



Preserving Genetic Resources

- NCGRP seed preservation protocols are based on over 50 years of experience and research. Our facility opened in 1958 and was expanded in 1992.
- Seeds are packaged in moisture proof foil bags for cold vault storage (-18°C; 0°F).
- Cryogenically (liquid nitrogen, -196°C; -320°F) stored seeds are sealed in polyolefin tubes.
- Our monitor test results provide information for timely regeneration by donors and NPGS contributors as necessary.
- The testing and storage protocols developed at NCGRP are shared with other researchers and genebanks and our expertise is used worldwide.

Information about us:

Plant and Animal Genetic Resources Preservation Research Unit
 USDA, ARS, **National Center for Genetic Resources Preservation**
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ars.usda.gov/main/site_main.htm?modecode=54-02-05-00

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United States Department of Agriculture

Agricultural Research Service

**National Center for
 Genetic Resources Preservation**



SEEDS



Why Preserve Diversity of Plant Genetic Resources?

Farmers and conservationists face challenges from climate change, the spread of new diseases, destructive pests, and abiotic stresses such as drought and salinity. Our mission is to preserve plant diversity so it is available to improve crops to meet these challenges. Modern U.S. agriculture and the food we eat rely on the availability of a wide diversity of crop varieties and their wild relatives.

Using Genetic Resources

- Seeds from the collections provide genetic traits essential for confronting a wide range of agricultural and environmental challenges and the changing needs of U.S. agriculture for food, fiber, bioenergy, industrial uses, medicine, shelter, sustainable agriculture, and land restoration.
- Our collections are dynamic and widely used by public and private plant breeders and researchers worldwide, free upon request. There are 29,951 unique organizations or individuals who have contributed or requested seeds from about 82 countries, including rare or endangered collections from 22 botanical gardens.

Some examples of the diversity in our collections are shown in the table at right.

- To maximize the benefit of these collections, information about them is stored in a data management system called the Germplasm Resources Information Network (GRIN Global). GRIN Global

Crop	Accessions (unique samples) stored at NCGRP*
Corn	15,264
Wheat	59,442
Beans	12,587
Sorghum	44,151
Rice	18,313
Cotton	6,203

*as of 2013

keeps track of all data we collect on the sample including information on plant characteristics and sample origin. Researchers worldwide can view collections online and order germplasm without cost by going to www.ars-grin.gov/npgs

Did You Know?

In the 1980's the Russian wheat aphid became a serious pest causing over a billion dollars in direct and indirect losses. Researchers and breeders have screened varieties in our collection and discovered ten different genes that help confer resistance to the Russian wheat aphid. Newly developed varieties have helped to restore wheat production, reduce insecticide use and save millions of dollars for wheat producers.

Information from: maswheat.ucdavis.edu/protocols/RWA

Acquiring Genetic Resources

- Acquiring robust collections that include crop wild relatives assures that future needs for plant improvement will be met. These collections are critical to our food security, conservation, and to national security.
- We acquire seeds from the National Plant Germplasm System (NPGS). Twenty-five field stations around the U.S. are responsible for growing specific crops to produce seed. The harvested seed is then sent here for long-term preservation.
- We also receive seeds from all over the United States and the world through foreign governments, public institutions and non-governmental organizations, companies, and other U.S. agencies.
- NCGRP has duplicate collections from other genebanks as a back-up security measure. For example, we have 112,111 accessions of rice collections from IRRI, the International Rice Research Institute genebank in the Philippines and 149,557 accessions of wheat and corn collections from CIMMYT genebank in Mexico. We have our collection duplicated at other genebanks around the world including Svalbard Global Seed Vault, located in Norway.

Evaluating Genetic Resources

- Evaluating and documenting the viability of seed collections provides a gauge for the longevity of individual collections. The more information we have about our seed collections, the greater their value to all of us.
- When seeds arrive at NCGRP they are equilibrated (brought to a moisture content appropriate for storage) and tested for moisture content.
- Seeds are evaluated for viability (tested for germination or dormancy) before and during storage.
- Our studies on root system architecture during germination tests and early growth help predict the root system architecture of the plant at maturity. These studies have implications for addressing agricultural problems associated with climate change including identifying plants with roots adapted to drought or salinity tolerance.



Dormancy test on Penstemon seed