

**S-009 Plant Genetic Resources  
Conservation and Utilization:  
Progress 2003 – Present**

**Gary A. Pederson  
USDA, ARS, Plant Genetic Resources Conservation Unit  
Griffin, Georgia**

# National Plant Germplasm System

**21 different genebanks comprise the NPGS**  
**Over 550,000 accessions maintained**  
**Over 14,600 plant species conserved**



# National Plant Germplasm System

- Four regional sites – S9, W6, NC7, and NE9
- NCGRP, Ft. Collins, CO, backs up all other collections



# Griffin Location - History

## Southern Plant Introduction Station

- **Established in 1949**
  - **Southern State Expt. Stations**
  - **USDA**
  - **Started with 811 accessions**

Southern PI station 1953



# Griffin Location

## Three Partners

- 1. USDA, Agricultural Research Service  
Plant Genetic Resources Conservation Unit**
- 2. S-009 MultiState Project  
Funding from 13 Southern  
State Experiment Stations**
- 3. University of Georgia – Griffin campus  
Provides land, facilities, and support**





# Personnel

**7 Federal Curators & Scientists**  
**21 Technicians/Support Staff**  
**(13 Federal and 8 S-009 employees)**





# Personnel

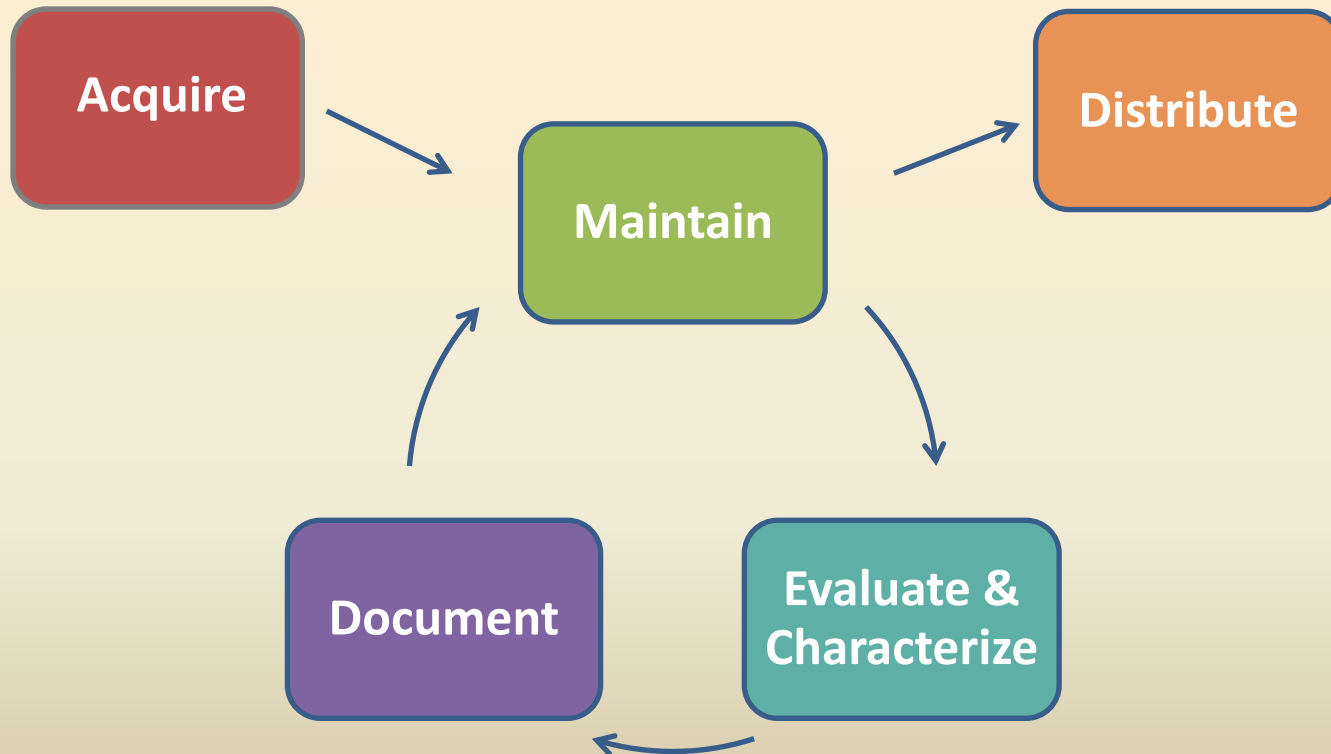
7 Federal Curators & Scientists  
21 Technicians/Support Staff  
(13 Federal and 8 S-009 employees)



7 Federal Curators & Scientists  
21 Technicians/Support Staff  
(13 Federal and 8 S-009 employees)



# Genetic Resources Conservation





# Acquisition – Accomplishments

## 1. Acquired 8,330 new accessions 2003 to present.

### Plant Exploration Trips

- Native or naturalized species in U.S.
- Plant collection trips to other countries

### Donations and Exchanges

- Private donations
- Retirements of plant breeders
- Elimination of breeding programs
- Germplasm exchanges with other genebanks

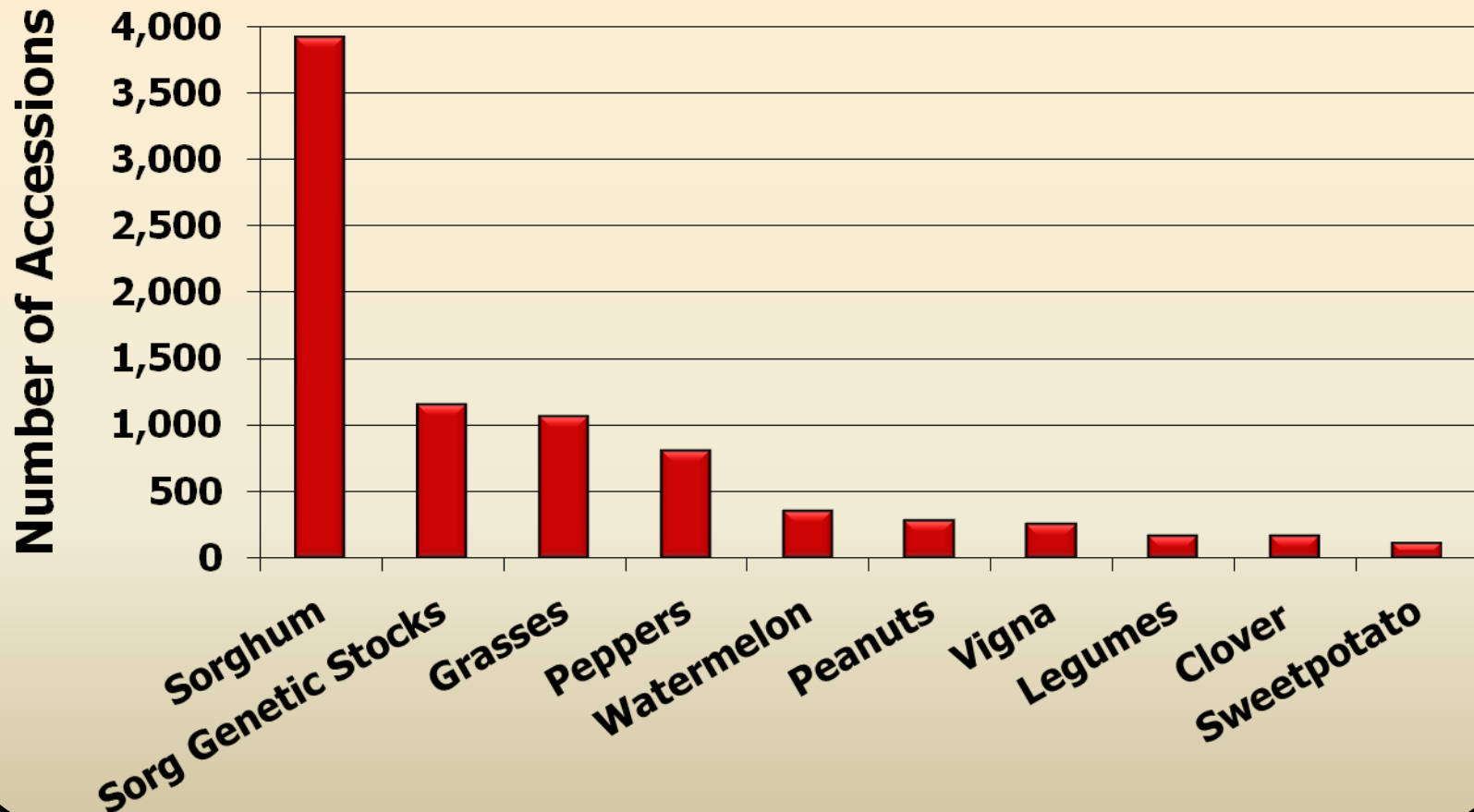


Switchgrass

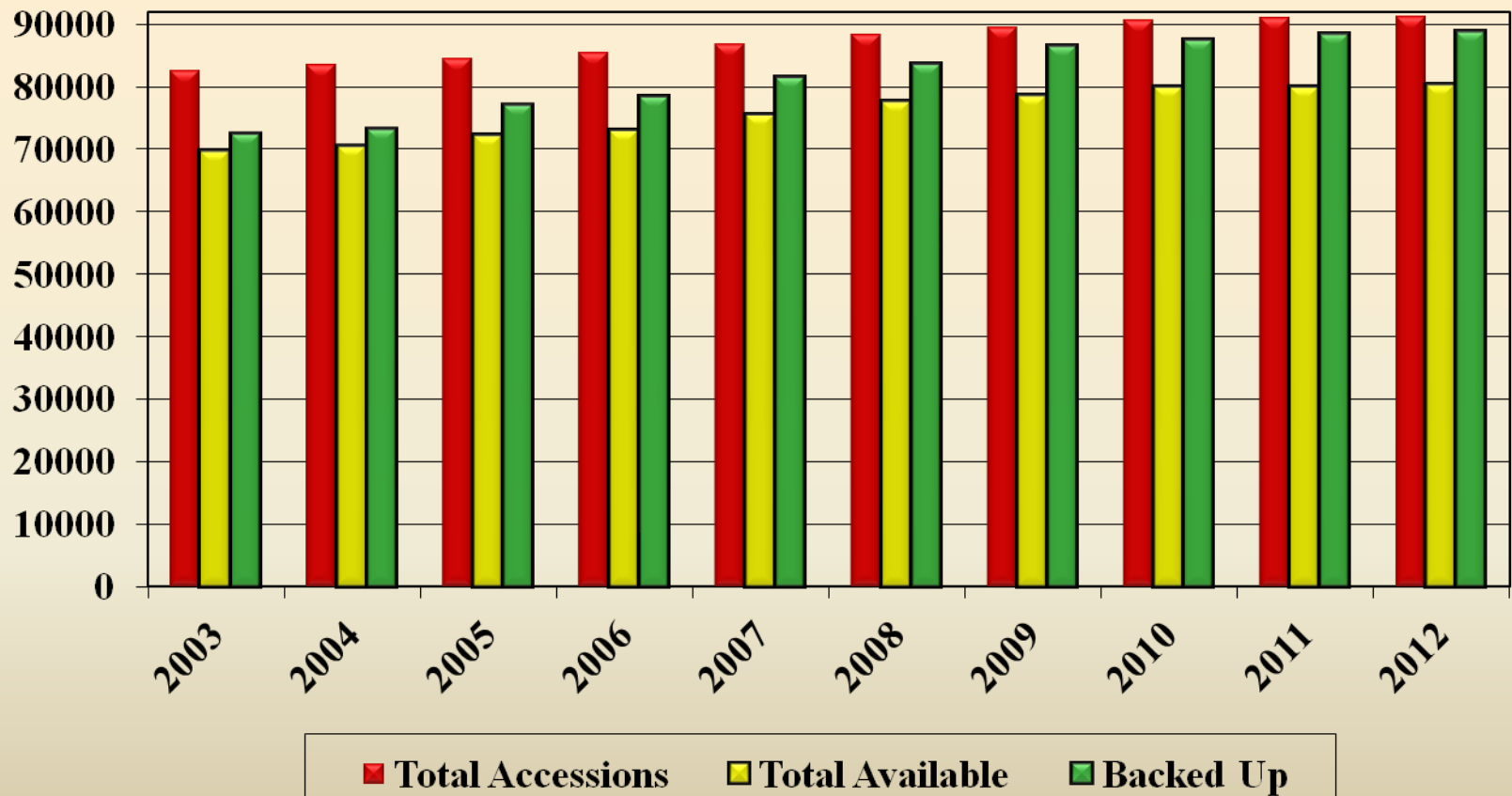


Peanut

# Accessions Acquired 2003-present



# Plant Genetic Resources Collection



# **Griffin Germplasm Collection**

**91,259 Accessions**

**1,548 Species**

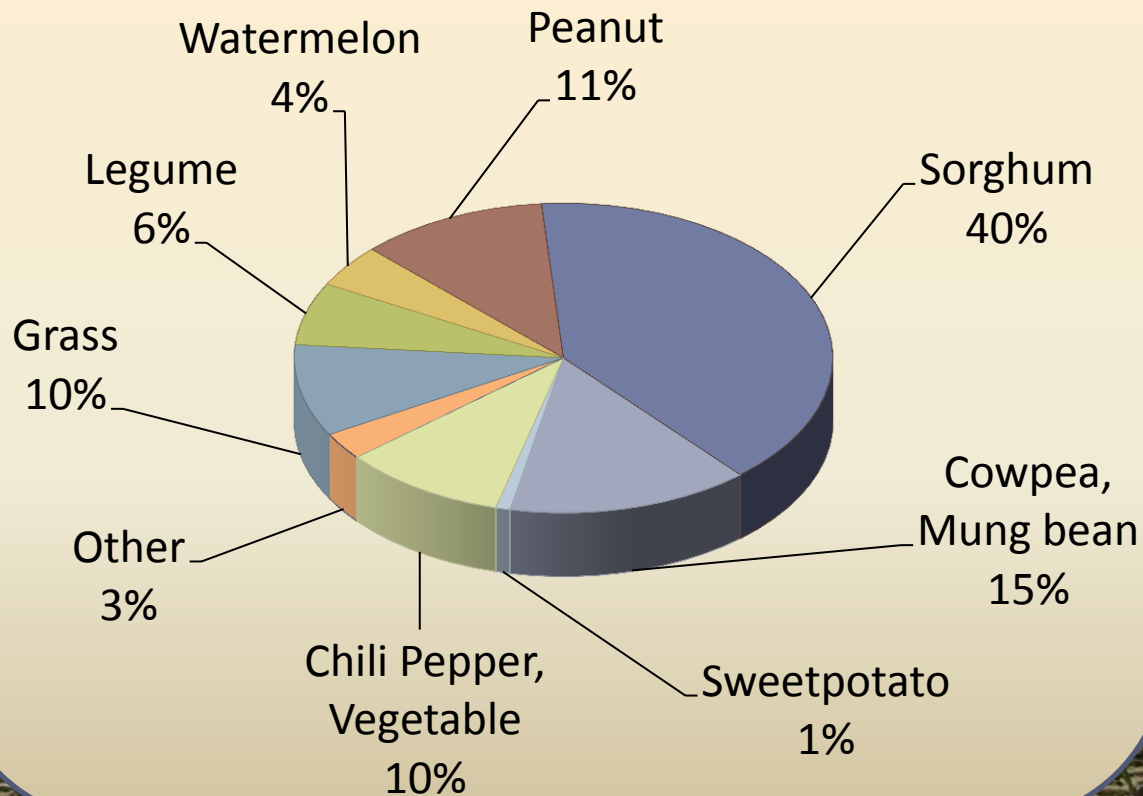
**258 Genera**

**190 Countries represented**

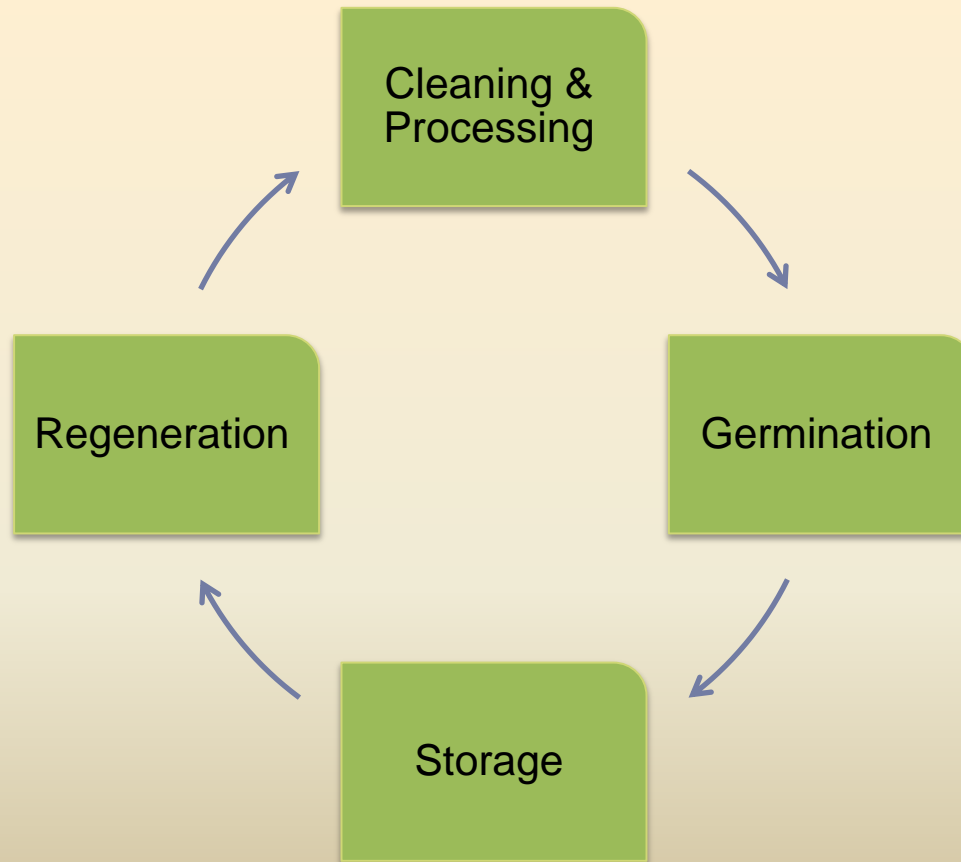
Acknowledgement: Merrelyn Spinks and Lee Ann Chalkley, PGRCU, compiled and summarized all numbers shown in this presentation.

# What is in our collection?

## Composition of PGRCU Collection



# Maintenance



# Regeneration – Accomplishments

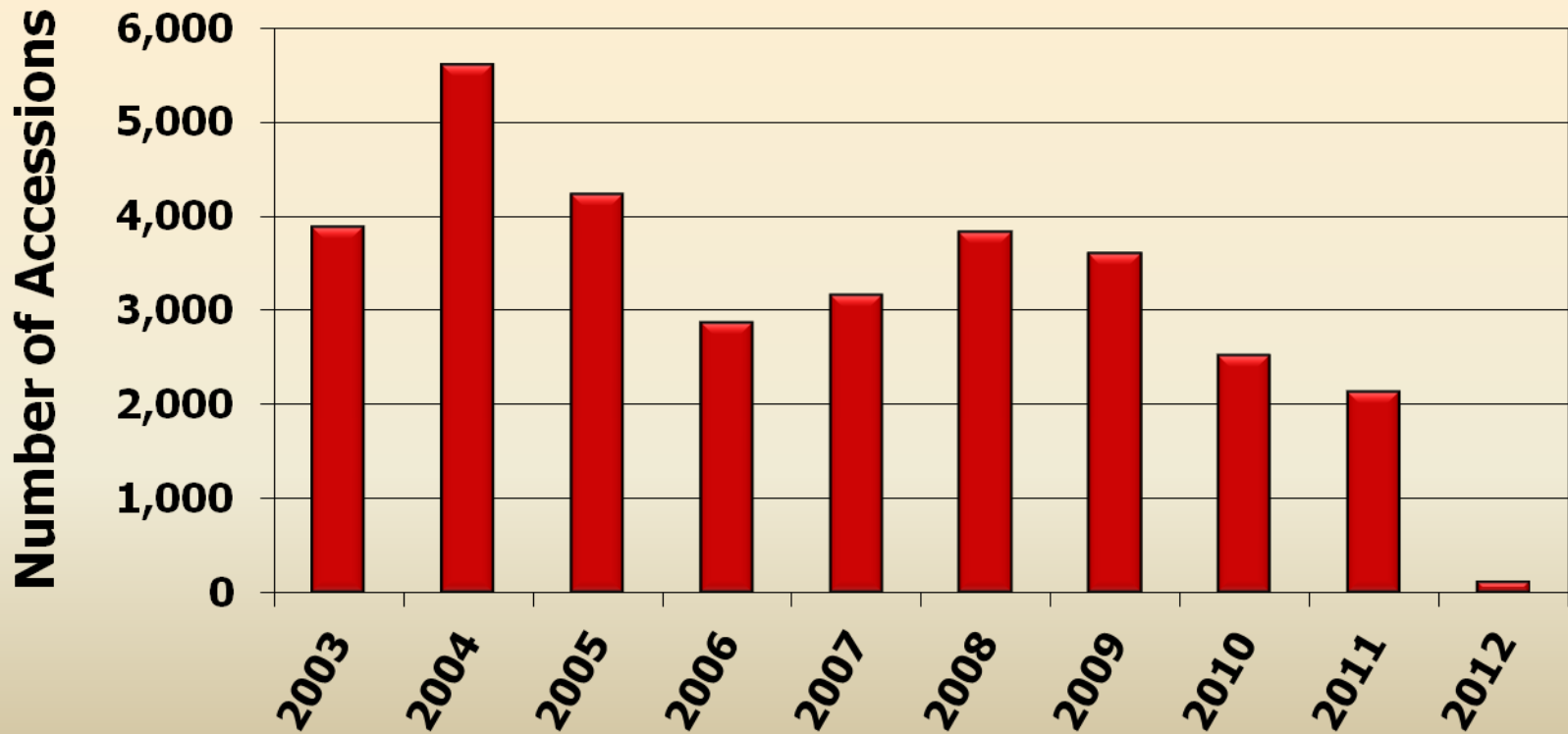
1. 31,863 accessions regenerated 2003 to present



Regeneration



# Regeneration of Accessions





# Maintaining Clonal Crops



Regeneration



Sweetpotato  
tissue culture

## Clonal Crops



Bamboo in Byron, GA



Wild peanut



Bermudagrass



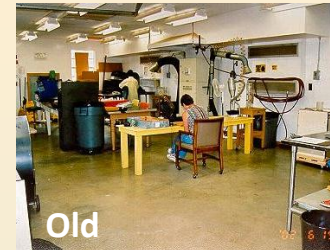
# Cleaning and Processing – Accomplishments

## 1. Six new workstations added to improve operations

Improved dust control

More work space

Accommodate more employees

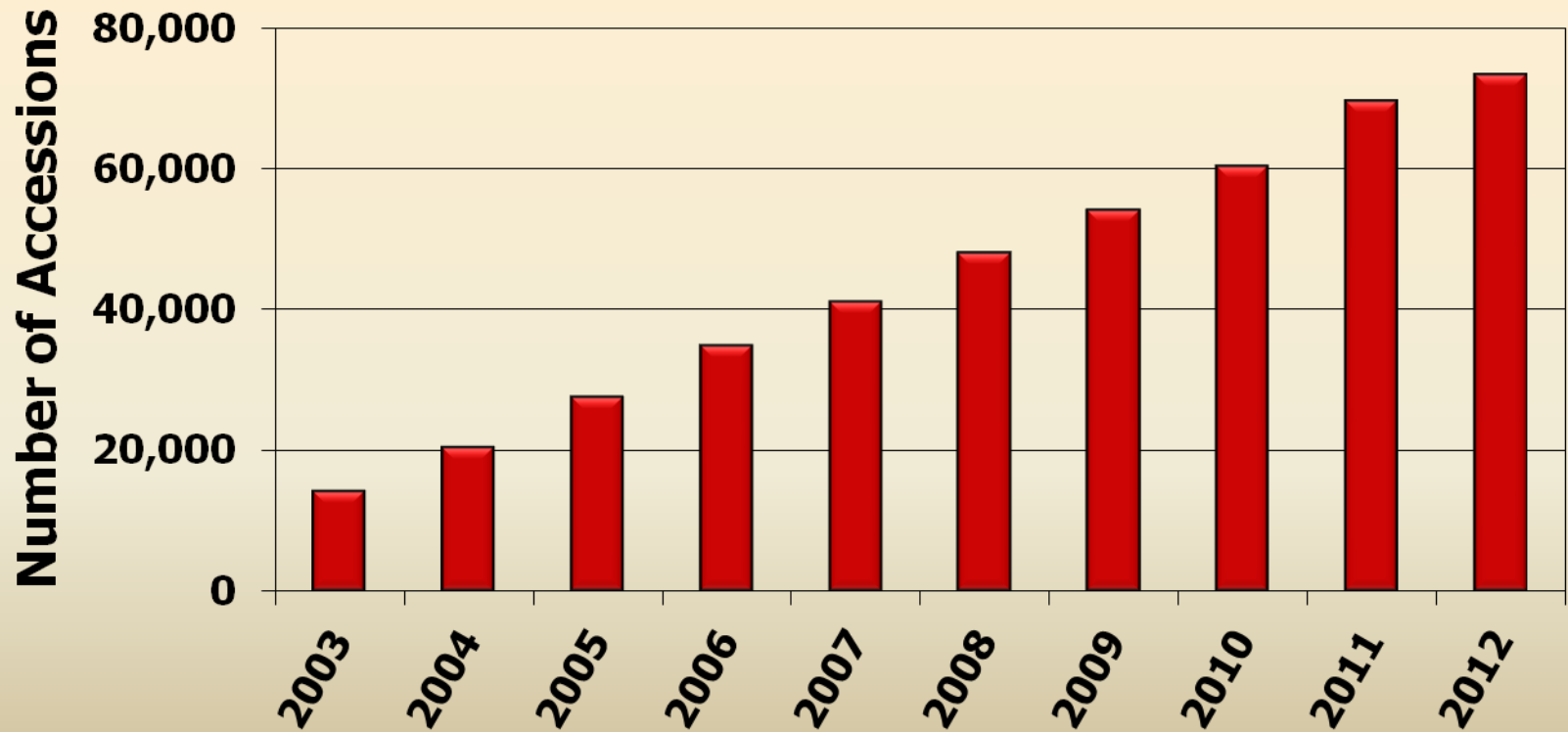


# Germination – Accomplishments

1. Griffin germination program established in 2002.
2. Accessions tested for germination  
Improved from 17.1% (2003) to 81.5% (present)
3. Benefits of viability data
  - Send live, quality seed to requesters
  - Set regeneration priorities
  - Determine long-term viability in storage



# Germination Tests

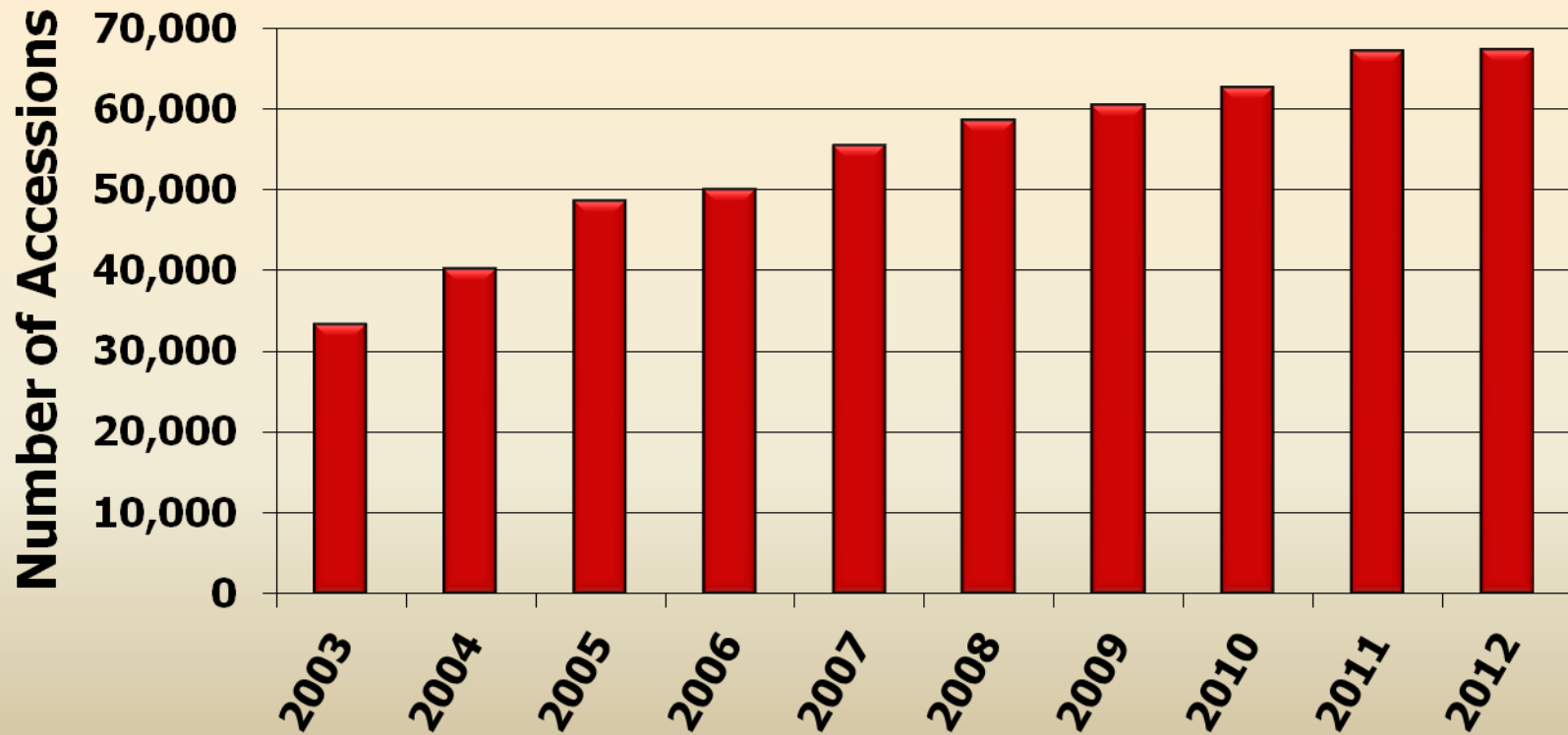


# Cold Storage – Accomplishments

1. Established program to store most seed in -18 C.  
Seed will remain viable longer in -18 C than 4 C.
2. Fewer seed regenerations needed.  
Maintain genetic variability  
Reduced chance of mixtures  
Cost savings



# Total Accessions in -18 C



# Cold Storage – Accomplishments

3. **Constructed addition with 20 x 30' cold room (4 C).  
Converting old 4 C room to -18 C.  
Increase -18 C space from 1,061 to 1,897 sq. ft.**



# Security Backup – Accomplishments

1. Collection safely backed up at one or more other locations.

National Center for Genetic Resources  
Preservation



97% backed up at Ft. Collins, CO

Svalbard Global Seed Vault



10% also backed up  
at Svalbard,  
Norway



# Evaluation and Characterization Accomplishments

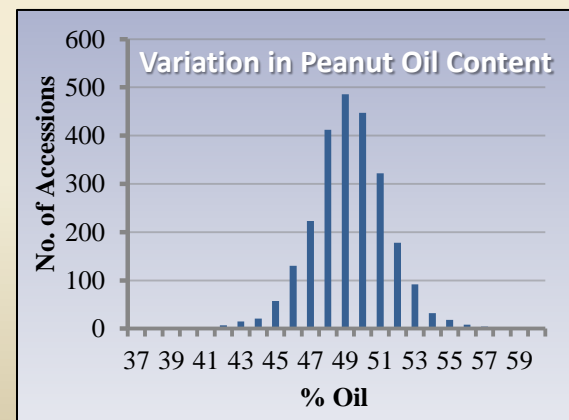
1. Descriptor data taken on all regenerations.

2. Evaluation of large collections

Oil content – okra, peanut, watermelon, sesame

Fatty acid composition – okra, peanut, watermelon

Capsaicinoids – pepper



# Documentation

## Germplasm Resources Information Network (GRIN)

[www.ars-grin.gov/npgs](http://www.ars-grin.gov/npgs)

## S-009 and Plant Genetic Resources Conservation Unit (PGRCU)

[www.ars.usda.gov/saa/pgrcu](http://www.ars.usda.gov/saa/pgrcu)

United States Department of Agriculture  
Agricultural Research Service  
The in-house research arm of the USDA

Germplasm Resources Information Network (GRIN)

GRIN Home | About GRIN | Contact GRIN | Help

Options

- Plant Germplasm
- Collections
- Search GRIN
- Request Germplasm
- pGRIN
- Crop Germplasm Committees
- Repository Home Pages
- FAQ
- Links

### National Plant Germplasm System

NPGS is a cooperative effort by public (State and Federal) and private organizations to preserve the genetic diversity of plants.

The world's food supply is based on intensive agriculture, which relies on genetic uniformity. But this uniformity increases crop vulnerability to pests and diseases.

Scientists must have access to genetic diversity to help bring forth new varieties that can resist pests, diseases, and environmental stresses. The NPGS aids the scientists and the need for genetic diversity by:

- scouting crop germplasm
- procuring crop germplasm
- evaluating crop germplasm
- documenting crop germplasm
- distributing crop germplasm

Since many important crop species originate outside the United States, the first steps toward diversity are acquisition and introduction. New germplasm (accessions) enter NEUS through

United States Department of Agriculture  
Agricultural Research Service

South Atlantic | Griffin, Georgia

ARS Home | About ARS | Help | Contact Us | En Español

Printable Version | E-mail this page

You are here: Home /

## Home

### PLANT GENETIC RESOURCES CONSERVATION UNIT

The Plant Genetic Resources Conservation Unit (PGRCU) exists to conserve plant genetic resources for users today and for future generations. The PGRCU is a cooperative effort supported by the U.S. Department of Agriculture, Agricultural Research Service (USDA, ARS) and the Southern State Agricultural Experiment Stations. Located on the Griffin Campus of the University of Georgia, College of Agricultural and Environmental Sciences, the PGRCU is one of four regional plant introduction stations and is also known as **Multistate Research Project S-009**. The PGRCU is charged with the responsibility to acquire, characterize, maintain, evaluate, document, and distribute genetic resources of agronomic and horticultural crops. Objectives include:

- Conserve genetic resources and associated information for a broad spectrum of crops and related species.
- Develop and apply new or improved evaluation procedures and marker-based approaches to assess diversity of genetic resources in the collections and evaluate materials for useful traits.

# Documentation – Accomplishments

## 1. University and Federal Cooperator Data added to GRIN

Sorghum – association panel, photoperiod sensitivity, greenbug resistance, nutritional traits, ergot and downy mildew resistance

Sweet sorghum – brix, sucrose concentration

Peanut – core selection

Pepper – root rot and root knot nematode resistance

Cowpea – antioxidant activity, iron deficiency, low phosphorus

Watermelon – root knot nematode and gummy stem blight resistance

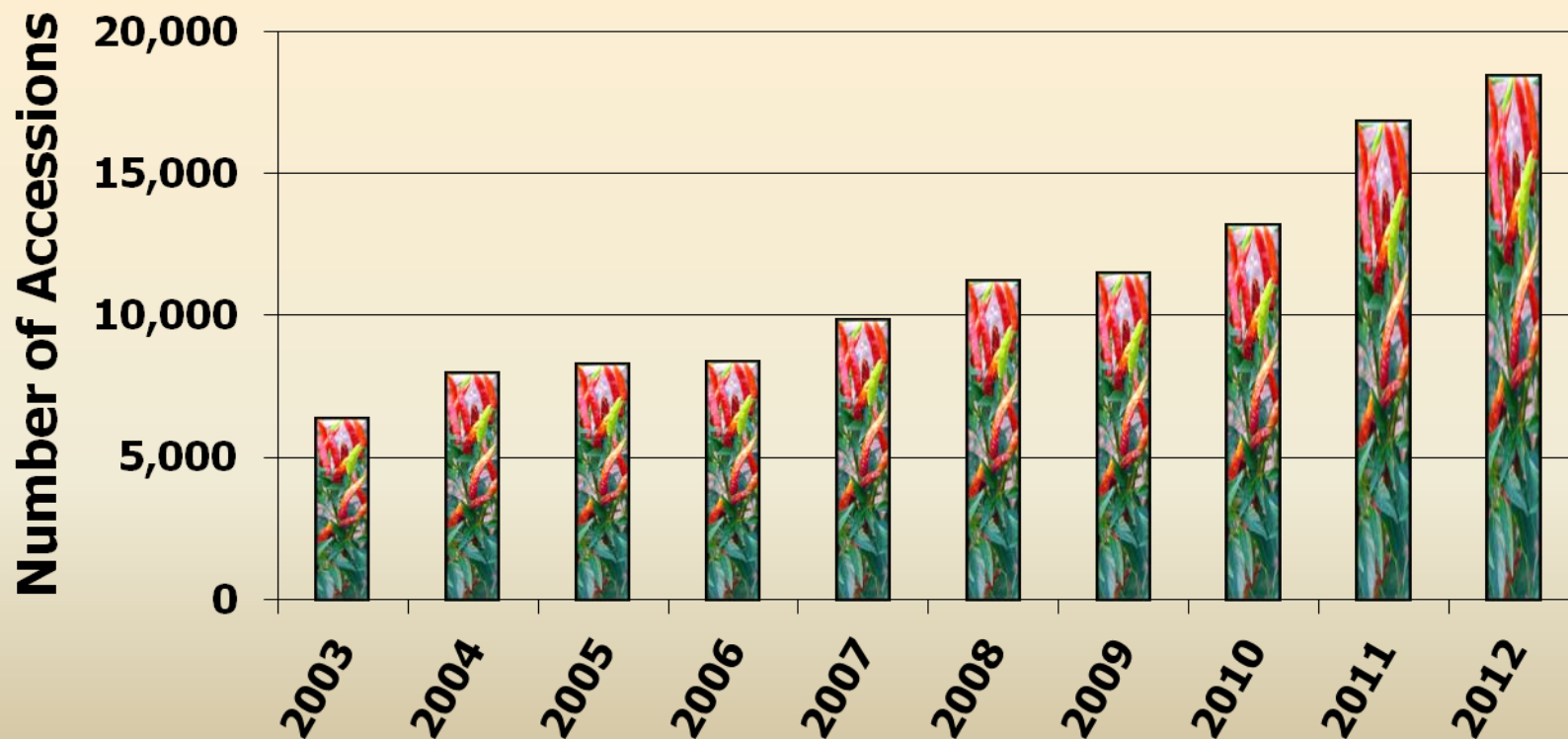
Sweetpotato – quality and storage traits

Clovers – isoflavone, iron deficiency, powdery mildew resistance

## 2. Images added to GRIN

Pepper, sorghum, cowpea, watermelon

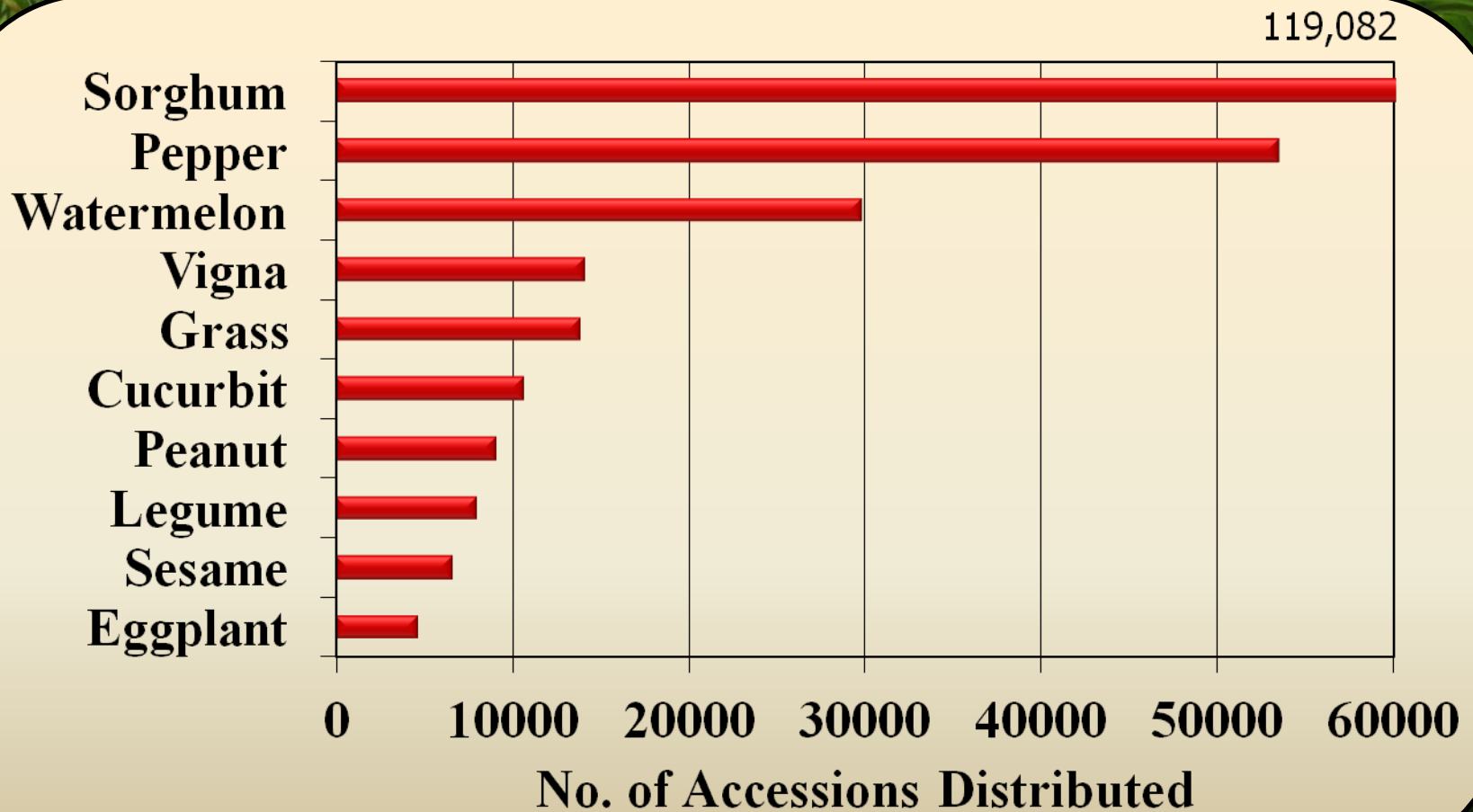
# Accessions with Images in GRIN



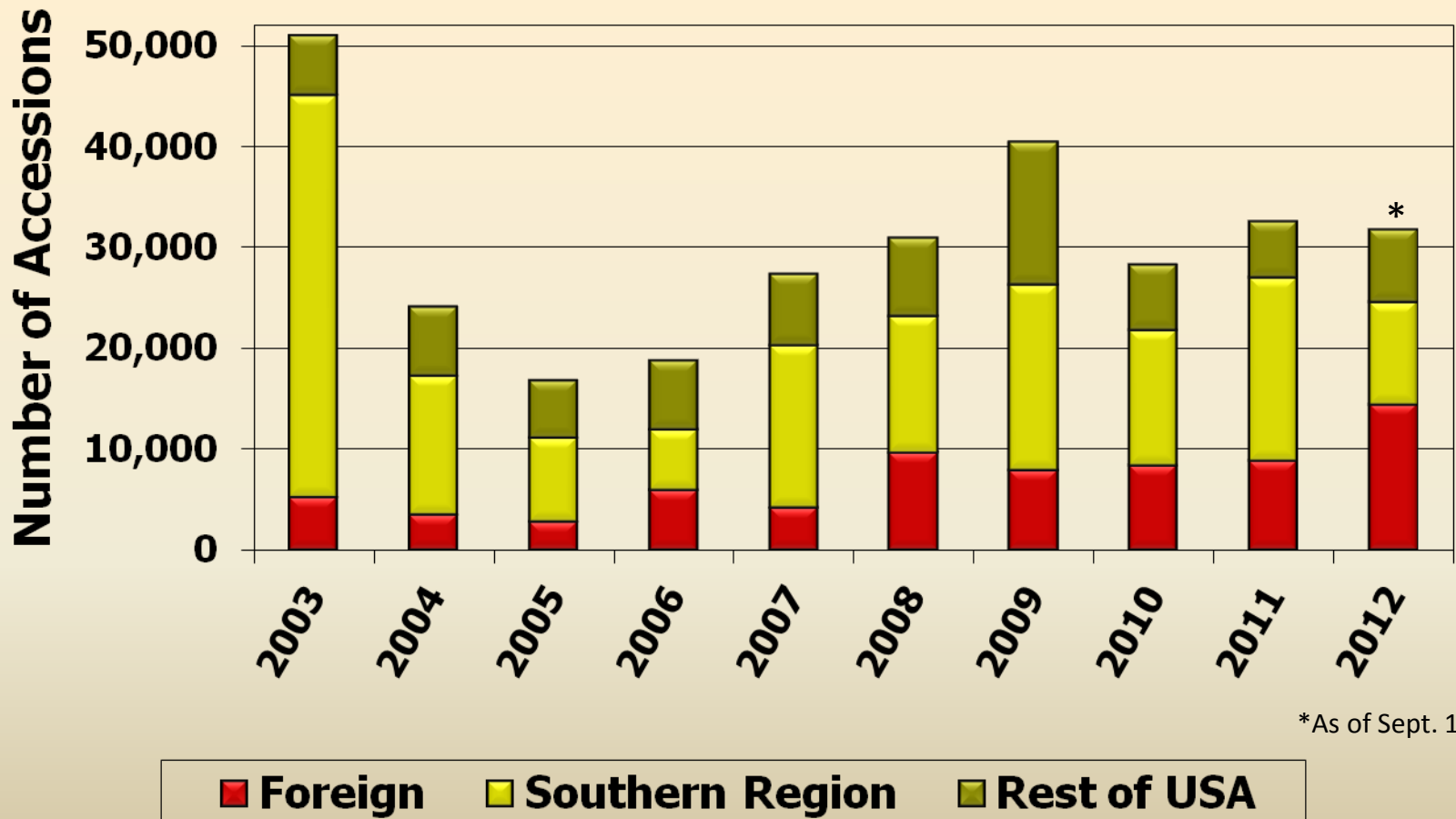
# **Distribution – Accomplishments**

- 1. 87.8% (80,142 accessions) of collection is available for distribution.**
- 2. Distributions average 30,196 per year (2003 to present) compared to 18,901 per year (1993 to 2002).**
- 3. Genetic resources distributed to all 50 states and 86 foreign countries (2003 to present).**

# Crops Distributed 2003-present

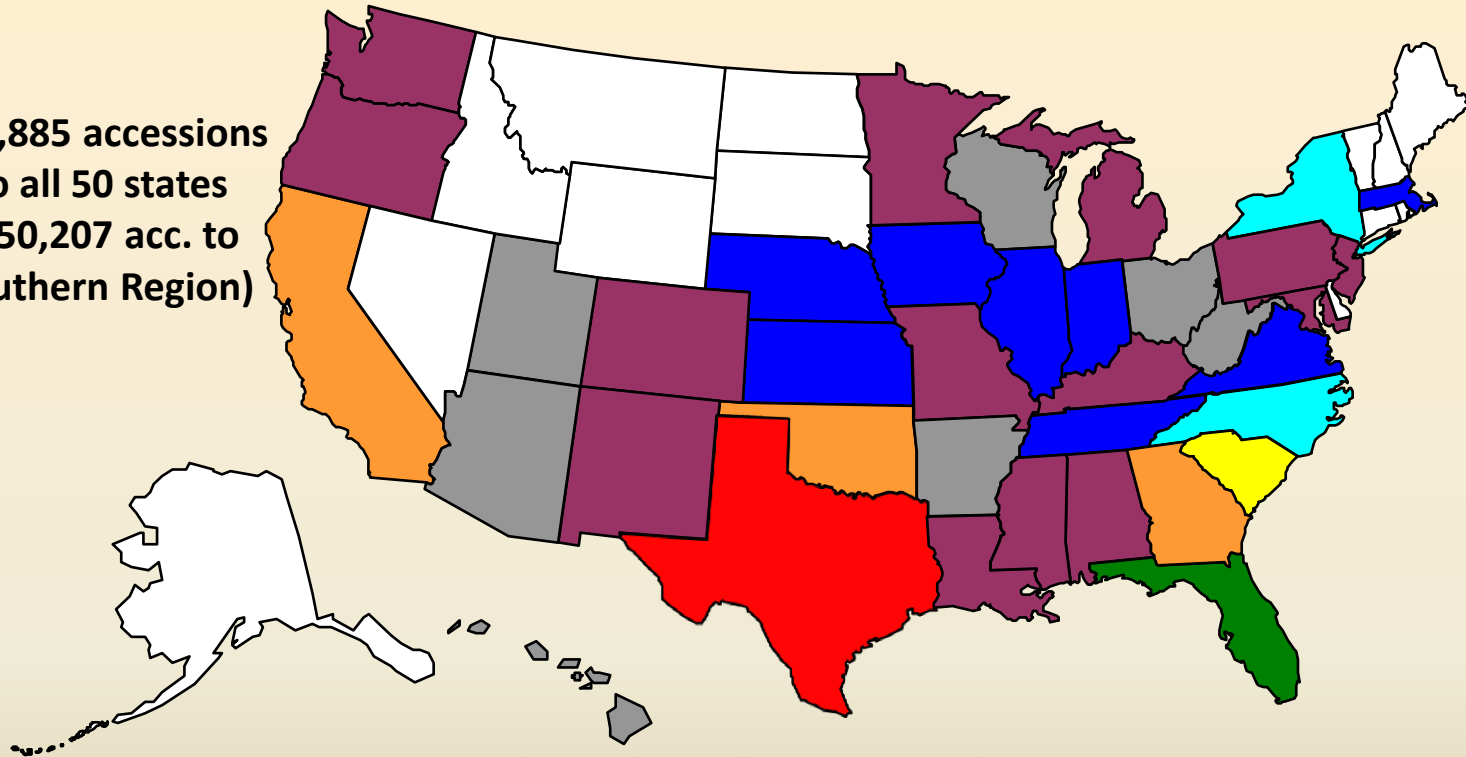


# Total Distributions from Griffin

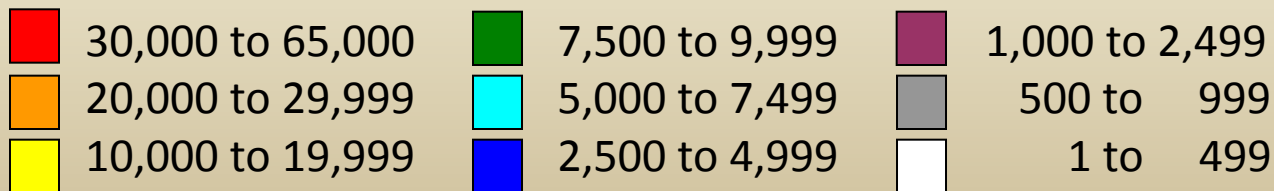


# Domestic Distributions 2003-present

223,885 accessions  
to all 50 states  
(150,207 acc. to  
Southern Region)



**Total number of accessions by state**





# Foreign Distributions 2003-present



# Why does it matter?

## Peanuts

Tomato spotted wilt virus – problem since late 1980s

PI 203396

Collected in Brazil market in 1952

Maintained in collection with minimal use

Has very good resistance to TSWV

Incorporated into >20 peanut cultivars



Virus infected peanut

# Why does it matter?

**Five peanut cultivars – 95% of GA, FL, and AL acreage in 2011**

<b>Georgia-06G</b>	<b>25% PI 203396</b>
<b>Georgia-07W</b>	<b>25% PI 203396</b>
<b>Georgia Greener</b>	<b>25% PI 203396</b>
<b>Florida-07</b>	<b>12.5% PI 203396</b>
<b>Tifguard</b>	<b>12.5% PI 203396</b>

**All have TSWV resistance from PI 203396**

# **What is the impact?**

**U.S. Economic Impact of PI 203396**

**\$2 billion (1996-2005)**

**\$200 million annually**

**Only one of 91,259 accessions maintained at Griffin!**

# **New S-009 Objectives**

- 1. Acquire and conserve genetic resources of crops and related wild species of importance to the Southern Region such as sorghum, peanut, watermelon, chili peppers, warm-season grasses, cowpea, clover, tropical/subtropical legumes, and others.**
- 2. Conduct genetic characterizations and phenotypic evaluations of the conserved crops and related wild species for commercially important genetic and agronomic traits.**
- 3. Incorporate characterization and evaluation information into the Germplasm Resources Information Network (GRIN) or other public databases.**
- 4. Distribute genetic resources and associated information to researchers, educators, and plant breeders in the Southern Region and worldwide.**

A photograph of a cornfield with a dirt path leading through the rows of tall green plants. The sky is clear and blue.

**Thank you for your interest!**

**Questions?**