

ANNUAL REPORT

Calendar Year 2009

1. NRSP-6: UNITED STATES POTATO GENE BANK

Introduction, Classification, Preservation, Evaluation and Distribution of tuber-bearing *Solanum* Species.

2. COOPERATIVE AGENCIES AND PRINCIPAL LEADERS

State Agricultural Experimental Stations

Representative

Technical Representatives

Southern Region		J. C. Miller, Jr.
Western Region	Vice Chair (2009)	F. Goktepe
North Central Region	Chairman (2009)	D. S. Douches
Northeastern Region	Secretary (2009)	W. De Jong

Administrative Advisors

Southern Region		C. Nessler
Western Region	Lead AA	L. Curtis
North Central Region		M. Jahn
Northeastern Region		E. Ashworth

United States Department of Agriculture

Agricultural Research Service

Technical Representative	C. R. Brown
National Program Staff	P. K. Bretting
	G. C. Wisler
Area Director, Midwest Area	L. Chandler

Cooperative States Research Education & Extension Service

A. M. Thro

Animal and Plant Health Inspection Service

M. D. Bandla

NRSP-6 Project Leader

J. B. Bamberg

Agriculture Canada

B. Bizimungu

3. PROGRESS AND PRINCIPAL ACCOMPLISHMENTS

A. Introduction of New Stocks

John Bamberg, Alfonso del Rio and Charles Fernandez (US Potato Genebank) had a successful collecting expedition to the Pinaleno Mountains in southeastern Arizona (about 75 miles northeast of Tucson) in late September of 2008 (supported with extramural funding from USDA). They collected 15 new populations. Fruit were harvested on 12 of the collections and live plants were collected for three of the populations, which were later crossed and true seed was produced.

A total of 45 accessions were assigned PI numbers in 2009, with 26 as true seed: 5 accessions from the Quarantine seed increase of Dr. S. Kiru's Russian breeding stocks, and 21 accessions collected in Arizona in 2009. Nineteen accessions were added to the tissue culture collection: two clones from Dr. R. Veilleux's sequencing clones, and 17 primitive cultivar from Peru.

The NRSP-6 web page (<http://www.ars-grin.gov/nr6>) has been updated to include all new stocks and screening information. Clients who have ordered from NRSP-6 in the past four years are contacted three times per year informing them of new materials that are now available either as true seed, tubers, in vitro plantlets, or herbarium samples.

B. Preservation and Evaluation of Stocks

In 2009, a total of 238 accessions were increased as botanical seed populations.

About 700 potato spindle tuber viroid (PSTVd) tests were performed on seed increase parents, seedlots and research materials. Germination tests were performed for 1,003 accessions, ploidy determinations for 20, and tetrazolium seed viability tests for 25 seedlots.

In cooperation with J. Palta (UW-Madison), it was found that low-cost calcium applications in the highlands of Peru result in a yield increase of 60% for some cultivars. Dr. del Rio began work on identifying DNA markers associated with the calcium response trait. We also received an NRI grant (with cooperators J. Palta, S. Jansky, and M. Havey from UW-Madison) for related work on high tuber calcium genetics and introgression using *S. microdontum* hybrids we developed.

We continued screening for antioxidants and anti-tumor components with USDA cooperator R. Navarre (USDA-Prosser) and J.C. Miller, Jr. (TAMU). Some extremely high phenolic clones were found in *S. phureja/stenotomum* and extracts of *S. jamesii* were found to inhibit colon and prostate cancer. We documented and reported remarkable eight-year dormancy of *S. jamesii* tubers from stocks we collected from New Mexico.

C. Classification

Dr. Spooner et al. have published and are working on five different areas of potato research: 1) molecular markers for genebank studies, 2) cultivated potato origins, 3) relationships in wild tomatoes and potatoes, 4) the predictive power of taxonomy relative to disease resistance data, and 5) a linkage map for late blight resistance in wild potatoes.

D. Distribution

The volume and types of stocks sent to various consignee categories are summarized in the table below. NRSP-6 distributed 191 orders to clients in 33 states of the USA and 26 orders to 11 other countries.

Category	Units of Germplasm Sent ¹							Total	PIs
	S	TF	TC	IVS	DNA	PL	HER		
Domestic	1,573	1,159	1,766	308	206	0	0	5,012	3,297
Foreign	8,203	0	22	151	0	0	0	8,376	1,357
Total	9,776	1,159	1,788	459	206	0	0	13,388	4,429

¹ Types of stocks sent/(number of seeds, tubers or plantlets per standard shipping unit): S= True Seeds/(50), TF= Tuber Families/(10), TC=Tuber Clones/(3), IVS=In Vitro Stocks/(1), DNA=DNA samples/(1), PL=Plants in plugs/(1), Her= Herbarium/(1).

4. IMPACT STATEMENT

Potato is the number one US and world vegetable in terms of production, value, and consumption. Considering its high satiety index and palatability, and its balanced protein, wide adaptability, and high productivity, it will play an increasingly important role in providing food security in developing countries and delivering new health-promoting nutrients to the diets of developed countries. Such food and health benefits carry with them a great economic impact, even in areas where potatoes are not grown. For example, if people in the US consumed adequate potassium, an estimated 100K lives and \$12B in annual healthcare costs would be saved. Potato, already a high-potassium food, is well positioned to make a substantial contribution through genetic improvement. NRSP-6, as the world's most diverse and available source of new genes and germplasm information, is best positioned to support such contributions.

Beyond providing stocks, NRSP-6 staff members are involved in discovering and developing associated germplasm tools and information. Among these are self compatibility, gibberellin, and 2n gamete mutants; cut-stem pollination, hormone pre-treatment of seeds for better germination, haploid-extracting pollinators, and 2n gamete breeding technique. Yukon Gold, one of the most popular and name-recognized tablestock cultivars, has *S. phureja* 195198, an exotic cultivated species from NRSP-6 as a grandparent, and was bred using the 2n gamete technique.

Evaluation for a wide variety of useful traits has also been designed, contracted and documented by staff. Such work is the foundation for deploying exotic genes in new cultivars. One recent example is the release of cultivar PA99N82-4 bred with the Mexican wild species *S. bulbocastanum* from NRSP-6. It has high resistance to nematodes that can only be controlled by fumigation at an estimated cost of \$20M per year, not counting the “cost” in risks to human and environmental health posed by use of toxic chemicals.

The genebank goal is maximum diversity. But because funds for collecting, preserving, distributing and evaluating are limited, reaching that goal depends on maximizing efficiency through quality control and technology R&D. Thus, we collaborate with other world genebanks to study the partitioning and vulnerability of diversity in our collections. Examples of impact of this area are the intergenebank potato database, identification of more diversity-intense sites for future collecting, and confirming that the rare alleles within some populations within certain species are not explained by introgression of alleles common in another sympatric species.

One way the overall impact of these contributions can be measured is by the occurrence of NRSP-6 germplasm in the pedigrees of new, improved potato cultivars. About 70% of all potatoes grown in the United States have germplasm from the genebank in their pedigrees. Both cultivar releases published in the American Journal of Potato Research in 2008, ‘Premier Russet’ and ‘Dakota Diamond’, have exotic species from NRSP-6 in their pedigrees. The great-grandmother of the latter is *S. chacoense* 472812, a wild potato species originally collected in Argentina.

Another gauge of impact is in the numerous publications in 2009 providing information that pushes potato science forward. Section 6 lists 51 papers, 18 abstracts, and 4 theses which report the results of studies associated with NRSP-6 *Solanum* stocks this year.

The impact of the genebank is expected to increase in the future for several reasons. 1) Mutants discovered and characterized by staff will be increasingly valuable as research models. 2) Intragenic transformation of potato has now been demonstrated and identified as a kind of GMO much more accepted by the consumer, so useful exotic potato genes will be increasingly valuable as the technology to easily insert them into existing cultivars improves. 3) Potato is rapidly expanding in large new growing regions, so the need for genetic resources for breeding in new environments and for new tastes will surge. 4) Loss of wild habitats and other limits on collecting will make it even more important to understand how to efficiently keep what we already have—thus, enhancing the importance of in-house R&D on the partitioning and vulnerability of diversity. 5) The revolution in electronic information exchange gives NRSP-6 an opportunity to provide more complete and timely germplasm data, advice, and stocks, and detect and develop opportunities for new traits and germplasm applications. 6) Potato genetic resources will be increasingly mined for nutritional traits that reduce healthcare costs and suffering as evaluation and breeding technology advances.

5. WORK PLANNED FOR 2009

Fast and accurate delivery of high quality germplasm and information will continue to be the general objective of NRSP-6. We also aim to raise awareness of the germplasm resource through an advertising/outreach program, and by conducting and publishing research that demonstrates new ways the germplasm can be useful for potato improvement. It will be a goal to perform 250 successful seed increases in the upcoming year.

Evaluation experiments will continue on *Solanum* species for these and other traits: antioxidants, tuber acidity, tuber potassium, frost hardiness, tuber calcium, hormone mutants and anti-cancer compounds.

APIC Intergenebank projects, such as researching the status and dynamics of genetic diversity using DNA markers, will strengthen ties with sister genebanks around the world. Specifically, ongoing joint studies on tuber calcium, frost hardiness, and impact of agrichemicals on reproduction of wild potato populations will continue.

Our plan is to move toward consolidation of R&D into a single major project that encompasses most of our priority goals: Intergenebank cooperation, detection of how diversity is partitioned and how it is vulnerable, evaluation for useful traits, and emphasis on evaluation for consumer-oriented traits. These activities will center on *S. microdontum*, outstanding as a species with extreme and variable expression for many potentially useful traits (pH, potassium, calcium, late blight and soft rot resistance, reproductive mutants, high protein and antioxidants), while being relatively easy to grow and introgress into *S. tuberosum*. This is the “MMP” = *microdontum multifaceted project*. A

multifaceted approach should be more efficient, since multiple evaluations can be done on tubers from one growout, and interactions between traits can be detected.

We intend to conduct a collecting expedition for native wild potatoes in the Santa Catalina Mountains near Tucson, Arizona.

6. PUBLICATIONS ISSUED DURING THE YEAR 2008

A. Publications issued by NRSP-6 Personnel

- Bamberg, J.B. and A.H. del Rio. 2009. Unbalanced bulk of parents' seed does not cause significant drift in germplasm regeneration of two model potato (*Solanum*) species populations. *Am J Potato Res* 86:391-397.
- Bamberg, J.B. and A.H. del Rio. 2009. Selfing potato species produce robust spontaneous field seed increases under floating mesh. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, p 74. (Poster)
- Bamberg, J.B., A.H. del Rio and Rocio Moreyra. 2009. Genetic consequences of clonal versus seed sampling in model populations of two wild potato species indigenous to the USA. *Am J Potato Res* 86:367-372.
- Del Rio, A.H. and J.B. Bamberg. 2009. Impact of seedling transplant selection on the genetic diversity of genebank populations of outcrossing potato species. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, pp 41-42. (Abstract)
- Ghislain, M., J. Nunez, M. del Rosario Herrera, J. Pignataro, F. Guzman, and D.M. Spooner. 2009. Robust and highly informative microsatellite-based genetic identity kit for potato. *Molec Breed* 23:377-388.
- Ghislain, M., J. Nunez, M. del Rosario Herrera, and D.M. Spooner. 2009. The single Andigenum origin of Neo-Tuberosum materials is not supported by microsatellite and plastid marker analyses. *Theor Appl Genet* 118:963-969.
- Jansky, S.H., J. Liping, X. Kaiyun, C. Xie, and D.M. Spooner. 2009. Potato production and breeding in China. *Potato Res* 52:57-65.
- Jansky, S.H., R. Simon and D.M. Spooner. 2009. A test of taxonomic predictivity: Resistance to the Colorado potato beetle in wild relatives of cultivated potato. *J Econ Entomol* 102:422-431.
- Nzaramba, M. Ndambe, Lavanya Reddivari, John Bamberg, and J. Creighton Miller, Jr. 2009. Antiproliferative activity and cytotoxicity of *Solanum jamesii* tuber extracts on human colon and prostate cancer cells in vitro. *J. Agric Food Chem* 57:8308-8315.
- Nzaramba, M. Ndambe, Lavanya Reddivari, John Bamberg, and J. Creighton Miller, Jr. 2009. Phenolic and glycoalkaloid levels of *S. jamesii* accessions and their antiproliferative effect on human prostate and colon cancer in vitro. *Am J Potato Res* 86:154. (Abstract)

- Rodriguez, F. and D.M. Spooner. 2009. Nitrate reductase phylogeny of potato (*Solanum* sect. *Petota*) genomes with emphasis on the origins of the polyploid species. *Syst Bot* 34:207-219.
- Rodriguez, F., F. Wu, C. Ane, S. Tanksley, and D.M. Spooner. 2009. Do potatoes and tomatoes have a single evolutionary history, and what proportion of the genome supports this history? *BMC Evol Biol* 9:191 doi:10.1186/1471-2148-9-191.
- Spooner, D.M. 2009. DNA barcoding will frequently fail in complicated groups: an example in wild potatoes. *Am J Bot* 96:1177-1189.
- Spooner, D.M., A. Clausen and I. Peralta. 2009. Taxonomic treatment of *Solanum* section *Petota* (wild potatoes) in: *Catalogo de plantas vasculares del Cono Sur (Argentina, Chile, Paraguay, Uruguay, y sur del Brasil)*, eds. Fernando O. Zuloaga, Osvaldo Morrone, and Manuel J. Belgrano. *Monographs in Systematic Botany, Missouri Botanical Garden* 107:3011-3053.
- Spooner, D.M., S.H. Jansky and R. Simon. 2009. Tests of taxonomic and biogeographic predictivity: resistance to multiple disease and insect pests in wild relatives of cultivated potato. *Crop Sci* 49:1367-1376.

B. Journal Articles and Abstracts Reporting Research with NRSP-6 Stocks

- Abad, J.A., C. Loschinkohl, M. Smither, and J. Pack. 2009. Interception of two unknown potato viruses at the USDA-APHIS Plant Germplasm Quarantine Program. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, p 60. (Abstract)
- Brown, C. R., H. Mojtahedi, J.M. Crosslin, S. James, B. Charlton, R.G. Novy, S.L. Love, M.I. Vales, and P. Hamm. 2009. Characterization of resistance to Corky Ringspot disease in potato: A case for resistance to infection by tobacco rattle virus. *Am J Potato Res* 86:49-55.
- Camire, M., S. Kubow and D.J. Donnelly. 2009. Potatoes and Human Health. *Critical Reviews in Food Science and Nutrition* 49:823-840.
- Carputo, Domenico, R. Aversano, A. Barone, A. Di Matteo, M. Iorizzo, L. Sigillo, A. Zoina, and L. Frusciante. 2009. Resistance to *Ralstonia solanacearum* of sexual hybrids between *Solanum commersonii* and *S. tuberosum*. *Am J Potato Res* 86:196-202.
- Chevalier, E., A. Loubert-Hudon and D.P. Matton. 2009. ScRALF3, a secreted RALF-like peptide implicated in the establishment of embryo sac polarity during ovule development. *ASPB Plant Biology 2009*, Honolulu, Hawaii, July 18-22, 2009. Poster presentation.
- Cooper, Susannah G., David S. Douches, Kelly Zarka, and Edward J. Grafius. 2009. Enhanced resistance to control potato tuberworm by combining engineered resistance, avidin, and natural resistance derived from *Solanum chacoense*. *Am J Potato Res* 86:24-30.
- Crosslin, J.M. 2009. PVY: an old enemy and a continuing challenge. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, pp 54-55. (Abstract)

- D'Hoop, B.B., P.L.C. Keizer, C. Marques-Castro, M.J. Paulo, R.G.F. Visser, H.J. van Eck, and F.A. van Eeuwijk. 2009. Population structure and linkage disequilibrium patterns in potato. In: The 6th Solanaceae Genome Workshop, Book of Abstracts, New Delhi, India, 08-13 November 2009: p.176. (Abstract)
- D'Hoop, B.B., M.J. Paulo, C. Marques-Castro, M. Malosetti, P.L.C. Keizer, R.G.F. Visser, H.J. van Eck, and F.A. van Eeuwijk. 2009. Association mapping in tetraploid potato. In: XIV meeting of the Biometrics in Plant Breeding Section, Book of Abstracts, Dundee, Scotland, 02-04 September 2009: p.9. (Abstract)
- Douches, D.S., C.R. Buell, W. de Jong, D. Francis, L. Mueller, A. Stone, and A. Van Deynze. 2009. Translating Solanaceae sequence diversity and trait variation into applied outcomes through integrative research, education, and extension. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, p 74. (Poster)
- Douches, D.S., J. Coombs, R. Hammerschmidt, W.W. Kirk, and C. Long. 2009. Kalkaska: A round white chip-processing potato variety with common scab resistance. *Am J Potato Res* 86:347-355.
- Fu, Yong-Bi, Gregory W. Peterson, Ken W. Richards, T. Richard Tarn, and Jane E. Percy. 2009. Genetic diversity of Canadian and exotic potato germplasm revealed by simple sequence repeat markers. *Am J Potato Res* 86:38-48.
- Ginzberg, I., J.G. Tokuhisa and R.E. Veilleux. 2009. Potato steroidal glycoalkaloids: biosynthesis and genetic manipulation. *Potato Res* 52:1-15.
- Gopal, J., Vinay Bhardwaj, P. Manivel, P.H. Singh, and Vinod Kumar. 2008. Screening of wild species for late blight resistance in potato. *Proc Internatl Conf Biodiv Conserv & Mgt* 327-331.
- Goyer, Aymeric. 2010. Why and how to increase the vitamin contents of potato? Proceedings of the 1st Washington Oregon Potato Commission Annual Meeting, Kennewick, WA, January 26-28, 2010.
- Groza, H.I., B.D. Bowen, A.J. Bussan, F.M. Navarro, W.R. Stevenson, J.P. Palta, and J. Jiang. 2009. Freedom Russet—A dual purpose russet potato cultivar with resistance to a common scab and good fry quality. *Am J Potato Res* 86:406-414.
- Halterman, Dennis. 2009. Elucidating the molecular determinants of broad-spectrum late blight resistance. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, p 32. (Abstract)
- Hamernik, A.J., R.E. Hanneman, Jr. and S.H. Jansky. 2009. Introgression of wild species germplasm with extreme resistance to cold sweetening into the cultivated potato. *Crop Sci* 49:529-542.
- Haynes, Kathleen G., Barbara J. Christ, Christopher R. Burkhart, and Bryan T. Vinyard. 2009. Heritability of resistance to common scab in diploid potatoes. *Am J Potato Res* 86:165-170.
- Hosaka, Kazuyoshi and Rena Sanetomo. 2009. Comparative differentiation in mitochondrial and chloroplast DNA among cultivated potatoes and closely related wild species. *Genes & Genet Syst* 84:371-378.

- Jansky, S.H. and A.J. Hamernik. 2009. The use of *Solanum verrucosum* as a bridge species. *Genet Res Crop Evol* 56:1107-1115.
- Jung, C.S, H. Griffiths, D. De Jong, S. Cheng, M. Bodis, T-S. Kim, and W. De Jong. 2009 The potato developer (D) locus encodes an R2R3 MYB transcription factor that regulates expression of multiple anthocyanin structural genes in tuber skin. *Theor Appl Genet* 120:45-47.
- Kelley, K.B., J.L. Whitworth and R.G. Novy. 2009. Mapping of the potato leafroll virus resistance gene, *Rlr_{etb}*, from *Solanum tuberosum* identifies interchromosomal translocations among its e-genome chromosomes 4 and 9 relative to the A-genome of *Solanum* L. sect. *Petota*. *Molecular Breeding* 23:489-500.
- Kozlov, V.A., N.V. Rusetsky, A.V. Chashinsky, N.M. Ignatova, and I.A. Shutinskaya. 2009. Results and perspectives of breeding the parental line of potato in Belarus. V.A. Kozlov [et al.] *kartopliarstvo*, 2009 N 3-4 (16-17).
- Kozlov, V.A., N.V. Rusetsky, A.V. Chashinsky, and I.A. Shutinskaya. 2008. Introduction and evolution of rare used potato wild species on agronomical characters in potato breeding. V.A. Kozlov [et al.] material of 8 international scientific conference 8-12 June, 2008. Michurinsk National Agrarian University-Michurinsk, p. 53-55.
- Kozukue, Nobuyuki, Kyung-Soon Yoon, Gwang-In Byun, Shuji Misoo, Carol E. Levin, and Mendel Friedman. 2008. Distribution of glycoalkaloids in potato tubers of 59 accessions of two wild and five cultivated *Solanum* species. *J Ag Food Chem* 56:11920-11928.
- Lafleur, E., M. Sabar, F. Tebbji, and D.P. Matton. 2009. Pollen tube guidance is severely affected in the *Solanum chacoense* MAPKKK ScFRK1 mutant. ASPB Plant Biology 2009, Honolulu, Hawaii, July 18-22, 2009. Poster presentation.
- Liu, Zhenyu and Dennis Halterman. 2009. Different genetic mechanisms control foliar and tuber resistance to *Phytophthora infestans* in wild potato *Solanum verrucosum*. *Am J Potato Res* 86:476-480.
- Lozoya-Saldana, H., J. Whitworth and C.R. Belmar-Diaz. 2009. Evaluation of potato clones for resistance to late blight (*Phytophthora infestans* (Mont) de Bary), in Chapingo, Mexico. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, pp 34-35. (Abstract)
- Luthra, S.K., J. Gopal, V. Kumar, B.P. Singh, and S.K. Pandey. 2008. Evaluation of potato germplasm for frost tolerance. *Indian J Hort* 65:346-348.
- Major, G., C. Daigle, T. Stafford-Raichard, F. Tebbji, E. Lafleur, S. Caron, and D.P. Matton. 2009. Characterization of *ScMAP4K1*, a MAP kinase kinase kinase kinase involved in ovule, seed and fruit development in *Solanum chacoense* Bitt. *Current Topics in Plant Science* 10:27-46
- Matton, D.P. 2009. Ovule development and pollen tube guidance are affected in the *Solanum chacoense* MAPKKK FRK1 mutant. Seminar speaker, Laboratorio Nacional de Genomica para la Biodiversidad (LANGEBIO-CINVESTAV). Irapuato, Mexico, February 2, 2009.

- Matton, D.P. 2009. Pollen tube guidance in *Solanum* species: identification of glycoproteins as the ovule-derived chemoattractant signal. Invited seminar speaker. Biology Dept., University of South Carolina, November 16, 2009.
- McCue, K.F., T. Oosumi, D.R. Rockhold, K.L. Deal, and W.R. Belknap. 2009. Cloning and characterization of a late blight resistance gene (*Rpi-bt1*) and other resistance gene analogs from *Solanum bulbocastanum*. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, pp 42-43. (Abstract)
- Mihovilovich, E., A. Velasquez, M. Aponte, and M. Bonierbale. 2009. Molecular breeding for potato leafroll virus (PLRV) resistance will be facilitated by a PCR-based marker closely linked to high levels of resistance in *S. tuberosum* ssp. *Andigena*. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, p 44. (Abstract)
- Murphy, A., D. De Koeyer, S. Wood, K. Douglass, T. Dalton, D. Wilson, and G. Belair. 2009. Marker-assisted selection for potato lines with golden nematode resistance using a high-resolution DNA melting assay. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, pp 43-44. (Abstract)
- Novy, R.G., J.L. Whitworth and K. Kelley. 2010. Characterization and mapping of the potato leafroll virus (PLRV) resistance gene *Rlretb* derived from *Solanum etuberosum*. *Am J Potato Res* 87:137. (Abstract)
- Oosumi, T., D.R. Rockhold, M.M. Macree, K.L. Deahl, K.F. McCue, and W.R. Belknap. 2009. Gene *Rpi-bt1* from *Solanum bulbocastanum* confers resistance to late blight in transgenic potatoes. *Am J Potato Res* 86:456-465.
- Ortega, J., S. Yilma and M.I. Vales. 2009. Premier Russet: A source of strain-specific resistance to Potato Virus Y (PVY). 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, p 42. (Abstract)
- Ortiz-Medina, E., V. Sosle, V. Raghavan, and D.J. Donnelly. 2009. A method for intercultural comparison of potato tuber nutrient content using specific tissue weight proportions. *J Food Sci* 74(5):S177-S181.
- Ottoman, R.J., D.C. Hane, C.R. Brown, S. Yilma, S.R. James, A.R. Mosley, J.M. Crosslin, and M.I. Vales. 2009. Validation and implementation of marker-assisted selection (MAS) for PVY resistance (*Ryadg* gene) in a tetraploid potato breeding program. *Am J Potato Res* 86:304-314.
- Perez, K.W., B-C Kang, J. Van Eck, S. Austin-Phillips, S. Gray, and M.M. Jahn. 2009. Overexpression of pepper *elf4E* allele *pvr1²* confers broad spectrum resistance to *Potato virus Y* in potato. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, p 58. (Abstract)
- Pompon, Julien, Dan Quiring, Philippe Giordanengo, and Yvan Pelletier. 2009. The characterization of *Solanum chomatophilum* resistance mechanism to aphid potato pests. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, p 30. (Abstract)

- Rusetsky, N.V., V.A. Kozlov, A.V. Chashinsky, and I.A. Shutinskaya. 2009. Wild and cultivated species potato as sources of agronomic characters: material All-Russian scientific coordination conference, dedicated to 100 years old from birth academic K.Z. Budin 28-29 July 2009. SSC of the RF. N.I. Vavilov All-Russian Research Institute of Plant Industry, St. Petersburg, p. 94-103.
- Sabar, M., E. Lafleur and D.P. Matton. 2009. Pollen tube guidance in *Solanum* species: identification of glycoproteins as the ovule-derived chemoattractant signal. Cell-cell communication in plant reproduction, University of Bath, UK, September 14-16, 2009. Oral and poster presentation.
- Santa Cruz, Jose H., Kathleen G. Haynes and Barbara J. Christ. 2009. Effects of one cycle of recurrent selection for early blight resistance in a diploid hybrid *Solanum phureja*-*S. stenotomum* population. *Am J Potato Res* 86:490-498.
- Sedlakova, V., P. Sedlak, P. Vejl, J. Domkarova, V. Horackova, and Z. Skodacek. 2009. Characterization of selected diploid genetic resources of genus *Solanum* intended for somatic hybridization with potato double haploids. *Agriculture* 55(1):17-25. ISSN 0551-3677.
- Sedlakova, V., P. Sedlak, P. Vejl, J. Domkarova, and V. Horackova. 2009. Analysis of chloroplast DNA intergenic spacer TrnL/TrnF in genus *Solanum* by denaturing gel electrophoresis. ECCB 2nd European Congress of Conversation Biology, Prague, 1-5 September 2009, pp 210. ISBN 978-80-213-1961-5.
- Sedlakova, V., P. Sedlak, P. Vejl, and P. Suchankova. 2009. Possibilities of potato somatic hybrids detection. 16th Scientific Congress: New knowledge in genetics and breeding of crops. November 21-22, 2009, Piestany, s. 31-35. ISBN 978-80-89417-04-09.
- Singh, Rudra P. 2009. Historical aspects of the *Potato virus Y* nomenclature. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, p 55. (Abstract)
- Stark, J.C., R.G. Novy, J.L. Whitworth, S.L. Love, D.L. Corsini, J.J. Pavek, M.I. Vales, S.R. James, D.C. Hane, B.A. Charlton, C.R. Brown, N.R. Knowles, M.J. Pavek, T.L. Brandt, and N. Olsen. 2009. Highland Russet: A full season, processing variety with high yields of uniform U.S. no. 1 tubers. *Am J Potato Res* 86:171-182.
- Tai, H., D. De Koeyer, C. Goyer, and A. Murphy. 2009. Comparative transcriptome profiling of diploid potato clones with variation in maturation timing. 93rd Annual Meeting of The PAA, Fredericton, New Brunswick, Canada, August 9-13, 2009, p 65. (Abstract)
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7. **APPROVED**

D. S. Douches, Chairman, Technical Committee

Date

C. Y. Hu , Lead Administrative Advisor

Date