STATE OF COLORADO

Annual Report to the W-6 Technical Committee for Calendar Year 2020 Compiled by Geoff Morris and Tarik Eluri, June 9, 2021

A total of 2,270 germplasm accessions were delivered in Colorado in 2020. This reflects a decrease from the number of accessions ordered in 2018 and 2019 totaling 2718 and 2475, respectively. In 2020, the orders were shipped from the following locations: W6, COR, NA, NSGC, S9, SOY, COT, NR6, NR6, NSSL, PVPO, DAV, GEN, PARL, and NE9.

The National Laboratory for Genetic Resources (NLGRP), a division of the USDA ARS, constituted the largest percentage receiving 40.1% of all accessions ordered in 2020. The total of all other Federal Agencies received 1.24% of accessions. The percentage of accessions received by Universities was 6.7% with Colorado State University constituting the largest percentage at 4.3%. Cargill, Inc was the company that received the largest percentage of accessions in 2020 at 27.2%. The total percentage for all companies was 29.5%. Denver Botanic Garden had a slight increase in orders, from 2 accessions ordered in 2019 to 8 accessions ordered in 2020. The institution type could not be determined for 6.8% of the institutions, labeled Miscellaneous in the table below.

Institution Type	No. of Items	Percent
Federal Agencies	1292	56.9
USDA, ARS (incl. NLGRP)	1264	55.7
USDA-APHIS-PPQ	27	1.2
USDA Forest Service	1	0.04
Universities	153	6.7
Colorado Mesa University	1	0.04
University of Colorado	54	2.4
Colorado State University	98	4.3
Companies	670	29.5
Cargill, Inc	617	27.2
Other companies	53	2.3
Miscellaneous	155	6.8
Total	2270	100.0

Below we list activities from 19 recipient institutions or individuals receiving accessions in 2020:

1. Brenda Sharp Native Ecotypes: This recipient institution requested accessions for biological and taxonomic investigations. The intended use was to produce reference seedlings and to use the materials to determine what cultivation methods are needed to produce a seed crop, what seed

cleaning method would be needed, and to determine seed yields.

- 2. Busch Agricultural Resources, Inc: This recipient institution requested accessions for research use. The accessions were used to determine rust resistance in barley.
- 3. Cargill, Inc: This recipient institution requested accessions for breeding and research use. The accessions were used for an early screening process and for plant increase under greenhouse conditions for later use in field evaluation trials.
- 4. Colorado Mesa University: This recipient institution requested accessions for genetic studies. The accessions were used to study genes that are regulating style elongation in response to temperature.
- 5. Colorado State University: This recipient institution requested accessions for research use. The topics of the research these accessions contributed to were:

Plant pathological investigations including screening of quinoa germplasm for downy mildew resistance along with other agronomic characters and to identify means of plant resistance to aphids.

Bioremediation investigations including evaluating the potential of the accessions for use in restoration of brine-impacted soils.

Genetic studies including genetic mapping of root traits and the determination of genomic and metabolomic structure of tropane alkaloid biosynthesis in *Hyoscyamus* ssp..

Entomological investigations including feeding trials for glucosinolate induction with *Pieris rapae*, necrosis examinations of *Pieris rapae* eggs on brassica, sisymbrium, on nigra, circadian clock genes studies on impact on aphid infestation, and determination of the nature of resistance in PI567301B.

- 6. Denver Botanic Gardens: This recipient institution requested accessions for breeding and research use. The topic of the research these accessions contributed to was the determination of the physical trait variation among wild populations of *Echinacea angustifolia* with the intention of selection and possible breeding or hybridizing for introduction to western horticulture due to *E. angustifolia*'s superior tolerance of steppe conditions.
- 7. HCC: This recipient institution requested accessions for education with mentally ill patients.
- 8. Home School/District 60: This recipient requested accessions for the use of homeschooled education of children during the COVID-19 pandemic.
- 9. Independent Breeder: This recipient requested accessions for the use of breeding and research to study the adaptation of the accessions to local conditions for potential breeding efforts.
- 10. NLGRP: This recipient institution requested accessions for research, breeding, and varietal development. Topics of interest were salix cryopreservation budwood testing and evaluation of ornamental characteristics.
- 11. Offerings Collective: This recipient institution requested accessions for educational uses to assist the local community and children on growing food, gardening, and permaculture.

- 12. San Luis Valley Research Center: This recipient institution requested accessions for the use of breeding.
- 13. The Annex By Ardent Mill: This recipient institution requested accessions for breeding and research use to evaluate seed properties and plant adaptation in the Pacific Northwest region of the United States.
- 14. The Outdoor Bumpkin: This recipient institution requested accessions for educational use to run a homeschool community group. The plants and seeds were used to plant a garden to educate students on plants, pollination and other scientifically approved studies for children.
- 15. University of Colorado: This recipient institution requested accessions for genetic studies characterizing the underlying genetic architecture of the accessions for a NSF NPGI Postdoctoral Fellowship and for modeling the effects of landscape connectivity on genetic rescue of populations under stressful environments.
- 16. USDA ARS Soil Management and Sugarbeet Research Unit (SMSRU): This recipient institution requested accessions for genetic studies including sequencing and screening for genes for rhizoctonia resistance.
- 17. USDA APHIS PPQ: This recipient institution requested accessions so that the resulting plants can be professionally photographed for the image ID database (https://www.ipmimages.org). This database serves as a resource for port identifiers and other USDA-APHIS-PPQ officials for identification of commodities and pests entering the United States. NIS National Taxonomists are seeking better reference images of commonly imported and commonly intercepted plant taxa.
- 18. USDA ARS: This recipient institution requested accessions for genetic studies including genomic sequencing.
- 19. Weminuche Farm: This recipient institution requested accessions for botanical/taxonomic investigations including finding varieties suitable to their specific climate.