MINUTES

Potato Crop Germplasm Committee meeting

PAA 2015 – Portland, ME

6:30 AM -- July 21st, 2015

Present: Gusmini, Abad, Bamberg (Chair), Jansky, Holm, Hoopes, Ronis, Whitworth, Douches, Sathuvalli. DeJong, Novy, Yencho, Barkley, del Rio

Bamberg gave a sketch of the history and purpose of the CGCs, and particularly the history and rationale for the composition of the potato CGC as it relates to the PAA. He noted that the full record of past grant awards and meeting minutes is available through the genebank website's links to GRIN.

The agenda items proposed by Bamberg by email on July 14 were addressed:

Collecting: Nothing particularly new. We continue to learn about status and dynamics of the *in situ* reserve from work in the USA. We continue to build relationships in Peru that involve joint use of germplasm. We had hoped to find *jamesii* sites in Mexico with Hector Lozoya this fall, but that was determined to be too risky.

CGC grant: The proposal we forwarded was funded. It will allow SNP 12K genotyping of ~400 of our clones and screening of ~160 *demissum* accessions for late blight pursuant to making a core subset. We need to be on the look-out for highest priority screening projects for upcoming years.

Quarantine: Dr. Abad distributed a report that is posted on the genebank website. One issue was the problematic import of tubers from Peruvian markets that were intercepted. This appears to have been resolved, since, quarantine issues aside, both Peru and USDA officials agree that if this germplasm was imported without proper MTA, it should be destroyed. There are other issues of quarantine concern like attempts to get waivers for mini-tuber imports. Also, negotiations are in progress for regulating TPS imports. Bamberg mentioned that Quarantine not only routinely clears materials coming into the country, but helps the genebank with virus cleanup, testing of suspect stocks in the genebank and general potato pathology advice.

Ideas for future grants: Bamberg noted that in addition to the CGC sponsored genotyping, Pepsico/Frito has initiated a genotyping project for over 700 of the genebank's clonal and seed samples of cultivated forms and will share the data. And very recently, R. Zhang of Inner Mongolia University contacted the genebank with a proposal to GBS most of the collection and share the data. We could be close to the dream of having most of the collection assessed for patterns of diversity—e.g., be able to identify core subsets and de-emphasize relative duplicates. In light of the expected influx of so much data, the group suggested that a CGC-sponsored grant might be needed to manage it.

It was noted that interest in diploid breeding with inbreds has been building. This suggest the possibility of a CGC grant to survey key germplasm in the collection for self-compatibility.

Meeting logistics: It was noted that the genebank should put more effort into facilitating remote participation in the TAC meeting. The current CGC meeting at PAA also might have been joined by remote members, but no equipment was available at the conference hotel. For example, P. Bretting sent a NPL report (posted on genebank website) but was unable to come in person.

Respectfully submitted,
John Bamberg

The National Plant Germplasm System: 2015 Status, Prospects, and Challenges

Peter Bretting
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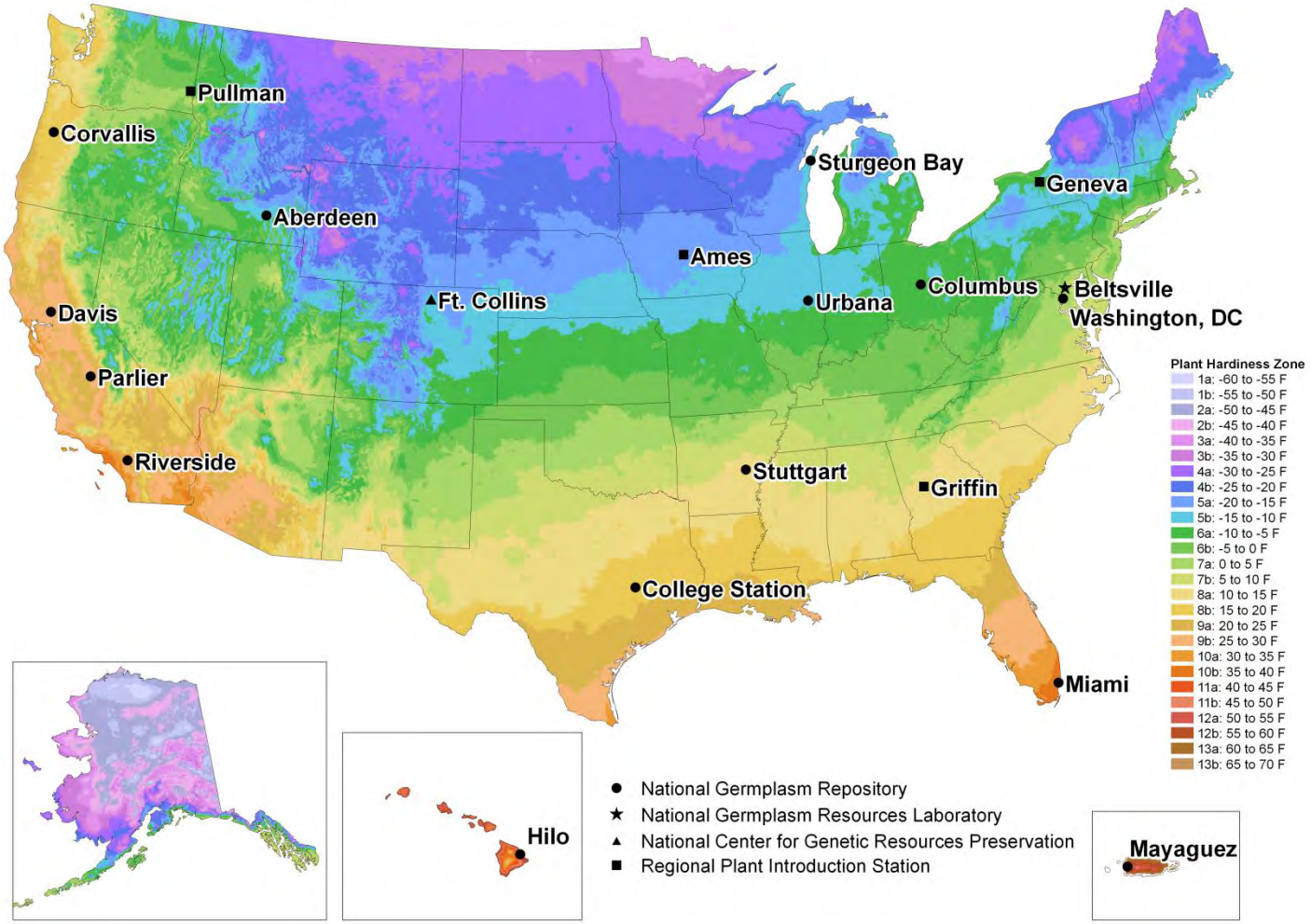
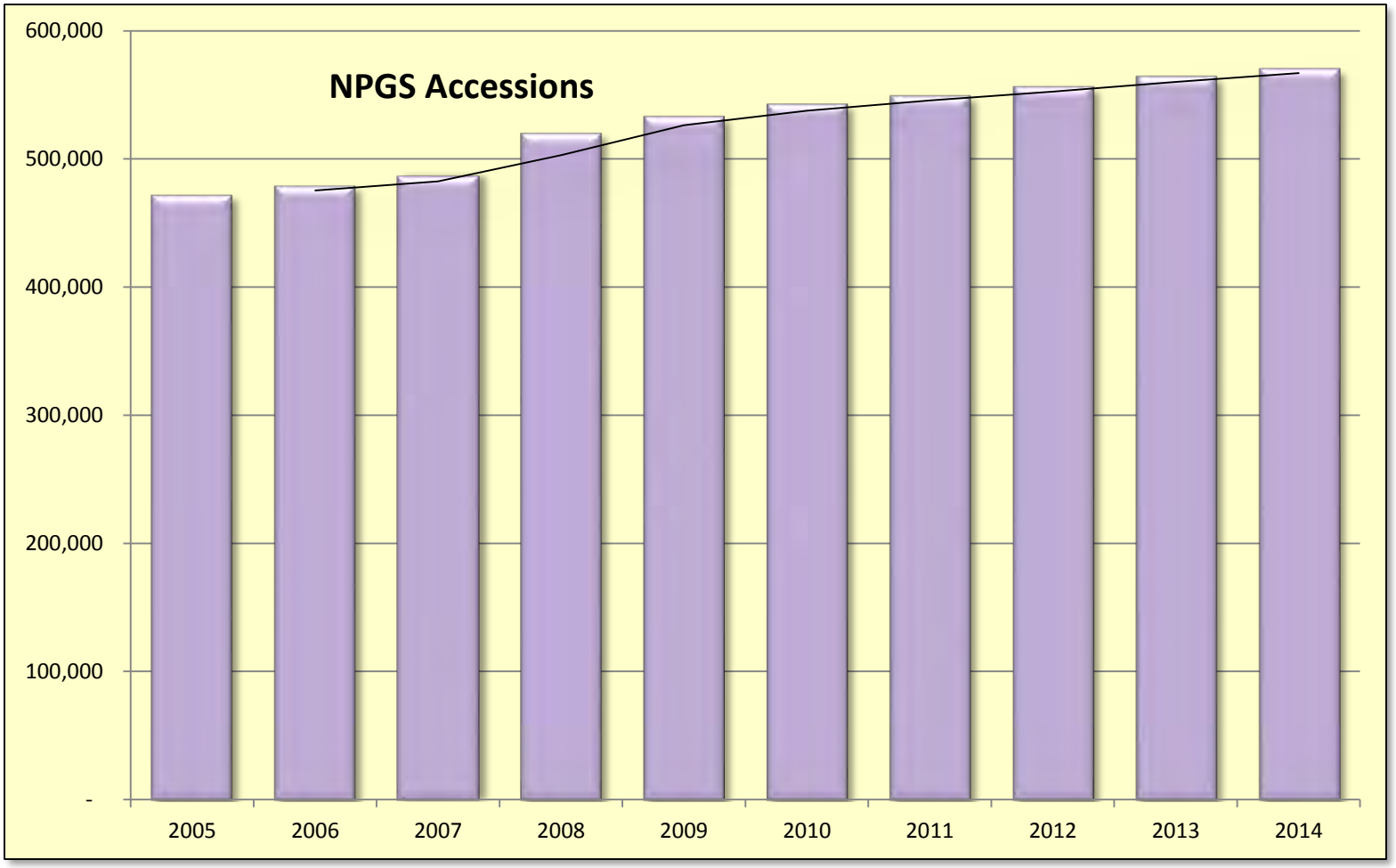
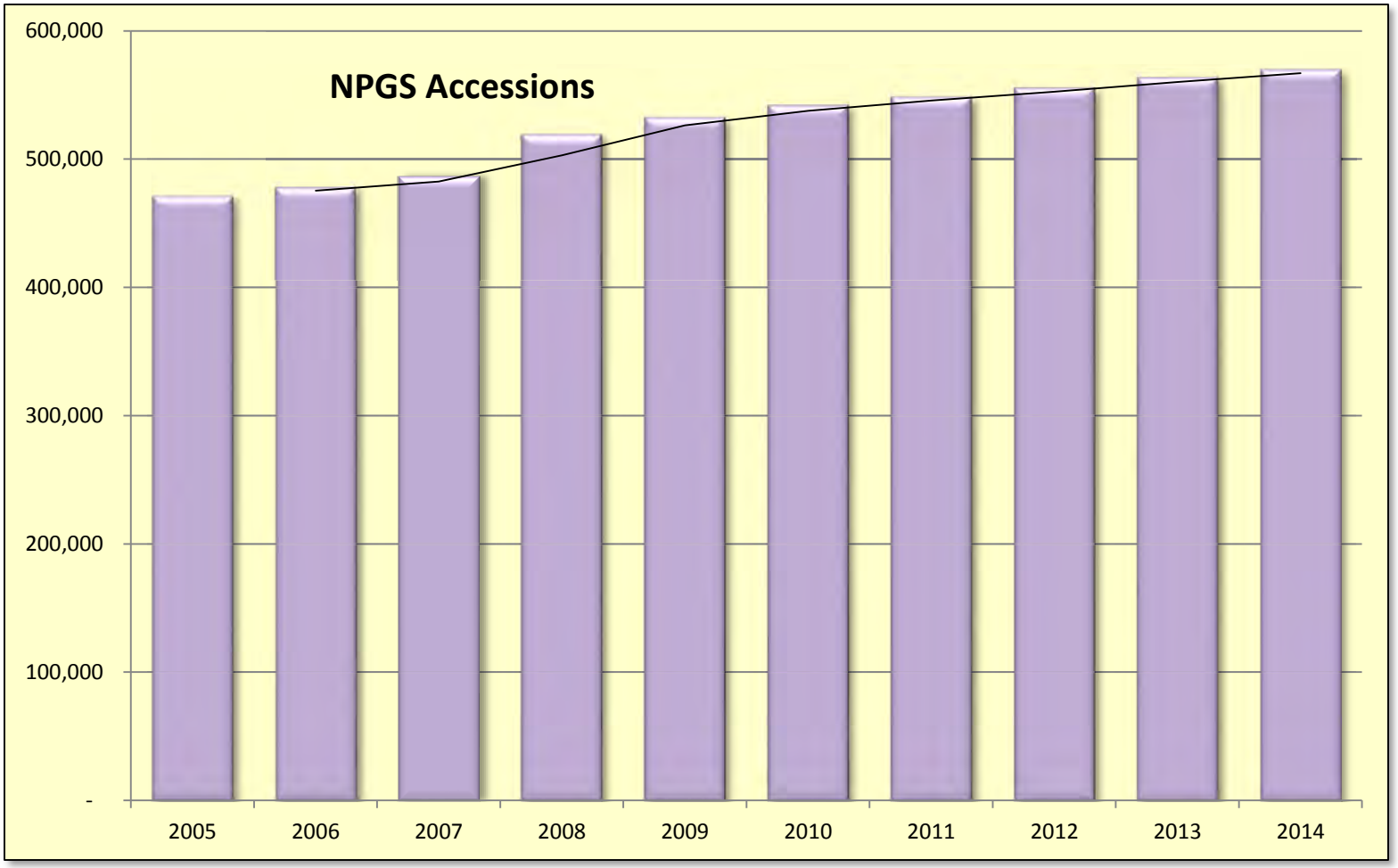
USDA National Plant Germplasm System (NPGS)



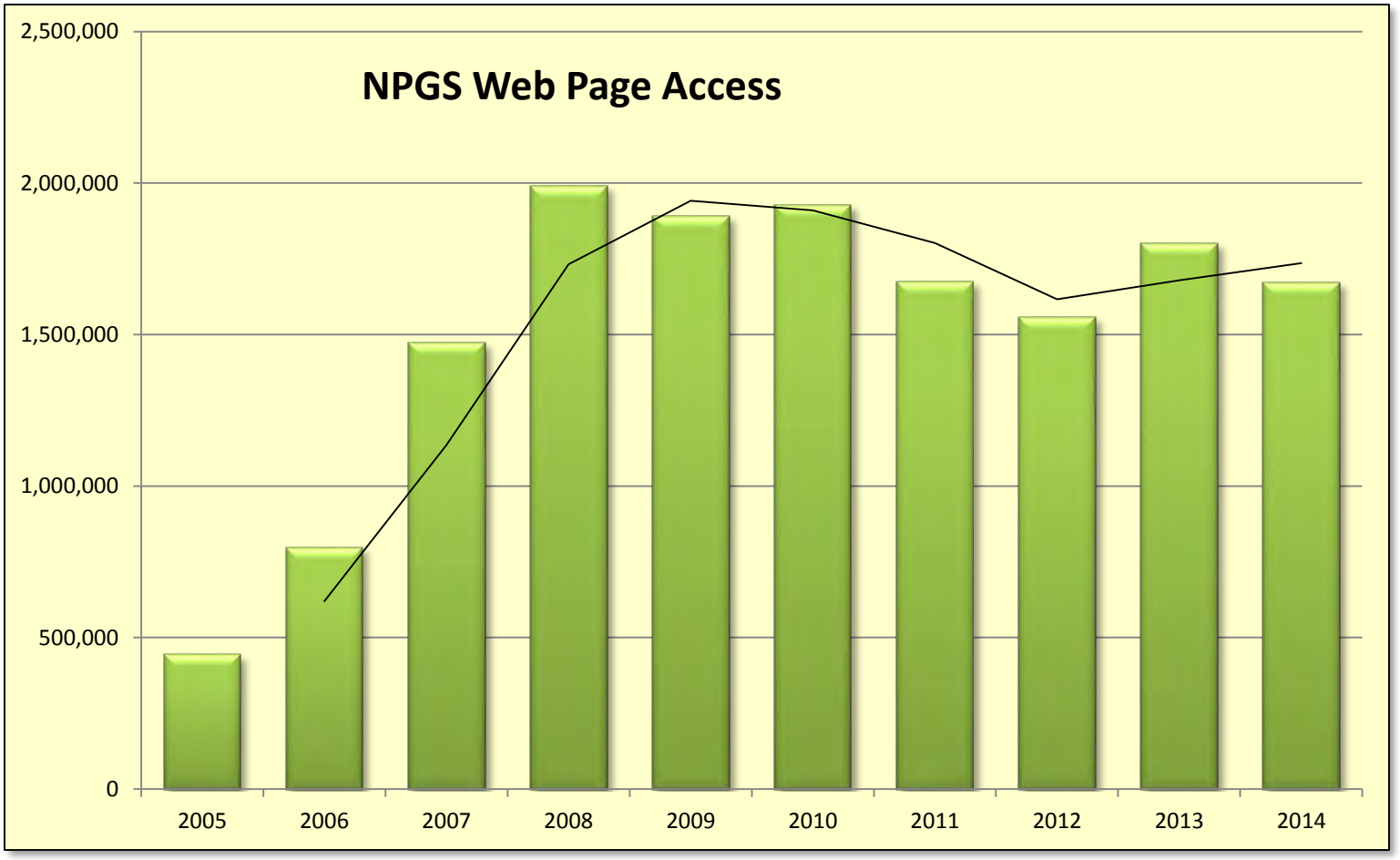
Number of NPGS Accessions 2005-2014



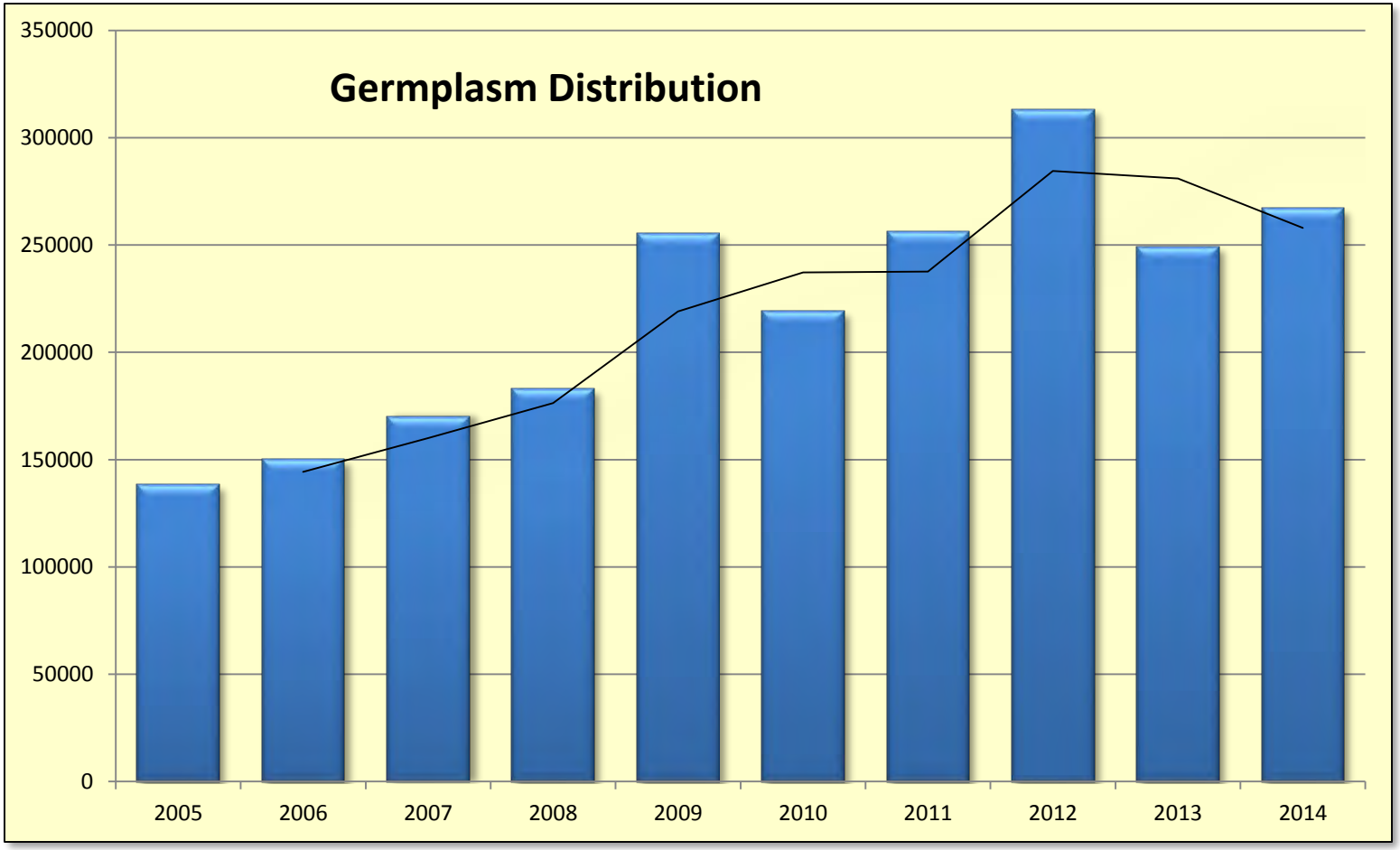
Number of NPGS Accessions 2005-2014



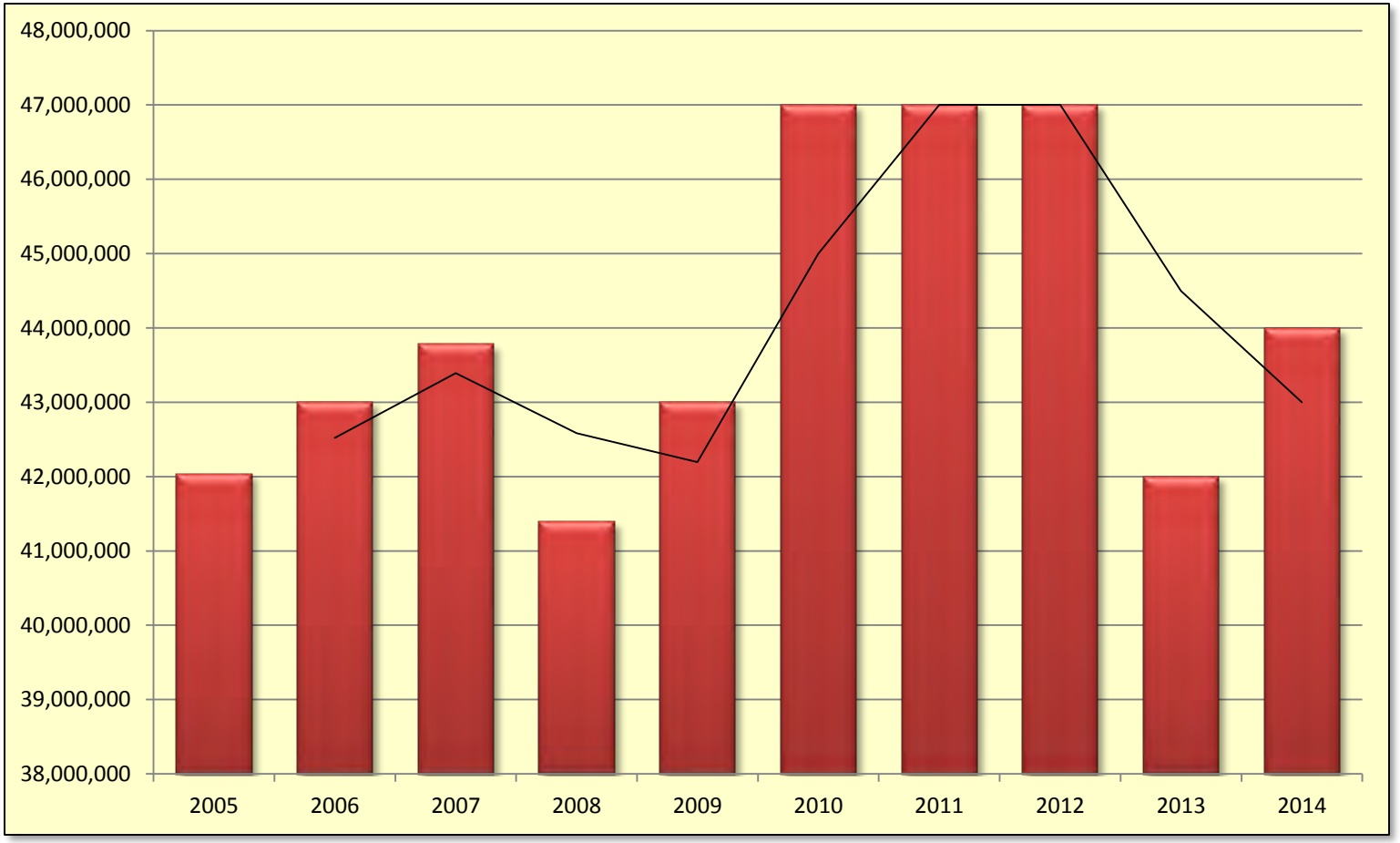
DEMAND FOR NPGS INFORMATION 2005-2014



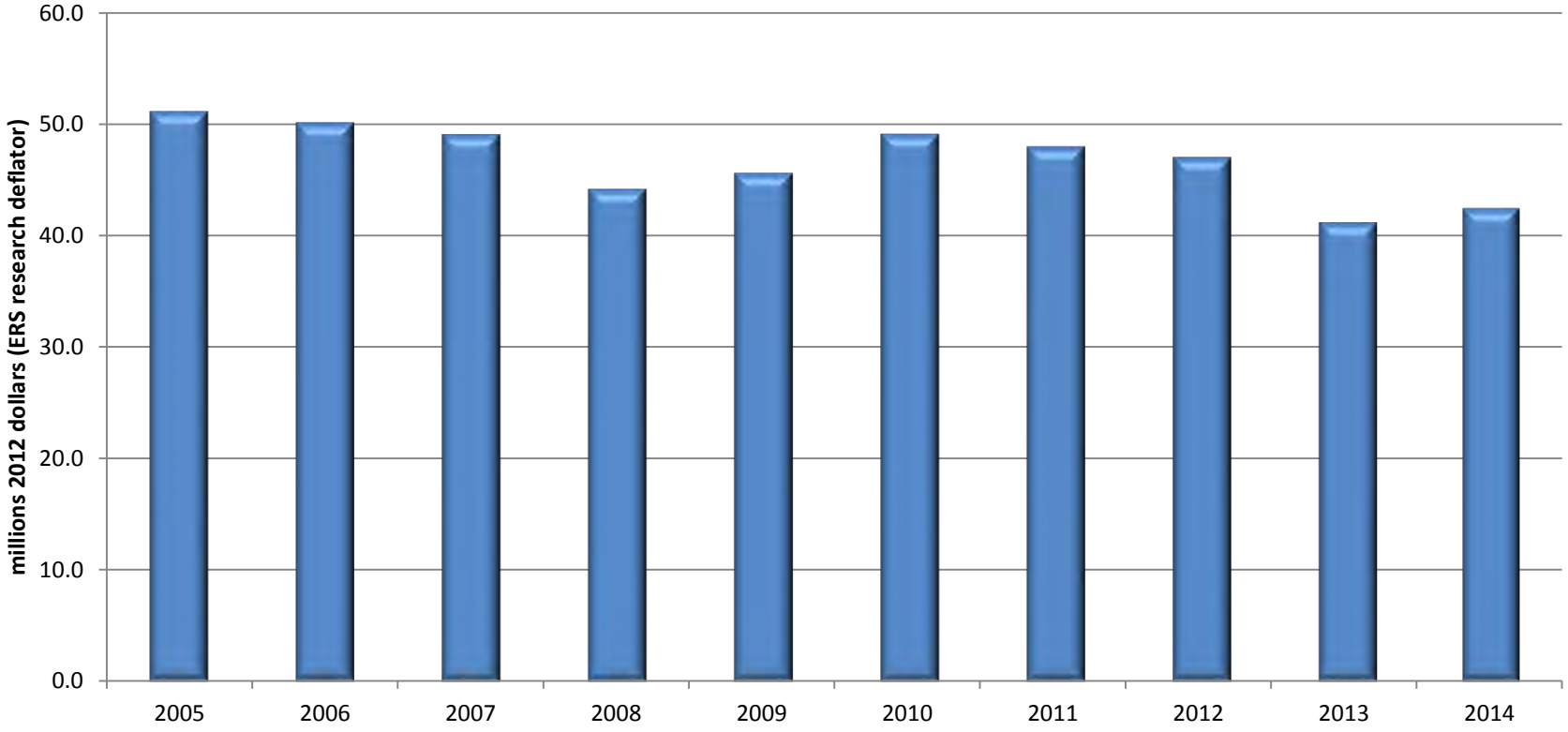
Demand for NPGS Germplasm 2005-2014



ARS National Plant Germplasm System budget 2005-2014



Real ARS National Plant Germplasm System Budget, 2005-2014 converted to 2012 dollars with ERS research deflator



FY 2016 President's Budget Proposal

- **The President's FY 2016 budget proposal for the USDA/ARS requests funding increases of about $3.475 million for the National Plant Germplasm System.**

- **$1.5 million: under the Sustainable Small Farm Initiative, specifically the sub-initiative Expand the National Plant Germplasm System ($1 million increase) and Provide training/information to Native Americans on conserving/improving traditional crops ($500,000 increase).**

- **$1.5 million: under Translational Crop/Livestock Genetics Initiative, specifically under the sub-initiative Analyze genetic stocks/specialized populations using advanced genomics/genetic technologies.**

- **$475,000: under Vertical Farming Initiative, specifically under the sub-initiative Develop high value horticultural varieties that are adapted for growth in greenhouses/urban environments.**

Some key challenges that stretch the NPGS's budgetary resources

- **Managing and expanding the NPGS operational capacity and infrastructure to meet the increased demand for germplasm and associated information**
- **Fulfilling the demand for additional germplasm characterizations/evaluations**
- **Acquiring and conserving germplasm of crop wild relatives**
- **Managing genetic/genomic seed stocks**
- **BMPs and procedures for managing accessions (and breeding stocks) with GE traits and the occurrence of adventitious presence (AP)**

Genetic Resource Management Priorities

- Acquisition
- Maintenance
- Regeneration
- Documentation and Data Management
- Distribution
- Characterization
- Evaluation
- Enhancement
- Research in support of the preceding priorities

DiversitySeek (DivSeek) Initiative

- **Mission--to enable breeders and researchers to mobilize a vast range of plant genetic variation to accelerate the rate of crop improvement and furnish food and agricultural products to the growing human population.**
- **Build on existing, emerging and future initiatives to characterize crop diversity and develop a unified, coordinated and cohesive information management platform to provide easy access to genotypic and phenotypic data associated with genebank germplasm.**
- **Its partners currently include 58 public-sector agricultural research institutions from many nations, including Clemson, Cornell, Iowa State, UC-Davis, Georgia, Minnesota, Missouri, and USDA/ARS.**
- **The DivSeek Steering Committee (includes P. Bretting) met on 29 May 2015 in Rome to address specific details for the organization, function, and scope for the Initiative.**

ARS Big Data Initiative

- **FY 2015-2019, $25 M**
- **“Science DMZ”**
  - **Dedicated scientific research network for data computing**
- **High-performance computing (HPC) system**
  - **Hybrid of local and cloud resources**
  - **Storage and efficient processing of ARS data**
- **Virtual research support core**
  - **Experts to staff the new infrastructure**
  - **Provide computational research support**

Status of the Potato Quarantine Program, 2015

Presented to the Potato Crop Germplasm Committee

July 21, 2015 in Portland, ME

by

Jorge Abad, PhD
Senior Plant Pathologist-Program Manager
Potato, Sweet Potato and Cassava Quarantine Programs
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Introduction

The mission of the Potato Quarantine Program (PQP) is to test germplasm for pathogens as a condition for the entry of this valuable crop germplasm into the United States. Special emphasis is given to the detection of viruses, viroids and bacteria including phytoplasmas. This program is the first line of defense against the inadvertent introduction of new potato diseases into the USA. Such diseases have the potential to create both economical and environmental burden to the crop. Additionally, in our program, any infected accession is subjected to therapy for the elimination of pathogens and then retested to ensure the success of the treatment. Eventually all the accessions are released to the requesters.

Staff

No rearrangements occurred in our Lab, last year. Prat Bandla, tissue culture specialist, continues taking responsibilities in potatoes, sweetpotatoes and in addition to these crops; she works with tissue culture in sugarcane, rice and other Poaceas. Prat was also trained in Cryotherapy at the USDA-ARS Cryopreservation Unit at Fort Collins, CO. Richard Slocum, our senior specialist, continues working with tissue culture in cassava in addition to his crops i.e. pomes, apples, kiwis and small fruits. Crindi Loschinkohl, our crop specialist, continues doing an outstanding job with her tremendous expertise in acquisition, testing, and distribution of potatoes, sweetpotatoes and cassava. Seth Pack continuous to be our gardener, he is doing an excellent job in the greenhouse work and helping Crindi with the biological and molecular tests. We have Student worker since September last year to help in the routine chores at the TC lab. and molecular testing. The USDA-APHIS Plant Germplasm Quarantine Program continues under the leadership of our Director, Dr. Joseph Foster.

Accomplishments

Our PQP continue keeping very high standards in pathogen detection tests for potato diseases. We keep on using a sound biological test under optimum conditions that ensures the interception of unknown or unusual viruses. This test includes the mechanical inoculation onto 12 different indicator plants and grafting on healthy potatoes when the accessions are negative for all the tests yet still showing symptoms in the original potatoes. Serology and molecular based methods will not detect the unknown viruses. We routinely use ELISA for PVX, PVT, PVM, PVA, PMTV, potyviruses and *Clavibacter michiganensis*. ImmuoStrips for *Ralstonia solanacearum*. RT-PCR and PCR tests with generic primers for: luteoviruses, carlaviruses, potexviruses, potyviruses, geminiviruses and phytoplasmas, respectively. We are using qRT- PCR (real time) to detect *Potato yellow vein virus* and *Potato leaf roll virus* potentially damaging and seed transmitted virus. Furthermore, in collaboration with the International Potato Center (CIP) in Peru, we are detecting and identifying difficult unknown viruses by next-generation sequencing analysis, a state of the art method where no specific primers are needed.

As several viroids have been reported affecting potatoes, we have developed a wide spectrum system of conventional RT-PCR that will detect PSTVd and all

pospoviroids that potentially can infect potatoes. Therapy continuous to be primordial in our program for the elimination of viruses in infected accessions. Thermotherapy and chemotherapy are used in the treatments in our current curing method.

We continue the introduction of true potato seed (TPS) accessions. Testing for this group is slightly different. Ten percent of the seedlings are sacrificed to be grown and mechanically inoculated in a set of five indicator plants that will show symptoms of all seed transmitted viruses in potatoes if present. Non-isotopic nucleic acid hybridization is used to detect PSTVd, a viroid that is readily transmitted by botanical seeds in potatoes. If the tests are negative; the remaining 90 % of the seeds are released.

Our primary stakeholders continue to be potato Breeders from universities, government and the private industry. Growers are also requesting potatoes from abroad. We continued our collaboration with the NRSP-6 US Potato Genebank by introducing more potato accessions through our quarantine program and running therapy to clean up their accessions that are infected with viruses. This season four accessions were imported and/or treated by therapy for the Genebank. Also, seven virus-infected accessions that were sent to us from Sturgeon Bay, completed therapy and testing therefore released back to Genebank. Thermotherapy and chemotherapy were used in the treatments.

Potato germplasm acquisition and releases

Our inventory for 2014-2015 consisted of 179 potato clones and 20 true seed lines with an overall total of 199 accessions, surpassing one more time our quota for the year (Table 1). It includes all the acquired and released germplasm as well as the clones in therapy for this season. From those, 136 clones were received this season, 72 as *in vitro* cultures and 64 as tubers. The remaining 43 accessions were obtained the previous years. After testing, we released 67 accessions. Twelve clones either died or did not grow, and 8 clones tested positive for carlaviruses, *Potato leaf roll virus* and potyviruses thus remaining in therapy, all summarized in table 1. Detections were made only in clonal accessions.

For true potato seed, 20 accessions were received and tested this year in our program. Seventeen were released and three were retained due to suspicious symptoms for a potential unknown virus (detected by deep-sequencing). Identification of this pathogen is underway (Table 1).

A note about an unusual interception of potatoes from South America

On May 25, 2014, about 200 of Andean potato tubers for planting were intercepted at the international airport in Miami by Jeana Davis, an APHIS inspector. Tubers were divided in 56 bags properly labeled with names of native Andean potatoes. Mr. David Hoffman from Illinois hand carried those potatoes under a Q37 permit (P37-09-00882) wrongly issued to him in 8-25-2009 (expired 8-25-2014) that authorized *Solanum tuberosum* ‘seed’ from Peru imported for ‘propagation’, per the permit.

Potato is a prohibited crop under our Code of Federal Regulations (CFR) when imported from any country in the world with the exception of Canada. Consequently,

APHIS took a corrective action by diverting those potatoes to our quarantine facility in Beltsville in order to be tested and eventually released to Mr. Hoffman. This action was in consultation with the USDA APHIS PPQ-PHP-Regulations, Permits, and Manuals, Plants for Planting Policy staff. They agreed in granting a Controlled Import Permit under the guidance of PGQP in order fulfill all the requirements to introduce these potatoes into the USA after testing in quarantine. This permit is still in process and the potato accessions are in quarantine under our permit.

Last June in our NRSP-6 meeting, it was unanimously recommended by the Technical Advisory Committee not to allow this introduction. They also recommended consulting with Drs. Peter Bretting and Gary Kinard, Agricultural National Leader and Research Leader at the USDA ARS, respectively, for their guidance in this matter. Both are involved in acquisition of foreign germplasm issues. The committee also recommended requesting the Peruvian Government's opinion. The SENASA, the equivalent of APHIS in Peru, response was that they do not require an authorization to grow those potatoes once they are out of the country (Peru). In their own words, it is USDA APHIS, as the Plant Protection entity in the US, who is now responsible to determine the final destination of the potatoes intercepted (See Appendix 1).

Please we need your advice in this matter.

Obtaining foreign germplasm

Federal law (Title 7 of the Plant Pest Act) prohibits the importation of plant parts for use in vegetative propagation of some 50 plant genera, including tuber-bearing *Solanum* spp. Importation of true potato seed (TPS) is also prohibited. The quarantine period for potatoes is typically 6-7 months. Potatoes generally are acquired from foreign donors or institutes or from plant exploration as seed lots of 200 seeds or more, as tubers, or as *in vitro* plantlets. All acquisitions must be accompanied by an import label issued by the PGQP pathologist for potato. Potato slots are filled and processed on a "first-come, first-served" basis. The indexing season for potatoes (based on greenhouse growing conditions for indicator plants) is from September through May. Requests for potato importation should be submitted between January and May preceding the start of the testing cycle.

The Crop Germplasm Committees of the various prohibited genera are composed of scientists with expertise in the genetics of the crop, and the Curators of the various collections in the National Plant Germplasm Repository System have unique knowledge of the diversity of the germplasm held in the collections for which they are responsible. Both the CGCs and the curators are part of the National Plant Germplasm System.

In applying this set of procedures, the PQP recognizes that contact with the Potato CGC and curators are critical and considered an important component in the plant introduction system. PQP will always take its recommendations. The Potato CGC may provide a prioritized list of the accessions that its members would like to import, those items are first on the list and the first to be served by PQP and in the order suggested by the CGC.

Acknowledgments

The Potato Quarantine Program is operating nearly without backlogs. This accomplishment would not be possible without the dedicated and outstanding work of our personnel at the PGPQ. I want also to acknowledge Dr. Joseph Foster, our Director for his guidance and encouragement.

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For additional information about the potato quarantine program in PGQP, you may contact:

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Table 1.- 2014-2015 Potato Quarantine Program Activities

Clonal Potatoes

There were 179 potato clones in the PGQP in the 2014-2015 season.

1	clone was received in 2012		
	1	from Japan	for M. Martin
42	clones were received in 2013		
	3	from the Repository	for M. Martin
	39	from Chile	for G. Secor
136	clones were received in 2014		
	3	in vitro from Germany	for F. Goktepe
	1	in vitro from the Netherlands	for D. Bernhardson
	5	in vitro from Germany	for C. Higgins
	55	tubers from Peru	for D. Hoffman*
	5	in vitro from New Zealand	for G. Ebe
	2	in vitro from Germany	for T. Lübberstedt
	1	in vitro from the Netherlands	for J. Wallace
	14	in vitro from the Netherlands	for J. Bragg
	3	tubers from Canada	for A. Witherell
	5	tubers from Peru	for A. del Rio
	1	in vitro from Germany	for J. Düsing
	1	in vitro from Peru	for M. Martin
	1	tuber from Scotland	for C. Keller
	6	in vitro from Brazil	for R. Novy
	4	in vitro from Peru	for S. Marquardt
	9	in vitro from Peru	for D. Norman
	5	in vitro from Ethiopia	for K. Perry
	12	in vitro from Chile	for G. Secor
	3	in vitro from Scotland	for N. Gudmestad

* This group of tubers were field-collected and intercepted with a mistakenly-issued permit. They were brought to PGQP too late for this year's testing.

Of these 179 clones:

12	died before testing began (field-collected tubers arrived rotted.)	
9	were still in therapy from last year	
82	arrived too late for testing	
1	was discarded (a replicate of a released clone)	
75	were tested	
	8 were positive	(Carlavirus, Luteovirus, Potyvirus, and unknown viruses)
	67 were released	

True Potato Seed

There were 20 TPS lots in the PGQP in the 2014-2015 season.

15	from The Netherlands	for J. Bragg
5	from The Brazil	for D. Douches

Of these 20 seed lots:

20	seed lots were tested	
	17 were released	
	3 were positive	(Unknown viruses)

Totals

- Total accessions = 199
- Total tested = 95
- Total released = 84
- Total positive = 11
- Total died = 12
- Total discarded = 1
- Total carried over to next year = 91

Appendix 1

From: **Rocio Beingolea Barua <RBEINGOLEA@senasa.gob.pe>**
Sent: **Tuesday, July 14, 2015 6:19 PM**
To: **Abad, Jorge A - APHIS**
Cc: **Dave Ellis (d.ellis@cgiar.org); Bamberg, John**
Subject: **RE: Intercepción de papas traídas de Perú.**

Follow Up Flag: Follow up
Flag Status: Flagged

Categories: Red Category

Señor Abad muy buenas tardes,

Por parte del SENASA, no necesitan autorización para sembrar dicho material, asumo que la persona o
institución interceptada trato de ingresar las papas nativas en forma ilegal.

El APHIS USDA como Organismo Nacional de Protección Fitosanitaria soberano determina el destino final del producto.

Lo que sí nos gustaría conocer en qué fecha fueron interceptadas la papas, que persona o Institución llevaba este material y la empresa de transporte.

Saludos cordiales,

Ministerio de Agricultura y Riego
SENASA
Servicio Nacional de Sanidad Agraria
PERU
Ing. ROCIO BEINGOLEA BARUA
Especialista en Importaciones
SUBDIRECCION DE CUARENTENA VEGETAL
DIRECCION GENERAL DE SANIDAD VEGETAL
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WWW.SENASA.GOB.PE

De: Abad, Jorge A - APHIS [mailto:Jorge.A.Abad@aphis.usda.gov]
Enviado el: martes, 14 de julio de 2015 02:28 p.m.
Para: Rocio Beingolea Barua
CC: Dave Ellis (d.ellis@cgiar.org); Bamberg, John
Asunto: RE: Intercepción de papas traídas de Perú.

Estimada Ing. Beingolea,

El año pasado, más de 50 bolsas de papas nativas peruanas (3/4 tubérculos por bolsa) fueron interceptadas en el aeropuerto de Miami. Estos tubérculos tenían como fin el ser plantados en los EE.UU. Tomando una acción correctiva hice que re-dirigieran estos tubérculos al programa de cuarentena, el cual dirijo. Las papa están seguras en nuestro programa.

Mi pregunta es, tienen estas papas necesitan tener una autorización del SENASA de Perú para poder ser
plantadas en otro país, como en los EE.UU.?

Si es así, tendríamos que proceder con la destrucción del material a no ser que Ud. Nos diera otra opción. Por favor hágame llegar su respuesta.

Cordialmente,
Jorge Abad

_____
Jorge A. Abad, PhD

Plant Pathologist in detail at PPQ-PHP-Regulations, Permits, and Manuals, Plants for Planting Policy
Information on ePERMITS: http://www.aphis.usda.gov/permits/

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