

States of Alaska, Arizona, Hawaii, Nevada and Wyoming

Annual Report for Calendar year 2013 to the W-6 Technical Committee

Compiled by Dave Stout

I am asked to compile the report since there is no active State representative for these five States. Our database recorded that during 2013, residences in these five states placed 176 orders requesting samples from the National Plant Germplasm System (NPGS). Here are the order numbers from each of these States: Alaska, 15; Arizona, 71; Hawaii, 64; Nevada, 17; and Wyoming, 9. User categories of the 176 requestors were: individuals, 65; state employed, 52; company employed, 48; and government employed, 11.

The response rate is pretty low to the email which was sent out to each of the requestors' email address on file. I received only 21 responses from the 176 individuals, barely 12%. From these responses, we can see our germplasm is being used for a wide range of purposes. To mention a few, 1) the *Ficus carica* is used to breed for their fruit for the Jewish holiday festival in Tucson, Arizona; 2) *Zinnia bicolor* was grown to flower for digital images for use in a book on the history of garden zinnias in Sonita, Arizona; 3) some Teosinte varieties were partly for education/display purposes for a middle school science fair, and Zea Mays B73 was used to generate material for gene expression study, both in Tucson, Arizona; 4) part of a peony collection are being tested for hardiness and evaluated for use as cut flowers in Fairbanks, Alaska; 5) Taraxacum (Russian dandelion or rubber weed) from Pullman station is grown with an intention to experiment with homestead scale rubber production in Fairbanks, Alaska ; and 6) *Zea mays* plants were used in a series of trial experiments to determine the optimal species for a larger scale/longer term experiment to determine the effects of atmospheric pCO₂ levels on carbon stable isotope fractionation in plant tissues in Hawaii.

Encouraging testimonies: 1) "The germplasm system has been a big benefit to me; it is critical to be able to obtain obscure material to find plants suitable for our extreme climate. I hope it continues to function well." from Vic Johanson, Fairbanks, Alaska; 2) "The material is greatly useful." "I intend to plant these and maintain a new section of the orchard with the Assad varieties. These plants will be bred for their fruit for the Jewish holiday festival." from Gabriel Acron, Tucson, Arizona; and 3) "This material was very useful. We used the material to grow a "history of corn breeding" nursery. This small nursery allows us to better teach visitors, employees, and students" from Josh Hager, Waimea, Hawaii.

Responses from requestors

1: Gabriel Acron, Tucson, Arizona received *Ficus carica*

I greatly appreciate and value the opportunity to grow these. At this time, I have yet to plant them, as I was waiting for the most recent seedlings to move to their next stage before starting on the Assads. I plan to plant shortly.

1. The material arrived well. It is stored in a climate controlled room, but as of yet unplanted.
2. The material is greatly useful. I have a number of other sourced citrus medica, but only one Moroccan plant. My other sources are Greece, Italy, Israel, and Yemen.
3. I intend to plant these and maintain a new section of the orchard with the Assad varieties. These plants will be bred for their fruit for the Jewish holiday festival.
4. No news yet, as they have yet to be planted. Planting will occur later in the summer.

2: Edward Grissell, Sonita, Arizona received *Zinnia*

1 *Zinnia angustifolia* var. *angustifolia* (sown May): I made two plantings of this annual and neither germinated. I'm trying again this year.

1 *Zinnia bicolor* (sown May and June): This annual species germinated at about 90% and grew successfully in the garden. I took images of the flowers (attached) for use in a book I'm writing on the history of garden zinnias. This species has reseeded in my garden from last year's plants, so it appears to be a reliable annual, though not as impressive as *Z. elegans*.

1 *Zinnia citrea* (sown January): This perennial germinated at about 50%. I'm told it is difficult to germinate. This is its second year and does not appear to have buds. The plants appear weak, perhaps because they are grown in a greenhouse. I'd hoped it would bloom so I could photograph it for the book.

1 *Zinnia elegans* (shown May): This annual germinated at about 75% and produced a number of flowers, which I photographed (attached). Unfortunately I was hoping to get the true species, but this turned out to be garden collected. It is a single form and extremely colorful. I harvested seed and sent them to the garden curator at Jefferson's home of Monticello, with the notation that it was not the true species.

1 *Zinnia haageana* (sown May): I made one planting of this annual species with no germination. I'm trying again this year.

1 *Zinnia juniperifolia* (sown January and May): This perennial species germinated at about 80%. As with *Z. citrea* this is its second year and it does not appear as if it will flower. The plants are weak compared to similar seedings of the native species *Z. acerosa*, which grow naturally in my area.

3: Brenda Hunter, Tucson, Arizona received *Zea mays*

I no longer work for the University. I don't have my notes, and I can't remember the specific lines. If you were to tell me the specific lines, I could probably be more specific. Most lines were ordered with the intent to compare gene expression with B73 wild type. I grew the plants, and others would do the gene expression analysis. The plants pretty much germinated fine. At this point, the only publication from the project is a time course and tissue comparison of gene expression in B73 wild type developing kernels, and those seeds were ordered a long time ago.

I know I ordered some tetraploids, probably in 2012. I needed to bulk up the seeds – I barely succeeded because the greenhouse was very warm so pollen yield was a problem, along with nicking between the flowers (I staggered the planting to try and make up for that.) So, yield was poor, and then lets add a seed fungus problem on top of that.

I also had ordered some teosinte varieties probably before 2012. This was partly for education/display purposes for a middle school science fair that is held about every other year, and partly for in planning for another gene expression comparison. The problem was growth conditions: one variety never flowered, and one flowered some, but very little pollen.

All these experiments were done in the greenhouse, and even in a controlled environment, growing corn in Arizona is tough. There is seasonal variation, and adjusting the lights to mimic the proper day length is an art in itself.

Sorry I couldn't be more help. You do provide a useful service. I guess our use fell more along the way of: is there a difference that we can compare and exploit?

4: Norris Phelps, Mesa, Arizona received *Persicaria*

Thanks for your follow up. I received late last month the requests for grape cuttings *Vitis vinifera* that I had requested 25 May 2013. As you can imagine our 105 degree temperatures make it a bit difficult to maintain them though I am happy to say that 11 of the cuttings are growing steadily. I am using raised beds, pots, and an indoor planter to see which of the three methods will be most successful and welcome your input. It would be very helpful if I could receive future orders in February or March. . . . I believe that I would have much greater success. The *Persicaria maculosa* was ordered by mistake The pomegranate and walnut cuttings did not arrive. I assume that *Chernaya rosa* is also a grape cultivar.

This year I have coordinated a **Provident Gardeners** group to promote ag/horticulture education amongst interested gardeners. (see attachment below) I had Claud Cluff, who works in Mesa Community College ag department, demonstrate budding of citrus and would like to have had the grape cuttings in time for him to demonstrate those as well. I welcome your input how to receive material earlier.

I thought I had used GRIN to place additional orders but received none of the other orders (see below). I note that I made several mistakes so I will try to be more skilled as I try again this year.

Local vendors of grapes, berries, etc. (like Harper's Nursery, Moon Valley Nursery, Home Depot, Whitfield Nursery) seem not to have varieties well-adapted for our area. Most of the Thompson seedless grapes I have purchased have had severe mildew. Others have produced badly. Perhaps it will be necessary for **Provident Gardeners** and like-minded groups to help select and maintain a gene pool of adapted cultivars we can count on.

In answer to your questions: The grape cuttings arrived in great shape! Thanks. About 50% are growing well. The buds of *Black Manukka*, *Chernaya rosa*, and *Seedless Emperor* all seemed to be killed by the mildew of nearby Thompson seedless plants before they could open. Even the early-applied Copper Fungicide (Modern Bordeaux replacement) did not seem to help at all. I have provided mid-day shade to give some relief to those still growing. (still get 11+ hours of sunlight.) There is good drainage and adequate moisture in the developing root zone. I believe that the cuttings will be helpful (1) in propagating adapted varieties that are mildew resistant and (2) in providing material I can use to educate college students and/or **Provident Gardeners**. At present I do not plan to make any crosses. I am not oriented towards publication though I might be able to arrange through colleagues publicity as with last Saturday's Urban renewal project in downtown Phoenix. Jeff Zimmerman and associates have asked that I assist them in testing and selecting beans adapted to arid conditions of Arizona: <http://www.phoenixnewtimes.com/slideshow/harvesting-native-arizona-wheat-with-hayden-flour-mills-41334459/> I am the one working the 60+year-old threshing machine and wearing the Tilley hat.

5: Sarah Smith, Eloyi, Arizona received Parthenium

1. Did the material arrive in good condition? Yes Did the material germinate and/or root well? Yes Did the material grow well? Yes Any observations you may have on general growth and development?
2. Was this material useful to you? Yes If yes, how? If no, why not? Found ploidy levels that will be grown in the field for further evaluation.
3. What were the outcomes from any plant germplasm you received: Was it part of a research experiment? Did you make crosses? Are you developing any new plant offerings? What are your future plans with this material? This material will be evaluated in the field and possibility implemented into our breeding program.
4. Have you completed any publications or news items related to the material you received at any time? If yes, please include a list of your publications and news items. No.

6: Dave Shroyer, Oatman, Arizona received Festuca, Poa and Medicago

yes, your samples arrived in great shipping. kudos to the person who packaged them. they were placed in fresh potting soil, and misted with our local water from our local well. not very good water to say the least. This thereby being the reason for the research, to see which plants other than cactus can grow in both our poor water and soil conditions. the plants did ok in the fresh soil and being misted. once they rooted, they were transplanted to 50/50 potting soil/local soil. it was here that they did not survive. either the local soil or water got to them both, but samples did not last longer than two weeks.

7: Paul L. Sanchez, Maricopa, Arizona received *Parthenium*

The plant germplasm materials arrived in good condition but some accessions have very poor germination. Most of the plants have normal growth and development.

Yes, the germplasm material was useful for determining the genome size, ploidy, and chromosome level of different *Parthenium* species.

We were able to confirm the genome size, ploidy and chromosome variation of selected *Parthenium* species. The plant species with known cytogenetic and genomic information could be utilized in making crosses and developing advance mapping population in the future.

Publication: Sanchez PL, Costich DE, Friebe B, Coffelt TA, Jenks MA, Gore MA. 2014. Genome size variation in guayule and mariola: Fundamental descriptors for polyploid plant taxa. *Industrial Crops and Products* 54: 1-5.

8: Scott Frische, Pheonix, Arizona received *Phoenix*

Did the material arrive in good condition? Yes it arrived in excellent condition.

Did the material germinate and/or root well? N/A. Material was date pollen.

Did the material grow well? N/A, see above.

Any observations you may have on general growth and development? Pollen was successful in pollinating female date palm.

Was this material useful to you? Yes.

If yes, how? Pollination with material was successful.

If no, why not?

What were the outcomes from any plant germplasm you received: Was it part of a research experiment? Yes, pollination took place, fruit and seed were produced.

Did you make crosses? Yes.

Are you developing any new plant offerings? Possibly but too soon to tell.

What are your future plans with this material? Grow and evaluate.

Have you completed any publications or news items related to the material you received at any time? No.

If yes, please include a list of your publications and news items.

9: David Coker, Apache Junction, Arizona received clonals from Davis and Corvallis

Sorry guy, hate to give you a bad report on my attempts to grow new plants from the cuttings and seed I received but everything either lived for a while but never produce roots or just did not germinate at all. I followed instructions to the letter but got no results. However, shipping quality was exceptional. Your end was totally faithful and lived up to expectations. I however, made a complete failure on everything I received. Go figure. My goal was to get a small local group interested in agriculture despite the dry climate of the state of Arizona daunting them. It seems I failed. All mt other plants from other sources either didn't live long or just produce poor results. Maybe next year? Thanks for your support anyway. Love you guys take care.
DC Sent from my iPad

The germplasms were a very good insight for research into trying to get things to grow out here with our poor conditions and the heat as well. very much appreciate the sending of the germplasms for this. we are hoping that with more and more experiments, we will be able to get more things to grow properly here. no official research publications made, not enough progress yet for that.

10:Paul Nabity, Tucson, Arizona received Vitis

The material arrived quickly once it was sent. There was a state quarantine in place that delayed shipment until a permit was issued to allow transport of the plant material. Upon arrival all but one species developed roots and grew into a vine. The one species that did not, *V. shuttleworthii*, is known to propagate poorly from cuttings so this failure was not surprising. Of the other cuttings, *arizonica*, *californica*, *tiliifolia*, *monticola*, and *rupestris* successfully propagated (4-5 out of 5 scions), whereas *betulifolia*, *cinerea*, and *rotundifolia* did not have as high success (2-4 out of 5 scions).

Exceptionally useful. I study the interactions of grape with its native insects and without this repository, I would have spent considerable time locating plants and then using molecular markers to ID field collections. The resources available at the repository are unmatched and greatly facilitate research.

All the cuttings I received were propagated to represent each of the various species of *Vitis* native to North America. This is part of my research program that characterizes the interactions between grapes and their insect herbivores in ecological and evolutionary context. I will use this material for my research during 2014 and possibly 2015 then discard the material. All research is ongoing and resulting publications will appear in late 2014-2015.

11: Daniel Kelly, Tahoa, Hawaii received Zingiber

Material arrived in good condition.

12: Pat Holloway, Fairbanks, Alaska received Paeonia

Yes. Excellent growth first year.

Yes- it is part of a peony collection we have to test hardiness and evaluate cultivars for use as cut flowers. The plant looks great, but it will be 3-4 years before we can evaluate it properly.

Evaluate the plants for at least 5 years to learn their value as cut flowers. Potentially propagate them for commercial distribution and/or use in breeding. Too early to tell.

13: Vic Johanson, Fairbanks, Alaska received Taraxacum

The material arrived in good condition and germinated well. It also grew well, blooming and setting seed the first season. Most all the plants survived the Fairbanks winter and are blooming again now. Just today I planted additional seeds of all three accessions, and expect to harvest seed from last year's plants. This material was useful to me. The initial goal was to determine winter hardiness, and that will continue to be monitored going forward since this winter was comparatively mild, with good snow cover. But initial results are encouraging; even plants sitting in pots exposed in a cold greenhouse survived well. I intend to experiment with homestead scale rubber production and would also like to make seeds available to others, since they don't appear to be for sale commercially. I have published nothing thus far about my research.

The germplasm system has been a big benefit to me; it is critical to be able to obtain obscure material to find plants suitable for our extreme climate. I hope it continues to function well.

14: Todd Steinlage, Palmer, Alaska received Chenopodium

1. Both accessions arrived in good condition, and germinated well. They grew well, very tall in our long summer days! *C. quinoa* set seed fairly quickly, while the *C. giganteum* apparently needed shorter days to flower.
2. The material was useful; I use them as symptomatic hosts of plant viruses. They are especially useful as local lesion hosts, and for viruses from plants with lots of phenolics that interfere with purification.
3. I use them in diagnostic procedures.
4. I haven't done any publications with them yet.

15: Jeff Scott, Kunia, Hawaii received Solanium and Capsicum

Our intended use of the germplasm requested was to add important traits to our proprietary breeding lines. However, if material was patented, then our use would only be as a control for comparisons. Material was received in good condition, but was not planted. Unfortunately, we ran into budget constraints that have delayed these projects on tomatoes and peppers, so we have not yet moved forward with evaluations or crosses.

16: Josh Hager, Waimea, Hawaii received Zea mays

All of the seed arrived in excellent condition and grew as expected.

This material was very useful. We used the material to grow a “history of corn breeding” nursery. This small nursery allows us to better teach visitors, employees, and students about what we do and the importance of plant breeding.

We plan to produce enough seed to continually plant this nursery for teaching and demonstration purposes.

17: Ande Buskirk, Hilo, Hawaii received Citrullus

The material arrived in good condition. The envelope was well sealed and the packing slip was detailed.

The seeds germinated well. We had a 100% success rate. The plants were used for rootstock in a grafting experiment. We are hoping to pull the plants and learn about rootknot nematode pressure in our area when our crop is finished later this summer.

One plant was overlooked during grafting and was accidentally planted in the field with the others. It produced an early, small melon (palm sized) with light green stripes and a yellow-green center. The seeds were large and brown. Our area has poor soils but the plant grew vigorously.

The material was very useful. We hope to obtain more in the future as it was not only a good resource for our grafting practice, but also a great springboard for discussion about what it means for a crop to be domesticated.

Our request for germplasm was educational. We are hoping to find that the wild watermelon resists RKnematodes.

We have not yet generated a report. In coming semesters, we may expand our experiment in order to write up our findings.

18: Yun Judy Zhu, Waipaha, Hawaii received Vasconcellia

Did the material arrive in good condition? yes.

Did the material germinate and/or root well? germination rate is very low.

Did the material grow well? Yes.

Any observations you may have on general growth and development?

The plants are growing in the greenhouse condition and seems normal so far.

Was this material useful to you? If yes, The plants are very useful to conduct a research to identify resistance genes which might be found from these plants.

What were the outcomes from any plant germplasm you received: It is part of research. No, we did not make any crosses yet. We will continue to grow them in the greenhouse for research to study the disease resistance mechanism.

Have you completed any publications or news items related to the material you received at any time? Not yet.

19:Josh Bostlic, Honolulu, Hawaii received Zea mays

1. The sample was received in good condition. 24 seeds were planted in 5 inch deep pots in our indoor growth chambers. We experienced a 91.6% germination efficiency (22/24 seeds germinated). All plants were grown for 3 week and plants reached an average height of 55.6 +/- 6.3 cm. The plants rooted well and we didn't experience any difficulties throughout the experiment.
2. The material was useful for us in determining which species would grow in our indoor growth chambers.
3. This species, along with a variety of other C4 species acquired from the ARS, was part of a series of trial experiments to determine the optimal species for a larger scale/longer term experiment to determine the effects of atmospheric pCO₂ levels on carbon stable isotope fractionation in plant tissues. We have decided to go ahead with another C4 species for the long-term experiment, but we may return to zea mays for future experiments.
4. No publications have been published with data acquired from this species.

20:Jacob Francis, Reno, Nevada received Solanum

The seeds arrived intact, but had low germination rates (less than 10 plants) compared to *S. eleagifolium* seeds collected in Roseville, CA (~ 60% germination success though we did not measure this). The seeds that did germinate did not transplant well, likely due to our errors in transplanting.

21:Christy Potter, Las Vegas, Nevada received Pisacia

1. Bamboo received in good condition, when planted, it germinated well, however, after 3 weeks, the once healthy plants, shriveled and did not do any more. I brought them out of the heat and tried to revive life but it was unsuccessful.

2. Yes, it would have been more successful if I had built a hot house with controlled sun, heat, and water for the first year or until established well.

3. I had hoped to cross it with a plant currently in my yard, but with the outcome I was unable to.

4. Nothing published as my research was unsuccessful. Thank you.

I hope to try this again but will purchase an established variety.