

State of New Mexico

Annual Report for Calendar Year 2018 to the W-6 Technical Committee

Compiled by Ian M. Ray

Twenty-three individuals from New Mexico placed 40 orders and received 478 accessions from the NPGS in 2018. In general, these materials were utilized for agronomy, anthropological, bioremediation, botany, genetics, physiology, taxonomy, and plant pathology research (74%); educational and demonstration programs (5%), varietal development (13%), and undeclared use (8%).

NPGS Germplasm Use in New Mexico: Users requesting >20 accessions highlighted in bold

Bacoccini, Kyle; Bacoccini Family Farms, Albuquerque, NM: received 3 accessions for use in public education and demonstrations including part of a farm training program to try different varieties from around the world and compare them to local varieties.

Baumgartel, Jeremiah; New Mexico Vine and Wine Society, Albuquerque, NM: received one grape accession to include in a cultivar trial to assess Baco Blanc's suitability to the climate in Northern New Mexico. Baco Noir is grown with success here in New Mexico and a white cultivar with similar winter hardiness could provide growers here with another option.

Chavez, Lawrence; general public, San Rafael, NM: received 2 accessions of unspecified crops for evaluation of sustainable cropping on different soil types using varying levels of irrigation. He noted that none of the seeds germinated.

Cramer, Chris; New Mexico State University, Las Cruces, NM: received 122 Allium/onion accessions to evaluate their susceptibility to Fusarium basal rot using seedling screening and mature bulb screening methods. We are also conducting a regeneration for a number of the accessions for the NPGS.

Diatz, Ian; Sweet Tree Farm, Corrales, NM: received 12 accessions for class instruction in high altitude, dryland farming.

Gisler, Melanie; Institute for Applied Ecology, Santa Fe, NM: received 2 accessions for use in common garden studies to identify seed transfer zones

Gleason, Craig; general public, Rio Rancho, NM: received 7 corn and potato accessions for use in public education and demonstration gardens associated with training in heirloom gardening, seed saving, composting, and different crop production methods.

Grant, Lois; New Mexico State University, Las Cruces, NM: received 3 corn accessions that were planted in 2018 to observe phenotypic characteristics and to see if the plants possessed characteristics that could contribute to the maize breeding program for high elevation. Seed was increased.

Grover, Kulbhushan; New Mexico State University, Las Cruces, NM: received 30 guar accessions for variety development for potential use in hydraulic fracturing processes. Seed of these accessions was increased in 2018 for evaluation of adaptability to arid irrigated environments of NM and AZ in 2019.

Hollander, Attelia; Los Alamos National Labs, Los Alamos, NM: received one model grass species for leaf microbiome studies responding to environmental changes. Model grass species used based on available genome and past research.

Hosna, Rachel; New Mexico State University, Las Cruces, NM: received 4 accessions for botanical/taxonomic investigations. Germplasm is being used in ongoing trials recording different seedling developmental stages of the species requested. We plan to document and catalog distinct seedling stages with high quality photographs, traditional herbarium specimens as well as specimens preserved in ethanol. It is our hope that these resources will ultimately be made available to the public for a variety of uses through portals such as SEINet and the New Mexico State University herbarium.

Kaur, Harpreet; New Mexico State University, Las Cruces, NM: received 3 alfalfa accessions for use as controls in conducting pathogen resistance research in alfalfa.

Mandal, Subhankar; New Mexico State University, Las Cruces, NM: received 95 onion accessions. The short-day onion accessions from NPGS will be used to evaluate their Fusarium Basal Rot resistance using both a seedling inoculation screening and an artificial inoculation mature bulb screening (AIMBS) methods. We also intend to improve the disease scoring of AIMBS method through digital image analysis and to identify antifungal steroidal saponins in the NPGS accessions.

Montgomery, Sarah; The Garden's Edge, Albuquerque, NM: received 3 NPGS accessions for observation and evaluation relating to historical and anthropological studies of the culinary traditions of Guatemala, specifically the Baja Verapaz region.

Puppala, Naveen; New Mexico State University, Clovis, NM: received 104 peanut accessions for variety development research. Two mapping populations were received in January 2018. These materials were developed through a collaboration between NMSU and ICRISAT, India. These materials went through quarantine before releasing it to NMSU, Peanut Breeding program. As the seeds received were very few, I grew them for seed increase in 2018. In May 2019, I planted them under two locations with two replications. We will be taking physiological measurements during the growing season. The final report will be ready by the end of this year. We appreciate the help from USDA-NPGS, in timely release of the material.

Sandoval, Loretta; Zulus Petals Organic Farm and Seed Bank, Dixon, NM: received 14 tomato and bean accessions for use as follows. "Beans will be direct seeded (only half) that was sent the rest will be saved for next year, both with control and treatment (which is treated with a Rhizobia spp for beans) to understand if this improves root size and plant vigor. Each accession will be evaluated for disease (leaf) and insect resistance (bean beetle) and at the end of the season, the collected beans will be weighed to understand the yields by plot size/plant number and average weight of beans.

The promising f1 for these accessions based on yield and vigor from this work will be planted 2020 and again yield, vigor, disease resistance and nutrient density (weight of 100 beans divided /100) and compared with initial. All plots will be evaluated for drought tolerance as well, plots will only be watered every 10-14 days after established or even longer.”

“Some of the tomato are almost ready for transplant outside however some did not perform well and were very non uniform and weak, some did not germinate at all. I can send my notebook results if you would like. The accessions that are doing well (10-25 from each) will be planted and evaluated in open field this summer. I saved half of the seed from everything and are in cryo, will grow them out again to compare with the f1 in 2020 to see if there are differences in vigor. Again not releasing any of these accessions to the public. We are growing them to understand if they can be acclimated to our region and if the lycopene concentration is higher than some modern types (green shouldered trait present for flavor profile). We are also using microbes (endofungi:bacteria inoculation) for these studies to understand if this improves the vigor and nutrient content. We do not have access to testing labs, but may send some to Linus Pauling Institute and have asked if they can evaluate some of this work for antioxidant content and may work on a application for a WSARE grant once we have initial results. Plus we will share results with NMSU Alcalde this year and next season.”

“This is helping us understand if accessions from similar latitudes and altitudes from around the world can be acclimated to NM as a food source, so very helpful for our work as organic farmers and as a seed bank.”

Sanogo, Soum; New Mexico State University, Las Cruces, NM: received 2 Capsicum/chile accessions (PI 439297 and Grif 9073). The purpose of the request was to use the seeds in screening for resistance to wilt diseases of chile pepper. Results from previous work showed that the two requested accessions have some resistance to Verticillium wilt. The seeds received had a very poor germination, and the few plants that emerged were decimated by heavy aphid infestation.

Vigil, Albert; Permaculture Gardens, Albuquerque, NM: received 3 accessions for conducting bioremediation research including the affects of biodiversity on soil properties and soil stabilization.

Ward, Troy; Impossible Moon Vineyards, Sandoval County, NM: received 24 grape accessions. I have selected the most cold tolerant Vitis vinifera cultivars I could find in the repository-many of which are impossible to find anywhere else due to restrictions on import. I have also traveled around New Mexico, selecting wild vitis arizonica vines for the purpose of breeding with the vinifera cultivars, in order to bring nematode resistance and cold hardiness into the breeding lines. I have wild vines from just south of Taos, in the Rio Grande gorge, vines from Nambe Falls, and other places. I am also considering doing a study on the uptake of arsenic by the grapevine, and looking at the differences between cultivars and vitis species on levels of arsenic in the fruit. I haven't ironed out the method yet. I do have the intention of applying for plant patents for the grapevines that are developed from my research and breeding. Much of my work would be impossible without the assistance of the germplasm repository. I am very grateful the resource is there for us.

Witt, Travis; Eastern New Mexico University, Portales, NM: received 4 accessions of an unspecified crop that will be used as parents to develop high oleic lines for eastern New Mexico.

The following individuals provided no information about the intended use, or outcomes obtained, from the accessions that were ordered in 2018:

Lombard, Kevin; New Mexico State University, Farmington, NM: received one NPGS accession.

Martinez, Ronald; general public, Albuquerque, NM: received 13 NPGS accessions.

Offitt, Karissa; general public, Rio Rancho, NM; received 25 NPGS accessions

PUBLICATIONS:

No NM recipients of NPGS germplasm in 2018 provided information about published research reports resulting from the evaluation of the materials that they received.