STATE OF COLORADO

Annual Report to the W-6 Technical Committee for Calendar Year 2016

Compiled by Pat Byrne, June 12, 2017

Orders for germplasm from the NPGS constituted delivery of accessions from both clonal repositories and Plant Introduction Stations. A total of 1,661 accessions were delivered in Colorado, constituting 96 orders. This represented a decrease in shipments from the previous year (2,312 accessions and 140 orders in 2015). Orders were shipped from the following locations: COR, DAV, GEN, HILO, MAY, MIA, NC7, NE 9, NR6, NSGC, NSSL, OPGC, PVPO, RIV, S9, SOY, TOB, and W6.

The following is a report of germplasm activities in Colorado during the 2016 calendar year from scientists that responded to a request for information.

1. Walter Messier of Evolutionary Genomics, Inc., Lafayette, CO, received numerous accessions for research on a genomics project. Seedlings were germinated and then DNA and RNA were prepared for subsequent research. No NPGS accessions were grown beyond seedling stage. No publications or releases were reported.

2. Erika Vohman of the Maya Nut Institute in Crested Butte, CO reported that the accession of *Brosimum alicastrum* she received was used for cooking. Some was processed in Colorado and some went to a company in Seattle that wanted to experiment with it.

3. Dustin Wiggans of USDA-ARS in Fort Collins received seed of several inbred lines of maize. The Germplasm will be utilized in a field and greenhouse experiment to research xylem functionality, repair, and overall robustness. No germplasm releases were made to the public. He reported two publications related to NPGS germplasm (see below).

4. Julia Schur of USDA-APHIS received seed of 23 species that she will photograph for the identification tool *Federal Noxious Weed Disseminules of the U.S.* The new photographs will replace existing photos in the tool, which are or poor quality. No germplasm releases were made to the public and there were not related publications.

5. Anne Howard and colleagues of Colorado State University used maize germplasm to conduct preliminary research on root structure and composition. Their results supported a research proposal to the ARPA-e ROOTS program that was funded. No germplasm releases or publications.

6. Patrick Byrne of Colorado State University used seed of two historical spring wheat varieties to evaluate their response to additions of compost to the soil in a greenhouse study.

7. Christy Peebles of Colorado State University used the germplasm for a student design project in chemical and biological engineering to transiently produce a monoclonal antibody. No germplasm releases or publications.

8. Vesselin Dotrov used apple and cherry germplasm to graft trees in his backyard. No germplasm releases or publications.

9. Lim Yates of Parker, CO used barley, rye, Kentucky bluegrass, and ginger germplasm to see if it would grow on their soil.

10. Lee Panella of USDA-ARS, Fort Collins, CO, will use 30 *Beta vulgaris* accessions to test for resistance to Rhizoctonia in a field nursery. The rest of the accessions represent a sampling of ARS-developed sugar beet germplasm decade by decade from the 1940s, and will be examined for changes in the gene pool of cultivated germplasm over that time period, comparing it to modern cultivars as well as the crop progenitor subspecies.

11. Andrew Barney of Colorado State University evaluated tomato wild relatives *Solanum galapagense* and *S. cheesmaniae* for novel traits that may be beneficial to domestic tomatoes, such as leaf structure, salt tolerance, frost tolerance, disease resistance, anthocyanin content, and attractiveness to pollinators.

12. Scott Haley of Colorado State University received seed of two durum wheat lines. He plans to cross these with bread wheat to transfer the solid stem trait for wheat stem sawfly resistance that the durum lines carry.

13. April Goebl of the University of Colorado planted sunflower accessions in a common garden experiment comparing performance (survival, growth, reproductive output) under different water treatments.

14. Carolyn Keller of Colorado State University's San Luis Valley Research Center received two potato cultivars as tissue culture material. They were used by her certified seed potato growers.

No cultivars or germplasm were released based on germplasm received from the National Plant Germplasm System.

Two publications were reported that involve NPGS germplasm:

1. Gleason, S., Wiggans, D., Bliss, C., Comas, L., Cooper, M., DeJonge, K., Young, J., & Zhang, H. (2016). Electron transport, PEP carboxylase activity, and maximal net CO_2 assimilation exhibit coordinated and proportional decline with loss of hydraulic conductance during water stress in *Zea mays*. Abstract for 25th Western Photosynthesis Conference, American Society of Plant Biologists.

2. Gleason, S.M., Wiggans, D.R., Bliss, C.A., Young, J.S., Cooper, M., Willi, K., & Comas, L. (2017). Embolized stems recover overnight in *Zea mays*: the role of soil water, root pressure, and nighttime transpiration. *Frontiers in Plant Science* 8, 662.