

The National Plant Germplasm System: 2010 Status and Prospects

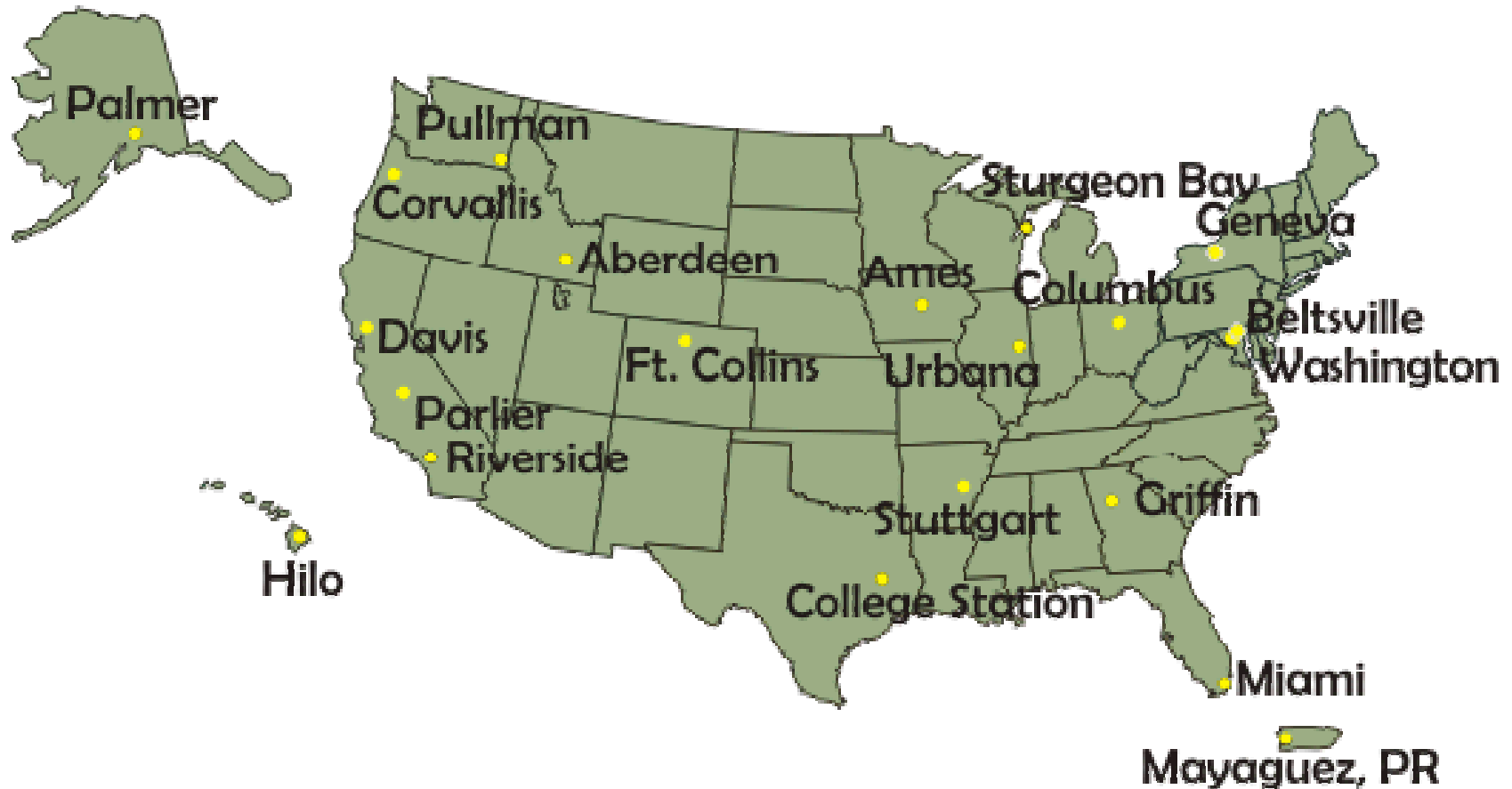
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The USDA/ARS National Plant Germplasm System (NPGS)

- One of the largest national genebank systems.
- More than 536,000 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)



Plant Genetic Resource Management in Genebanks

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

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 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 about 85% complete, and will conclude in late 2010 or early 2011. **GRIN-Global will become the global standard plant genebank information management system**





Other NPGS Developments

- **Molly Jahn**, Dean of Agriculture at Wisconsin, served as REE Deputy Undersecretary and Acting Undersecretary from November 2009 until June 2010. Earlier in her career, Dr. Jahn was chair of the NPGS's Capsicum Crop Germplasm Committee.
- **John Preece** is the new RL at the Davis, CA genebank, and **Gabriela Romano** the new curator at the Parlier, CA.
- **Phil Forsline** retired as USDA/ARS RL and Apple and Cherry Curator at the Geneva, NY NERPIS (NE-9). **Gan-Yuan Zhang** is serving as RL; the Apple and Cherry Curator position is currently being advertised.
- **Pablo Jourdan** is the new Director of the Ornamental Plant Germplasm Center in Columbus, OH.

Other NPGS Developments

- USDA/ARS will conduct an agency-wide **Capital Investment Strategy** exercise next FY. This will summarize USDA/ARS's needs for buildings, land, etc. in the future. The four **Plant Introduction Stations** will serve as a pilot project for this larger effort.
- The NPGS **avocado** collection in Miami, FL is threatened by **laurel wilt**, a deadly fungus carried by a beetle introduced into GA five years ago, which has spread into central FL. The Miami avocado field collection is being **backed up** in Hilo, HI.

USDA Avocado Collection



>250 Accessions of mature avocado trees

– 3 Horticultural Races

- West Indian (*Persea americana* var. *americana*)
- Guatemalan (*P. americana* var. *guatemalensis*)
- Mexican (*P. americana* var. *drymifolia*)

– Numerous hybrids

Overview of Laurel Wilt

Introduction & Spread

2002 – 1st RAB captured in U.S.
near Savannah, Georgia

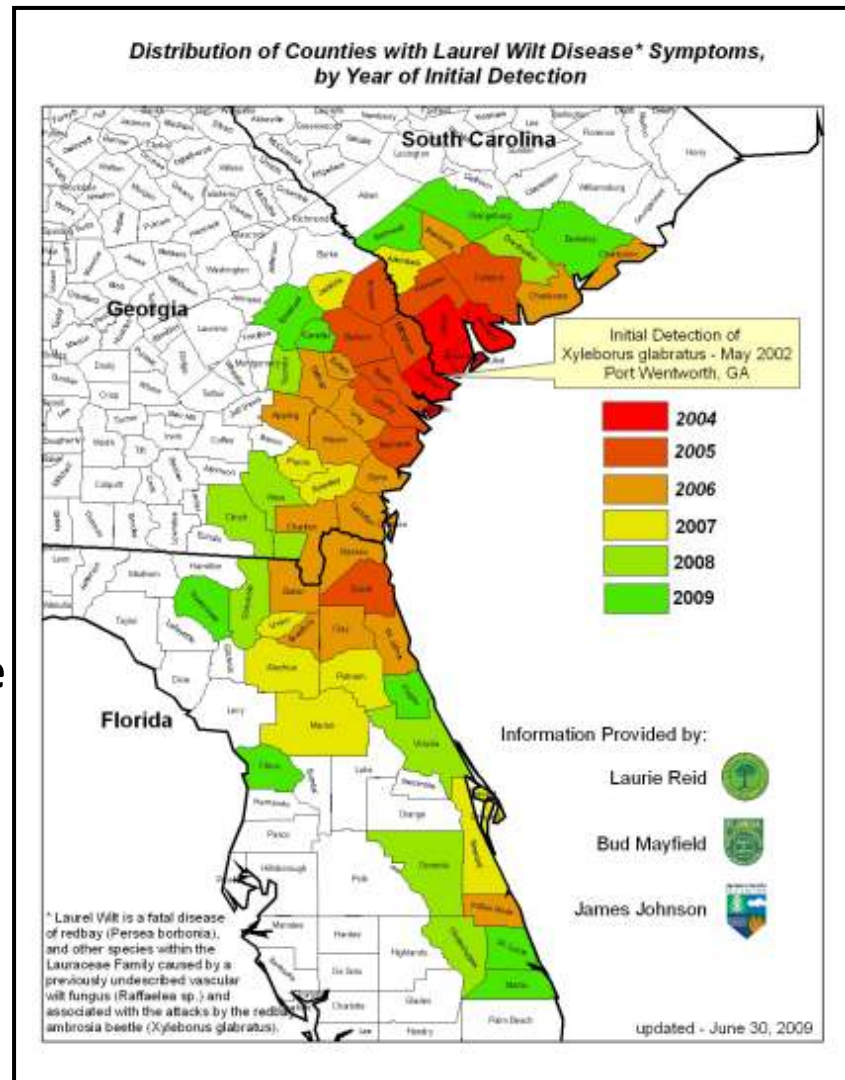
2004 – LW observed in GA, SC

2005 – LW in Florida (Duval Co.)

2009 – Spread to Martin Co.

– Suspicious fungus isolated
from avocado in Miami-Dade
Co. (determined not LW)

March 2010 – 1st RAB captured in
Miami-Dade Co. (CAPS
survey trap) but no LW
observed



Safeguarding orchard plantings is an NPGS priority!

- Emerald ash borer
- Other lethal insects...
- Huanglongbing (HLB) citrus greening
- Other virulent diseases...
- Extreme temperatures, storms...

International Profile and Publicity



Future Prospects



Some (but not all!) Key Challenges for the NPGS

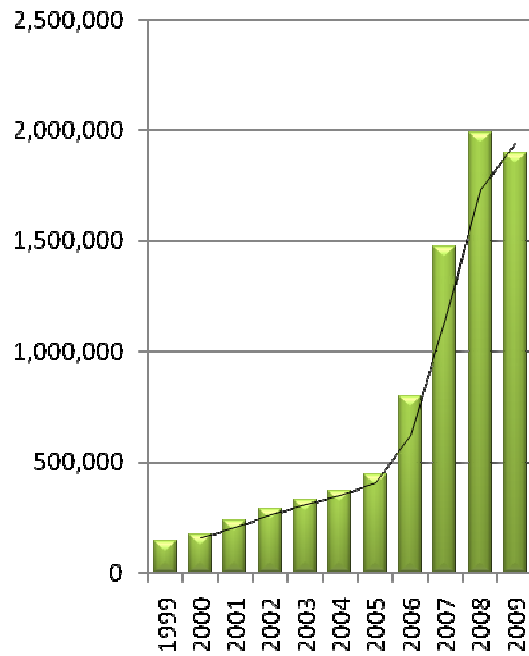
- **Managing and expanding NPGS operational capacity and infrastructure**
- **Fulfilling the demand for additional germplasm characterizations/evaluations**
- **Acquiring and conserving germplasm of wild crop relatives**
- **Managing genetic/genomic seed stocks**
- **Conserving germplasm of crop-associated microbes**

Likely Trends for Crop Germplasm and its Management

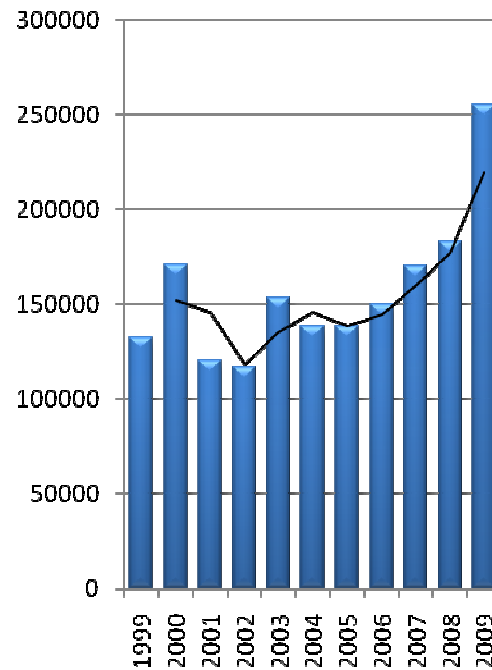
- **Static budgets? (but see the Administration's FY 11 budget request!)**
- **Increasing costs for managing germplasm**
- **Larger germplasm collections**
- **Increasing demand for germplasm**

Demand for NPGS germplasm and information vs. NPGS budget

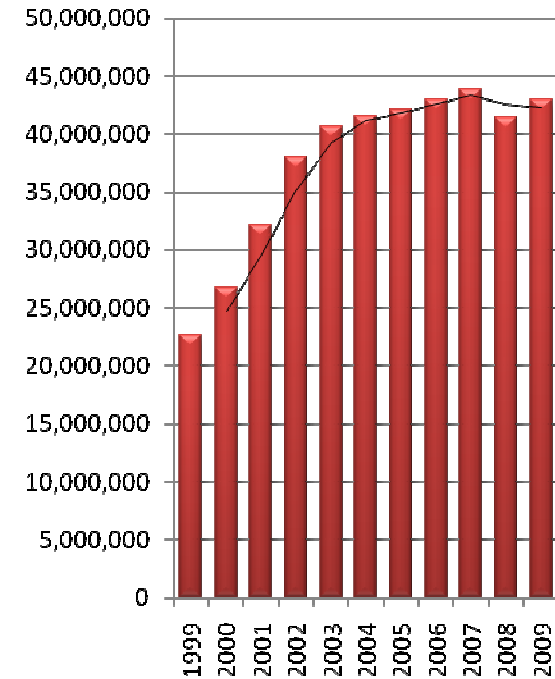
NPGS Web Page Access



Germplasm Distributions



NPGS Budget



AGRICULTURAL RESEARCH SERVICE

Proposed FY 2011 President's Budget

Proposed S&E Budget Increases

ARS' FY 2011 Salaries and Expenses (S&E) Budget proposes an increase of \$20 million, from \$1.18 to \$1.20 billion. ...

Pay Costs (\$10,030,000).

Crop Breeding and Protection to Enhance Food Production and Security (\$9,039,000).

- Expanding knowledge/tools needed for classical plant breeding.
- Enhancing plant breeding for sustainable production and climate change protection.
- Enhancing plant breeding for disease/insect protection.
- Rapid response to issues/emergencies relating to plant health crises.

Scientific Collections (\$6,900,000).

--Enhancing capacity to conserve a broad diversity of National Plant Germplasm System resources.

- Enhancing capacity to conserve insect germplasm.
- Enhancing insect systematics capacity.
- Enhancing microbial germplasm and systematics collections capacity.

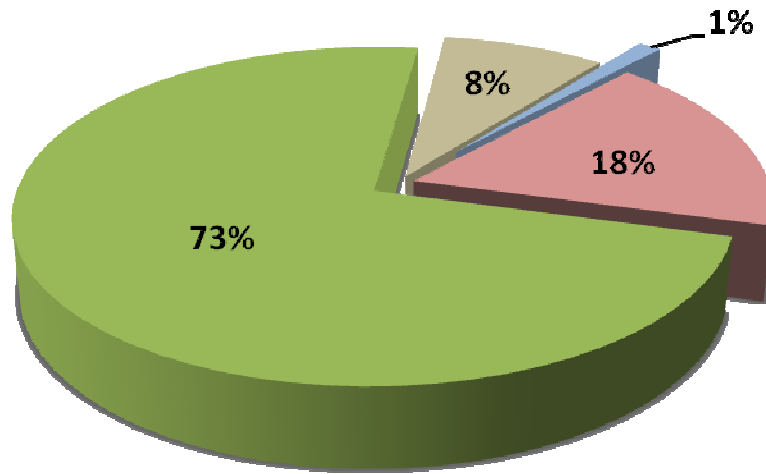
More about demand for NPGS germplasm

- The current size of the NPGS collection is a bit more than 530,000 accessions.
- During 2000-2009, the NPGS as a whole distributed an average of more than 170,000 accessions per year.
- Thus, especially during the last 2-3 years, an average of about a third of all the NPGS accessions were distributed at least once per year.
- But, there is wide variability in germplasm demand from genebank to genebank, crop to crop, and even within crop collections.



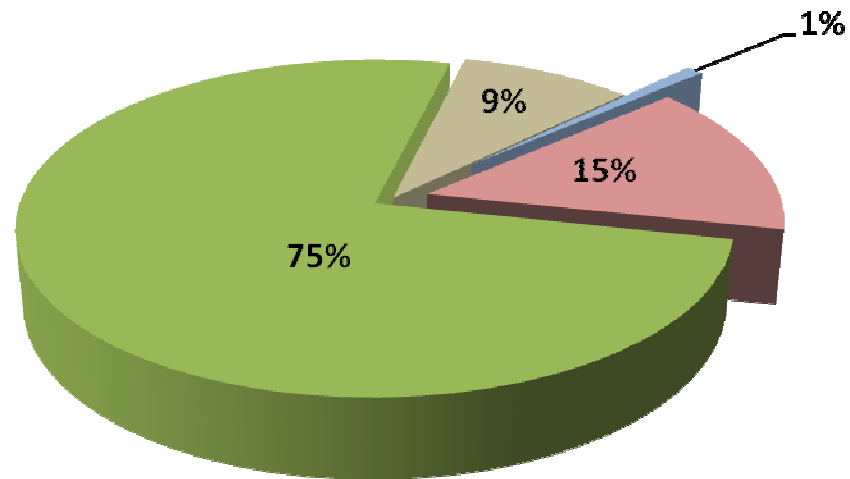


Percentage of NPGS accessions maintained by genebank collections of different sizes

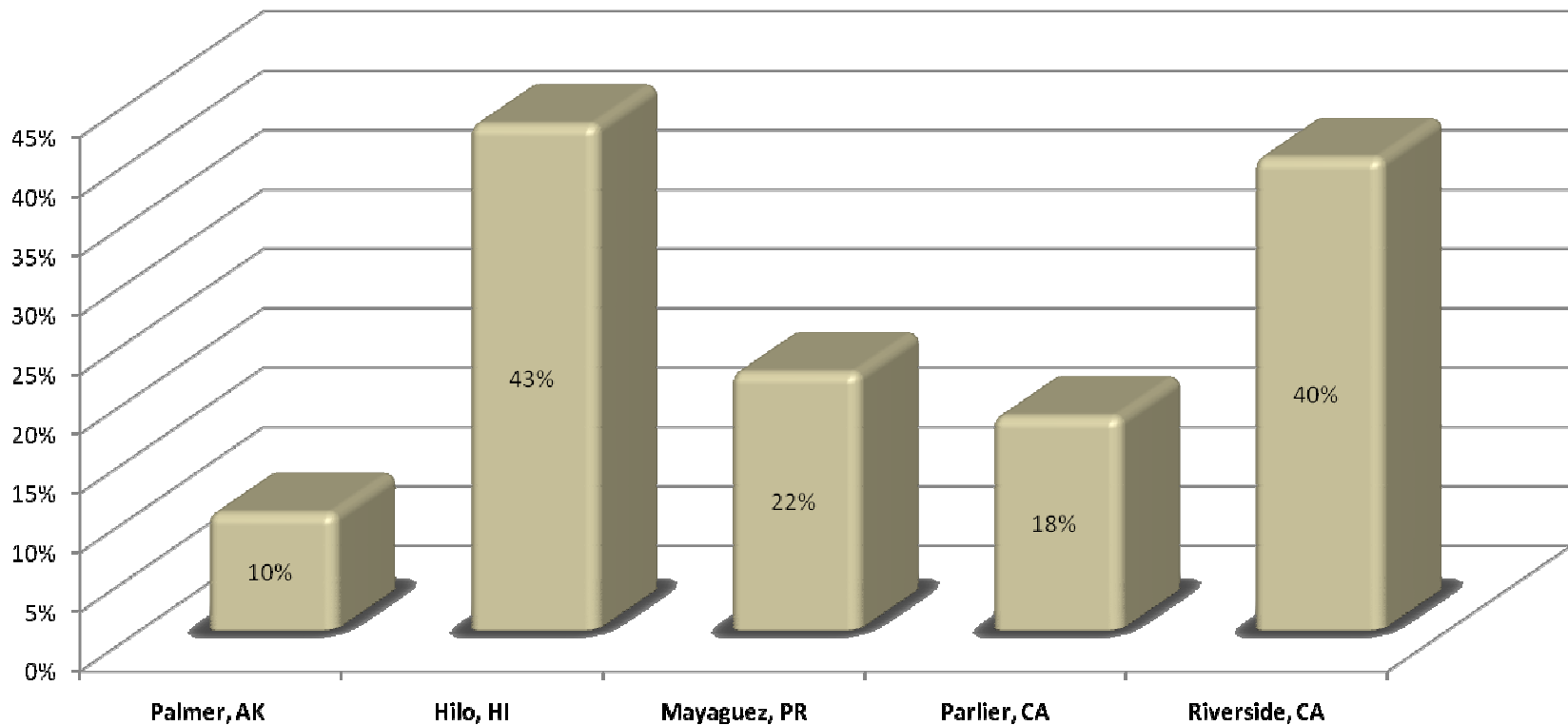


■ Genebanks >2,000 ■ Genebanks 2,000-20,000 ■ Genebanks <20,000 ■ Genetic Stocks

Percentage of NPGS accessions distributed by genebank collections of different sizes

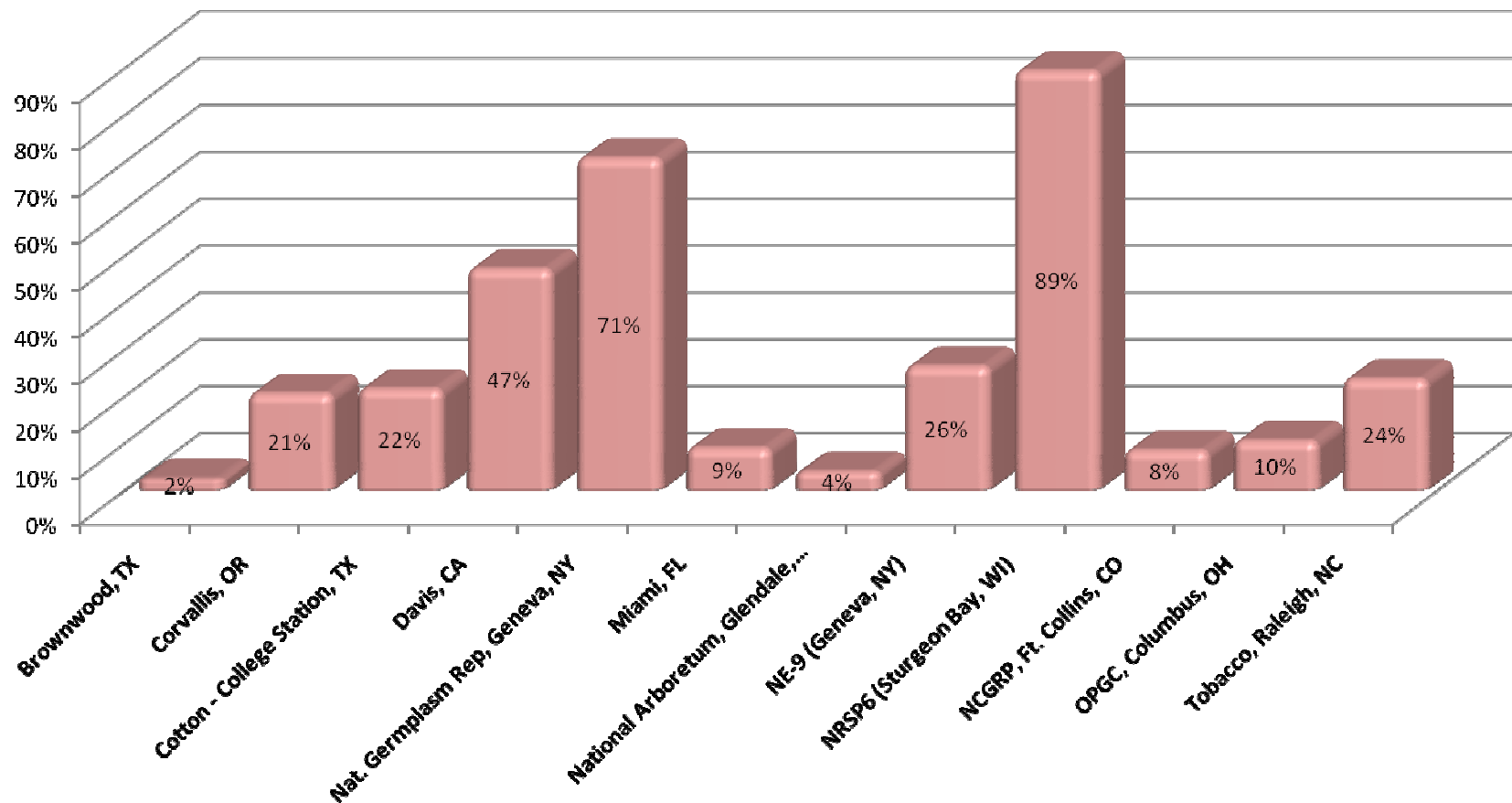


Average Percentage of Genebank Accessions Distributed Annually 2000-2009



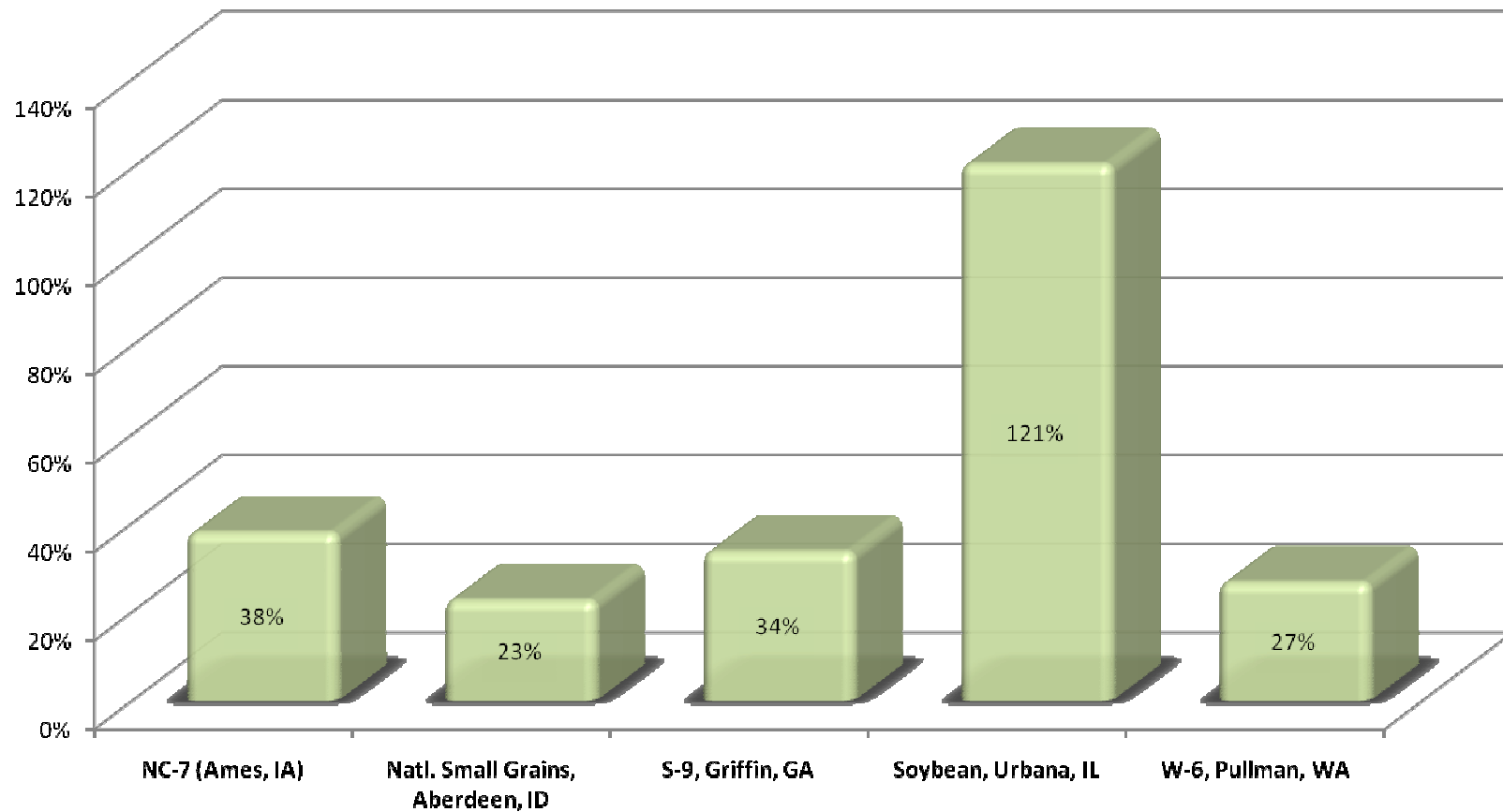
Genebanks with 2,000 or fewer accessions

Average Percentage of Genebank Accessions Distributed Annually 2000-2009



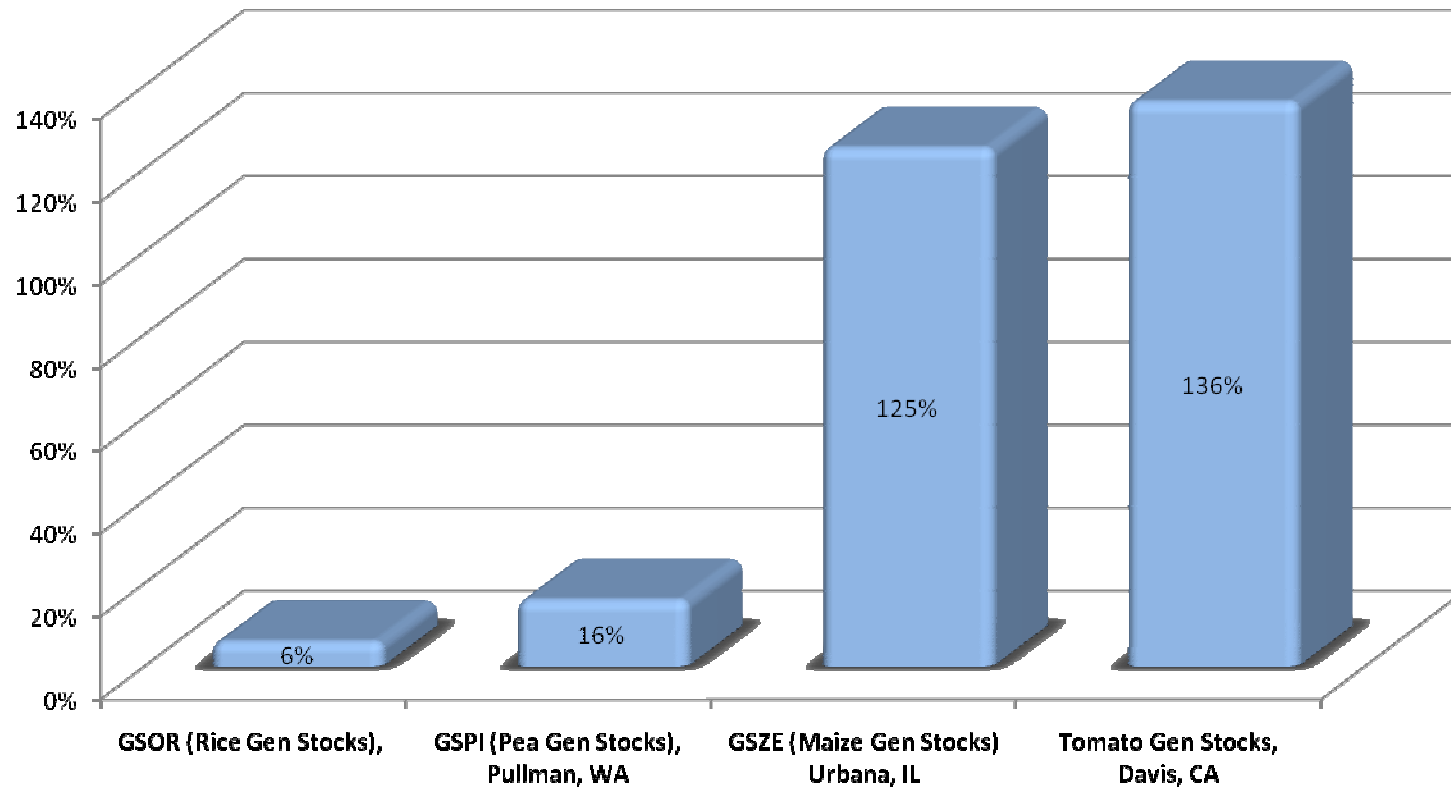
Genebanks with more than 2,000 and fewer than 20,000 accessions

Average Percentage of Genbank Accessions Distributed Annually 2000-2009



Genebanks with more than 20,000 accessions

Average Percentage of Genbank Accessions Distributed Annually 2000-2009



Genetic stock centers/collections

Priorities for Genetic Resource Management in Genebanks

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- **Maintenance**
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