



Preserving Cultivated Plants:  
The role of the National Plant Germplasm System

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# Overview

- Conservation context
  - related federal efforts
    - *ex situ* native plant diversity
    - collaborations
- USDA National Plant Germplasm System
  - scope and organization
    - cultivated & wild crop relatives
    - Germplasm Resource Information Network (GRIN)



# Seeds of Success

Interior-BLM

- 2001 national initiative for wildland native seed collection
  - research, development, conservation and restoration
  - RBG Kew Millennium Seed Bank
- 2008, new MOU and alliances
  - 10 Federal agencies
  - 265 non-federal partners, eg. APGA members
  - USDA-ARS NCGRP long term storage



Prairie restoration, Fermilab-DOE

# Plant Materials Program USDA-NCRS

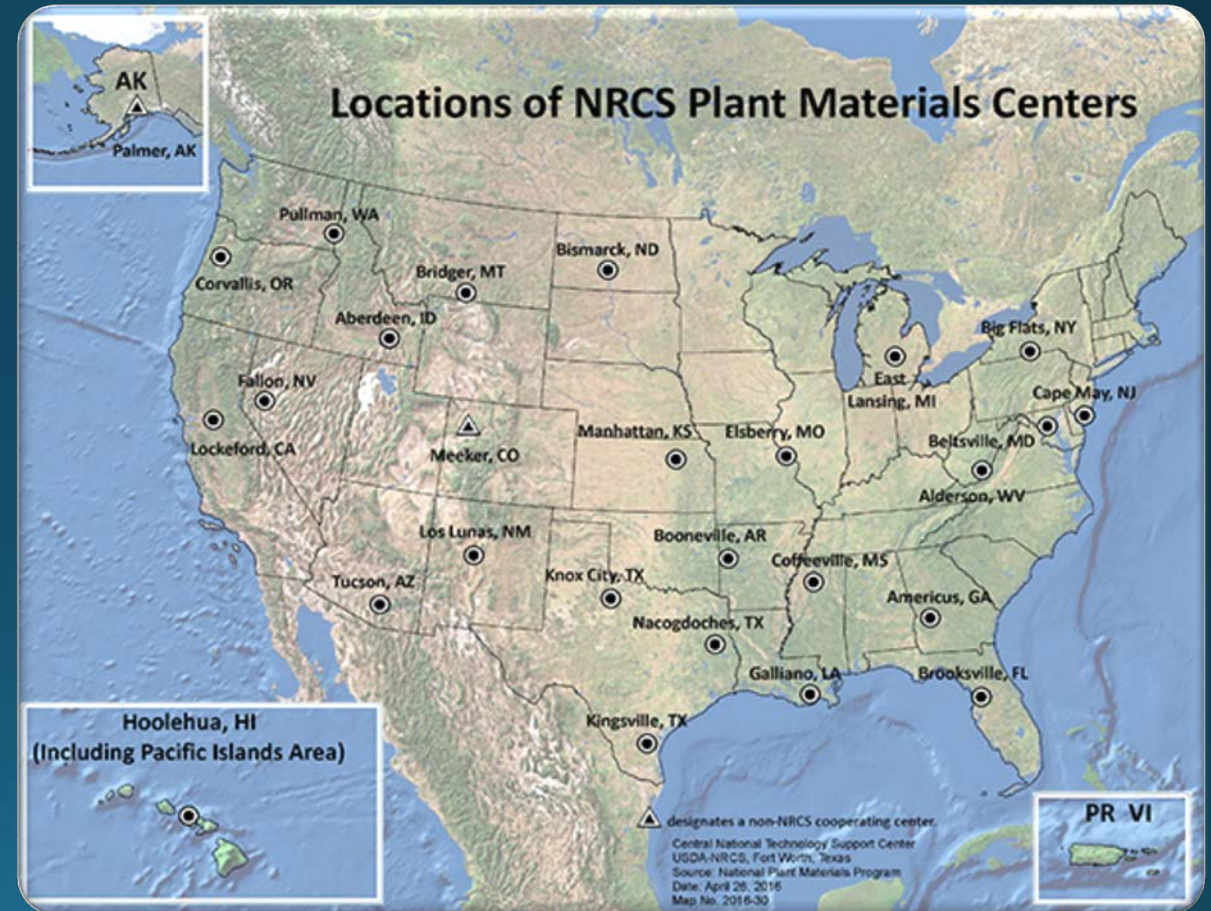
- 1935 Soil Conservation Service
  - soil erosion/conservation nurseries
    - exotic & native material
    - wildlife value
    - provenances, seed & clonal cultivars



Hugh Bennett, Soil Erosion Service, 1933 (USDA-ARS)

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  - coordinates 25 PMCs & mid-Atlantic germplasm
  - available through NPGS-GRIN



# National Forest System USDA-FS

- *In situ* and increasing *ex situ*
  - 1950's conversion of marginal farm land
    - 20 species, mostly conifer



*Pinus taeda* & farm conversion

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    - restoration, including threatened & herbaceous
    - genetic improvement programs



*Pinus palustris* & *Aristida stricta* habitat restoration



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seed preservation, NCGRP (USDA-ARS)

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  - 2011 FS establishes national tree conservation goals
    - at risk, range-wide collections
    - APGA & FS active partnership begins in *ex situ* conservation



*Quercus acerifolia* conservation

# National Genetic Resources Program USDA-ARS

- acquire, characterize, preserve, document and distribute to scientists, germplasm of all life forms important for food and agriculture



Thomas Jefferson, Monticello

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- ex. Y-12693 *Saccharomyces pastorianus*



Carlsberg Brewery, Copenhagen (Wikipedia)

# National Genetic Resources Program USDA-ARS

- acquire, characterize, preserve, document and distribute to scientists, germplasm of all life forms important for food and agriculture
  - ex. Y-12693 *Saccharomyces pastorianus*
- National Plant Germplasm System (NPGS)
  - 29 repositories, crop specific
  - NGR, coordinates effort
  - NCGRP, long term preservation



# NPGS Repositories & Regional PI Stations

1910 USDA Plant Introduction Stations

1947 Regional PI Stations: Ames, IA; Pullman, WA; Geneva, NY; Griffin, GA

1958 NCGRP, Ft. Collins, CO

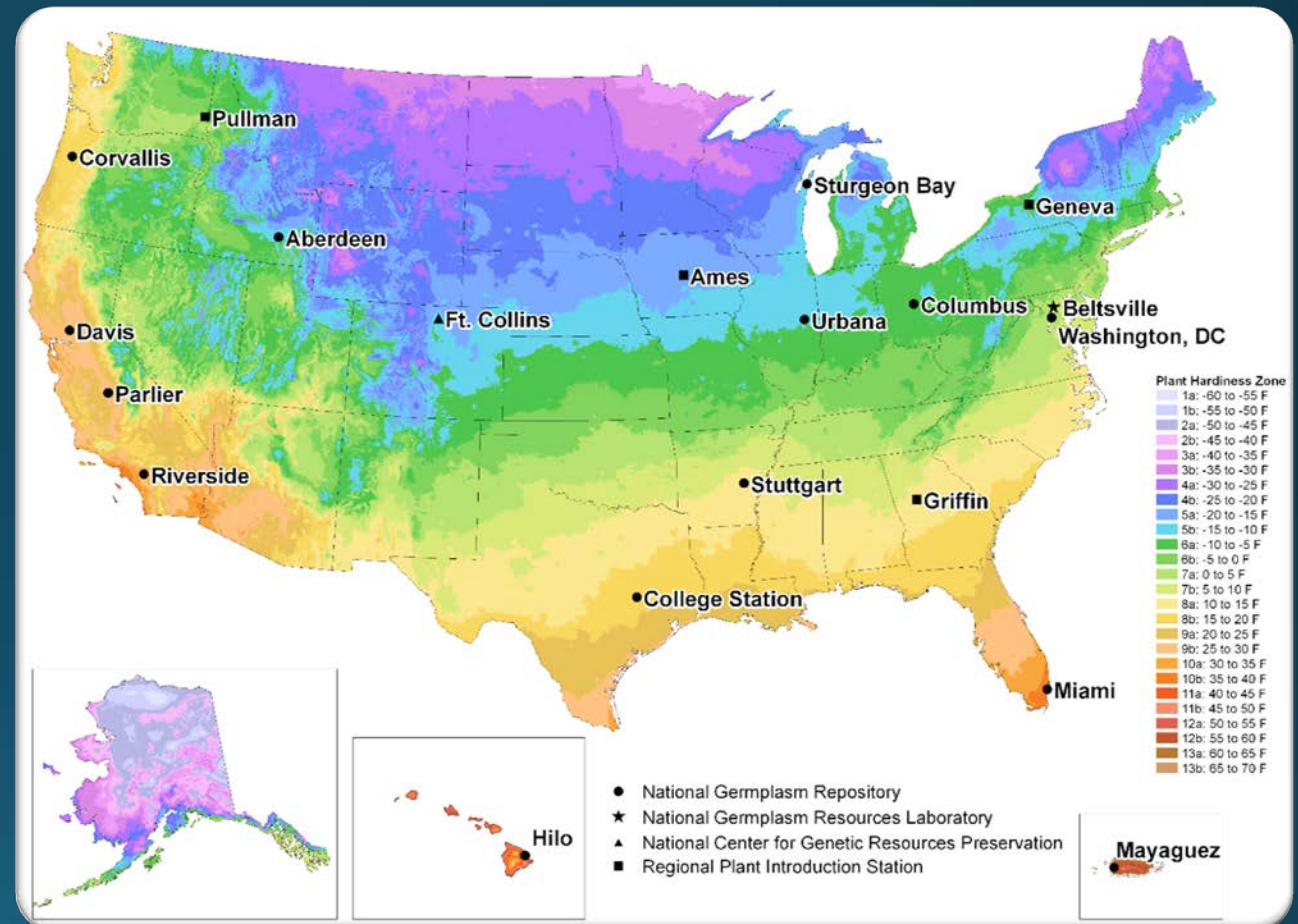
1980 Clonal repositories, fruit & nut:

Tropical and subtropical: Hilo, HI; Mayaguez, PR; Miami, FL; Riverside, CA

Temperate: Brownwood, TX; Corvallis, OR; Davis, CA; and Geneva, NY

1987 USNA, Washington, DC; temperate, woody ornamentals

1998 Ornamental Plant Germplasm Center, Columbus, OH; herbaceous ornamentals



# NCGR-Davis

(*Actinidia*, *Diospyros*, *Ficus*, *Juglans*, *Olea*, *Morus*, *Pistacia*, *Prunus*, *Punica*, *Vitis*)



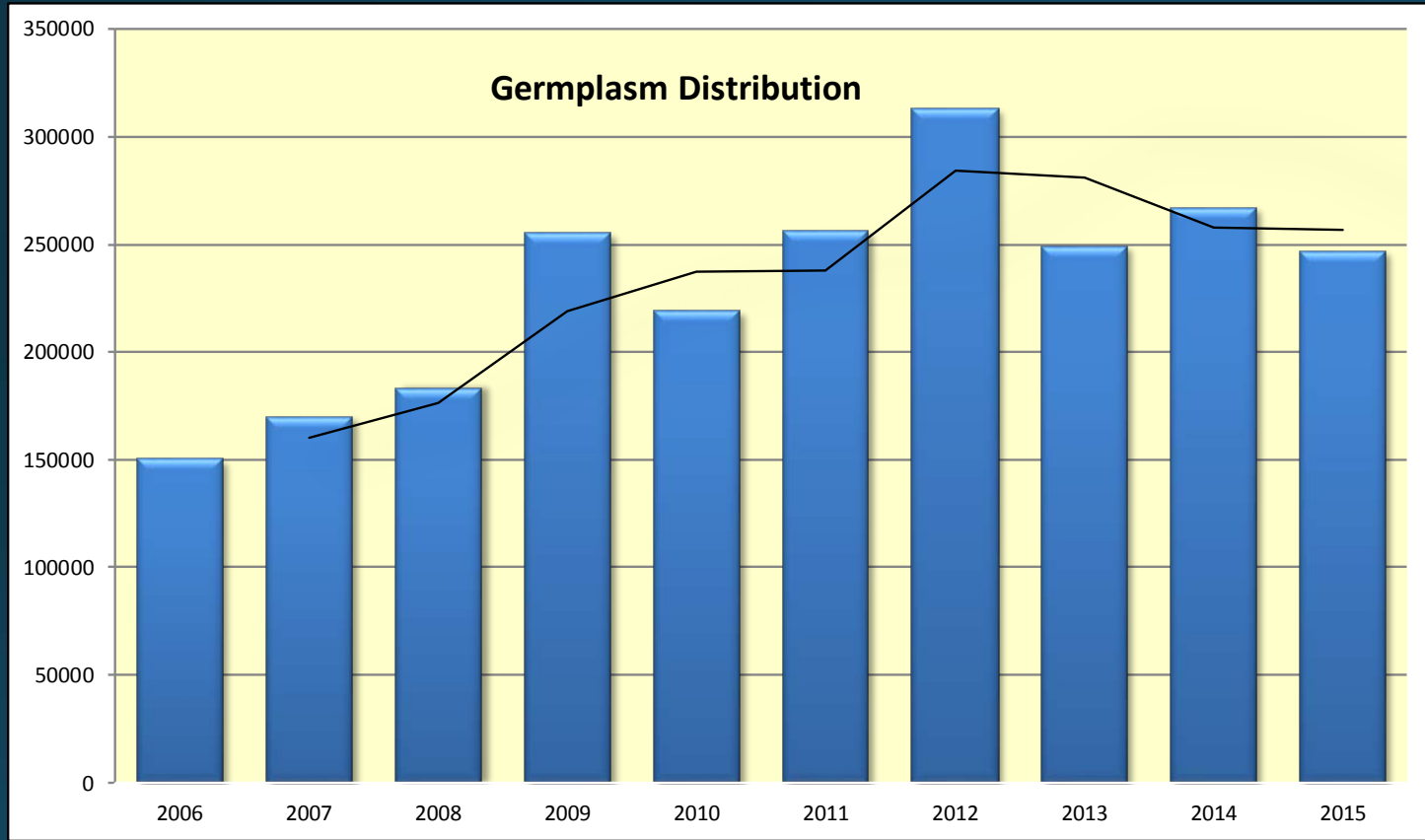
# NCGR-Davis

(134+ *Olea europaea* available, all but 6 cultivated/landraces; Arbequina)





# NPGS Distribution 2011-2015



- 1.3 million samples of NPGS Germplasm distributed to fulfill more than 42,000 germplasm orders.
- Requestors are selecting an average ca. 30 accessions per order.

(574,764 accessions)

# Germplasm Resources Information Network

Databases that maintain passport, characterization, evaluation, inventory and distribution data for national germplasm collections

GRIN-Global: user interface for this information, and requesting germplasm

Clonal woody ornamentals, historic

The screenshot displays the U.S. National Plant Germplasm System website. At the top, there are navigation links for 'Login', 'Register Now', 'No items in cart', and 'Contact Us'. The main header reads 'U.S. National Plant Germplasm System' with the GRIN-Global logo. Below the header is a banner image of various fruits and vegetables. A navigation menu includes 'Accessions', 'Descriptors', 'Taxonomy', 'View Cart', 'Reports', 'My Profile', and 'Help'. The current page is 'Accessions > General'. The search criteria are 'buxus sempervirens'. The search results table is as follows:

Group By:	Plant Name	Taxonomy	Origin	Material	Maintained By	Availability
Plant ID						
<input type="checkbox"/>	NGRL_937	GSMO 7-1	<a href="#">Buxus sempervirens</a>	Georgia	NA	Not Available
<input type="checkbox"/>	PI 79510	Aurea maculata	<a href="#">Buxus sempervirens</a>	United Kingdom, England	NA	Not Available
<input type="checkbox"/>	PI 79511	Aurea pendula	<a href="#">Buxus sempervirens</a>	United Kingdom, England	NA	Not Available
<input type="checkbox"/>	PI 79512	Handsworthii	<a href="#">Buxus sempervirens</a>	United Kingdom, England	NA	Not Available
<input type="checkbox"/>	PI 79513	Latifolia macrophylla	<a href="#">Buxus sempervirens</a>	United Kingdom, England	NA	Not Available
<input type="checkbox"/>	PI 79514	Latifolia maculata	<a href="#">Buxus sempervirens</a>	United Kingdom, England	NA	Not Available
<input type="checkbox"/>	PI 79515		<a href="#">Buxus sempervirens</a>	United Kingdom, England	NA	Not Available
<input type="checkbox"/>	PI 79516		<a href="#">Buxus sempervirens</a>	United Kingdom, England	NA	Not Available
<input type="checkbox"/>	PI 79517		<a href="#">Buxus sempervirens</a>	United Kingdom, England	NA	Not Available
<input type="checkbox"/>	PI 79518	Pyramidalis	<a href="#">Buxus sempervirens</a>	United Kingdom, England	NA	Not Available
<input type="checkbox"/>	PI 79519	Rosmarinifolia	<a href="#">Buxus sempervirens</a>	United Kingdom, England	NA	Not Available
<input type="checkbox"/>	PI 79520	Salicifolia	<a href="#">Buxus sempervirens</a>	United Kingdom, England	NA	Not Available
<input type="checkbox"/>	NA 72303	AGRU-32	<a href="#">Buxus sempervirens</a>	Georgia, Ajaria	Seed	NA
<input type="checkbox"/>	NA 72337	AGRU-66	<a href="#">Buxus sempervirens</a>	Georgia	Seed	NA
<input type="checkbox"/>	NA 72338	AGRU-67	<a href="#">Buxus sempervirens</a>	Georgia	Seed	NA
<input type="checkbox"/>	NA 72339	AGRU-68	<a href="#">Buxus sempervirens</a>	Russian Federation	Seed	NA
<input type="checkbox"/>	NA 72340	AGRU-69	<a href="#">Buxus sempervirens</a>	Russian Federation	Seed	NA

# Ornamental plant preservation

- USNA “woody ornamentals”
  - 1200+ woody genera
- American Public Gardens Association
  - Plant Collections Network
    - continent-wide effort
    - curatorial excellence
  - value of cultivated germplasm



National Boxwood Collection, USNA, 1995