

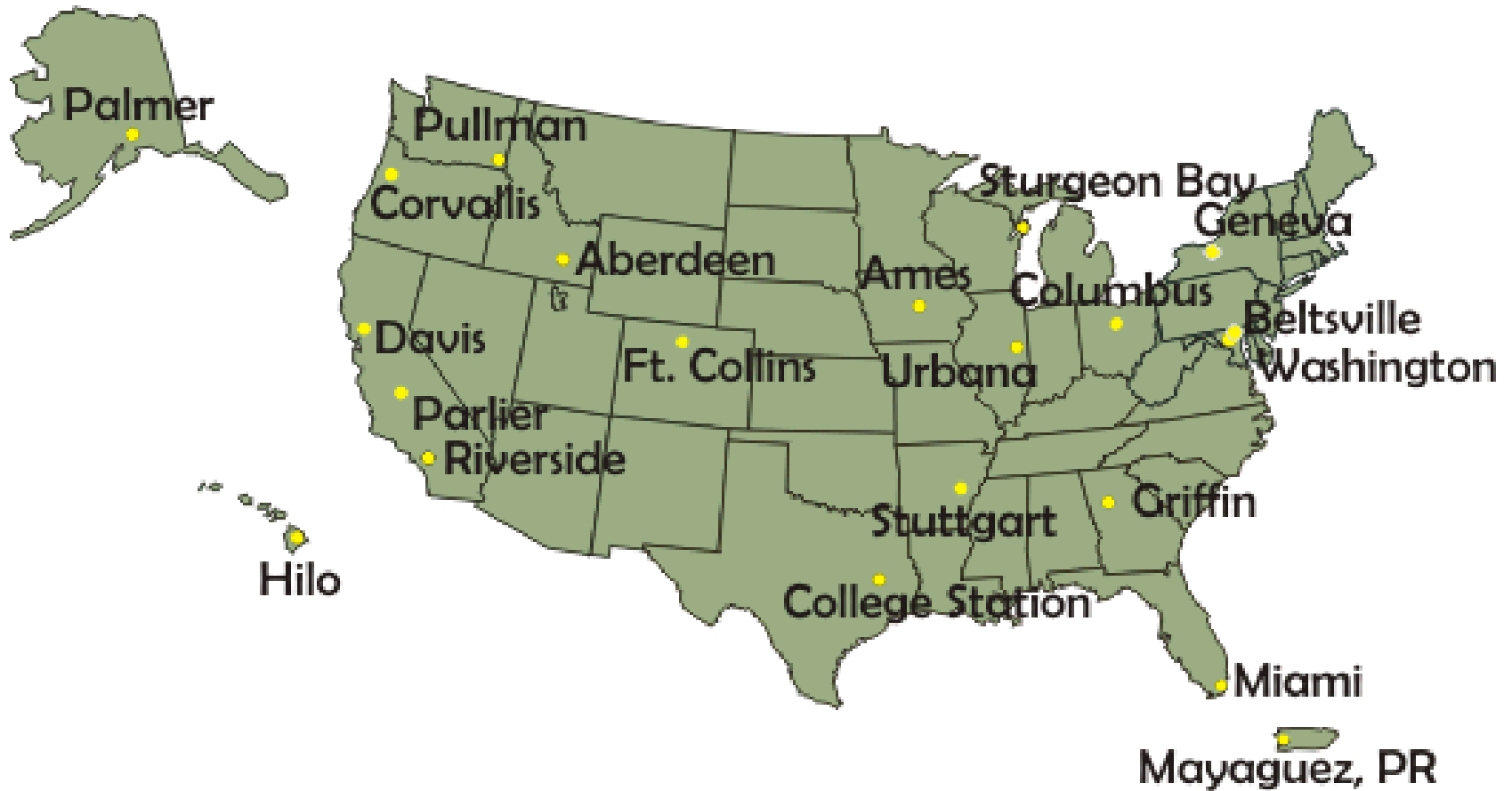
**The role of the Germplasm  
Resources Information Network  
(GRIN) in unifying the U. S. National  
Plant Germplasm System (NPGS)**

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# The USDA National Plant Germplasm System (NPGS)

- One of the largest national genebank systems.
- More than 539,000 samples of more than 13,400 plant species.
- Large collections of the major staple crops important to U. S. and world agriculture.
- Large holdings of crops without major collections at international agricultural research centers, e.g., cotton, soybean, various horticultural and “specialty” crops.
- Germplasm Resources Information Network (GRIN): an international standard.

# USDA National Plant Germplasm System (NPGS)



# Evolution of the NPGS

- **Pre-1900: Beltsville; Miami**
- **1945-1950: Ames; Geneva; Griffin; Pullman; Sturgeon Bay; Urbana**
- **1958: Ft. Collins**
- **1970s: College Station**
- **1980-1990: Aberdeen; Corvallis; Davis; Geneva; Hilo; Mayagüez; Riverside; Washington, DC**
- **2000-present: Columbus; Palmer; Parlier; Stuttgart**

# Examples of NPGS genebanks

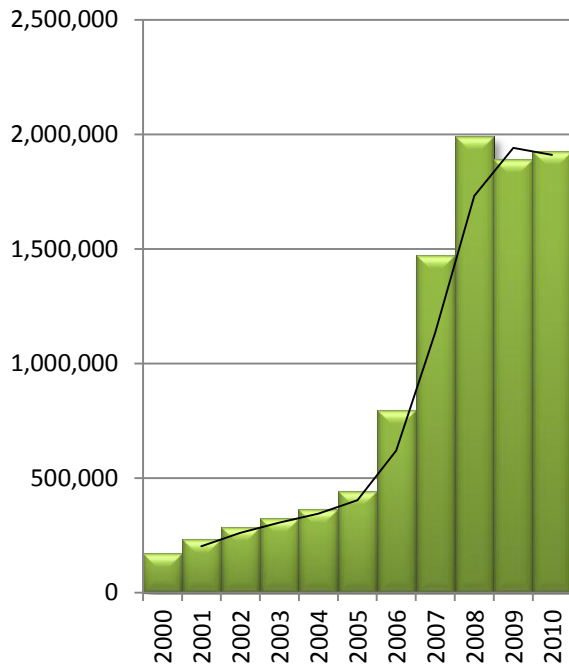


# Genetic Resource Management Priorities

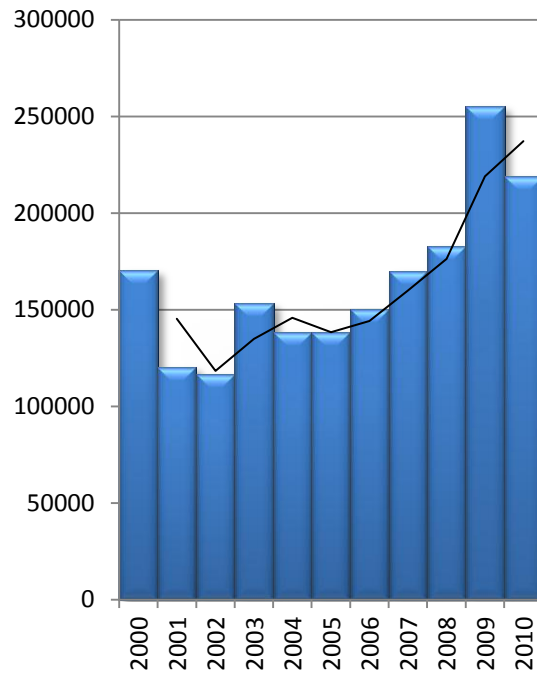
- **Acquisition**
- **Maintenance**
- **Regeneration**
- **Documentation and Data Management**
- **Distribution**
- **Characterization**
- **Evaluation**
- **Enhancement**

# Demand for NPGS germplasm and information vs. NPGS budget

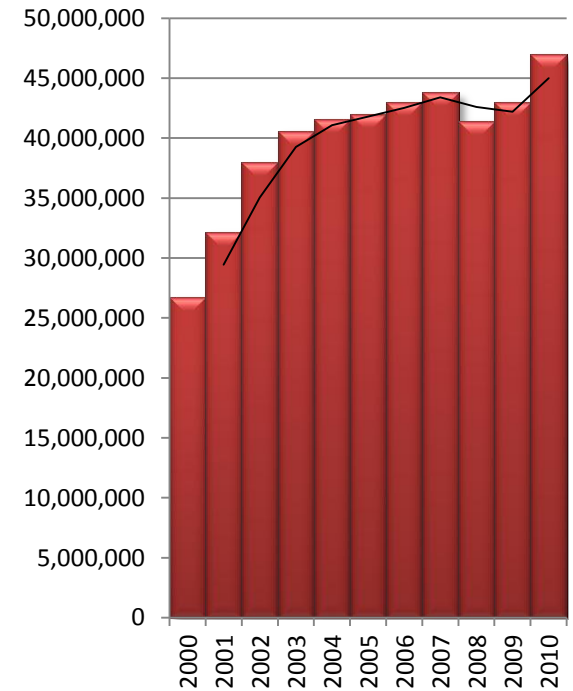
## NPGS Web Page Access



## Germplasm Distributions



## NPGS Budget





# GRIN from 1980 to the present

- **Prior to the mid-1980s, individual NPGS genebanks maintained paper records of germplasm inventory, descriptions, etc., a/k/a “legacy data.”**
- **Then, some individual genebanks began to store and manage data on mainframe computers—often at host universities.**
- **GRIN began to develop in the early 1980s. In 1983, it constituted 300 MB of disk space on a Prime 750, accessible through 300-1200 bps modems, TELENET terminals.**
- **1986: re-design and enhancement into “GRIN 2”**



# GRIN in the 1980s



# GRIN from 1980 to the present

- In the early 1990s, PCs evolved, and some individual genebanks began to manage data locally with PC-based applications.
- 1992: GRIN connects to the Internet.
- 1994: pcGRIN, a “stand-alone” version for PCs was developed, in conjunction with the IPGRI. Currently inactive.
- Present: Oracle database running on two Sun Solaris servers with 2 terabytes of storage, connected to the Internet via a 1 gigabit fiber link.



# GRIN today



# The role of GRIN in unifying the NPGS

- GRIN catalyzed the evolution of a collaborative germplasm and information management and user community, a “community of practice”
  - A common database for the NPGS
  - Common standards for information management



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## Germplasm Resources Information Network

### Welcome!

In 1990, the U.S. Congress authorized establishment of a National Genetic Resources Program (NGRP). It is the NGRP's responsibility to: acquire, characterize, preserve, document, and distribute to scientists, germplasm of all lifeforms important for food and agricultural production.

The Germplasm Resources Information Network (GRIN) web server provides germplasm information about plants, animals, microbes and invertebrates. This program is within the U.S. Department of Agriculture's Agricultural Research Service.

The National Genetic Resources Advisory Council (NGRAC) advises and makes recommendations to the Secretary and Director of the NGRP. The NGRAC responds to the important issues of the nation in respect to conserving and utilizing genetic resources for food and agriculture.

Updated 25-Mar-2010

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# The role of GRIN in unifying the NPGS



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## GRIN Taxonomy for Plants

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GRIN taxonomic data provide the structure and nomenclature for accessions of the National Plant Germplasm System (NPGS), part of the National Genetic Resources Program (NGRP) of the United States Department of Agriculture's (USDA's) Agricultural Research Service (ARS). In **GRIN Taxonomy for Plants** all families and genera of vascular plants and over 46,000 species from throughout the world are represented, especially economic plants and their relatives. Information on scientific and common names, classification, distribution, references, and economic impacts are provided.

Cite as:

USDA, ARS, National Genetic Resources Program.  
*Germplasm Resources Information Network - (GRIN)* [Online Database].  
National Germplasm Resources Laboratory, Beltsville, Maryland.  
URL: <http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl?language=en> (25 March 2011)

Last modified: 12 March 2009

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## GRIN Taxonomy for Plants

- An online global standard for plant taxonomic information



# The role of GRIN in unifying the NPGS

- It fostered the evolution of Crop Germplasm Committees (CGCs). See <http://www.ars-grin.gov/npgs/cgcweb.html>
- There are currently 42 CGCs which cover a broad spectrum of agronomic and horticultural crops.
- This is a formal mechanism for clientele input into the NPGS's operations.



# The role of GRIN in unifying the NPGS

- All the accessions in the U. S. national collection are identified in GRIN by a unique number preceded by the acronym “P.I.” for “Plant Introduction.” E.g., “PI12345.”
- This unique identifier in GRIN therefore serves to circumscribe the national collection’s holdings.





# The role of GRIN in unifying the NPGS

- **GRIN accelerated the operational integration of new germplasm collections and genebank sites into the National Plant Germplasm System.**



# The role of GRIN in unifying the NPGS

- GRIN was instrumental for developing common NPGS standards for plant genetic resource curation







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# GRIN-CA indicators

since May 21, 2001 to May 18, 2010

- **Successful requests: 40,161, 385**
- **Avg. successful requests / day: 12,238**
- **Avg. successful requests for pages / day: 9,471**
- **Distinct files requested: 1,641, 611**
- **Distinct hosts served: 312,352 (155 countries)**
- **Data transferred: 634.18 gigabytes (6.02 gigabytes – last 7 days)**
- **Avg. data transferred / day: 178.58 megabytes**
- **Busiest month: Apr 2009, second March 2010**
- **Busiest day of week: Friday**
- **Busiest hr of day (requests): 2200**

# GRIN-Global

- **GRIN = Germplasm Resources Information Network.**  
<http://www.ars-grin.gov/> The genebank information management system for the NPGS, and for Canada's genebank system (GRIN-Canada).
- The Global Crop Diversity Trust asked ARS and Bioversity International (an International Agricultural Research Center) to enhance and expand GRIN to address global germplasm information management needs.
- In 2008, the Global Crop Diversity Trust awarded ARS and Bioversity a 3-year, \$1.4 million grant to develop GRIN-Global; ARS is devoting more than \$1 million in-kind support to the project.
- The project is now almost complete, and will conclude this year. GRIN-Global will become the global standard plant genebank information management system





Welcome to the GRIN-Global  
Train the Trainer Workshop

April 12-23, 2010  
Beltsville, Maryland USA









# The role of GRIN in unifying the NPGS

“A flaw in the human character is that everybody wants to build and nobody wants to do maintenance.”

Kurt Vonnegut

