to graft to root stock that is used to help raise funds for scholarships.

I personally purchased the apple root stock that I use to graft on the bud wood that you provide. I donate the apple trees to the club to help raise funds for annual scholarships that we give to horticulture students at Calpoly Pomona. I am not the only person that donates plants for the annual sale. This this past April we raised over \$10,000 in our annual plant sale that was hosted by California State University Fullerton called The Green Scene. This past year I grafted 40 rootstocks with your bud wood. After a couple years they will go on sale at The Green Scene.

I work at Chapman University in Orange, California. This past year the University planted a garden with many fruit trees surrounding it. I received permission to graft to the two apple trees they planted.

That gives the students a chance to see first hand the grafting process. I am also excited that I will be able to observe the grafts first hand and see how they do in this climate. It will be a great learning experience for me as well as the students at Chapman. I never get a chance to observe the trees once they leave to see how they are doing in this area.

Thanks so much for providing us with the bud wood so we are able to do this.

Darryl Phillips, Milpitas CA

In 2014 and early 2015 I received seeds and scions of *Malus Sieversii* from the Geneva New York facility.

The seeds and scions are primarily intended for a gene pool of disease resistance for breeding purposes. The assumption is that *Malus Sieversii* is the wild ancestor of domestic apples and a reservoir of genetic diversity that includes disease resistance.

Primarily, I focused on acquiring accessions with proven resistance to fireblight. Fireblight is widespread throughout Eastern Santa Clara Valley. As one travels through the area, Fireblight is seen on many of the ornamental pear trees lining city streets. The intent is to gather a diverse collection of *Malus*, let them cross pollinate randomly, grow the seeds in the local environment, and then propagate results that grow well and produce fine fruit.

*A secondary interest is in making a small contribution to the preservation and proliferation of the excellent work of your colleagues in consideration of*

- 1. Scheduled elimination of the *Malus Sieversii* block in Geneva in 2015.*
- 2. Russia's intentions to attack the USA by 2026.*

*The latter requires some background. In addition to being a graduate student at Santa Clara University, I am a practicing engineer in the tech industry with prior experience and training in industrial intelligence. And, I am a polymath with many interests including history. My assessment of Russia's behavior is that Russia is going down the same course as 1930's Germany and is preparing for war against the US, UK and Western Europe. My assessment of their weapons programs is that their preparations will likely be complete in the early to mid 2020s. The likely outcome of such a war will be the nuclear destruction of all USDA Germplasm collections and collapse of Western civilization. In consideration of this grave and serious risk, it is very important for the contents of the National Germplasm system to be duplicated in as many places as possible to ensure preservation of your work through redundancy. I strongly advise that you work with your peers in countries outside the NATO alliance and Northern Hemisphere, such as New Zealand, Chile, Kenya, South Africa, etc. to create as much redundancy as possible. And I strongly advise that you distribute to as many schools, collectors, gardens, growers, etc., as possible. In my case, I'm going to try acquiring some rural property and planting as many varieties of fruit trees as I can.*

*After the fall of the Roman Empire, it was only through redundancy that Western knowledge and civilization was preserved. In particular, preservation of*



*great literary works was though distribution to monks in Ireland, far from the rampaging barbarians sacking and looting the remains of Rome. Your work can be preserved for future generations in similar fashion.*

Anne Woo-Sam, Concord CA

Thank you for sending the specimens last year. I attempted to get them to root but was unable to. I placed them in tree soil. By comparison, I have cut some plum and pomegranate branches of our current trees and in winter. Of these, 1 plum branch rooted and two years later has started to produce plums. In the future, I will hopefully determine whether outside of plums we are only able to grow trees by grafting onto rootstock, at least in the summer.

Meaghan Black, Salinas CA  
Hartnell College - Alisal Campus

*In November 2014, we received the germplasms PI536724 and PI536719. Our intent is to use them for a 'Role of Phytochrome' experiment in our Plant Science class for the fall semester 2015. We have not yet used these germplasms, but these were the suggested varieties for use in exhibiting the forms of phytochrome. I can provide an update when the experiment is completed sometime in the fall semester 2015. Thank you very much for the germplasm and your help.*

Travis Stegmeir, Redding CA  
Lassen Canyon Nursery

I am currently in the process of using the germplasm I received from the NPGS in Corvallis, OR (strawberry). I want to convey my gratitude that such a system is in place for this valuable resource (germplasm). As a new strawberry breeder with Lassen Canyon Nursery, access to such a wide variety of germplasm and information about the germplasm in the repository was an invaluable resource for me. I will continue to request, and use the NPGS, and highly appreciate the service it provides. I would also like to add that the personal that I was in contact with to request the strawberry germplasm was very quick and efficient.

German V. Sandoya, Genome Center  
& Plant Sciences UCD, Salinas CA

Screening of Capsicum spp. against *Verticillium dahliae*

*Verticillium wilt caused by *Verticillium dahliae* is an important soil-borne disease of pepper (*Capsicum* species) worldwide. Most commercial pepper cultivars lack resistance to this pathogen. Our objective was to identify resistance to two *V. dahliae* isolates in wild and cultivated *Capsicum* accessions from the core collection of the National Plant Germplasm System of the USDA.*

*We first screened 397 *Capsicum* accessions against two *V. dahliae* isolates (Vdca59, VdCf45) in greenhouse tests in one unreplicated test. Seventy eight accessions selected from this screen were further evaluated in a follow-up experiment. In this experiment we used an augmented randomized complete block design in which each cultivar was tested once and the controls sixteen times. The controls used were the partially resistant PI 215699 and the susceptible commercial cultivar 'California Wonder'. In total, 21 (26.9%) and 13 (16.6%) *Capsicum* accessions tested were resistant to *Verticillium* wilt when inoculated with *V. dahliae* isolates VdCa59 and VdCf45, respectively. Eight accessions (Grif9073, PI 281396, PI 289397, PI 438666, PI 439292, PI 439297, PI 555616, and PI 594125) were resistant to *Verticillium* wilt against both *V. dahliae* isolates. On the basis of Germplasm Resources Information Network data, two of the *Capsicum* *annuum* accessions Grif9073 and PI 439297 were also resistant to *Phytophthora* root rot disease. These sources of multiple disease resistance will be useful to pepper breeding programs.*

A publication was submitted to Plant Disease Journal and currently it is in first look. The manuscript was titled as "Screening of Wild and Cultivated *Capsicum*

Germplasm Reveals New Sources of Verticillium wilt Resistance" and can be found in <http://apsjournals.apsnet.org/doi/pdf/10.1094/PDIS-01-15-0113-RE>.

Dr. Peter van Hest, Oceano CA

Bejo Seeds

*In 2014 Bejo seeds, Inc. requested and received various clones and true seed lines from the collection of the Irish potato (Solanum) maintained by the National Plant Germplasm System. Typically 40 - 75 lines are acquired each year.*

*For more than a decade, Bejo seeds has received true seed, in vitro and in vivo material in this fashion in order to evaluate these lines in its breeding program to create true seed potato varieties.*

*Of the hundreds of clones received over the years, 31, or about 4% of total clones, have provided their genes towards potential parent lines which are currently being evaluated.*

Because of the breadth of genetic material available from the National Plant Germplasm System, access to it is of utmost importance to Bejo Seeds, and it is highly appreciated to receive the material.

Over the years there has been a rare instance of questionable phytosanitary condition, but that is the rare exception rather than the rule. In addition, we were alerted to this possibility and to destroy the clone in question, which speaks of the high standards the NPGS follows.

In summary, Bejo Seeds, Inc. is very appreciative of the clones available from the Potato Genebank, and will continue with yearly requests.

Zachary Bower, Davis CA  
Bayer CropScience

I am glad to help report on the value of the National Plant Germplasm System to our company Bayer CropScience Vegetable Seeds (formerly called Nunhems USA, Inc., a subsidiary of Bayer Crop Science).

Bayer CropScience Vegetable Seeds is an international company active in research, production, processing, marketing and sales of vegetable varieties for the professional horticultural production and distribution business. We are among the world's four leading vegetable companies and are present in all major vegetable production areas in Europe, Middle East, North and South Africa, The Americas and Asia/Pacific. Solanaceous crops such as tomato, eggplant and pepper are important global crops for Bayer CropScience Vegetable Seeds, with R&D activities on these crops both here in the US as well as other locations around the world.

We are all acutely aware of the growing need to explore and utilize traits found only in wild germplasm to improve crops. We are currently using the germplasm as a part of general background research in solanaceous wild species to help our traditional plant breeding and pathology efforts in solanaceous crops. We've made phenotypic observations on the plants, however the research is in the preliminary stages and the ultimate use and value has yet to be determined.

At Bayer CropScience Vegetable Seeds we are grateful for the National Plant Germplasm System providing a source of diverse germplasm to meet future needs. In general, there is great value in a central collection of germplasm where researchers can obtain seed from the exact accessions reported in publications. And in turn, report the exact accessions used in publications to enable other researchers to obtain the seed. This is particularly useful when research projects are decades apart and helps overcome significant R&D challenges in our industry.

Ross Koda, South Dos Palos CA

The short grain sweet rice seed which we received through APHIS and grown in 2014 did not show any desirable characteristics which would be useful to us.

Although I don't have more specific details at my fingertips, I can say that the varieties, in comparison to our California stock, were spindly, less tillering, lower yielding, and longer season. In short, they displayed no characteristics that would enhance what we are growing already.

Joe Kepiro, Glenn CA

I requested Rice germplasm in 2014. The acquired germplasm has multiple purposes.

First, I want to evaluate previously developed Japanese type rice for compatibility with the California climate and see if there are varieties that are accepted and desired in Japan that can be grown in the USA and exported. These varieties are not the most currently used in Japan but are to lines use to develop the most current. Some are still in production.

Secondly, I needed the germplasm that was used to develop the current California commercial varieties since the California Cooperative Rice Research Foundation has patents on the current main varieties which prevents free use of that germplasm in breeding. I can use the unpatented predecessors to the current patented varieties to make crosses and introgress those desirable traits into the premium sushi rice we grow.

Thirdly, I want to use the predecessors of the well accepted premium rices of Japan (e.g. Koshihikari) and remake those crosses, then make selections in the California climate in the hopes of capturing the highly desired traits and also optimizing agronomic traits for California commercial production.

*This germplasm that I acquired is not available anywhere else that I am aware of. NPGS is essential for me to have access to that germplasm. I am very thankful to the United States Department of Agriculture for collecting and curating the germplasm for dissemination.*

*Recently the California Rice Commission has enacted restrictions on the import of any rice for growing into the state of California. Although not impossible to meet the requirements for importation into California the new rules are very burdensome and expensive for a small company like the one I work for. I was fortunate to have acquired over 300 lines of germplasm before the new rules came into effect. I will not have the time nor resources to bring in promising rice germplasm from NPGS in the future. This is very disheartening because the material available from the NPGS is a resource that I want to utilize and will benefit my company greatly.*

Derrick Reed, Calabasas CA

I was unable to get several of the fig cuttings to root successfully (Col de Dame, Black Madeira, Barnisotte, and others). Of the ones that rooted, it is too early to tell how suitable they are for my region (San Fernando Valley).

Glen Woodmansee, Santa Monica CA

I received a fig cutting which I am growing out to test its adaptability to coastal Santa Monica weather. If it is a good one for this microclimate I will bring cuttings to the local chapter of the California Rare Fruit Growers so that others can try it. Cuttings are distributed free between members on a regular basis. -Glen Woodmansee

*My local chapter is involved with a plant collection in which you may be interested, as no germplasm collection of commercial varieties of the Acca sellowiana (feijoa, or pineapple guava) seems to exist in the U.S. There was at one time such a collection in New Zealand that was maintained by the government, but it no longer exists. New Zealand developed quite a few improved varieties, and the fruit is very popular there. We recently imported their varieties and added to the collection by seeking old heirloom types in California. U.S. nurseries don't generally sell this plant for its excellent fruit, but rather sell seedlings for foliage. It would be a good plant for a government collection, since varieties are easily lost when there aren't many plants and when some people sell seedlings with the names of established varieties. --Glen Woodmansee*

Liliana E. Scarafia, Durham CA  
Agbiolab Inc.

We are grateful to have such a service that can satisfy our needs for registered or referenced material. Our use is mostly for DNA fingerprinting, and some gene

tracing in breeding programs. We will acknowledge the source material if published.

William Yi, Corona CA

The scion woods are wrapped up professionally and are very healthy when I received them. I have used the asian pear scion woods to graft onto my apple tree. All of them are growing and I believe the Hosui and the Sinseiki have little pea size fruits right now.

Jessica Grice, Bonsall CA

I always wonder if those Pistachios that are so cleverly marketed are your varieties. A harvest series, thatll keep them busy! I've been working on Petunia, Calibrachoa and Phlox this year but I have other projects in the works including some embryo rescue work (maybe using colchicine to induce polyploids?). Seems to be a trend amongst flower breeders, I'd like to try it on cherries. Not looking forward to water restrictions this year.

Jake Myrick, San Francisco CA  
Sequoia Sake

Unfortunately we were not able to get our test field and are still trying to find a replacement farmer to plant our rice. It has been a very trying ordeal but I and still optimistic we will get this program going. Once we do I will be very happy to share all our data.

If by chance you know of any small independent rice farmers who would like to do a small plot of land I would be very grateful for the introduction.

Yasha Magarik, Encinitas CA

First, thanks for your help all these years with the germplasm ordering system. This past November, I requested about 135 accessions from 9 different repositories, as part of our effort to build a local genetic library for the community and local growers, and enable research for a probable future agricultural research station on site. I did receive 8-10 excellent bundles of cuttings from Geneva, NY, as well as 2 small (seed) packets from another repository. *However, I still have not received any material from any of the other repositories, and can only assume that my request has been denied either because of a lack of winter, or the drought, or because the request was somehow found unsatisfactory (although I'd ordered material with much greater success the year before). So on the whole, I wasn't able to use very much NPGS material. I was particularly disappointed by not receiving material from Davis and Corvallis, which have so much of the material with which we'd like to work and experiment.*

With regard to the one significant shipment we did receive, that set of 8-10 apple cultivars, I managed to graft them all onto M-111 rootstock we'd ordered and we are currently evaluating them (in addition to a number of other varieties I acquired through a local nursery) for suitability for our climate in coastal Southern California. That piece of the project was inspired by Kevin Hauser, owner of Kuffel Creek Nursery, who has experimented quite a bit with growing apples in warm climates and seems to have shown that, at least with regard to apples, chill hours are a misleading metric as currently constituted. I have coupled our experimentation with known and named cultivars with a small but growing apple breeding program, planting out apples by seed with the goal of perhaps finding a new useable apple or at worst suitable rootstock for Encinitas, CA. Although the apple seedling program is not a use of NPGS material, it is greatly assisted by the availability of the apple cuttings, since I've been able to compare growth patterns and understand what markers we should be aspiring for as we select among the seedlings.

Hamza Zamani, Hayward CA

Budwood/cuttings requested all were of excellent quality:

2013:

DFIC 12 - DAV - Ficus carica

DFIC 63 - DAV - Ficus carica

DVIT 535 - DAV - *Vitis vinifera* subsp. *vinifera*

Comments: DVIT 535 was successfully rooted and had growth. Both varieties of ficus were successful in rooting and later died - most likely cause was due to over watering.

2014:

DFIC 17 - DAV - *Ficus carica*

DFIC 63 - DAV - *Ficus carica*

DFIC 144 - DAV - *Ficus carica*

Comments: Only received cultivars of Brown Turkey (x3) and V.deBardeux (x1). Currently in the process of rooting with the goal of grafting the potential growth onto an unknown variety of fig currently growing (next season). Buds are swollen at the moment and waiting for roots / new growth.

Carlos Quiros, Plant Sciences UCD

Attached is my report for the asparagus germplasm received last year. It is too early to tell about the value of the germplasm since the plants will not reach maturity for another 2 years.

We received in September 2014 23 accessions of *Asparagus officinalis* that were planted in a Cd rich plot to select for reduced Cd absorption. The seed was germinated successfully for all accessions, except one, 'Mary Washington' NSL 20542 01. The seedlings were transplanted into the field where they are growing well. The plants of each accession will be evaluated for Cd absorption and disease resistance when they reach maturity, that is in two years from now. At that time we will be able to determine the value of this germplasm.

R. Varma Penmetsa, Plant Pathology  
UC Davis

As a researcher working on food legumes for several years I am writing to describe the critical role that NPGS has played in our research projects in general, and the W6 station in particular.

I have worked for about 5 years now to understand the impact of crop domestication on symbiosis and related traits in chickpea. The foundation of these studies has been germ plasm available from the NPGS (W6 section in particular). Seed for accessions of the cultigen *Cicer arietinum*, and its wild crop relatives have been the bedrock of our research studies, where we have previously documented impacts of domestication on symbiosis (nodulation, rhizobia partner choice) and responsiveness to fertilizer nitrogen. In followup and ongoing work we are currently working to define the genetic elements underlying these differences between cultivated and wild chickpea. A manuscript based on NPGS material is listed below, and four additional manuscripts are currently under preparation, with submission to scientific journals anticipated over the next 12 months. In addition to this scientific metric I note that NPGS germ plasm has allowed for us to obtain several large research and training grants from NSF and USAID, and other funding agencies, that cumulatively are >\$ 5 million in funding, and which have allowed for training of undergraduate and graduate students, visiting scholars, and post-docs.

From having worked with international collaborators and germ plasm held in the international collections, I make a further point. As an American scientist it is a matter of professional satisfaction (and some pride) to find that the NPGS is unusual in serving a key intent of germ plasm repositories: of making biological material and meta data easily accessible to users. In contrast to barriers encountered with several other repositories that I have experienced directly or heard of from colleagues, I am yet to encounter instances of an inability to obtain material from NPGS. Thus given the variable nature of access through other repositories, the continued operation of the NPGS serves a 'global public good' function.

Scientific article(s):

Penmetsa RV\*, Carrasquilla-Garcia N, Bergmann EM, Vance L, Castro B, Kassa MT, Sarma BK, Datta S, Farmer AD, Kaashyap M, Baek JM, Coyne CJ, Varshney RK, von Wettberg EJB, Cook DR\* (201x). Multiple post-domestication origins of kabuli chickpea through allelic variation in a diversification-associated transcription factor. *New Phytol.* (submitted). [\*: co-corresponding authors].

Penmetsa RV et al. (201x) A major-effect QTL for flowering time control in chickpea colocalizes with a cluster of Flowering Locus T genes in chickpea (in preparation).

Penmetsa RV, Mir RR, Shah G, Carrasquilla-Garcia N, DR Cook (201x).

Molecular polymorphism of an anthocyanidin synthase ortholog co-segregates with the C locus of chickpea that conditions a white flower color (in preparation).

Mir RR, et al., and Penmetsa RV (201x). Allelic variation in candidate genes and the green seeded chickpea trait (in preparation).

Doug Heath, Oceano CA  
Bejo Seeds

I may have mentioned these already since I think I received them in 2013 but PI lines 365904 and 247087 were grown out in the open field in Los Alamos, CA in 2014 for observation and seed increase. The lines were extremely vigorous but the setting was poor. I am continuing with PI 247087 to do some breeding or development crosses with cultivated tomato germplasm of very large size to begin to increase size in this background. I know from previous experience that this material has good monogenic recessive resistance to pvv and tev. I will further test if the material has any resistance to Septoria leaf spot. Dev crosses will be made this fall and then F2 seed will be made in the spring of 2016 and then a large population will be sent to my parent company in Holland for pathology screening.

Armando Hinojosa, Farmersville CA

I appreciate the cuttings I got, I grafted them to a Conadria Fig tree and others, Unfortunately I had a break out of Root Knot Nematodes that killed the trees. So, I have nothing else to report. I have the RKN problem corrected. I put the trees in a big tub of 100 degree water and slowly added hot water to bring it up to 118 degrees and it appears to have killed the nematodes. The trees were in hot water for about 30 minutes.

Kyle Herbold, Stockton CA

I have used the fig cuttings to distribute to other Master Gardeners so that this material is further preserved. Thanks so much!!

Rob Cuthrell, UC Berkeley  
Archaeological Res. Facility

*Materials requested from NPGS in 2014 included seeds of several species of tobacco, including domesticated tobacco and tobacco native to the western United States. These materials are being used in an ongoing morphometric study to determine whether tobacco can be identified to sub-generic levels based on the shapes of seeds. The results of this analysis will be used to identify archaeological tobacco seeds recovered from a Spanish mission in central California, from contexts dating to the first half of the 1800s. The research will potentially provide new information about the use of tobacco in Spanish missions by Native people, for example, whether they continued to cultivate local indigenous tobacco species, or whether domesticated tobacco became the primary tobacco grown and used in the missions. This research is important to the field of anthropology for understanding processes of colonization and cultural hybridity.*

Susan Alvarez, San Luis Obispo CA  
US Agriseeds

*For the past several years, I have made a few requests for germplasm samples through GRIN. All of my requests have been for the purpose of obtaining reference samples for a seed herbarium. I have been trying to find reference samples for all*

*of the species required for site identification by the Society of Commercial Seed Technologists, for which I am a registered member, for all species included on the International Seed Testing Association's Universal List of Species (I am also a personal member of this organization), and for all species listed on the Canadian Food and Inspection Agency's Minimum List of Species for Seed Identification by Canadian Accredited Seed Analysts and Laboratories (which I am not a member of).*

I greatly appreciate the generosity of the USDA and associated regional plant stations in helping me to fulfill this quest. I would also like to comment that I use the images on GRIN frequently when trying to identify unknown contaminants found in seed samples.

Holly Dumont, San Martin CA

Foothill Farm

Here is the link where my corn reviews for the season are written. Please feel free to incorporate anything into your report. Including photos. I could not continue my research in drought tolerant vegetables without the help of GRIN.

[http://foothillfarm.blogspot.com/2014\\_08\\_01\\_archive.html](http://foothillfarm.blogspot.com/2014_08_01_archive.html) (Isola di Este)

<http://foothillfarm.blogspot.com/2015/03/isola-de-este.html>

<http://foothillfarm.blogspot.com/2015/02/a-review-of-taos-blue-corn.html>

<http://foothillfarm.blogspot.com/2015/05/review-of-papago-corn.html>

Summaries from these web pages are attached.

Clayton Garland, Santa Barbara CA

*I used the plant material for a horticulture project at Santa Barbara City College. I got an A on my project and I plan on donating the trees to local non profit food forest projects....Mesa Harmony garden, Alpha resource center, and the SBCC Lifescape garden. The value of the trees is probably equal to or greater than the market value for nursery trees. which go for \$20-40 a tree. I got 53 rooted trees from my shipment of cuttings which I value at \$1,060-2120. I really appreciate the program and hope I can receive another order in continuing years and conduct some research projects. Thanks so much,*

PDF presentation to class is attached.

Cindy Bohmann, Live Oak CA

We just received our plants this year and the students are super excited! Wonderful opportunity, thank you

Species: *Rubus loganobaccus*

Jon Verdick, San Diego CA  
Encanto Farms

We had very unseasonably warm weather, and very erratic weather in early to mid-spring, so I actually lost all my late season cuttings that were in the process of being rooted, which included those from the NPGS in 2014. So, in that sense, there isn't much new to report. I continue to grow things received in earlier seasons, and post the results at [figs4fun.com](http://figs4fun.com) as time permits.

I did manage to sneak in a visit to WEO last August and I hope that I finished taking pictures of the original fig orchard, though do not have them processed, yet.

William Kellogg, Paradise CA

We rec'd germplasm for red clover. I have had some problems increasing the samples which I still have enough seed to try again this fall. The service has been prompt and only one sample did not germinate. I expect to ask for some beardless wheat samples soon.

Late report from 2013-14.

Iresha Goonesinghe, Ridgecrest CA

We have tried to grow these in the 93555 Zip code area - Southern CA Ridgecrest

Climate - Desert

First time nothing grew

Second time we did have some success in at least getting them to come up. We planted our second group in August 2014

See photo of the plants in Sept 2014

However we have had a really bad aphid infestation that have literally killed most of our plants

We do not have any more seeds and our conclusion is that our attempt to use these seeds in the Desert Climate did not work

Accession numbers PI 177422, 273606, 274369, 274900, 536806, 601479, 601589

Species: *Lactuca sativa* Late report from 2013-14.







e-mail [rainbownursery@aol.com](mailto:rainbownursery@aol.com)  
Phone (760) 723-5556 Office (310) 202-1382

## Rainbow Heights Nursery & Research

7632 Rainbow Heights Rd  
Rainbow, CA 92028

April 28, 2006

Dr. Dan E. Parfitt:

Rainbow Heights Nursery and Research is a small farm corporation located in northern San Diego County. We dedicate an important amount of our limited resources to do basic and applied research on crops that might represent a viable economic alternative to this semi-arid region where irrigation water is becoming scarce and, when available, extremely expensive. Being aware of the need to on time acquire our foundation plant material and establish a reliable gene pool we contacted the U.S Department of Agriculture, National Plant Germplasm System [Clonal Germplasm] [R] repository. We are grateful for the plant material, information and support that we have received from the NPGS program. With their generous cooperation our gene pool and scientific database today is sufficient to guide our development efforts.

Growers and scientist with far reaching vision consider that the future of this arid a semi arid land largely depends on the sustainable farming system using suitable crops. The genetic resources of these crops, essential for our research work, have been secured and made available to us by the National Plant Germplasm System [Clonal Germplasm] [R] repository.

A special word on the *Opuntia* genus hold at Rainbow Heights. The *Opuntia* collection received from Parlier is of special interest since many of the collected accessions are not available from foreign sources any longer, due to international germplasm exchange restrictions. In addition to the biological and cost problems with shipments of high-water-content cladodes across international boundaries, there are significant legal problems. Some agricultural customs agents are not aware that cladodes of *Opuntia* subgenus are specifically exempt from the Convention on International Trade in Endangered Species (CITES). Furthermore, the descriptors and characterization data for *Opuntia* provided to us by Maria M. Jenderek, USDA, ARS, National Arid Land Plant Genetic Resource Unit and her staff has been of enormous value since there is a lot of confusion in the taxonomy of *Opuntia* and considerable variability is found in the current plantations that cannot be traced back to individual plant repositories.

In the last year we requested Germplasm of several *Olea europea* varieties since we have seen a renew interest in the research and development on Olives for oil extraction or fresh consumption. Unfortunately, we NEVER received the plant material or any reason why it was not delivered.

We trust that with the continuous cooperation of the NPGS program in general and the professional advise of their staff in particular, our research efforts will lead to the production of quality planting material and the development of cultural practices that will allow the farmers to have a choice of the different species' of economic potential.

### **Germplasm requested during 2014**

#### **Genus/Specie**

*Olea europea*

#### **Observations**

This plant material was requested on July 24, 2014. The

#### **Germplasm was never received**

GRIN Germplasm Request for DAV (29828)

NAME: Patrice Dreckmann

ORG: Rainbow Heights Nursery & Research

ADDR: 3408 Keystone Ave

June 18, 2015

All the material that we have order from the National Germplasm System since 2002 and 2003 have come in excellent conditions and has been an extreme valuable contribution to our growing and breeding purposes. Please keep up the excellent work the Germplasm System is doing. It allows us growers and researchers to obtain an extremely valuable resource in our efforts to introduce new species and varieties for the consumer market and developed some new improved material for the future.

If you need any further information or some of the data that we are collecting, for the different accession that we have in our possession, please do not hesitate to contact us at your convenience. It will be a pleasure for us to make a modest contribution to the great work that you do to improve the possibilities of the USA farmers.

Once more, thank you very much for the very valuable work that your staff is doing and, please accept our congratulations for the particularly valuable material that you have supply us.

Dr. Patrice Dreckmann  
Technical Director  
Rainbow Heights Nursery & Research  
Rainbow, California

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## .BSL .JOFS SFQPSU

Report on Vitis ordered from ARS-GRIN, written 5/2015

I am maintaining several sites. Asterisks mark grapes from ARS-GRIN

Fourplex = Jim Stansell's fourplex at 1905 Cypress St, at Georgia St., Hillcrest, San Diego, 92104. Rich soil, has proven very successful for an old Concord vine. Being between two building, the site gets only half sun. But this is enough to ripen Concord in July, and I hope other American varieties will also do well there.

Captivator

Concord

Steuben

Delaware

Burmunk (\*)

Seneca

Rebecca (\*)

Queen of the Vineyard

CACG = College Area Community Garden, 92182

This site is immediately to the East of San Diego State University. The grapes are in full sun. All are doing extremely well.

Arandell

Triumph (\*)

America

Delicatessen

Wapanuka

Centennial

RCG = Roger's Community Garden at UCSD, South of the Che Cafe.

Winchell, Muscat Hamburg, Price, Jupiter, Reliance, Iona, New York Muscat, Centennial

Propagation-row has about 50 one and three gallon pots with new cuttings, many from ARS-GRIN.

The problem at RCG is that the site-soil is decomposed sandstone, hardly any organic matter at all, and the surrounding grove of 100 year old eucalyptus trees infest moist soil with their roots very rapidly.

Centennial alone is flourishing; the other grapes seem to badly affected, are slow to leaf out, generally groggy and not vigorous. They are receiving regular water, feeding, and good sun. In their third year, I expected them to "leap," but they have most certainly not done so. Current thinking is to try some other rootstocks in the area. Vines grafted onto 3309C have been ordered; America (Munson) is being planted, as having done extremely well at CACG; and I would

like to experiment with DOG RIDGE as a vigorous rootstock for sandy soil. Dog Ridge, however, seems to have fallen by the way-side, and is proving difficult to track down. Here is a case where I would be out of luck, without ARS-GRIN.

Northminster Presbyterian Church Community Garden, 4324 Clairemont Mesa Blvd., San Diego, CA 92117  
An old covered walk-way has been repurposed as a trellis for grapes. The seven pillars each have three grapes planted 2015.

1	Centennial	Jefferson (*)	America
2	Beauty Seedless	Triumph (*)	Delicatessen
3	New York Muscat	Captivator	Muscat Hamburg
4	Wapanuka	Joy	Dizmar (*)
5	Swenson Red	Golden Muscat	Early Muscat
6	Izunishiki (*)	Carignane (*)	Lucile (*)
7	Mavrodaphne (*)	Black Eagle (*)	Brianna

LG = Lemon Grove, 91945. Rich soil, full sun, regular irrigation.

Venus, Brianna, Joy, Muscat Hamburg,

Golden Muscat, Campbell Early, Uzbekistan Muscat(\*), Kyoho (\*)

Captivator, Orange Muscat, Izunishiki(\*), Early Muscat, Muscat Blanc.

Ordered for planting 2014

Burmunk

Flourishing at fourplex

Triumph

Flourishing at CACG, much fruit already, many cuttings made.

The vine is wonderful; if the fruit is as good as the 19th. ampelography claims, Triumph

will be a winner!

Kyoho

Growing slowly and deliberately in LG

Rebecca

Growing slowly at RCG and fourplex

Uzbekistan Muscat

Growing slowly at LG

Red Giant

LOST in May 2014 Santa Ana!

V. girdiana (3 clones)

All flourishing in grape-hedge at RCG

Ordered for planting 2015

Brilliant

NPCT and prop-row at RCG

Black Eagle

Still in 'frij; will go in at fourplex

Duchess

Prop-row at RCG

Jefferson

Will go in at fourplex

Headlight

Prop-row at RCG

Lucile

NPCT and prop-row at RCG

Rochester

Prop-row at RCG, for friend in Rochester, NY, who lives near the Ellwanger & Barry

nursery site.

Izunishiki

NPCT and LG

Carignane

NPCT

Mavrodaphne

NPCT

Ordered for planting 2016:

3	DVIT 10 - DAV - Vitis hybr.	Armalaga
4	DVIT 22 - DAV - Vitis hybr.	Black Queen
5	DVIT 51 - DAV - Vitis hybr.	Edna
6	DVIT 84 - DAV - Vitis hybr.	Koshu Sanjaku
7	DVIT 147 - DAV - Vitis hybr.	Super Hamburg

8	DVIT 1118 - DAV - Vitis hybr.	Pione
9	PI 231813 - DAV - Vitis hybr.	Muscat Angel
10	DVIT 130 - DAV - Vitis labrusca	Red Giant
11	DVIT 2573 - DAV - Vitis spp.	Extra (Munson)
12	DVIT 410 - DAV - Vitis vinifera subsp. vinifera	Gold
13	DVIT 8167 - DAV - Vitis vinifera subsp. vinifera	Suavis
14	PI 193304 - DAV - Vitis vinifera subsp. vinifera	Cannon Hall
15	DVIT 8049 - DAV - Vitis x champinii	DOG RIDGE (HIGH PRIORITY!)
16	PI 588203 - GEN - Vitis hybr.	Ellen Scott
17	PI 588431 - GEN - Vitis hybr.	XLNTA (Munson)
18	PI 588551 - GEN - Vitis hyb	Atoka.
19	PI 588561 - GEN - Vitis hybr.	Mericadel
20	PI 597126 - GEN - Vitis hybr.	Lindley
21	PI 597173 - GEN - Vitis hybr.	Delago
22	PI 597201 - GEN - Vitis hybr.	Brighton
23	PI 597207 - GEN - Vitis hybr.	Croton

**W6 2014 Responses****Ockert Greyvenstein**

400 Obispo St

Guadalupe,

CA,

93434

USDA Germplasm received and tested during 2014

PI	Genus	Species	Germ %	Notes
650935	<i>Cuphea</i>	hybrid	Cuttings	Cuttings arrived in good condition and rooted with ease. Five plants were evaluated for use in ornamentals. No self seed were obtained from hybrids or when used in crosses with other related species. The hybrid resembles <i>C. caeciliae</i> more than <i>C. ignea</i> .
650936	<i>Cuphea</i>	hybrid	Cuttings	Cuttings arrived in good condition and rooted with ease. Five plants were evaluated for use in ornamentals. No self seed were obtained from hybrids or when used in crosses with other related species. The hybrid resembles <i>C. caeciliae</i> more than <i>C. ignea</i> .
534698	<i>Cuphea</i>	<i>llavea</i>	0.72	PI was evaluated for possible use in ornamental breeding program. Plants are very weedy and require paclubutrazol treatment at seedling stage to reduce hypocotyl stretch. Apart from a possible source of spreading germplasm no other apparent ornamental use was observed. Self seed was made from two selections as possible future source spreading of germplasm.
357299	<i>Helianthus</i>	<i>tuberosus</i>	0.92	All <i>H. tuberosus</i> were evaluated as possible edible ornamentals. PI produced nice big white tubers. Probably too vigorous for use as new crop at this point. Some open pollinated seed were collected for storage in cold room.
503277	<i>Helianthus</i>	<i>tuberosus</i>	0.83	All <i>H. tuberosus</i> were evaluated as possible edible ornamentals. PI segregated for production of pink and white skinned tubers. Open pollinated seed were harvested for storage in cold room. Plants are probably too vigorous for ornamental use at this point.
547238	<i>Helianthus</i>	<i>tuberosus</i>	0.71	All <i>H. tuberosus</i> were evaluated as possible edible ornamentals. PI, a very vigorous accession producing large quantities of small tubers. Might have weed potential. Too vigorous for use. No seed were harvested.
650104	<i>Helianthus</i>	<i>tuberosus</i>	0.96	All <i>H. tuberosus</i> were evaluated as possible edible ornamentals. PI produced nice large pinkish tubers. Accession to vigorous for use at this point but seed were harvested for storage in cold room.
664617	<i>Helianthus</i>	<i>tuberosus</i>	0.75	All <i>H. tuberosus</i> were evaluated as possible edible ornamentals. PI produced weak plants, tubers were elongated. No seed were harvested.
664619	<i>Helianthus</i>	<i>tuberosus</i>	0.92	All <i>H. tuberosus</i> were evaluated as possible edible ornamentals. PI had lower vigour, produced few elongated tubers. Probably the most suitable for further investigation. Seed were harvested for storage in cold room.

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27 May 2015

Dr. Dan E. Parfitt  
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RE: W6 2014 Responses

Dear Dan:

For this year's report I decided to focus on rhubarb COO\ graft compatibility and cultivar fidelity. The majority of the requests I make fulfill the educational purpose of the repository system. The plant material is shown regularly to visitors including educators. Determining the original names of historic varieties is very important. Additionally, it has been a rewarding experience breeding a strain of corn.

Rhubarb

As part of my search for the original Topp's Winter Rhubarb I requested RB19 *Rheum rhabarbarum* New Zealand, in 2010. The stalks were larger than those described for the Topp's variety and the requested plant soon died under mysterious circumstances (i.e. neighbor trolls who regularly poison my plants with salt water). If you have any contacts in New Zealand or Australia who are able to find this important historic variety and send it to NCGR I will be very glad to hear of it [Note: I just discovered this afternoon that PI 666025 may be this exact clone].

Com

I set out to breed a rainbow-leaved com equal or better to that shown in one of the volumes of *Luther Burbank - His Methods and Discoveries and Their Practical Application* (1914-1915) edited/ghostwritten by John Whitson, Robert John, and Henry Smith Williams using com seed requested from NCRPIS in 1998. While observing the plants that resulted from the crosses I made it seemed a better choice to further develop the green and yellow leaved individuals. The pictures enclosed show plants grown in 2014. My ideal for this variety is to see all of the red color bred out of the portions of the leaves which clasp the stalk. Aside from this, I like the results so far obtained. This is not a project I work on every year so figure on it being some time before the ideal is achieved.

## Graft Compatibility

Recently (May 14 2015) I received Prunus scionwood from NCGR-Davis requested in 2014. This is in addition to past orders of *Pnmur*. All of it is intended for conservation via grafting and all of it is to be observed for trueness to names. Records are kept of all grafts made.

I've been curious for a long time why some species successfully graft together and others do not. I'd like to see a tree with branches producing apples and branches producing oranges. I think this is possible if a sufficient number of interlocks are used. Therein lies the mystery of graft compatibility. In some cases a species grafts better on a different species than it does on its own. Why is this?

In the case of the 2014 *Citrus* germplasm request, successful budding was done of all varieties on Lisbon lemon stock. For some reason, YUZU (budstick acquired from a local friend) did not work at all on Lisbon lemon nor another lemon believed to be Ponderosa.

I frequently try 'pre-experiments' which are mini-experiments not subject to full statistical stringency in order to feel out how a better, larger experiment may be conducted. It is too early to give a full report of compatibility studies.

## Cultivar Fidelity

Much confusion abounds concerning the stoneless plums/prunes developed by Luther Burbank. The prune in the NCGR system under the name "Sans Noyau" (DPRU 2419) is not the "Sans Noyau" imported by him from France. The real identity of DPRU 2419 is probably Conquest. Again, as with the rhubarb, if you know anyone in France who can find the Sans Noyau described by Burbank and send propagules to NCOR-Davis, it would be of great help to my research in setting the record straight.

The Bababerry raspberry which was popularized here in southern California during the 1980s may be Luther Burbank's 1893 introduction October Giant. A Bababerry cutting was sent to me along with other *Rubus* cuttings by NCGR, Corvallis but unfortunately it did not root. The majority of that shipment did survive however.

Luckily I subsequently found this variety for sale at a Jocal nursery.

Sincerely,



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Enclosures





Pictures of Dr. Wiersma's variegated corn.