The National Plant Germplasm System

www.ars-grin.gov/npgs

An introduction with special reference to
users in *small-scale, local, & organic production systems*

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Outline

Introduction: Where we are within USDA

- CSREES funding for organic and other research
- CSREES collaboration with ARS
  in the National Plant Germplasm System (NPGS)

NPGS locations and crops

How to get NPGS material
-- seeds, cuttings, other propagules

NPGS expertise in small-scale seed production

How to give input (comments) to the NPGS
-- and to CSREES and ARS

INTRODUCTION

Within USDA: Seven *'mission areas' (large groupings)*
Within mission areas: About 18 '*agencies'* all together

Mission area "***Research, Education, & Economics***" *(REE)*
includes four agencies:

•*Cooperative State Research, Education, & Extension Service* (CSREES):
Administers funding for research, education & extension at land-grant universities and other entities; and, provides leadership on strategic issues in these areas.

•*Agricultural Research Service* (ARS): In-house ag research

•*Economic Research Service* (ERS): In-house economics research

•*National Agricultural Statistical Service* (NASS):
Record keeping for agriculture

Note for reference:

The National Organic Program (NOP)
is in the Agricultural Marketing Service (AMS) agency,
within the ‘Marketing & Regulatory Programs’ mission area.

That is, NOP is in a *different* mission area
from CSREES, ARS, and the National Plant Germplasm System.

To review:

Within USDA: Seven *'mission areas'* , including:

| | |

Research, Education & Economics *(5 others)* ***Marketing & Regulatory Programs***

| |

| |

CSREES, ARS, ERS, NASS AMS

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National Plant Germplasm System NOP Audit Review & Compliance (+ others)

\

(verify Quality Mtg. Systems)

(think about?: small, local)

CSREES

Funding for organic and other research

Estimated total FY 2005 CSREES funding (*, **)

National Plant Germplasm System (NPGS)	**Organic agriculture** **	Classical plant breeding	Plant genomics, molecular genetics	Transgenics /genetic engineering
$ 3,506,256	**$ 9,480,000** (Integrated Organic Prog:$4,700,000)	$ 30,135,675	$ 23,080,194	$ 9,771,917

No shading	Hatch (formula) funds only
Light shading	Dedicated competitive grants programs, plus other sources
Darker shading	No competitive grants program available Hatch, Special Grants, other

FOOTNOTES to: CSREES funding for organic and other research

Estimated total FY 2005 CSREES funding (*, **) for selected activities

* Data sources: Organic ag estimate: CSREES USDA CRIS database calc's. for T. Bewick, CSREES NPL, IOP program manager; all other estimates, CRIS database calc's. for 2007 report to Gov't. Accountability Office (GAO).

** Includes the Integrated Organic Program, plus other CSREES funding for organic ag from programs such as Hatch (1862 land grant university research), Evans-Allen (1890 land grant university research), Sustainable Ag Research and Education (SARE), Small Business Innovation Research (SBIR), National Research Initiative (NRI), Special Research Grants, others.

*** Funding sources for other activities in the table:

NPGS: Hatch funds;

Classical breeding & genomics: any program listed (**);

Transgenic research: Special Research Grants, Hatch funds, SBIR, NRI.

How will FY 2008 CSREES funding compare to FY 2005?

≃ not much change

National Plant Germplasm System (NPGS)

An interagency collaboration of CSREES and ARS

The National Plant Germplasm System (NPGS) has responsibility to "**acquire, maintain, regenerate, distribute, document, characterize, and evaluate"** plant germplasm resources.

NPGS is a federal-state collaboration with over 50 years of service. Its beginnings trace back to Thomas Jefferson, and, later, the creation of USDA and the land-grant system in the late 1800's.

About 90% of NPGS funding comes through USDA-**ARS**, which has primary responsibility for management of the NPGS.

CSREES collaboration with ARS in the National Plant Germplasm System (NPGS)

CSREES provides significant funding to the NPGS, through Hatch Funds

Average over $3 million/yr for FYs 2000-2005

Decisions regarding use of Hatch funds (- and, hence, the level of CSREES funding for the NPGS -) are made by the SAES Directors

Consequently, CSREES funding supports SAES participation in planning and managing the NPGS.

NPGS benefits from technical advice organized by region and crop

By region:

SAES participation in the NPGS is organized in four ‘multi-state (or regional) research projects’, plus, a ‘national research support project’.

By crop:

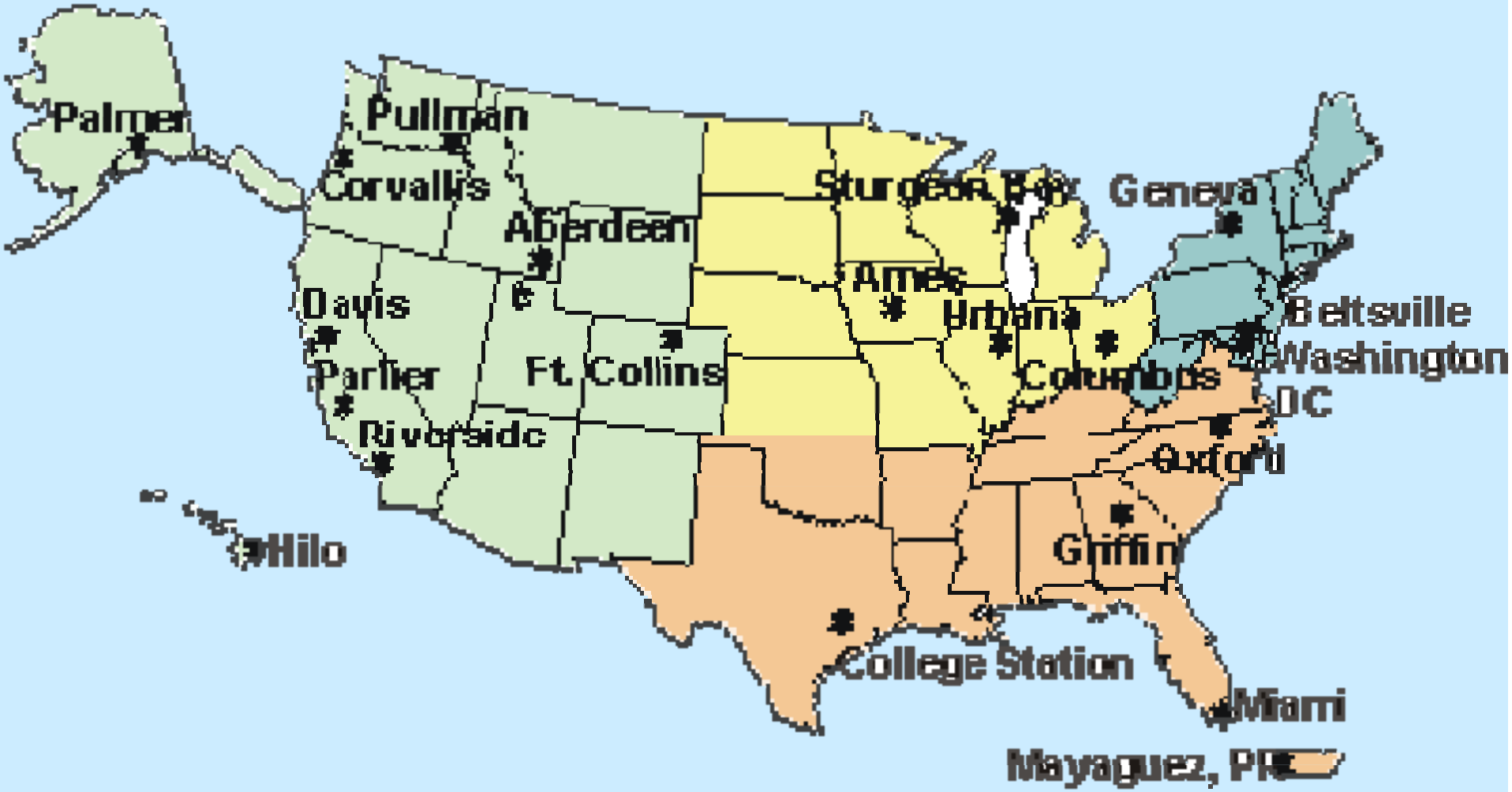
Over 40 different Crop Germplasm Committees (CGCs)
Convened by ARS

CGCs include SAES and ARS scientists and other public and private sector members, who serve based on their expertise in the particular crop.

National Plant Germplasm System

Locations and Crops

National Germplasm Repositories



The National Plant Germplasm System

Contains about 481,558 different accessions
from about 12,459 species

"Accession":
Curator's term for a type, or variety, of the item collected
(e.g., in the NPGS, a type of seed)

Each accession in the NGPG is unique
Identified by its own PI # = plant introduction number.

NPGS annually distributes
about 120,000 samples
to researchers worldwide.

NPGS regional collections

Northeast (NE-9) Geneva NY

Tomato, onion, selected crucifers, celery, winter squash, radish, other vegetables, buckwheat, apple, grape, and cherry. Approx. 11,800 accessions.

North Central (NC-7) Ames IA

Maize, sunflower, root and bulb vegetables, forage and turf grass, cabbage family, herbaceous ornamentals, woody landscape plants, leafy vegetable, cucurbits, clover, special purpose forage legumes. Approx. 84,100 accessions.

Southern (S-9) Griffin GA

Capsicum (peppers), clovers, special purpose forage legumes, cucurbit, warm season turf grass, peanut, sorghum, sweet potato, cowpea, vegetables (okra, pepper, watermelon, squash, eggplant, gourds), mung bean, guar, winged bean, bamboo, castor bean, sesame, pearl millet. Approx. 47,800 accessions.

Western (W-6) Pullman WA

Forage and turf grasses, beans, pea, lentil, chickpea, fava bean, lupine, lettuce, safflower, onion relatives, and forage legume crops, some ornamental and medicinal species. Approx. 72,400 accessions.

Crop-specific collections

Wheat, oats, rye, barley, rice,	Aberdeen ID
Citrus, date palm,	Riverside, CA
Soybeans,	Urbana IL
Berries, small fruits,	Corvallis OR
Arctic crops,	Palmer AK
Subtropical/tropical crops,	Miami FL, Mayaguez PR, and Hilo HA
Arid land crops,	Parlier CA
Ornamentals,	Columbus OH and Washington DC
Tree nuts/tree fruits,	Davis CA; Brownwood/Somerville, TX
Potatoes (NRSP-6),	Sturgeon Bay WI

Long-term emergency backup samples of everything

National Center for Genetic Resources Preservation, Fort Collins, CO

Coordination office and GRIN database

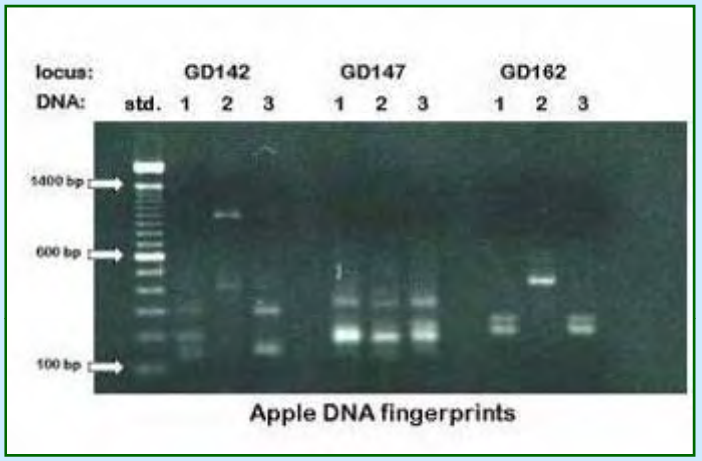
National Germplasm Resources Laboratory, Beltsville, Maryland

Typical scenes at an NPGS repository site

Seed storage, propagation, pollination, seed cleaning

Typical scenes at an NPGS repository site

DNA analysis for identifying and characterizing accessions



Apple DNA fingerprints

Typical scenes at an NPGS repository site

Tree crop collections

HOW TO GET NPGS MATERIAL

~ Seeds, cuttings, or other types of propagules ~

Free -- to anyone conducting *bona fide* ('good faith') research
e.g. **testing** small samples (± 50 seeds, or a few cuttings)
in search of types of seeds/plants that can help solve a problem or create an opportunity

Not: "free seed" for planting a crop

In return *(→ optional ←) (but encouraged and very helpful)*:

***Feed-back** to NPGS !*
***information** on your observations and results (data)*
Info becomes part of public database, helps curator and other users

Consider donating samples of any unique seeds you may have
Include information about the seed's source, name(s), attributes
The seeds will be conserved and available to others

If the NPGS samples you receive
turn out to be of value to you or users:

Multiply the seed of useful varieties

Use for planting, breeding, or sale to other users

NPGS seeds are “no strings attached”

As of 1 Jan 2007

International Treaty on Plant Genetic Resources for Food & Agriculture ("IT")

Rationale: Developing countries desire revenue from their germplasm
"Rio" Biodiversity Treaty (1992) system for germplasm exchange = not practical

The IT creates an agreed-upon **international system** for sharing germplasm;
A % of any commercial revenue goes to a trust fund for developing countries.
Includes revenue from use in breeding

Seeds newly entering the NPGS <u>from international sources</u>
will carry IT conditions for access:
Standard Material Transfer Agreement (SMTA)

Seeds that come with SMTA must be distributed with SMTA

NPGS is setting up a system to handle new international accessions w/SMTAs

SMTAs will *not* apply to seeds that are:

- in the NPGS collection pre-Jan 1, '07 *and* distributed within U.S.;
- or, received from *and* distributed within U.S.
- or, crops *not covered* by the IT (soybeans, tomatoes)

NPGS did not and does not charge any user for seeds distributed
SMTA conditions are international obligation, not an NPGS charge

To order seed on-line: use GRIN, the NPGS database

GRIN: ‘Germplasm Resources Information Network’

ARS staff continually improve GRIN user interface
(you should have seen it in 1970’s!)

Crop Curators can be contacted to discuss
which accessions (PIs, seeds) might be good to try

List of curators:
see NPGS website

www.ars-grin.gov/npgs

GRIN database contacts:
mark.bohning@ars.usda.gov
sharon.stern@ars.usda.gov

To Search GRIN

From the NPGS website (www.ars-grin.gov), click ‘Plant Germplasm’

Then ‘Search GRIN’

Then ‘Accession Area Query’

Then - depends on what you are looking for and what information you know...

- If know the Variety Name you are looking for use the area marked "SIMPLE QUERY"
- If only know the Common name (tomato) or Genus species (Lycopersicon esculentum) use the "TAXONOMY" search area under Complex query
- If looking for something very specific - (late blight disease resistance), use "TEXT SEARCH" area at the top and type in "late blight" or whatever you are looking for

OSA can request a demonstration of GRIN .

Directly as received from NPGS,
seed may not be immediately organically-certifiable

Depends on what the curator had to do
to preserve and multiply the many different accessions

May need to grow first year on a transition plot

This intermediate function
may be a role for commercial organic seed producers
or cooperation with public researchers or extension

NPGS EXPERTISE

IN SMALL SCALE SEED PRODUCTION

Small-scale seed production, cleaning, and storage
for many different types of seeds

This expertise can be shared, if resources are available

Example from NE region

- Public Seed Initiative (PSI) (2002-2005)
  supported by CSREES IFAFS grant
- Organic Seed Partnership (OSP) (2005-present)
  supported by CSREES OREI grant

Public Seed Initiative Cooperators:

NPGS –NC Region (ARS/USDA)
Cornell University
Northeast Organic Farming Association;

Organic Seed Partnership Cooperators:

NPGS –NC Region (ARS/USDA)
Cornell University
Northeast Organic Farming Association,
Oregon State University
West Virginia State University
Alcorn State University
UC-Davis
New Mexico State University

Funding: CSREES/USDA

Mobile Seed Processing Unit

Seed Production

- Community Seed Days
  - Overview of Seed Production, Safety, Step-by-Step Rundown of Seed Production Equipment, Hands-On Training
  - Equipment left at host farm for a week – month

Seed Production

- Areas in Northeast where there has been a seed production workshop, demo, community seed day or lecture from 2002-2007

Participatory Plant Breeding

- Green Finger Cucumber–multi-disease resistant
- Sweet Reba – Bush-habit acorn squash
- Romulus – Powdery Mildew Resistant (PMR) green zucchini

“Sweet Reba”

“Romulus”

Participatory Plant Breeding

- Continuing Additional Projects:

Large mildew resistant Butternut with high sugars and carotenes

Novel Type: Bi-color butternut

HOW TO GIVE INPUT TO THE National Plant Germplasm System NPGS:

Through the Crop Germplasm Committees

(link from www.ars-grin.gov/npgs)

To give input about GRIN:

GRIN database contacts:

mark.bohning@ars.usda.gov; sharon.stern@ars.usda.gov

HOW to GIVE INPUT to CSREES

1. Serve as grant review panel member:
   email to newreviewer@csrees.usda.gov ***-- and--***
   Call or email the National Program Leader (NPL)
   E.g. IOP, SARE, SBIR, specific NRI sections
   e.g. managed ecosystems, community food systems
2. Comment on Requests for Applications (RPAs) for grant programs
3. Listening sessions
4. Stakeholder input page:
   www.csrees.usda.gov/business/reporting/stakeholder.html
5. Submit stakeholder input by mail or email:
   Policy, Oversight, & Funds Management Staff
   Office of Extramural Programs, USDA-CSREES
   1400 Independence Avenue, SW, Stop 2299
   Washington, DC, 20250-2299;
   RFP-OEP@csrees.usda.gov

HOW to GIVE INPUT to ARS

1. Serve as a Scientific Quality Review panel member: contact:

Office of Scientific Quality Review (OSQR), Peer Review Coordinator

osqr@ars.usda.gov
http://ars.usda.gov/osqr/reviewer.htm

2. ARS stakeholder listening sessions
(for dates, contact OSQR)

1. Joint CSREES/ARS stakeholder listening session: planned;
"stay tuned" for date

Conclusions

•CSREES and ARS are among USDA agencies with programs of interest to organic agriculture. They are in different ‘mission areas’.

•CSREES funds organic and other types of agricultural research, education, and education

• State ag experiment stations and CSREES collaborate with ARS in funding and managing the ***National Plant Germplasm System*** **(NPGS)**

• ARS has primary responsibility for funding and managing the NPGS

• Four main regional NPGS sites, advised by technical committees

• Over one dozen additional NPGS locations and collections

• Over 40 public-private Crop Germplasm Committees

(Continued)

Conclusions

- In the entire NPGS, about 481,500 accessions at about 20 locations
- NPGS distributes seed to users for research /testing (not as crop planting seed) – about 120,000 samples/yr
- NPGS values receiving data (information) and feed-back from seed recipients
- NPGS has expertise in small-scale seed production, processing, and storage. This expertise can be shared if there is interest and resources
- Several effective ways that groups or individuals can provide comments and input to the NPGS and the funding /managing agencies CSREES and ARS

The National Plant Germplasm System

End