

## Primary Mission

The Plant Genetic Resources Unit (PGRU) is part of the U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS). The PGRU consists of three projects that together have the primary mission of the preservation of germplasm of selected crop plants.

Specific activities include acquisition, documentation, maintenance, characterization, breeding, enhancement, and distribution of the assigned plant crops.

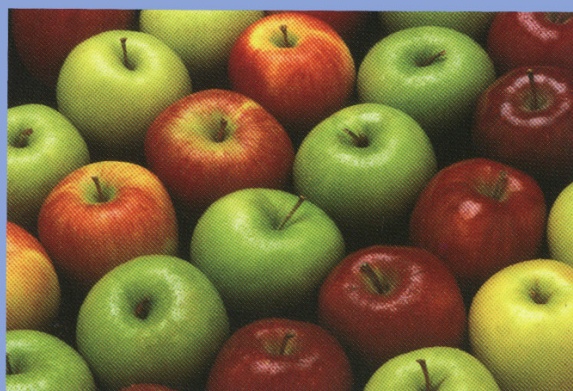
### Major crops assigned to PGRU:

Scientific name	Common name(s)	Approximate number of accessions
<i>Allium</i>	onion	1,300
<i>Apium</i>	celery	235
<i>Asparagus</i>	asparagus	160
<i>Brassica</i>	cole crops: broccoli, cabbage, cauliflower, kale, etc.	2,200
<i>Cucurbita</i>	winter squash	820
<i>Fagopyrum</i>	buckwheat	230
<i>Lycopersicon</i>	tomato	5,800
<i>Malus</i>	apple	6,830
<i>Physalis</i>	tomatillo	160
<i>Prunus cerasus</i>	tart cherry	125
<i>Raphanus</i>	radish	700
<i>Vitis</i>	grape	1,480



## Acquisition and Documentation

At PGRU, germplasm accessions are acquired from specialized research and breeding collections, genebanks, botanical gardens, seed companies, private growers and organizations, foreign exchange programs, and plant-collecting expeditions. A prominent example of major recent acquisitions at PGRU is the apple collection, which has more than doubled with collections of wild species from seven expeditions to Asia since 1989. All pertinent information about each accession—such as its origin, species identity, life form, where it is stored, in what form it is distributed, how many samples are currently in the collection, and all known characterization and evaluation information—is recorded and verified. In addition, PGRU is developing digital images for all its crops. Information about all of PGRU's germplasm is stored on and accessible through the Internet in the Genetic Resources Information Network (GRIN), a database managed by the ARS National Germplasm Resources Laboratory in Beltsville, Maryland, at <http://www.ars-grin.gov/npgs/searchgrin.html>.



## Maintenance and Characterization

PGRU maintains a large collection of plant genetic resources in the form of seeds, plants, and pollen. Seeds are dried and then stored in sealed packets in a  $-20\text{ }^{\circ}\text{C}$  room to maximize longevity and viability. Accessions of clonally propagated crops are preserved as living plants in vineyards (grapes) or orchards (apples and tart cherries). All seed accessions and dormant apple and tart cherry buds are cryopreserved in liquid nitrogen and placed in backup storage facilities at the ARS National Center for Genetic Resources Preservation in Fort Collins, Colorado. A partial backup of the apple collection is also cryopreserved locally in a storage tank.

PGRU maintains germplasm of vegetables and buckwheat as seeds, while apple, grape, and tart cherries are maintained as field plantings. Regeneration of seed crops, usually by controlled pollination using honeybees, is required to maintain germplasm and provide it for distribution. Apple, grape, and tart cherry accessions are maintained in field plantings with two clones per accession, and these clones are regenerated as necessary when plants begin to show decline.

All crops maintained at Geneva are characterized with standard sets of descriptors. Many acces-

sions are also tested for disease resistance and tolerance to environmental extremes. Much of this evaluation is done by collaborators with cooperative agreements. Availability of this information allows cooperators to make more informed decisions about which germplasm accessions to order.

## Breeding and Enhancement

Breeding and enhancement are critical elements of PGRU's activities and are implemented in a program to improve apple rootstocks.

The apple rootstock breeding and evaluation program does two things: 1) develops new dwarfing rootstocks that have improved tolerance to pests, diseases, and climatic extremes; and 2) develops genomic and bioinformatic tools to develop marker-assisted selections of apple rootstocks.

Other research projects include use of molecular markers to identify genotypic traits in apple, grape, and tart cherry. In addition, PGRU scientists are working with Cornell University and other ARS plant pathologists and entomologists to identify traits such as resistance to fire blight, scab, postharvest diseases, and insects.

