USDA/ARS PROGRAMS IN PLANT GENETIC RESOURCES

United States Department of Agriculture • Agricultural Research Service

Agricultural Research Service

- USDA's intramural research agency
- 22 National Programs
- 1,100+ research projects
- FY06 budget: $1.1 billion
- 8,000+ employees
- 2,000+ scientists
- 100+ laboratory locations
- Partnerships with other Federal agencies, universities and industry

ARS National Programs

Animal Production

- Food Animal Production (101)
- Animal Health (103)
- Veterinary, Medical, and Urban Entomology (104)
- Animal Well-Being and Stress Control Systems (105)
- Aquaculture (106)

Natural Resources

- Water Quality & Management (201)
- Soil Resource Management (202)
- Air Quality (203)
- Global Change (204)
- Rangeland, Pasture & Forages (205)
- Manure & Byproduct Utilization (206)
- Integrated Agricultural Systems (207)
- Bioenergy & Energy Alternatives (307)

Crop Production

- Plant Genetic Resources, Genomics and Genetic Improvement (301)
- Plant Biological & Molecular Processes (302)
- Plant Diseases (303)
- Crop Protection & Quarantine (304)
- Crop Production (305)
- Methyl Bromide Alternatives (308)

Human Nutrition

- Human Nutrition (107)
- Food Safety (animal & plant products) (108)
- Quality and Utilization of Agricultural Products (306)

NP301: Plant Genetic Resources, Genomics, and Genetic Improvement

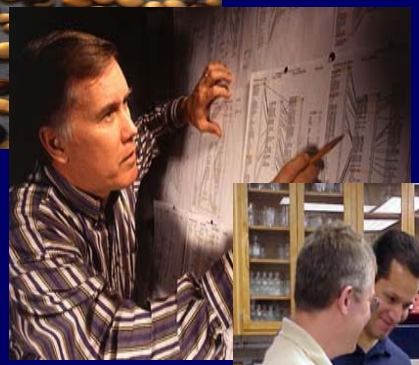
- Largest NP, with 180+ projects, and about $128 million gross annual budget.
- Conducted by about 300 scientists at more than 50 ARS locations.
- Vision: furnish genetic and bioinformatic tools, genomic information, and genetic materials to enhance US agricultural productivity and ensure high quality, safe supply of agricultural products.

NP301: Plant Genetic Resources, Genomics, and Genetic Improvement

- Focused on crop research, but included several beneficial microbe genetic resource projects.
- Emphasis on developing and maintaining scientific infrastructure (databases, genebanks).
- Applied research, such as genetic improvement, is emphasized.
- NP301 expanded during 2000-2005, resulting in many new projects.
- NP 301 Action Plan encompasses 3 Research Components and 10 Problem Areas.

Integrated research approach, with extensive collaborations/partnerships

Exploit untapped plant & microbial genetic diversity in NPGS Collections



Plant genomics, gene discovery, markers

Proteomics & Bioinformatics

Genome Databases

Genetic Enhancement and Breeding

NP 301 Research Component I: Genetic Resource Management

- Safeguard threatened genetic resources and associated information
- Conserve genetic resources
- Characterize genetic resources
- Evaluate genetic resources
- Provide genetic resources and associated information

USDA/ARS National Plant Germplasm System (NPGS)

- NCGRP: “base collection”; preservation research
- NGRL: GRIN database; exploration
- PGQO: germplasm quarantine
- Sites with “active collections”: acquire, maintain, regenerate, distribute, document, characterize, evaluate
- Associated research
- Crop Germplasm Committees; university, NGO, IARC, and industry cooperators

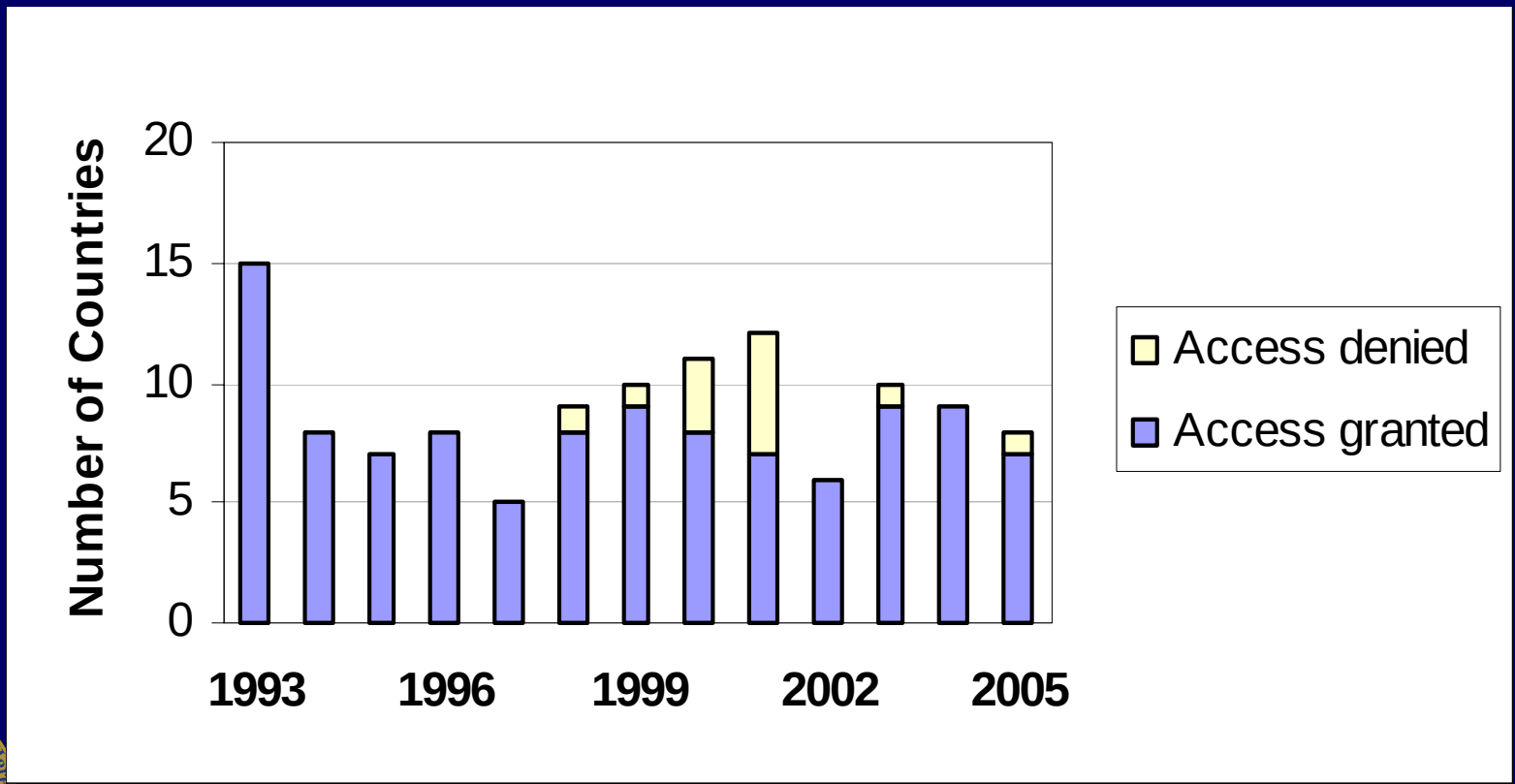
Foci for activities

- Major, minor, established and new crops
- Grains and oilseeds
- Vegetables and fruits
- Fiber, forage, timber, and feed
- Sugar, herbs, spices, and medicinals
- Ornamentals

Genetic Resource Management

- Acquisition: exchange among genebanks; plant exploration.
- Distribution: NPGS germplasm is distributed without restriction; 120-140,000 samples distributed annually: a large proportion of total available.

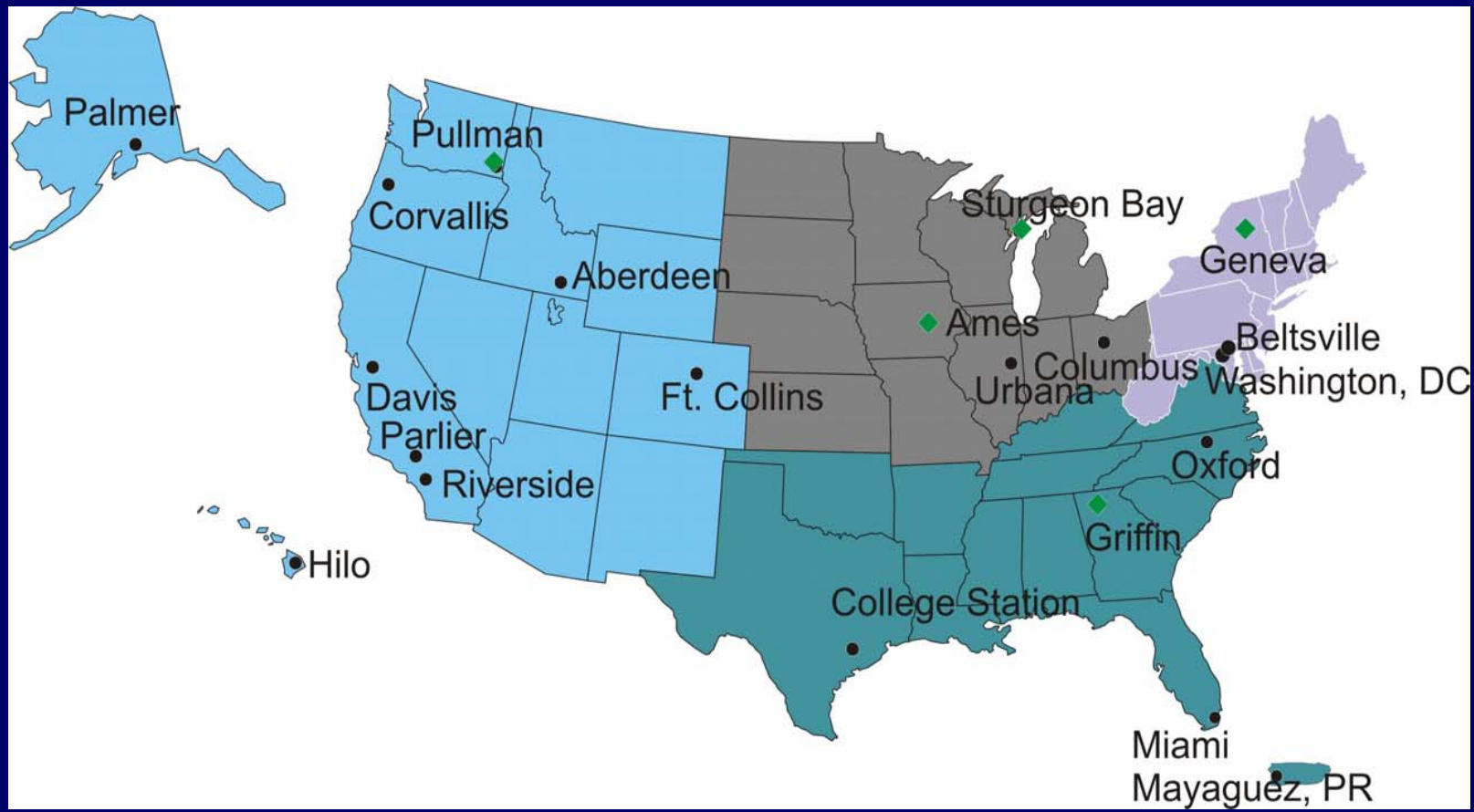
Access to Plant Genetic Resources for NPGS Plant Explorations 1993 - 2005



Genetic Resource Management

- Maintenance: for long-term conservation
- Regeneration: increase number, vigor, viability
- Characterization: assessment of genetic markers for management and research
- Evaluation: assessment of agriculturally-important traits
- Genetic enhancement: “base broadening”

National Plant Germplasm System Genebanks (green diamonds = five sites supported by off-of-the-top funding)



USDA National Plant Germplasm Budget