

# **PGOC, NRSP-6, and Regional Plant Introduction Stations Update**

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# Plant Germplasm Operations Committee

- Due to travel funding concerns, 2013 PGOC meeting was held virtually on June 13 via teleconference.
- Reports from ONP and various NPGS functional groups

Office of National Programs Report – Peter Bretting; NGRL, CGC, and PEO update – Gary Kinard and Ned Garvey  
PAGRPR update-Dave Dierig; PGPRU update – Chris Walters; GRIN Global update – GRIN Global team

- Reports from subcommittees:

NPGS Operations Manual update – Kim Hummer;  
Acquisitions & Distributions – Karen Williams  
Molecular Markers in GRIN – Gayle Volk and Chris Richards  
Updating “Seeds for Our Future” brochure – Karen Williams and Gary Kinard  
GIS and Georeferencing – Stephanie Greene  
Crop Wild Relatives – Stephanie Greene  
Phytosanitary and Shipping – Gary Kinard  
GMOs – Dave Dierig  
Gene Patenting – Randy Nelson

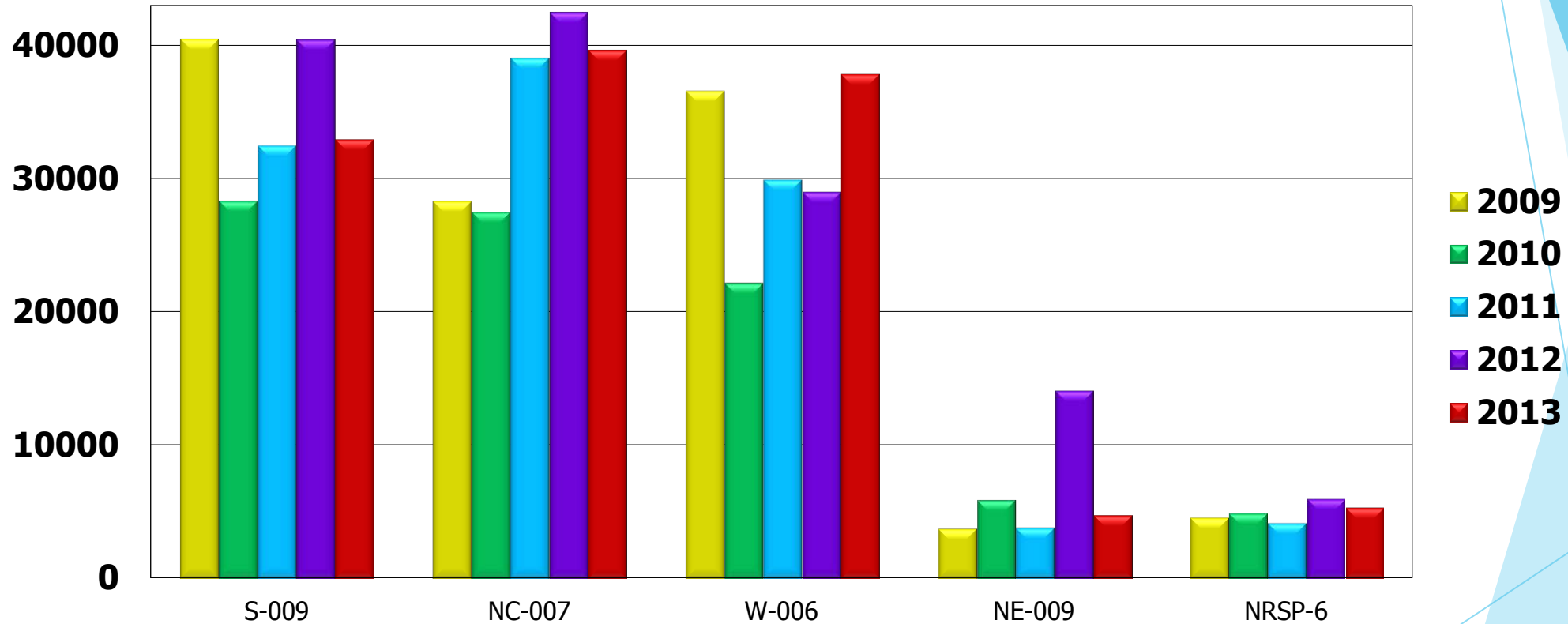
# Plant Germplasm Operations Committee

- Non-Research Request response – Candy Gardner; Disclaimer for x-PVP lines – Peter Bretting.
- PGOC Chair: Joseph Postman (Corvallis, OR), Vice-Chair: John Preece (Davis, CA).
- Next PGOC meeting and 5<sup>th</sup> Curators Workshop is scheduled to be held at National Clonal Germplasm Repository for Fruit and Nut Crops, Davis, CA in the week of October 27, 2014.

# US Regional Plant Introduction Station Functions

- ▶ Acquire, conserve and distribute plant genetic diversity and associated information
- ▶ Encourage use of germplasm (User-focused)
- ▶ Conduct research to improve genetic resource management programs
- ▶ Evaluate and characterize germplasm to facilitate targeted research objectives
- ▶ Prebreeding activities to facilitate utilization

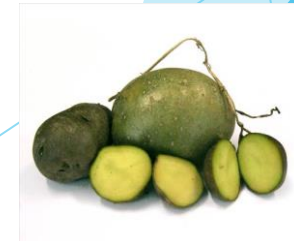
# Distributions



Over 1.16 million accessions and genetic stocks have been distributed annually in last 5 years by NPGS

# Potato Genebank (NRSP-6)

- Preservation, evaluation and distribution of 5,000 botanical seed accessions of about 100 species; 1,000 in vitro clones are also preserved.
- Help cooperators create genetic stocks and populations (wide F2s, bulk pops within elites, and representative pops within a core of species etc.).
- Evaluate some nutritional traits of interest (e.g. non-green non-glycoalkaloid after illumination, tomatine in tubers, super-high antiox folates, biguanide anti-diabetes, anti-appetite).



# Potato Genebank (NRSP-6)

- Studies on various new traits and mutants.



Floral mutants



Very orange flesh



Hormone  
deficients



Extremely long tuber dormancy

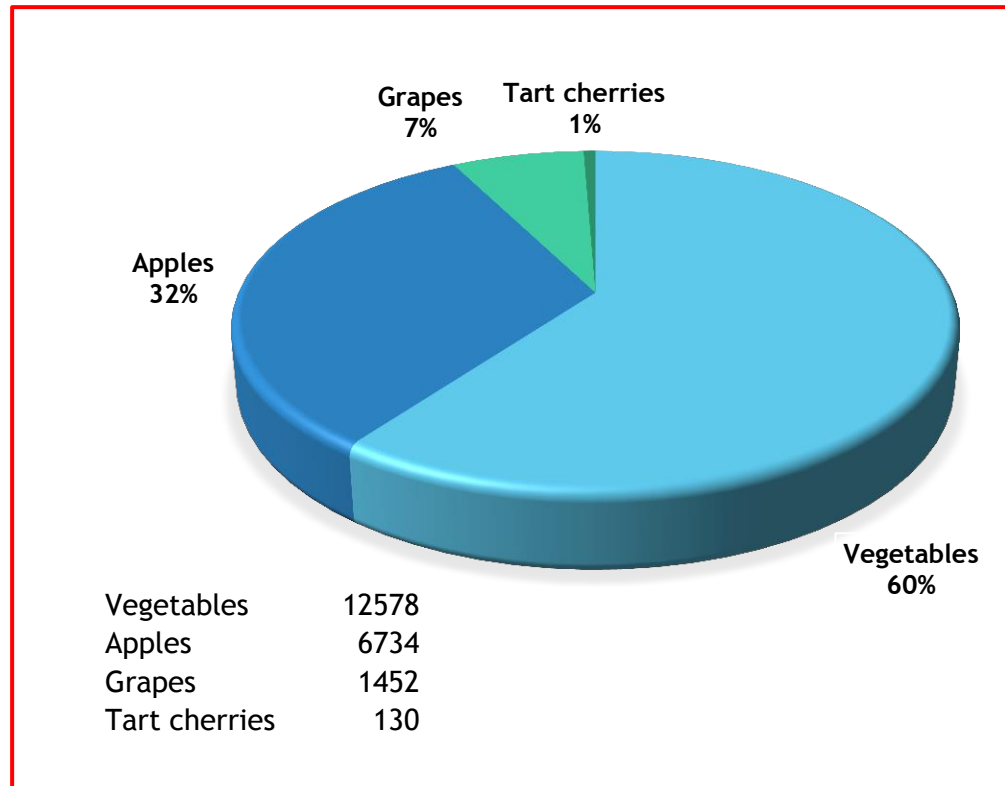
- Cooperation with germplasm donor countries and other genebanks (e.g. Peru on calcium efficiency and frost).

- Collecting research in southwest USA (identify hot spots, mutants, vulnerabilities etc.)



# North-Eastern Regional (NE-009)

## ➤ Crops managed



## ➤ Two curatorial programs:

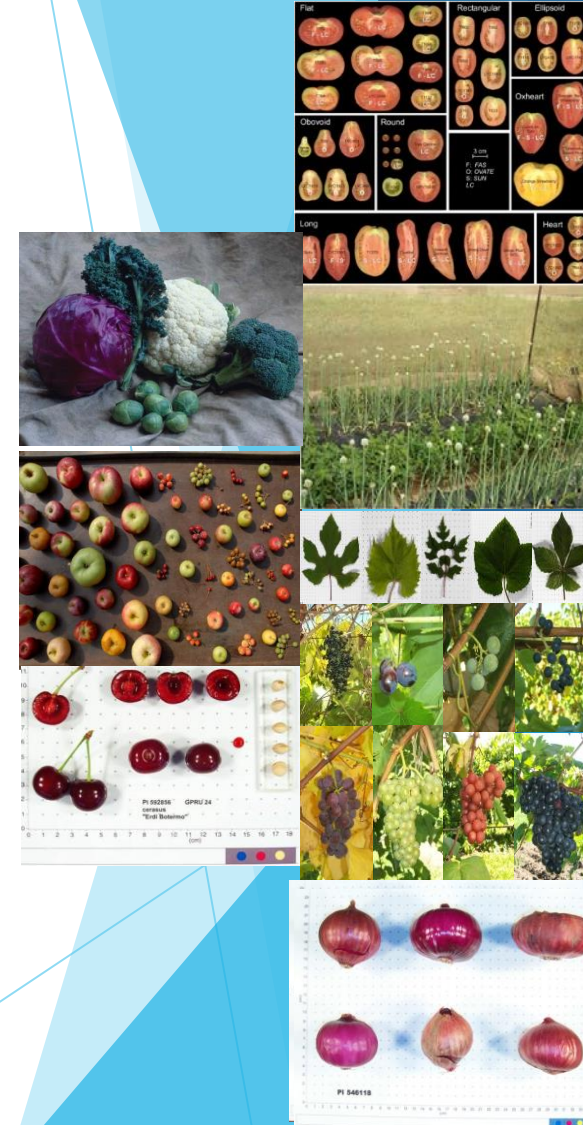
- ❖ Vegetable Crops (**Larry Robertson & Joanne Labate**) tomato, onion, radish, winter squash, cabbage, cauliflower, broccoli, other cole crops, celery, tomatillo, asparagus, buckwheat and other vegetables.
- ❖ Clonal Crops (**Thomas Chao & vacant position**) apples, grapes and tart cherries.



# North-Eastern Regional (NE-009)

## Highlights:

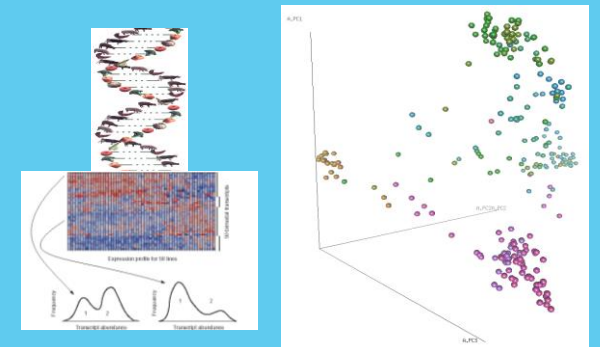
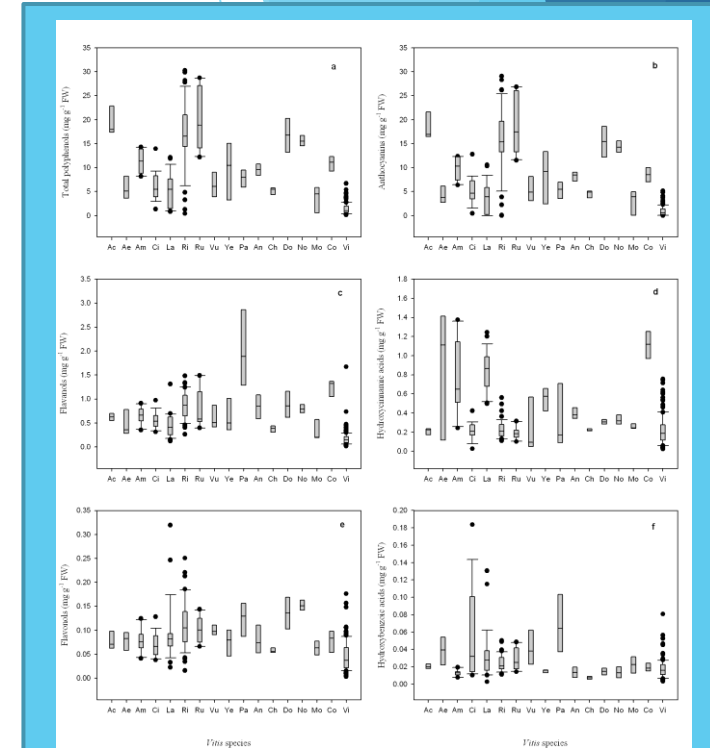
- Distribution of 54,548 germplasm samples (18,510 in 2013-2014) of fruits and vegetables and 17,942 fruit, tissue and DNA samples in the NE9 region, the rest of the U.S. and worldwide over the past five years.
- Establishment of more than 2,000 regeneration plots for seed production of vegetable germplasm to distribute and replenish stocks over the past five years.
- Cryopreserved apple and tart cherry accessions and storage and backup of high-quality vegetable seed at National Center for Genetic Resources Preservation (NCGRP).
- Increased coverage of digital images and characterization data of apple, grape, tart cherry, tomato, onion, squash, and cabbage available on GRIN Global, improved efficiency of use of germplasm.



# North-Eastern Regional (NE-009)

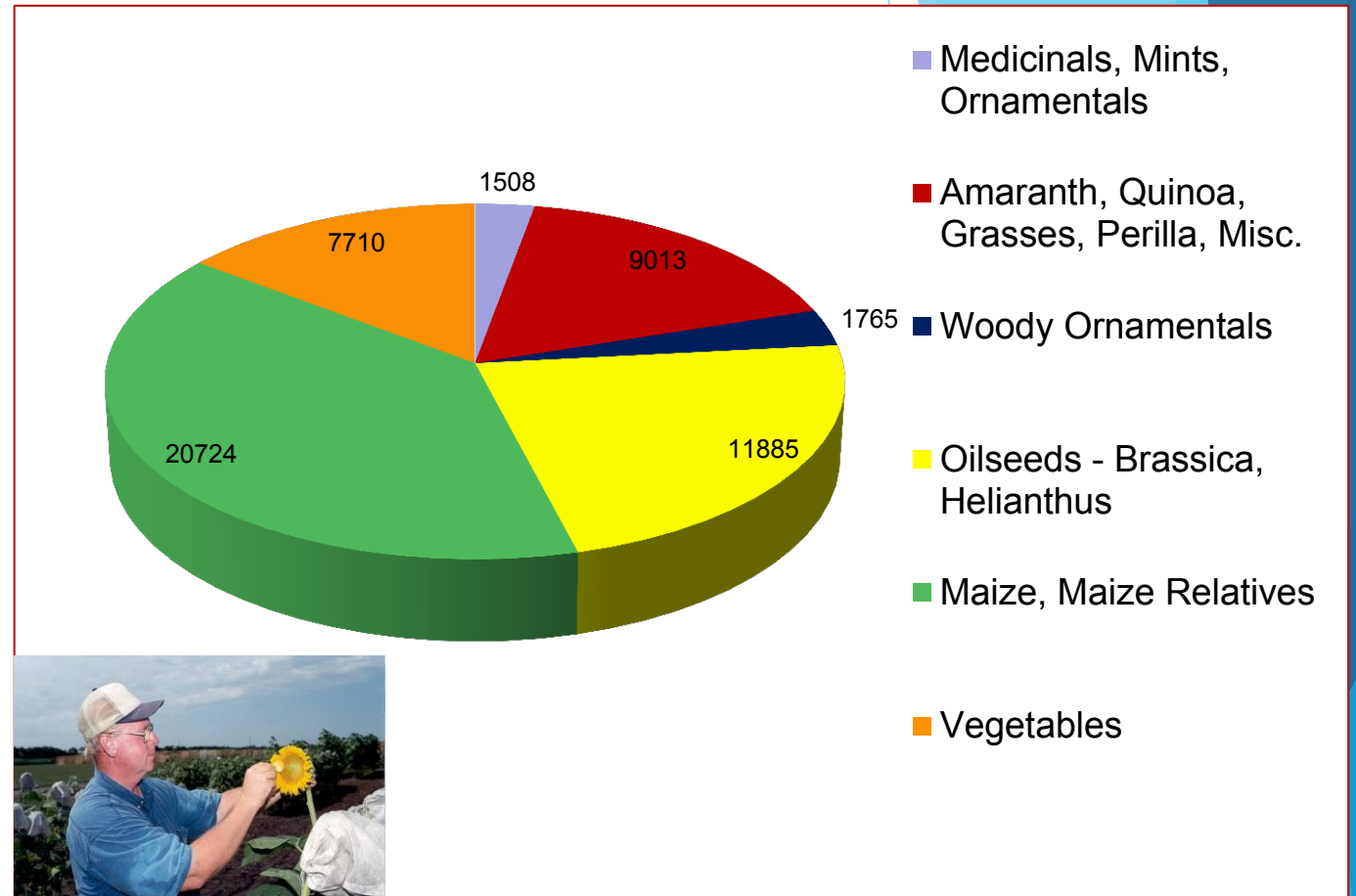
## Highlights:

- Biochemical characterization of the PGRU fruit and vegetable germplasm for exploitation by breeders for enhancement of quality for flavor, texture, and health beneficial components such as vitamins, minerals, and cancer-preventing compounds.
- Improved molecular genotyping (e.g. GBS) for accession identification and fingerprinting, phylogenetics, population genetics, and genetic mapping resulting in more efficient characterization and management of our collections (apple, grape, tomato, onion, winter squash and tomatillo).
- Enhanced knowledge and use of the germplasm by organic agriculture associations for varietal development via outreach activities funded through collaborative, competitive grants.



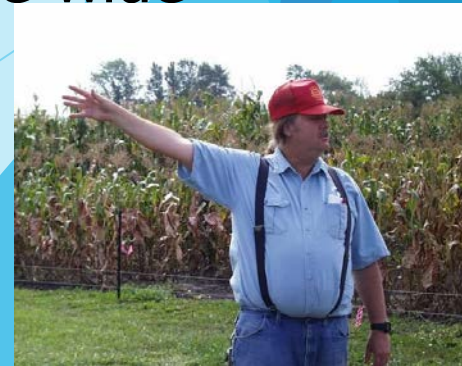
# North Central Regional (NC-007)

- Strategic collection development
- Maintain and provide high quality, true to type, well-documented germplasm for research and education objectives for primarily heterogeneous, heterozygous, out-crossing crops
- Pollinator insect management program to provide six insect species on demand to support regenerations
- Characterization and evaluation information to increase collection usefulness
- Provide technical expertise for completion and deployment of GRIN-Global
- Germplasm enhancement of maize (GEM)



# North Central Regional (NC-007)

- **Phenotypic and genetic characterization of 2800 Maize accessions**
  1. Evaluate the genetic diversity present at the entire USDA maize inbred lines collection
  2. Understand population structure across the genome and subgroups of germplasm
  3. Evaluate the use of the collection and GBS markers for genome-wide association studies
  4. Facilitate targeted use of the collection





# North Central Regional (NC-007)

## ➤ Recent collection establishment

1. Wild *Helianthus* Collection in California
2. Conserving Ash Tree Germplasm for Future Re-establishment (threatened by the emerald ash borer)
3. *Zea nicaraguensis* (ancient relative of corn, only one accession in the US)



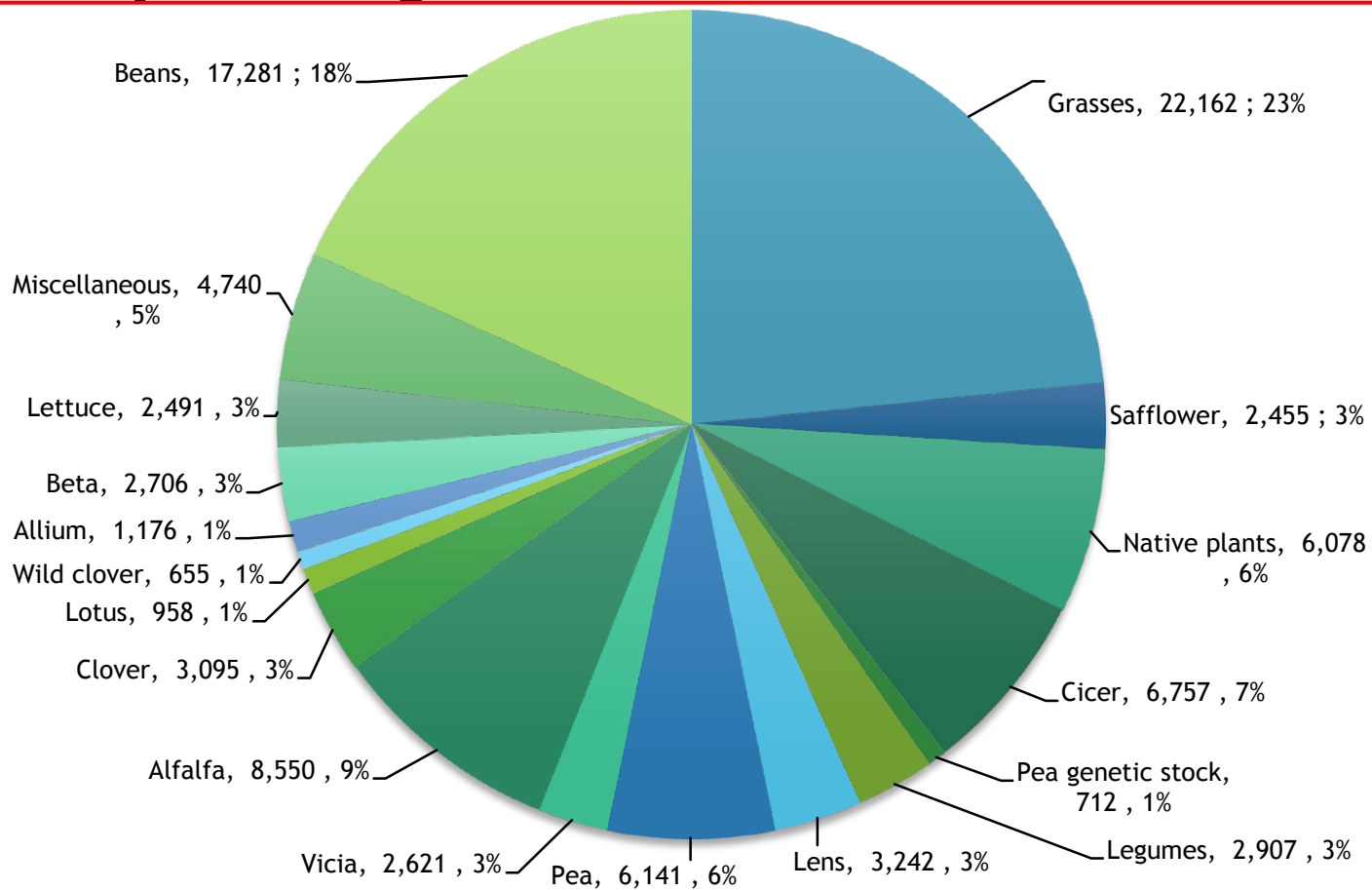
## ➤ Factors to consider for collection establishment

Among many factors to consider, the importance of the species and risk of habitat loss or extinction take priorities.



# Western Regional (W-006)

## Crops managed



## Five curatorial programs:

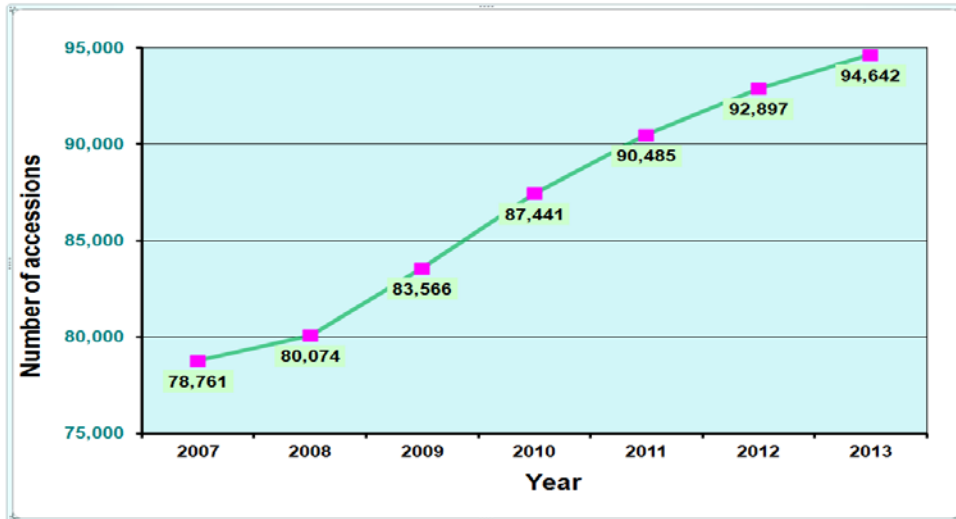
1. Agronomy and grasses (**Vicki Bradley**)
2. Beans (**Theodore Kisha**)
3. Cool season food legumes (**Clare Coyne**)
4. Temperate forage legumes (**Vacant**) located in Prosser, WA
5. Horticultural and miscellaneous crops (**Barbara Hellier**)

## Three research programs:

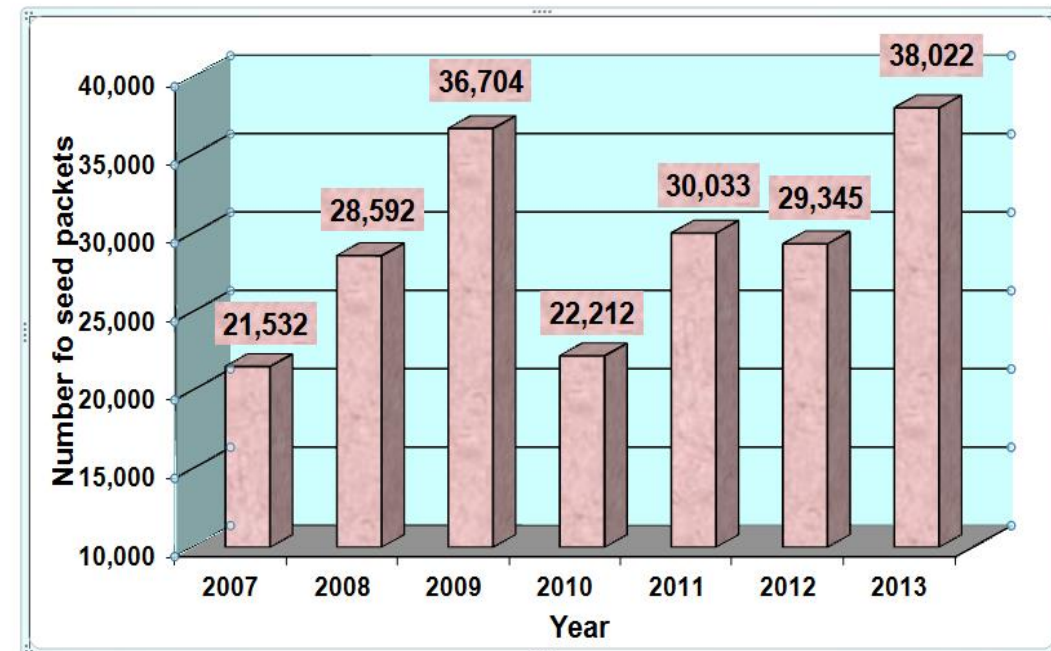
1. Agronomy (**Richard Johnson**)
2. Plant pathology (**Frank Dugan**)
3. Genetics (**Jinguo Hu**)

# Western Regional (W-006)

Changes of total number of accessions managed by WRPIS in the past eight years



Number of seed packets distributed in the past seven years





# Western Regional (W-006)

## Various germplasm management and research activities





# Southern Regional (S-009)

## Highlights:

- Maintained 92,201 accessions of 1,558 species with 88% available for distribution and 97% backed up at Ft. Collins.
- Distributed 32,958 accessions in 1,090 orders to users in 47 states and 40 countries in 2013.
- Germination tests, started in Griffin in 2002, have now been conducted on at least one inventory sample of all available accessions.
- ❑ New 4C cold storage room was completed and existing 4C room was converted to -18C. This increases -18C storage space from 1,061 to 1,897 sq ft. Almost 5,000 accessions were immediately moved into -18C. Currently, bulk seed of 80% of the Griffin collection is stored in -18C for improved seed longevity



# Southern Regional (S-009)

## Highlights:

- Characterized U.S. collections including:
  - ❖ Seed oil content and antioxidants in the peanut mini-core.
  - ❖ Seed oil content and fatty acid composition in accessions of *Macrotyloma*, *Teramnus*, *Hibiscus*, and castor species.
- Financial situation at the Griffin location has improved due to:
  - ❖ Increases in both federal and S-009 funding
  - ❖ Termination of two vacant positions (Vigna curator and technician).
  - ❖ Grants were received from the Sorghum Checkoff Program (\$100,000), Peanut Foundation (\$57,000), and Mars, Inc. (\$20,000).