

STATE OF NEVADA

Annual Report for Calendar Year 2019 to the W-6 Technical Committee

Compiled by Melinda Yerka

Summary: Table 1 summarizes NV use of the NPGS in 2019. Thirteen (10 in 2017, 15 in 2018) individuals from Nevada placed 30 orders (17 in 2017, 39 in 2018) and received 193 (91 in 2017, 2138 in 2018) accessions from the NPGS in 2019. The primary reason for a spike in orders in 2018 was the establishment of a new plant breeding program at the University of Nevada-Reno (UNR) that year (my own lab). Researchers at UNR continue to be the primary institutional users (96 accessions of 193). All users were contacted via email and 7 out of 13 responded. Users reported one manuscript submission in total.

Table 1. Summary statistics for NV in 2019.

	Historical	Genetics	Taxonomy	Variety Devo	Education Teaching	Home Gardening	Other
# accessions used for each purpose	4	76	0	1	105	4	3
% accessions used for each purpose	2	39	0	0	54	2	2

NPGS USER REQUESTS AND RESPONSES IN NEVADA: (7 of 13 replied)

UNIVERSITY OF NEVADA SYSTEM AFFILIATES (Total of 5)

1. **Won Yim**, UNR Department of Biochemistry & Molecular Biology. Research use notes: We are going to sequence whole genomes of the selected species to identify genes related to phenotypic differences. We will identify the genetic basis of drought stress traits.

<i>Brassica carinata</i> - 5 accessions
<i>Brassica juncea</i> - 4 accessions
<i>Brassica juncea</i> subsp. <i>juncea</i> - 1 accession
<i>Brassica nigra</i> - 5 accessions
<i>Zea mays</i> subsp. <i>mays</i> - 3 accessions

2. **John Cushman**, UNR Department of Biochemistry & Molecular Biology. Research use notes: Fill gaps for genome sequencing of our cactus collection.

<i>Opuntia aurea</i> - 1 accession
<i>Opuntia engelmannii</i> var. <i>lindheimeri</i> - 1 accession
<i>Opuntia ficus-indica</i> - 2 accessions
<i>Opuntia humifusa</i> - 2 accessions
<i>Opuntia hyptiacantha</i> - 1 accession

<i>Opuntia macrorhiza</i> - 1 accession
<i>Opuntia polyacantha</i> - 1 accession
<i>Opuntia spp.</i> - 8 accessions
<i>Opuntia x vaseyi</i> - 1 accession

Responses to the four standardized email questions:

- What was the quality of the plant materials you received?
 - Excellent.
- Did you release any plant material(s) to the public in 2019 that was partially or fully derived from any NPGS germplasm(s) that you received in 2019 or any time previously? If yes, please provide as much information as possible about the released plant material(s).
 - No, all material is being kept in house and only the National Arid Land Plant Genetic Resource Unit (NALPGRU) in Parlier, CA is sending out material requests.
- If you published an article in 2019 that includes NPGS germplasm that you received in 2019 or earlier, please provide the publication citation (authors, title, journal, etc.).
 - Nothing published yet, be we do have a germplasm collection manuscript planned with NALPGRU.
- Do you have any suggestions or feedback for the improvement of the NPGS system?
 - Nothing at this time.

3. Melinda Yerka, UNR Department of Agriculture, Veterinary & Rangeland Sciences.
Research use notes – Phylogenetic and evolutionary studies.

<i>Sorghum angustum</i> - 5 accessions
<i>Sorghum bicolor</i> - 1 accession
<i>Sorghum bicolor</i> subsp. <i>bicolor</i> - 1 accession
<i>Sorghum bicolor</i> subsp. <i>verticilliflorum</i> - 1 accession
<i>Sorghum brachypodium</i> - 1 accession
<i>Sorghum bulbosum</i> - 3 accessions
<i>Sorghum exstans</i> - 1 accession
<i>Sorghum intrans</i> - 1 accession
<i>Sorghum plumosum</i> - 2 accessions
<i>Sorghum stipoides</i> - 2 accessions
<i>Sorghum x alnum</i> - 1 accession

Responses to the four standardized email questions (for all Yerka Lab members):

- What was the quality of the plant materials you received?
 - Excellent.
- Did you release any plant material(s) to the public in 2019 that was partially or fully derived from any NPGS germplasm(s) that you received in 2019 or any time previously? If yes, please provide as much information as possible about the released plant material(s).

- No.
 - If you published an article in 2019 that includes NPGS germplasm that you received in 2019 or earlier, please provide the publication citation (authors, title, journal, etc.).
 - Nothing yet.
 - Do you have any suggestions or feedback for the improvement of the NPGS system?
 - No.
- 4. John Baggett**, UNR Department of Biochemistry & Molecular Biology (Ph.D. student in Dr. Melinda Yerka's lab). Research use notes - This germplasm is being used to explore new short sequence repeats for use as molecular markers in *Sorghum bicolor*. Plant tissue is needed for PCR and sequencing.

<i>Sorghum bicolor</i> nothosubsp. <i>drummondii</i> - 1 accession
<i>Sorghum bicolor</i> subsp. <i>bicolor</i> - 11 accessions

Citation: See below.

Responses to the four standardized email questions: See replies for Melinda Yerka (above)

- 5. Anil Kunapareddy**, UNR Department of Cellular & Molecular Biology (Ph.D. student in Dr. Melinda Yerka's lab). Research use notes - My project is to screen the Sorghum Association panel for salt tolerance.

<i>Sorghum bicolor</i> subsp. <i>bicolor</i> - 9 accessions

Responses to the four standardized email questions: See replies for Melinda Yerka (above)

NON-UNIVERSITY OF NEVADA AFFILIATES (Total of 8)

- 6. David Rhode**, Desert Research Institute (DRI). Research use notes - Study of paleoenvironmental and archaeological specimens.

<i>Iva frutescens</i> - 1 accession
<i>Paeonia lactiflora</i> - 1 accession
<i>Smilax rotundifolia</i> - 1 accession
<i>Tsuga canadensis</i> - 1 accession

Responses to the three standardized email questions:

- What was the quality of the plant materials you received?
 - The quality was excellent for my purposes.
- Did you release any plant material(s) to the public in 2019 that was partially or fully derived from any NPGS germplasm(s) that you received in 2019 or any time previously? If yes, please provide as much information as possible about the released plant material(s).
 - No, I did not release any materials.

- If you published an article in 2019 that includes NPGS germplasm that you received in 2019 or earlier, please provide the publication citation (authors, title, journal, etc.).
 - I did not publish an article in 2019 that included NPGS germplasm.
 - Do you have any suggestions or feedback for the improvement of the NPGS system?
 - I'm grateful for the system and think it works fine.
- 7. Brant Stewart, Sadalsuud Foundation.** Research use notes - Public education, demonstrations. I am interested and working towards growing out, preserving, and eventually baking with landraces from the Middle East.

<i>Triticum aestivum</i> subsp. <i>aestivum</i> - 7 accessions
<i>Triticum aestivum</i> subsp. <i>compactum</i> - 1 accession
<i>Triticum turgidum</i> subsp. <i>dicoccoides</i> - 1 accession
<i>Triticum turgidum</i> subsp. <i>dicoccon</i> - 1 accession
<i>Triticum turgidum</i> subsp. <i>durum</i> - 20 accessions
<i>Triticum turgidum</i> subsp. <i>polonicum</i> - 1 accession
<i>Triticum turgidum</i> subsp. <i>turanicum</i> - 1 accession

Responses to the three standardized email questions:

- What was the quality of the plant materials you received?
 - The use of the seeds is to serve to develop drought-tolerant wheats, as well as in situ preservation of wheats from the Middle East. We hope to eventually bake with the wheats as a means to educate the public.
 - Did you release any plant material(s) to the public in 2019 that was partially or fully derived from any NPGS germplasm(s) that you received in 2019 or any time previously? If yes, please provide as much information as possible about the released plant material(s).
 - No.
 - If you published an article in 2019 that includes NPGS germplasm that you received in 2019 or earlier, please provide the publication citation (authors, title, journal, etc.).
 - No.
 - Do you have any suggestions or feedback for the improvement of the NPGS system?
 - No.
- 8. Brian Wignall, California Rare Fruit Growers.** Research use notes - Public education, demonstrations. I work locally with Fruit Growers and the UC-Davis Cooperative Extension teaching people how to graft and demonstrating how to grow tropical and sub-tropical fruit trees and plants in desert regions of the world. I have provided this same instruction when working with the USDA in the same manner with citrus trees.

<i>Malus domestica</i> - 4 accessions
<i>Plumeria</i> hybr. - 10 accessions
<i>Bunchosia argentea</i> - 1 accession

<i>Jacaranda mimosifolia</i> - 1 accession
<i>Carica papaya</i> - 3 accessions
<i>Vasconcellea goudotiana</i> - 1 accession
<i>Vasconcellea pubescens</i> - 1 accession
<i>Mangifera indica</i> - 1 accession
<i>Psidium guajava</i> - 3 accessions
<i>Mangifera indica</i> - 11 accessions
<i>Annona reticulata</i> - 2 accessions
<i>Annona squamosa</i> - 1 accession
<i>Annona muricata</i> - 1 accession
<i>Pouteria sapota</i> - 1 accession
<i>Artocarpus heterophyllus</i> - 1 accession
<i>Malpighia emarginata</i> - 1 accesssion
<i>Pimenta dioica</i> - 1 accession
<i>Averrhoa carambola</i> - 1 accession

Responses to the three standardized email questions:

- What was the quality of the plant materials you received?
 - The quality of materials I received was very professional. All budwood cuttings were carefully packaged in sealed bags and placed in Styrofoam boxes to prevent overheating of the enclosed materials, and a detailed packing list was provided with each order.
- Did you release any plant material(s) to the public in 2019 that was partially or fully derived from any NPGS germplasm(s) that you received in 2019 or any time previously? If yes, please provide as much information as possible about the released plant material(s).
 - No, all materials are strictly used for grafting and propagation techniques as teaching tools on my own test plot.
- If you published an article in 2019 that includes NPGS germplasm that you received in 2019 or earlier, please provide the publication citation (authors, title, journal, etc.).
 - All shared information is done either in person or through internet or social media sites with the California Rare Fruit Growers, the local Cooperative Extension or through numerous associated growers sites on rare fruits.
- Do you have any suggestions or feedback for the improvement of the NPGS system?
 - The only suggestion I would offer is a confirmation to when materials might be expected. The Miami station is very good about this. At other locations I never receive an answer and never receive the order. I've tried emailing them and asking several times and still no answer. The reason I would like to have a general idea when materials are being shipped is so I can make sure I am in town so I can be available to immediately open the package and take proper care of the materials.
 - Other than that, I really appreciate that USDA makes these materials available. It's an amazing tool to have access to these materials for teaching and advancing techniques of propagation.
 - I would like to say that over the many years working with the California Rare Fruit Growers, UC Davis, and numerous botanical facilities that the materials that USDA has provided has

allowed me to pioneer techniques of grafting, propagating and growing numerous rare and tropical fruits right here in the Mojave desert.

9. Wendy Baroli, GirlFarm. Use notes – Home garden use.

<i>Rubus idaeus</i> subsp. <i>idaeus</i> - 4 accessions

10. Hal Barkdull, North American Fruit Explorers (NAFEX). Use notes – None. [MKY note: I found this on the NAFEX website (<https://nafex.org/>): “NAFEX hosts an national meeting annually, publishes an online quarterly newsletter called Pomona, and connects people together and to fruit, and fruit related content across a variety of platforms from social media, our website, and in person locally, regionally, and through our annual national events.”]

<i>Malus domestica</i> - 20 accessions
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<i>Malus</i> hybr. - 4 accessions

11. Justin Clanton, All Things Everyone. Use notes – We are trying to breed plants to survive in high drought areas of the southwest United States.

<i>Sambucus nigra</i> subsp. <i>cerulea</i> - 1 accession

12. Meg Clark, Gingerbread Gal Shop. Use notes - I want to write about the impact and importance of different edible species for my blog. I want to plant and seed these for a few years back to back so I can post updates on different species of edible plants for my blog.

<i>Ribes rubrum</i> L. - 1 accession

<i>Fragaria virginiana</i> subsp. <i>virginiana</i> - 2 accessions
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13. Ray and Virginia Johnson, Custom Gardens Organic Farm & Trial Plots. Use notes – None. [MKY note: I found this on their website (<https://nevadagrown.com/custom-gardens-organic-farm/>): “We are Nevada’s first certified organic farm, one of the first farms to construct hoopouses and use season extension practices, and now we have the distinction of being the “original home of Nevada-Hawaiian Ginger Root”.]

<i>Actinidia polygama</i> - 4 accessions
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PUBLICATION:

Baggett, J.P., R. Tillett, and M.K. Yerka. Meta-analysis of whole-genome resequencing data in *Sorghum bicolor* classifies margaritifera as a distinct race utilizing *de novo* identification and targeted resequencing of SSRs. *Submitted to PLOS ONE May 11, 2020.*