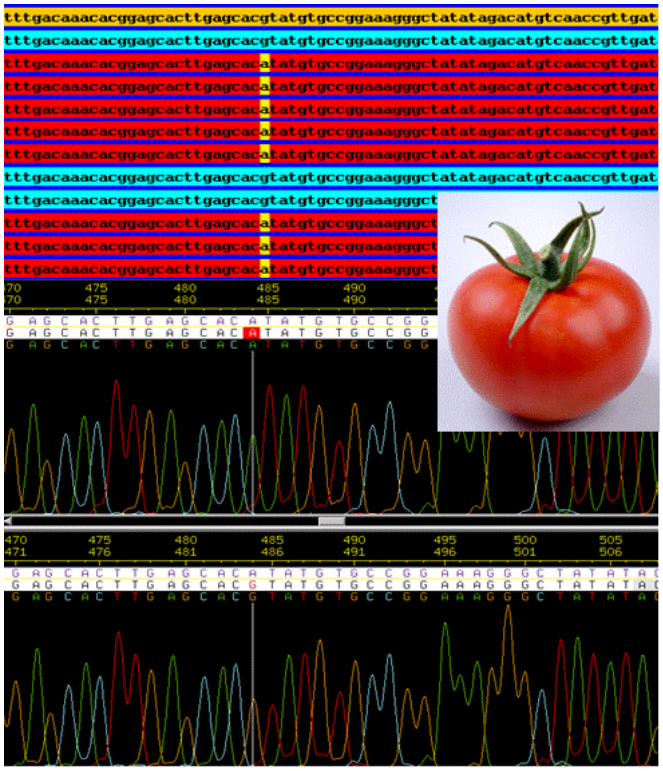
Conserving Plant Genetic Resources

NE-009 (2008-2013)



By evaluating, describing, and storing plant genetic material, gene banks enable scientists and farmers to breed new varieties. Photo by Joanne Labate/USDA-ARS.

Plant Genetic Material Needed to Maintain Diversity & Productivity

The foundation for agricultural productivity is plant genetic diversity. Researchers, breeders, and farmers need plant genetic material to develop new plant varieties that resist pests, diseases, and environmental stresses and to design varieties with desirable traits such as high yield, color, taste, or specific nutritional or pharmaceutical qualities.

"Gene banks" ensure that seeds, plant tissues, and other living plant materials that contain genes are available for years to come. In the northeastern U.S., safeguarding plant genetic diversity is critical to meeting future production challenges of crops such as apple, grape, cherry, onion, tomato, and cruciferous vegetables, which are key drivers of the regional economy and staples of a healthy diet for consumers worldwide. To make the best and most efficient use of plant genetic materials, gene bank samples must be properly classified, routinely evaluated for quality, and easily accessible. Proper conservation of plant genetic resources enables valuable research and provides security from devastating crop disasters.

Multistate Research Project Manages Plant Genetic Resources Efficiently, Sustaining the Vitality of Agriculture in the Northeast

Diverse plant material available at the PGRU has enabled the development of varieties of grapes suitable for colder climates. This has allowed cultivation of grapes in new regions, like the Finger Lakes in upstate New York.

To sustain the success of U.S. agriculture, the USDA established the National Plant Germplasm System. The Plant Genetic Resources Unit (PGRU) in Geneva, New York is a vital part of this system, acquiring and conserving plant genetic material for key northeastern crop species. Multistate research group, NE-009, provides critical resources and efficient management of the collection of samples stored at the PGRU.

Over the past five years, NE-009 has established more than 2,000 plots for regeneration of plant genetic material, replenishing stocks. NE-009 efforts to acquire, regenerate, and propagate samples has resulted in more complete representation of fruit and vegetable diversity that includes wild and weedy relatives, hybrids, modern varieties, landraces, and heirlooms. PGRU is the only institution that maintains the more than 100 ancestors of popular apple varieties. Increased availability of diverse genetic resources reduces the vulnerability of crops to stresses. A broader collection also provides researchers with more samples for experiments. Over the past five years, PGRU has distributed 54,548 samples of fruit and vegetable germplasm and 17,942 fruit, tissue, and DNA samples to researchers worldwide.

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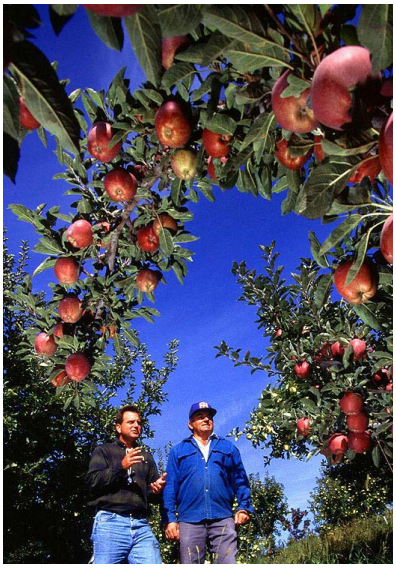

NE-009 researchers have also used wild tomato samples to develop new tomato varieties that incorporate genes for resistance to bacterial speck, spotted wilt virus, tobacco mosaic virus, leaf mold, Fusarium wilt, Verticillium wilt, blight, and nematodes. Pictured above, the new "Iron Lady" variety developed at Cornell University is resistant to late and early blight and Septoria leaf spot.

PGRU stores genetic material for over 100 ancestors of popular apple varieties. Using these samples, scientists have developed new apple rootstock that is resistant to fireblight and crown rot and have started to mix genes for resistance to wooly apple aphids and powdery mildew. Photos by Scott Bauer/USDA-ARS.

Want to know more?

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Participating Institutions:
Cornell University
Cornell University Agricultural Experiment Station
New York State Agricultural Experiment Station
Pennsylvania State University
Rutgers University
University of Connecticut
Connecticut Agricultural Experiment Station
Storrs Agricultural Experiment Station
University of Delaware
University of Maine
University of Maryland
University of Massachusetts
University of New Hampshire
University of Vermont
West Virginia State University
United States Department of Agriculture-Agricultural Research Service
Plant Genetic Resources Unit
National Center for Plant Genetic Resources Center
National Germplasm Services Laboratory

This Impact Summary was compiled and designed by Sara Delheimer.

Through coordinated evaluations of samples in the collection, NE-009 has thoroughly described and classified genetic resources, helping researchers use the collection more efficiently and select the most appropriate samples for their research objectives. NE-009 has also helped establish a database of evaluation and characterization data. The database includes digital images and is available through the Internet on the Germplasm Resources Information Network (GRIN-Global) website.

By examining the genetic materials in the collection, NE-009 researchers have discovered genetic sources of resistance to diseases, nematodes, and stresses of apple, tomato, grape, and winter squash. Chemists and nutritionists have also evaluated samples for health benefits, including antioxidants in apples and grapes and carotenoids and Vitamin C in tomato.

Using these materials, scientists have begun to breed new fruit and vegetable varieties that are resistant to serious stresses. Adopting these crop varieties has led to decreased reliance on pesticides, reduced growers' costs, and reduced negative environmental impacts. Varieties that have higher yields support a more abundant, stable supply of fresh and processed products to consumers and industries worldwide. With new varieties, farmers can bring to market produce with enhanced nutritional or pharmaceutical qualities and desirable qualities (such as better flavor, color, and texture) that boost customer satisfaction. By enabling plant breeding and crop development, the NE-009 team and the PGRU ensure the productivity, profitability, and viability of key agricultural sectors, including organic agriculture, in the northeastern U.S.