Minutes

Sweetpotato Crop Germplasm Committee
Annual Meeting
February 19, 2015

The Sweetpotato Crop Germplasm Committee (SPCGC) held its annual meeting via teleconference and webinar on February 19th, 2015. Kenneth Pecota (Chair, SPCGC) presided over the meeting that was attended by committee members Chris Clark (LSU), Craig Yencho (NCSU), Zvesdana Pesic-VanEsbroeck (NCSU), Victor Njiti (Alcorn State University), Kai-Shu Ling (USDA-ARS, Charleston, SC), D. Michael Jackson (retired-USDA-ARS, Charleston, SC), Howard Harrison (USDA-ARS, Charleston, SC) and ex-officios Gary Pederson and Bob Jarret from the Plant Genetic Resources Conservation Unit (USDA-ARS, Griffin, GA); Jorge Abad (USDA-APHIS, Beltsville, MD); Gary Kinard and Ruhui Li from the National Germplasm Resources Lab (USDA-ARS, Beltsville); Peter Bretting and Gail Wisler from the Crop Production and Protection division (USDA-ARS, Beltsville).

After brief introductions by everyone we began the meeting. The first agenda item was a discussion of the report from the National Germplasm Resources Laboratory presented by Gary Kinard (report attached). Highlighted was the pending retirement of nomenclaturist and taxonomist John Wiersema who will need to be replaced, and an update on GRIN Global. It is not live yet pending a security vulnerabilities evaluation. No new date for full implementation has been set. It is fully functional except for ordering. Next up was an update on sweetpotato virus research from Ruhui Li (NGRL) (report attached). Next generation sequencing was used to identify viruses raising several questions mostly regarding what is the meaning of finding small sequences using this technique? How do you account for viruses that have been incorporated into the plant genome? Jorge Abad considers it a helpful technique, but you still need to validate the viruses biologically. Do they induce disease? Next up was Gail Wisler for Peter Bretting (NPGS) with a Powerpoint report (attached) outlining the use of the system from 2000-2013 and budget information. In response to a question it was mentioned that approximately 2/3 of the usage is domestic. A question about exploration in Latin America was that it has become difficult. While there is willingness among scientists and curators to share material, national laws around consent and concerned environmental groups has made exchange difficult. Next up was a report from Bob Jarret (PGRC) on the status of the *Ipomoea* collection (report attached). A question was asked about the backup of the collection in Fort Collins in cryopreservation. The focus has been on lines that don't do well in tissue culture with the plan to eventually back up the entire collection of 756 clonally propagated lines. They are currently adding 25 lines per year. About 80% of the US repository material is also in the CIP collection. Next up was Jorge Abad (PGPQ) with a quarantine update (report attached). Anyone interested in bringing in material should contact Jorge with the request and donor information. The final report was from Mike Jackson (USVL) and was a progress report on the Crop Germplasm Evaluation grant (report attached). Over the last 3 years 737 sweetpotato accessions have been grown

out, and descriptive data and photo's taken, and samples freeze dried for DNA extraction. All the data collection has been done and is being prepared for entry into GRIN. The characterization work is being continued by Mike Jackson, despite his recent retirement.

After the reports there was discussion regarding doing a Crop Vulnerability Statement. There is now a standardized, though not rigid template to follow, and examples that have been done for other crops. The information will be used by various agencies in determining what crops are most vulnerable and in need of work. Various CGC members agreed to help work on the report and a meeting regarding it will be held in conjunction with next years National Sweetpotato Collaborators meeting to review progress.

Chris Clark mentioned to the group that sweetpotatoes are now officially part of the Clean Plant Network and that it will interface well with this group for pathogen work.

A general consensus was reached regarding the format of this annual meeting, that a teleconference works well, but that every few years there should be face to face meetings so new members can meet everyone involved. The meeting was adjourned.

Respectfully submitted by

Kenneth Pecota, Chair
Sweetpotato Crop Germplasm Committee
April 3, 2015

USDA-ARS National Germplasm Resources Laboratory
Beltsville, Maryland
2015 Report to PGOC, RTACs and CGCs

The National Germplasm Resources Laboratory (NGRL) supports the acquisition, introduction, documentation, evaluation, and distribution of germplasm by the National Plant Germplasm System (NPGS) and other components of the U.S. National Genetic Resources Program (NGRP). The Laboratory is comprised of the Plant Exchange Office (PEO), the Database Management Unit (DBMU), and the Plant Disease Research Unit (PDRU).

Plant Exchange Office

Plant Exploration and Exchange Program

- The PEO supports the collection of germplasm for the NPGS through the management of a Plant Exploration and Exchange Program. Guidelines for developing plant exploration and exchange proposals will be distributed to CGC chairs in February 2015. Proposals must be endorsed by the appropriate CGC or other crop experts.
- Ned Garvey retired June 30, 2014. Recruitment for his replacement is pending. The position is being revised to provide additional expertise to support GRIN-Taxonomy.
- The deadline for submitting proposals for explorations or exchanges to be conducted in FY 2016 is July 24, 2015.
- All foreign explorations supported by PEO comply with the Convention on Biological Diversity on access and benefit sharing related to genetic resources. Prior informed consent to collect genetic resources is obtained from the host country before the exploration. The PEO is involved in most requests to foreign governments for permission to collect, and negotiates the terms of agreements when necessary.

FY 2014 NPGS Plant Explorations

Target Crop	**Country**	**Principal Contacts**
Camelina and other crops	Armenia	G. Fayvush, A. Lexanyan, H. Hovhannesyan
Wild lettuce	Azerbaijan	A. Asgarov, N. Quliyev, M. Eldarov
Walnut and grape	Georgia	M. Aradhya, D. Kluepfel, D. Maghardze, Z. Bobokashvili
Kentucky coffeetree	United States (IN, IL))	J. Carstens, A. Schmitz
Chenopodium spp.	United States (UT, WY, AZ, NM, CO, NE, MN)	R. Jellen, P. Maughan
Ash	United States (ND)	J. Zeleznik
Ash	United States (AL, AR, MI)	J. Carstens, M. Scanlon

Wild potato	United States (AZ)	J. Bamberg, C. Fernandez, A. del Rio
Wild squash	United States (FL)	H.R. Kates
Spiraea alba and *Diervilla lonicera*	United States (IA)	J. Carstens, A. Schmitz, E. Malin
Betula nigra	United States (IA)	J. Carstens

Complementary Conservation of Crop Wild Relatives (CWR) in the United States

- A framework for collaboration between ARS and the US Forest Service (USFS) on the *in situ* and *ex situ* conservation of native CWR occurring on National Forest System lands has been published: http://www.fs.fed.us/wildflowers/ethnobotany/documents/cwr/FrameworkNativeCropWildRelativesOct2014.pdf

Conservation of cranberry genetic resources in the U.S.

- As a pilot project under the USFS-ARS framework, the Plant Exchange Office is collaborating with the USFS botanists on the conservation of the genetic resources of wild cranberry (*Vaccinium macrocarpon* and *V. oxycoccos*) on U.S. National Forests. Representative populations across the species' native ranges are being evaluated using standard protocols developed by the ARS and USFS to collect leaf tissue for DNA analysis, collect fruit and seed (when present), and prepare herbarium vouchers.
- Seed from all populations is sent to the ARS National Clonal Germplasm Repository in Corvallis, OR. Leaf tissue from all populations is sent to the ARS Cranberry Genetics and Genomics Laboratory in Madison, WI, for molecular analysis of inherent genetic variability. Herbarium vouchers are sent to the U.S. National Arboretum in D.C.
- The goal is to identify wild cranberry populations on National Forests that are the highest priority for designation as *In Situ* Genetic Resource Reserves (IGRRs). Long-term management plans will be implemented by the USFS to monitor, manage, and safeguard the security of the populations. Germplasm will be conserved and distributed by the NPGS. The evaluation will be extended to populations on land under ownership of other public or private entities in the future.

GRIN Taxonomy for Plants

- GRIN Taxonomy provides online current and accurate scientific names and other taxonomic data for the NPGS and other worldwide users. This standard set of plant names is essential for effective management of ARS plant germplasm collections, which now represent ca. 14,895 taxa. A broad range of economically important plants are supported by GRIN nomenclature, including food or spice, timber, fiber, drug, forage, soil-building or erosion-control, genetic resource, poisonous, weedy, and ornamental plants.
- GRIN Taxonomy includes scientific names for 26,979 genera (14,282 accepted) and 1,375 infra-genera and 104,076 species or infra-species (61,330 accepted) with over

64,000 common names, geographical distributions for 53,909 taxa, 447,298 literature references, and 30,892 economic impacts.

- GRIN Taxonomy includes federal and state regulated noxious weeds and federally and internationally listed threatened and endangered plants, with links to information on noxious weed and conservation regulations to ensure unimpeded interstate and international exchange of plant genetic resources.
- Since 2008 a project to provide thorough coverage in GRIN-Taxonomy of wild relatives of all major and minor crops has been underway. We have completed our initial work on 135 major and minor crops, and an interface to query these data in various ways has been developed (www.ars-grin.gov/~sbmljw/cgi-bin/taxcwr.pl) and is now placed on the GRIN Taxonomy public site. We invite feedback from NPGS curators and CGC members for those CWR classifications already developed.

Facilitation of Germplasm Exchange

- PEO assists NPGS personnel and other scientists with acquiring germplasm from scientists, foreign national and international genebanks, domestic and foreign explorations, and special projects and agreements. The PEO also helps to expedite the distribution of germplasm from the NPGS to foreign scientists and other international genebanks through a long standing collaboration with USDA-APHIS at Building 580, BARC-East.
- In 2014, germplasm for 798 public orders containing a total of 44,707 samples of NPGS accessions were shipped from Beltsville to individuals in 65 countries throughout the world for research and education. In addition, PEO facilitated the agricultural inspection of 21 arriving germplasm shipments containing accessions from 13 different foreign countries to researchers and curators at several NPGS sites in the U.S.

Crop Germplasm Committees

- The position that was occupied by the late Mark Bohning, which helps coordinate CGC activities, is still awaiting recruitment.
- Most committees continue to meet regularly and are active. Committees are urged to update their Crop Vulnerability Statements.
- A virtual meeting/web conference was held for CGC Chairs on November 20, 2014 with about 30 committees represented. Updates were provided on the activities of ARS and the NPGS, international issues related to plant genetic resource exploration and exchange, GRIN-Global, and the activities of the CGCs.
- NGRL also has a conferencing account that is available to the CGCs to host virtual meetings.

Database Management Unit

GRIN and GRIN-Global

- The DBMU develops and maintains information systems for the National Genetics Resources Program comprised of plants, animals, microbes, and invertebrates. The primary emphasis is on the plant GRIN and GRIN-Global that supports the NPGS.

- At the beginning of 2015, the plant database included:
  568,900 accessions representing 14,895 species and 2,383 genera
  2,011,410 inventory records
  1,848,225 germination records
  8,882,171 characteristic/evaluation records
  325,134 images
  1,672,037 distinct visits to the NPGS pages of GRIN in 2014, a 7% decline from 2013
- We are awaiting a security review of the version 1.9.3. GRIN-Global source code before converting from GRIN to GRIN-Global. We hope this will be completed early in 2015.
- A fully functional test version of the GRIN-Global public website can be found at: http://www.ars-grin.gov/npgs/gringlobal/webpages/publicwebsite.html. **However, germplasm requests are not being filled through this test public website until we make the conversion.**
- Comments, ideas and suggestions on GRIN-Global can be sent to the entire development team at feedback@ars-grin.gov.

Plant Disease Research Unit

- The PDRU conducts research to understand the biology of pathogens that infect economically important prohibited genera plant germplasm, including their etiology, detection, and elimination by therapeutic procedures. This project provides support to the APHIS quarantine programs and help facilitate the safe introduction, conservation, and international exchange of valuable plant germplasm.
- Two new visiting scientists have recently joined the pathology project: Dr.Mengji Cao (a recent post-doc at the University of California-Riverside) and Dr. Nouman Tahir (a recent PhD from Quaid-i-Azam University in Pakistan).

Key NGRL Contacts

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GRIN-Database Management Unit Technical Issues
Quinn Sinnott (Quinn.Sinnott@ars.usda.gov, 301-504-6072)

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Plant Disease Research Unit
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Dimitre Mollov (Dimitre.Mollov@ars.usda.gov, 301-504-8624)

Update on Sweet Potato Virus Research

Ruhui Li

USDA-ARS, National Germplasm Resources Laboratory, Beltsville, MD

Next generation sequencing (NGS) of small interfering RNAs (siRNAs) was assessed for the detailed identification and discovery of viruses infecting sweet potato. Seven viruses (four potyviruses, two geminiviruses and a crinivirus) were identified in a diseased plant and one virus (a geminivirus) in a 'healthy' control, respectively. Infection of these viruses in both plants is being confirmed by RT-PCR and/or PCR cloning. More tests will be done to ensure the NGS is reliable in plant quarantine indexing.

Mechanical inoculation of *Nicotiana benthamiana* is used to separate four potyviruses from the same disease plant, and only *Sweet potato virus 2* (SPV2) was transmitted. NGS data showed the virus concentration of SPV2 is the highest among all viruses, indicating the NGS data can be used to determine the virus concentration in infected plant. In addition, the distribution of siRNA size frequencies can be used to study the pattern of gene silencing induced by infection of a virus.

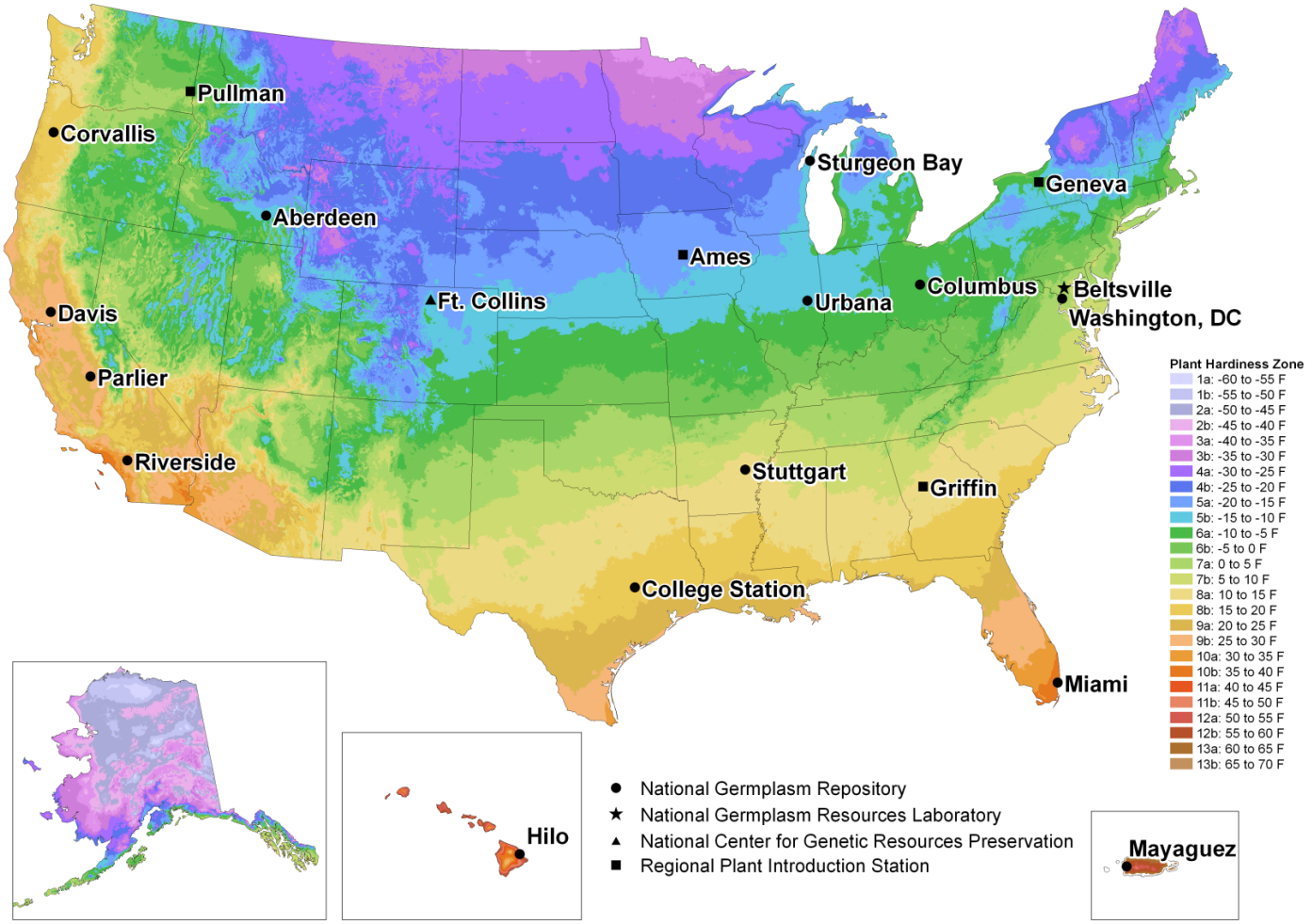
Both conventional and TaqMan real-time RT-PCR were developed for the simultaneous detection and differentiation of SPLV, SPVG and SPMMV. The mulitplex assays were evaluated using field samples to be specific, sensitive and reliable. It will be useful for rapid and reliable identification of these viruses in quarantine, certificate programs and virus surveys.

The National Plant Germplasm System: 2015 Status and Prospects

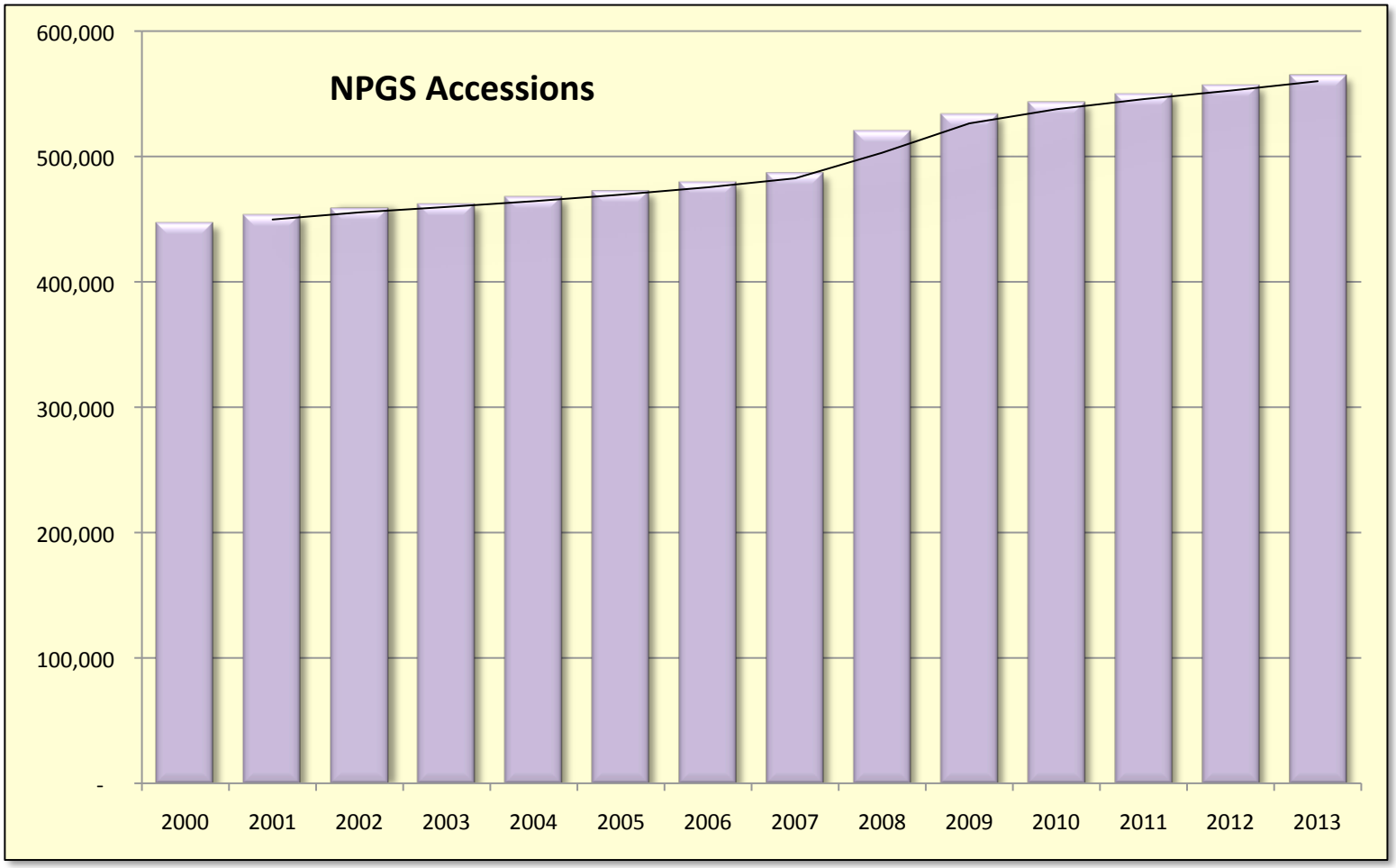
Peter Bretting

USDA/ARS Office of National Programs

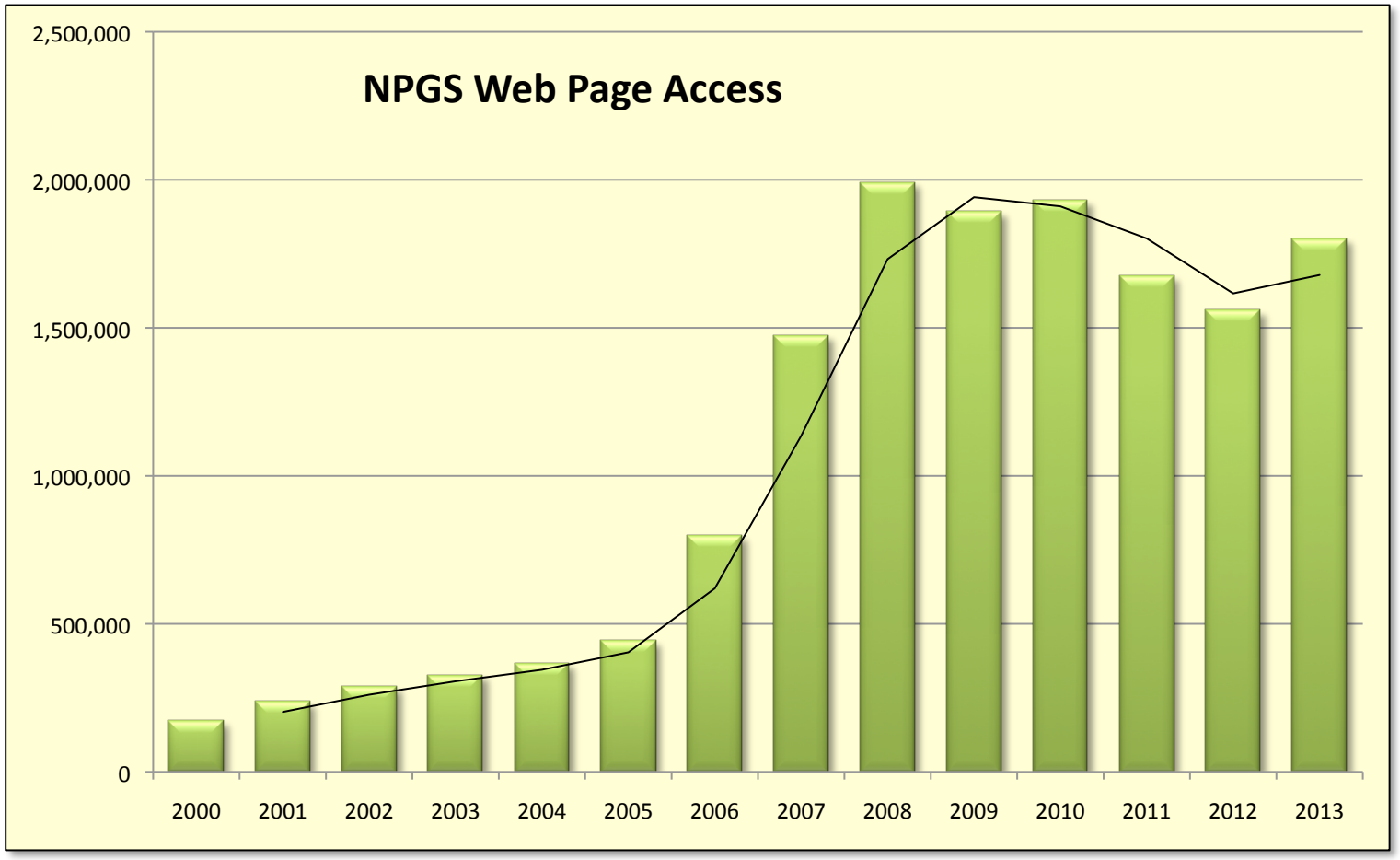
USDA National Plant Germplasm System (NPGS)



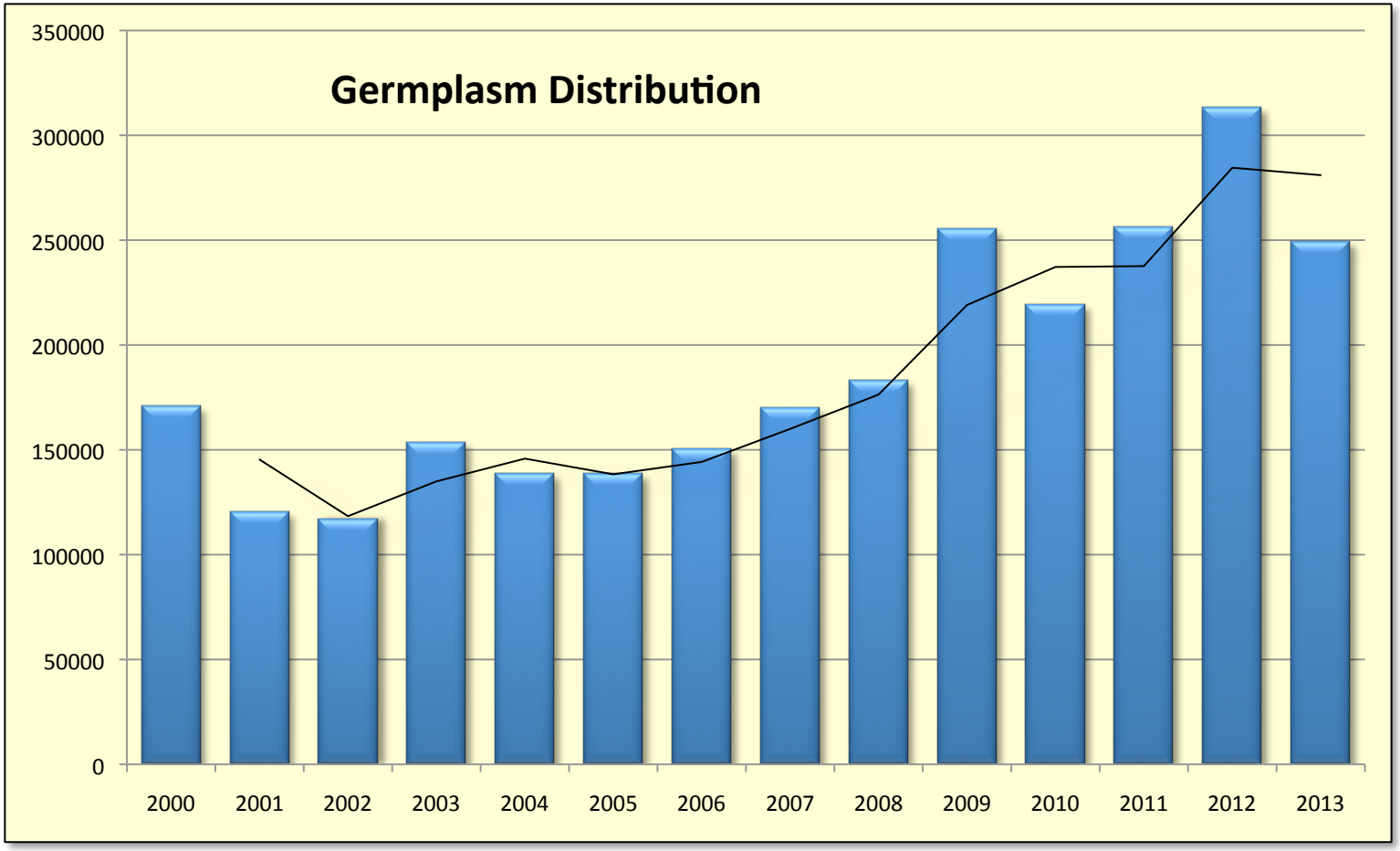
Number of NPGS Accessions 2000-2013



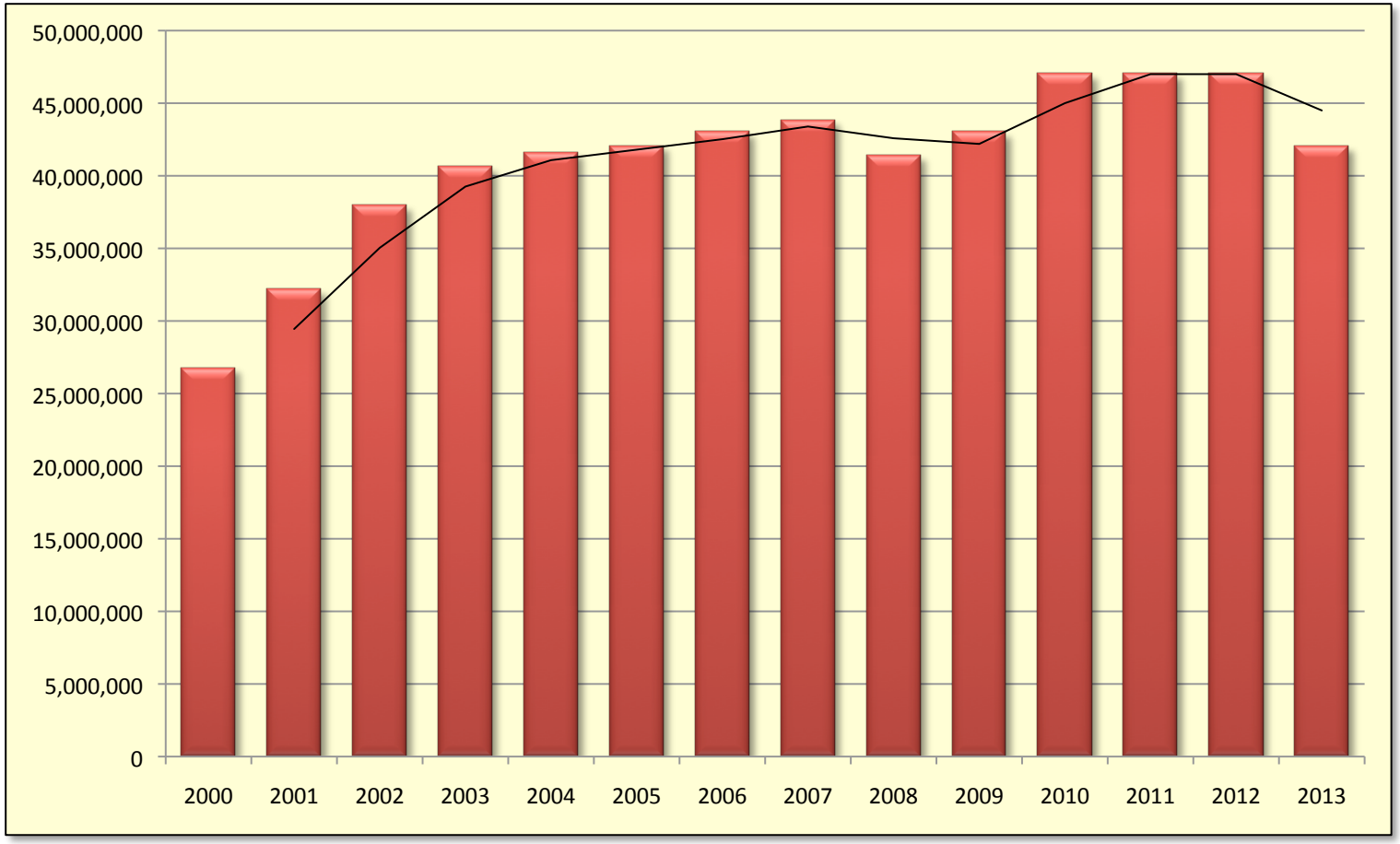
DEMAND FOR NPGS INFORMATION 2000-2013



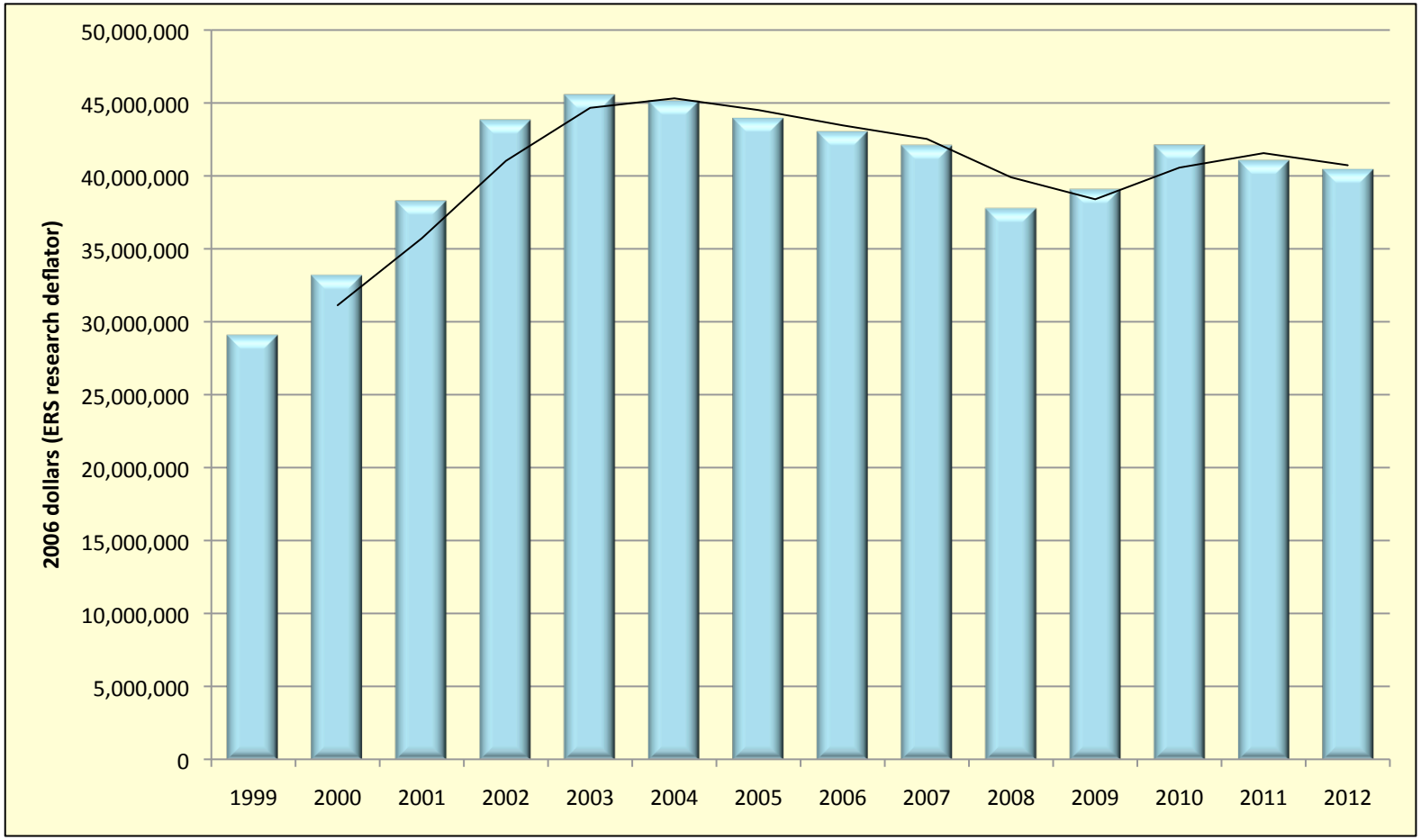
DEMAND FOR NPGS GERMPLASM 2000-2013



ARS National Plant Germplasm System budget 2000-2013



ARS National Plant Germplasm System Budget, Real, 1999-2012



Notable NPGS Developments

- **FY 2014 and FY 2015 budgets**
  - **NPGS budget increased by $2.6 million to $44.6 million in FY 2014. FY 2015 budget is essentially the same.**
- **FAO International Treaty on Plant Genetic Resources for Food and Agriculture**
  - **Seed industry advocates US ratification.**

Notable NPGS Developments

- **Stronger and more extensive international partnerships**
  - **Global Crop Diversity Trust: Developing international project for increasing the use of PGRFA (especially crop wild relatives), and global strategic plans for conserving numerous crops**
  - **PRC, S. Korea, Canada, Mexico, Colombia national genebanks: training at NPGS**

Notable NPGS Developments

- **NPGS staff changes**
  - **Retirements or resignations: M. Welch (Pullman), D. Dierig (Ft. Collins), F. Zee (Hilo), E. Garvey (Beltsville), G. Romano (Parlier), W. Yan (Stuttgart), N. Barkley (Griffin).**
  - **Position changes: S. Greene filled the vice-Ellis position at Ft. Collins, and T. Kisha filled the vice-Welch position at Pullman.**

2015 Report to the Sweetpotato CGC (for CY 2014)

Personnel: Personnel currently assigned to the project include Dr. R. Jarret and Ms. Sarah Moon.

Inventory: The current inventory of the *Ipomoea* collection can be viewed at www.ars-grin.gov.

The in vitro *Ipomoea batatas* collection currently includes 756 clonally maintained lines. In 2013, 19 accessions were placed back into tissue culture (from greenhouse-maintained plants). In 2014, eight of these 19 accessions were tested (via grafting) for SPFMV and SPVG. All were negative. Five additional clones are in the process of being tested.

Three virus-indexed clones of cv. GA Jet were received by the repository (from Plant Quarantine) in October 2014. Plant Introduction 566627/'Georgia Jet', the clone currently in the in vitro collection (denoted in the table below as 01119), was included among these. The following indexing results were provided by Jorge Abad. All three sources were tested and all were found to be negative per the following:

2014 Test Ipo						
Number	TC Poty 1 PCR	TC Poty2 PCR	TC Gemini PCR	TC Carla PCR	TC SPCSV-W qPCR	TC SPCSV-E qPCR
R-GA Jet	-	-	-	-	-	-
C-GA Jet	-	-	-	-	-	-
01119 (GA Jet)	-	-	-	-	-	-

The *Ipomoea* spp. (sweetpotato-related wild relatives) collection currently holds 461 accessions (combined seed and clonal).

Germplasm Regeneration:

- Eight accessions of various *Ipomoea* spp. (*I. trifida, I. ramosissima, I. tenuissima* and *I. triloba*) were increased in the greenhouse in CY 2014.
- Several *Ipomoea* spp. accessions were also regenerated in Puerto Rico.

Germplasm Acquisition:

- The repository received cultures of Q47356 ('Finlay') from Plant Quarantine. This clone (originally from Fiji) has been added to the in vitro collection. 'Finlay 'was introduced under an SMTA.

Germplasm Distribution: This calendar year the project shipped 144 items of clonal (*I. batatas*) material in response to three foreign orders, and 125 items in response to 12 domestic orders. The project also shipped a total of fifty-one items in response to requests for seed or cuttings of sweetpotato-related spp. (14 foreign/3 orders and 37 domestic/7 orders).

In CY 2014 an additional 7 orders were shipped to Fort Collins for normal backup, or for cryopreservation research/backup. This included 233 cultures for regular backup and 1,296 cultures for LN backup.

The project received 8 requests for information in CY 2014: 1 foreign (Cambodia) information request, and 7 domestic information requests.

Germplasm Characterization: Images of regenerated seed-propagated *Ipomoea* spp. were acquired. No new characterization data on 6X *I. batatas* clones were received for addition to the database, in CY 2014.

Germplasm Evaluation: To our knowledge, no germplasm evaluation data were received during the 2014 CY. Anyone having evaluation data to be entered into the database should contact the curator or the Chair of the Sweetpotato Crop Germplasm Committee.

Additional: The cooperative effort (Griffin-Fort Collins) to place the 6X sweetpotato collection in LN for long-term storage, continues. Cultures of 204 accessions were sent for cryo backup to Ft. Collins in 2014. The Griffin site continues to provide clones as quickly as the Fort Collins site can work with them - in this long-term endeavor.

A double-wide Percival growth chamber was purchased and installed in 2014. The new unit was used to replace 2 single-wide units that have repeatedly failed (each was approx. 30 years old and due for replacement).

Contacts:

Curator	Dr. R.L. Jarret	bob.jarret@ars.usda.gov
Technical Support	Ms. Sarah Moon	sarah.moon@ars.usda.gov
Technical Support	Mr. Chris Tatum	ctatum@uga.edu
Database Operator	Ms. M. Spinks	merrelyn.spinks@ars.usda.gov

SWEETPOTATO DISTRIBUTIONS (Items) CY 2014

US

Washington	4
Alabama	2
Hawaii	25
Arkansas	23
Georgia	3
Missouri	10
Oregon	1
South Carolina	15
Texas	13
Maryland	1
Florida	2
Puerto Rico	26
US subtotal items	125

Foreign

Canada	144

Update on 2014 Sweetpotato Quarantine Activities to The Sweetpotato Crop Germplasm Committee

Jorge A. Abad, **PhD**
Senior Plant Pathologist-Project Leader
USDA-APHIS-PPQ-OP
Plant Germplasm Quarantine Program (PGQP)
Beltsville, MD 20705
February 19, 2015.

"The importation of plant parts of *Ipomoea* species for vegetative propagation purposes is prohibited from all countries except Canada under the Federal Plant Pest Act Title 7 Part 319.37 effective June 1980 and revised January 2010, full text can be found at http://www.gpo.gov/fdsys/pkg/CFR-2001-title7-vol5/pdf/CFR-2001-title7-vol5.pdf
The importation of botanical seeds is not prohibited. *Ipomoea* spp. with diseases of economic significance may be refused entry by Animal and Plant Health Inspection Service (APHIS). However, small quantities of germplasm may be introduced into the United States for propagative purposes by subjecting the plant propagations to a set of detection and diagnostic tests for plant pathogens at our Plant Germplasm Quarantine Programs (PGQP)."

Activities carried out by the Sweetpotato Quarantine Program at the USDA-APHIS-OP-PGQP during 2013.

http://www.aphis.usda.gov/import_export/plants/plant_imports/quarantine/program.shtml

Staff

No significant changes occurred on 2014 in our program; Prat Bandla continues to be our tissue culture (TC) specialist to work with potatoes, sweetpotatoes and sugarcane. She is doing an outstanding job in TC. The program maintains the excellent support of Crindi Loschinkohl, our Plant Pathologist/Crop Specialist for all crops and Richard Slocum also a TC specialist working with pommes, stone and small fruits and Cassava. The TC lab has also the therapy program for all of crops mentioned above. Seth Pack is still the gardener/technician in our program helping with greenhouse work, biological and laboratory tests. This year we were able to hire a new student, Amy Milne. Amy is helping with different activities in the TC lab and molecular testing in our program.

Acquisition Releases and Inventories

Table 1 shows the list of all the acquired *Ipomoea* germplasm. Our inventory presents that we worked with 39 accessions received in from 2010 to 2014. A total of 8 were received between 2011 and 2012 and 24 clones were received in 2014. No accessions were received in 2013. All

the accessions were tested by graft inoculations onto *Ipomoea setosa* and molecular methods (PCR, RT-PCR and qPCR) for the presence of viruses, following our approved protocols.

This season 24 accessions were too small to finish testing and 10 finished molecular tests but were too small for graft tests consequently remained in quarantine until the 2015 testing season.

Five clones were released after completing the testing this year. Real time RT-PCR (also called quantitative PCR or qPCR) for *Sweetpotato chlorotic spot virus* remains as the most sensitive of the molecular tests, allowing early and precise detection of this pathogen. This season we continue testing for both the West and the East African strains in a single step multiplex test using specific probes in qRT-PCR.

Tissue Culture Activities

As part of the quarantine testing, each accession imported to our program is propagated upon arrival and is maintained *in vitro* until screening is complete. After testing, clonal tissue of each sweetpotato accession is eventually released and shipped in a special TC medium to stakeholders upon certification of clean status. Five sweet potato accessions were released this year and 18 new accessions were initiated into culture.

All accessions that tested positive for pathogen(s) are treated by a combination of thermotherapy, apical meristem extractions, and chemotherapy to eliminate the detected pathogens. Clones from these accessions will be indexed in 2015 for results.

In addition to the accession in testing, the TC lab maintains a total of 47 *in vitro Ipomoea* positive controls and two healthy controls for reference. Two cultivars, Nancy Hall and Beauregard infected with 6 different viruses are also maintained *in vitro* as multiple positive control.

Requesting foreign sweetpotato germplam

The procedure to request sweetpotato germplasm is as follows:

The U.S. federal law requires that plants of *Ipomoea spp*. from foreign countries be placed in quarantine and tested for exotic pests before they can be distributed in the United States therefore any request for sweetpotato germplasm from abroad should be directed to:

Jorge.A.Abad@aphis.usda.gov or Crindi.Loschinkohl@aphis.usda.gov

The request should contain the name, address and telephone number of the donor so we can send the official letter of request and the import mailing label via express carrier. The application deadline for sweetpotato requests is February 28. Accessions should arrive no later than the last day of March. The quarantine period for sweetpotatoes is about 7 months. During that time, all acquisitions go through our indexing activities which occur from April to September. The program capacity for this year is 30 accessions. Last year we did not have any requests. Fortunately, so far we have 24 clones requested for this coming season.

Current and future work

We are advancing our research on sweetpotato virus identification and characterization of our positive control collection as well as the intercepted exotic pathogens, in a great collaboration with USDA-ARS –PDRU. We continue working with two unusual recently described sweetpotato viruses: Sweetpotato vein clearing virus (SPVCV), a Solendovirus and Sweetpotato collusive virus (SPCV), a Cavemovirus, both in the family Caulimoviridae. We keep monitoring the recently discovered Badnavirus and Mastrevirus and continue implementing qPCR for these viruses. We are also validating two multiplex RT-PCR tests: to detect several potyviruses and PCR to detect DNA viruses.

Our collaboration with researchers at USDA-CPHST, Beltsville, MD, North Carolina State University, Louisiana State University, and the International Potato Center (CIP) continues.

Acknowledgments

The Sweetpotato Quarantine Program acknowledges the dedicated and outstanding work of Crindi Loschinkohl, Seth Pack and Prat Bandla. I want also to thank to Dr. Joseph Foster, our Director, for his guidance and encouragement and Dr. Clarissa Maroon-Lango, the Lead Scientist of the Molecular Lab at PGQP, for her continued support and collaboration.

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Table 1

From spring to fall 2014, there were 39 sweetpotato clones at PGQP.

3 clones were received in 2010

3 from Uganda for Dr. C. Yencho

5 clones were received in 2011

5 from Uruguay for Dr. D. LaBonte

24 clones were received in 2014

5 from Peru for Dr. J. Felix
19 from Uganda for Dr. C. Yencho

Results of 2013 tests

10 finished PCR tests but were too small for graft tests

24 were too small to begin testing

5 clones were released
5 to Dr. J. Felix

Clones still at our facility at the end of 2014 season 34

Progress Report for Crop Germplasm Evaluation Funding from USDA-ARS

"Evaluating the Integrity of the Sweetpotato Germplasm Collection"

PI's: D. Michael Jackson, Robert Jarret, and Howard Harrison

February 18, 2015

The USDA/ARS Sweetpotato Genebank in Griffin, GA provides virus-indexed *in vitro* propagules of sweetpotato (*Ipomoea batatas*) in addition to seed of related *Ipomoea* spp., and the performance of related activities. These plant materials continue to contribute to ongoing research and breeding programs and serve as a resource that supports this crop's improvement. The accuracy of descriptor data is essential to the usefulness of this collection. All sweetpotato germplasm in the genebank is maintained *in vitro*. Many clones have been continuously maintained in tissue culture for more than 20 years, some for more than 25 years. Maintenance in an *in vitro* environment eliminates or reduces the ability to observe many of those morphological characteristics that are used to define individual clones. For example, *in vitro* cultures do not produce storage roots, which are arguably the most important morphological feature associated with the cultivated *I. batatas*. A study conducted in the past using AFLP markers suggested that some clones have become mislabeled over the course of their *in vitro* maintenance life, and/or have changed genetically. *Ipomoea batatas* is known to be genetically unstable in the field as well as *in vitro*. The importance of periodically growing out these plant materials to ensure their correct identification and to evaluate their genetic stability was recognized in the 1980s, when this collection was initiated. In addition, there is inadequate original descriptor data for many of the accessions in the sweetpotato collection.

Therefore, during 2012-2013, we received 737 sweetpotato genotypes as tissue-culture plantlets from the USDA/ARS collection. At that time, there were 779 listed sweetpotato accessions in the collection, but 36 genotypes were no longer available and six were seed lots. Tissue-culture plantlets were carefully transferred to pots and acclimatized in a greenhouse, and later transferred to a plant bed in the field at the USDA-ARS U.S. Vegetable Laboratory (USVL), Charleston, SC. During the 2012-2014 growing seasons, all 737 accessions were grown in the field in five-plant plots that were replicated twice.

Over the three-year period, descriptor data were collected for both roots and leaves of all 737 accessions. Plants were photographed in the plant beds and field every 1-2 weeks. Leaves were collected after the plants had been in the field for six weeks. The top and bottom of each leaf was measured, photographed, and had its color recorded using a colorimeter (Konica-Minolta Chroma Meter). Each leaf photograph was printed out so that morphological descriptors (Huamán 1991) associated with each could be assessed later. After approximately 120-130 days in the field, the roots were harvested and stored in "onion bags" at 15°C. After washing, morphological characterization of the roots was accomplished using the genebank descriptors (Huamán 1991), and via digital imaging of important morphological characteristics. Colors of root skins and flesh were recorded using a colorimeter (Konica-Minolta Chroma Meter), and root dry weight percentages were determined from root cores after oven drying. Leaf tissue from each accession was collected, freeze dried, and stored at -70°C. These samples will later be used for the extraction of DNA for future genetic analysis and "fingerprinting." All collected information is now being prepared for entry into the USDA-ARS GRIN system with assistance of Merrelyn Spinks, USDA-ARS Plant Genetic Resources Conservation Unit, Griffin, GA.

Reference Cited: Huamán, Z. 1991. Descriptors for sweet potato. International Board for Plant Genetic Resources, Rome, Italy, 134 pp.