

USDA-ARS
National Germplasm Resources Laboratory
Beltsville, Maryland
2021 Report to PGO, RTACs, and CGCs

The National Germplasm Resources Laboratory (NGRL) supports the acquisition, introduction, documentation, evaluation, and distribution of germplasm by the National Plant Germplasm System (NPGS) and other components of the U.S. National Genetic Resources Program (NGRP). The Laboratory is comprised of the Plant Exchange Office (PEO), the Database Management Unit (DBMU), and the Plant Disease Research Unit (PDRU).

NGRL was fortunate to onboard two new permanent employees (Program Support Assistant, Biological Science Laboratory Technician) and one temporary employee (ARS funded Postdoctoral Research Associate) during the 2020 coronavirus pandemic.

There are three permanent positions currently vacant in NGRL, including a Botanist position in the PEO that should open for applications in late January 2021.

Plant Exchange Office

Plant Exploration and Exchange Program:

- The PEO supports the collection of germplasm for the NPGS through the management of a Plant Exploration and Exchange Program. Guidelines for developing plant exploration and exchange proposals will be distributed to CGC chairs in February 2021. Proposals must be endorsed by the appropriate CGC or other crop experts.
- The deadline for submitting proposals for explorations or exchanges to be conducted in FY 2022 is July 30, 2021.
- All foreign explorations supported by PEO comply with the principles in the Convention on Biological Diversity covering access and benefit sharing related to genetic resources. Prior informed consent to collect genetic resources is obtained from the host country before the exploration. The PEO is involved in most requests to foreign governments for permission to collect and negotiates the terms of agreements when necessary.
- All explorations originally scheduled for FY 2020 were postponed because of the pandemic. They will be rescheduled when conditions are considered safe. Proposals for two domestic explorations, *Helianthus* spp. in California and *Lupinus polyphyllus* in Washington, were submitted mid-year and supported.

Collaboration on Crop Wild Relatives in the U.S.:

Borderland Restoration Network, the U.S. Forest Service (USFS) and the NGRL continued collaboration on documentation and collection of germplasm of crop wild relatives (CWR) in the Wild Chile Botanical Area (WCBA) in the Coronado National Forest, AZ and surrounding areas. In 2020, germplasm was collected of nine taxa of CWR. Additional collections are planned for

2021. In addition to collection and conservation of germplasm, the project is documenting the occurrence and status of many CWR in the WCBA, which is a candidate for designation as an *in situ* reserve for CWR under the USFS/ARS Strategic Framework on the Conservation and use of Native CWR in the U.S.

GRIN Taxonomy for Plants:

- GRIN Taxonomy, available through GRIN-Global (<https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomyquery.aspx>), provides online current and accurate scientific names and other taxonomic data for the NPGS and other worldwide users. This standard set of plant names is essential for effective management of ARS plant germplasm collections, which now represent ca. 16,000 taxa. A broad range of economically important plants is supported by GRIN nomenclature, including food, spice, timber, fiber, drug, forage, soil-building or erosion-control, genetic resource, poisonous, weedy, and ornamental plants.
- GRIN Taxonomy includes scientific names for 27,660 genera (14,502 accepted) and 1,422 infra-genera (1,360 accepted) and 121,730 species or infra-species (66,764 accepted), with over 67,614 common names, geographical distributions for 60,495 taxa, 486,031 literature references, and 32,996 economic importance records. These numbers increase regularly.
- Since 2008, a project to provide thorough coverage of wild relatives of all major and minor crops in GRIN Taxonomy has been underway. We have completed our initial work on 241 major and minor crops from 120 genera, and CWR from 4013 taxa have been mapped to these crops and others under progress. An interface to query these data is available (<https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearchcwr.aspx>). We invite feedback from NPGS curators and CGC members for those CWR classifications already developed. A new CWR page was released in 2020 to allow users to search for trait class and breeding type data contributed by the Global Crop Diversity Trust.

Facilitation of Germplasm Exchange:

The PEO helps expedite the distribution of germplasm from the NPGS to foreign scientists and international genebanks through a long-standing collaboration with USDA-APHIS at Building 580, BARC-East in Beltsville. The past year presented many challenges for distributions, including country closures due to the pandemic, lack of a full-time APHIS inspector for much of the time, and changes in the regulations for germplasm importation to E.U. countries.

In 2020, 568 public orders containing a total of 44,803 samples of NPGS accessions were shipped from Beltsville to individuals in 63 countries around the world for research and education. In addition, PEO facilitated the agricultural inspection of arriving germplasm shipments containing accessions from numerous foreign countries for researchers and curators at NPGS sites.

Crop Germplasm Committees:

- The two separate Alfalfa and Clover/Specialty Legume CGCs merged in June 2020 to form a single committee, Forage Legumes CGC.

- Most committees continue to meet regularly and are active, although the pandemic created a challenging situation in 2020 especially for committees that typically meet in person. Committees are particularly urged to update their Crop Vulnerability Statements and several CGCs recently completed new versions.
- A virtual meeting/web conference for CGC Chairs will occur February 22, 2021. A CGC Chairs meeting was not held in 2020.
- NGRl has a Zoom conferencing account that is available to the CGCs to use for hosting virtual meetings.
- Please send updates to the individual crop committees of the CGC page on GRIN (<https://www.ars-grin.gov/CGC>) to Gary Kinard.

Database Management Unit

GRIN and GRIN-Global:

- At the time of this report, the GRIN-Global plant database included the following:
 - 597,615 active accessions representing 16,156 species and 2,549 genera
 - 3,423,201 inventory records
 - 2,084,799 germination records
 - 8,552,139 characteristic/evaluation records
 - 1,298,174 digitized images and other attachment records

Many of these numbers increase almost daily.

- The entire GRIN platform (all databases and informational pages) were migrated from in-house servers to the Microsoft Azure cloud in September 2019. At that time, the GRIN home page (www.ars-grin.gov) was totally redesigned with new navigation for the ARS genetic resource collection informational pages, the Crop Germplasm Committee pages and the content for the National Genetic Resources Advisory Council.
- A new version of the NPGS public facing GRIN-Global website was released in August 2020. It features revised approaches and display pages for accession and descriptor searches and results. Some revisions to GRIN Taxonomy were also published, including new Simple Query and Crop Wild Relatives pages. Additional improvements in GRIN Taxonomy are slated for 2021.
- Current information about the project, including user documentation and release notes from each version of the software, can be found on the project website at <https://www.grin-global.org/>.

Plant Disease Research Unit

The PDRU conducts research on pathogens that infect clonally propagated prohibited genus (i.e., quarantine) plant germplasm, including their etiology, detection, and elimination by therapeutic procedures. This project provides direct support to the APHIS Plant Germplasm Quarantine Program and helps facilitate the safe introduction, conservation, and international exchange of

valuable plant germplasm. PDRU also collaborates on virus related problems with NPGS germplasm repositories, state departments of agriculture, and university scientists. Additional updates will be provided for those committees whose crops are within the scope this project's research.

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