ANNUAL REPORT

Calendar Year 2005

1. NRSP-6: INTER-REGIONAL POTATO INTRODUCTION PROJECT

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

2. COOPERATIVE AGENCIES AND PRINCIPAL LEADERS

State Agricultural Experimental Stations		**Representative**
Southern Region	Vice-Chair (2006)	J. C. Miller, Jr.
Western Region		J. Stark
North Central Region		D. S. Douches
Northeastern Region	Chairman (2006)	W. De Jong
United States Department of Agriculture		
Agricultural Research Service		
Technical Representative	Secretary (2006)	C. R. Brown
National Program Staff		P. K. Bretting
Area Director, Midwest Area		S. Shafer
Cooperative States Research Education & Extension Service		A. M. Thro
Animal and Plant Health Inspection Service		L. E. Levy
Inter-Regional Potato Introduction Project	Project Leader	J. B. Bamberg
Agriculture Canada		T. R. Tarn
Administrative Advisors		
Southern Region		R. L. Westerman
Western Region		C. Y. Hu
North Central Region	Lead	S. A. Slack
Northeastern Region		S. D. Reiling

3. PROGRESS AND PRINCIPAL ACCOMPLISHMENTS

A. Introduction of New Stocks

Dr. Bamberg, Dr. Alfonso del Rio, and Charles Fernandez (US Potato Genebank) had a successful collecting expedition to the Huachuca Wilderness in southeast Arizona and the Santa Catalina Mountains near Tucson, Arizona in September of 2005 (supported with extramural funding from USDA). They collected 14 new accessions, 13 of *S. stoloniferum* and one *S. jamesii* from the Chiricahua Wilderness. For 50 years the only available germplasm from this area consisted of a few collections from spots easily accessible by road. New collections were from sites accessible only through camping and extensive hiking. This will be a test case of an important question about germplasm collecting: Do samples from sites easy to access adequately represent the genetics in a geographic area, or is there much more work that should be done to access more remote sites? They also collected two *S. stolonifenum* from the Santa Catalina Mountains, both near two previous herbarium collection sites.

A total of 22 accessions were assigned PI numbers in 2005: two PVY resistant varieties from the UK, five late blight resistant clones from Mexico, one *S. soestii* from Bolivia, and 14 accessions collected from the SW United States. These accessions are now available from the NRSP-6 *Solanum* germplasm collection.

Several steps were taken in the past year to promote and inform researchers of NRSP-6's services and stocks. The NRSP-6 web page (http://www.ars-grin.gov/nr6) has been updated and made more user friendly. Clientele that 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. A new service we are offering is dried ground leaf samples for DNA testing. For foreign requesters this is useful since there are no quarantine restrictions on dried material.

B. Preservation and Increase of Stocks

In 2005, a total of 175 accessions were increased as botanical seed populations.

A total of 900 potato spindle tuber viroid (PSTVd) tests were performed on seed increase parents, seedlots and research materials. Germination tests were performed on 1199 accessions, ploidy determinations were made on nine accessions, and tetrazolium seed viability tests were done on 100 seedlots.

Progress was made on several international collaborative projects. We are working with CIP on a project to assess the impact of agrichemicals on pollen and seed viability of wild species (oral presentation at the PAA06). We planned a study to look at the prevalence of hidden recessives and diversity of nematode resistance alleles in *S. andigena* with Russian (VIR) colleagues.

Work continued with Dr. C. Miller's lab screening for antioxidants in uncolored wild potato species tubers. Previous screening among species identified ones with promising levels of

tuber antioxidant capacity. Some diploid "Mexican" species seem to have high antioxidants in common: *S. cardiophyllum, S. jamesii, and S. pinnatisectum* (paper submitted AJPR 3/2006). Continued fine screening is discovering high levels of antioxidants in species that are more crossable to tuberosum and known to have acceptably low levels of glycoalkaloids.

We explored the potential of using a potato-based in vitro *Agrobacterium tumefaciens* system to screen for anti-tumor factors. The Potato Crop Germplasm Committee (CGC) also sponsored a funded grant proposal to screen for Potato Carboxypeptidase Inhibitor (PCI), a small heat-stable protein unique to potato that has been shown to efficiently inhibit proliferation of some of the most pernicious human cancers.

Frost resistant breeding work continues with recurrent selection of *S. tuberosum, S. acaule* and *S. commersonii* hybrids. Materials are now maturing earlier with the introgression of very early varieties, and some selections have been confirmed to survive in vitro leaf freezing to –5ºC. In a related study, substitution backcross families were used to show that cytoplasm is *not* a factor in the extreme frost hardiness of *S. commersonii*.

We discovered a new floral development mutant in *S. microdontum* which we have named *crazy sepal* because it grows multiple (indeterminate) sets of sepals instead of anthers and pistils. This is a potential tool for studying floral development, and may have other applications as a completely sterile mutant. Progeny tests indicate monogenic recessive gene action. Attempts to artificially restore fertility are in progress as well as the generation of DNA markers to tag the recessive cs_1 allele (short communication in AJPR).

Testing was continued in an effort to confirm and characterize apomixis in *S. jamesii*.

A field tuberization location in Hawaii was tested and appears to be effective. Until now, the only other way to produce tubers of wild species has been in winter greenhouse pots, and such tubers might not give a true indication of their potential value with respect to a variety of tuber traits.

Plant parts are known to vary widely for pH, but little is known about the variation, basis, or utility of pH extremes in potato tubers. When pH was measured on species of the mini-core collection, replicates over years and populations gave rather consistent results, with *S. polytrichon, S. pinnatisectum* and *S. papita* being the most acidic. Cultivated species, *S. verrucosum* and *S. okadae,* were least acidic. The observed range of pH (5.5-6.1) represents a 4-fold difference in H ion concentration. We intend to fine-screen among genotypes within species to find the limits of tuber acidity, then characterize the physiology, genetics and impact on economic traits like disease resistances and processing quality (oral presentation at the PAA06).

We want to see if we can do more efficient research by combining many initiatives. *Solanum microdontum* is remarkably extreme and variable for several characteristics (acid, potassium, calcium, late blight, and antioxidants). We will characterize all the S. mcd for these traits. We also want to collect and analyze DNA to see if gross genetic differences are a guide to variation for useful traits.

C. <u>Classification</u>

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

D. Distribution

NRSP-6 distributed 3,929 units of seed (not including in-house use); 135 tuber families; 1,106 tuber clones; 732 in vitro stocks; 368 DNA samples; and 157 plants in plugs to clientele in 30 states of the USA and 12 other countries. Internally NRSP-6 used 13,566 units of seed for seed backup, chromosome counts, germination tests, identification and taxonomic check plantings, in vitro maintenance, seed increases, PSTV tests, and miscellaneous plantings. The volume and types of stocks sent to various consignee categories are summarized in the table below.

VOLUME AND TYPES OF STOCKS DISTRIBUTED

	Units[1]								
Category	S	TF	TS	IVS	DNA	PL	HER	TOT	PIs
Domestic	2,815	135	1,094	438	368	157	0	5,007	3,145
Foreign	1,114	0	12	294	0	0	0	1,720	791
NRSP-6[2]	13,566	0	0	0	0	0	0	13,566	1,895
Total	17,495	135	1,106	732	368	157	0	20,293	5,831

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

[2] Includes chromosome counts, germination tests, ID and Taxonomic check plantings, in vitro maintenance, seed increases, PSTV tests, miscellaneous plantings, and NSSL seed backup.

E. Visitors From Other Countries

Dr. D. Rios Canary Islands

4. USEFULNESS OF FINDINGS

NRSP-6's purpose is to provide a ready source of raw materials, technology and information to support potato enhancement, breeding and research in the USA and around the world. Thus, one way the success of NRSP-6 can be measured is by the occurrence of NRSP-6 germplasm in the pedigrees of new, improved potato cultivars. Another is in the use of NRSP-6 stocks in more basic research programs, which is reflected in publications that provide information that ultimately contribute to better exploitation of the germplasm resource.

Four cultivar releases were published in the American Journal of Potato Research in 2005: ‘Dakota Pearl’, ‘Millenium Russet’, ‘Sierra Gold’, and ‘Summit Russet’. Four verticillium

wilt resistant germplasm releases were published in AJPR. All of these are known to have wild species in their pedigrees.

Section 6 lists 100 papers, 45 abstracts, and 3 theses which report the use of NRSP-6 *Solanum* introductions this year.

5. WORK PLANNED FOR 2006

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.

Evaluation experiments will continue on *Solanum* species for these and other traits: antioxidants, tuber acidity, apomixis, crazy sepal mutant, sugar end disorder, frost hardiness, tuber calcium, hormone mutants, and anti-cancer compounds.

APIC Intergenebank projects, researching the status and dynamics of genetic diversity using DNA markers, will continue to strengthen ties with sister genebanks around the world.

6. PUBLICATIONS ISSUED DURING THE YEAR

A. Publications issued by NRSP-6 Personnel

Bamberg, J.B. and A.H. del Rio. 2004. Hypothetical obscured recessive traits in tetraploid *Solanum* estimated by RAPDs. Am. J. Potato Res. 81:76. (Abstract)

Bamberg, J.B., J.P. Palta, and S.E. Vega. 2005. *Solanum commersonii* cytoplasm does not improve freezing tolerance in substitution backcross hybrids with frost-sensitive potato species. Am. J. Potato Res. 82:251-254.

Busse, J., J.B. Bamberg and J.P. Palta. 2005. Genetic variations for calcium accumulation efficiency in tuber and aerial shoot tissue. Am. J. Potato Res. 82:60. (Abstract)

del Rio, A.H. and J.B. Bamberg. 2004. Geographical parameters and proximity to related species predict genetic variation in the inbred potato species *Solanum verrucosum* Schlechtd. Am. J. Potato Res. 81:55. (Abstract)

del Rio, Alfonso, J.B. Bamberg and C. Fernandez. 2005. Assessment of the genetic structure of in situ populations of wild potato *Solanum fendleri* eco-geographically dispersed in the Chiricahua Mountains, Arizona, USA. Presented at 89th Annual Meeting of The Potato Association of America, Calgary, Canada, July 17-21, 2005. (Abstract)

del Rio, A.H., J.B. Bamberg and Z. Huaman. 2005. Assessment of putative identical germplasm collections at CIP and US Potato genebanks determined by RAPD and SSR markers. Am. J. Potato Res. 82:66. (Abstract)

Fernandez, C.J. and J.B. Bamberg. 2005. A new *Solanum fendleri* mutant lacking purple pigment. Am. J. Potato Res. 82:69. (Abstract)

Kiru, S., S. Makovskaya, J. Bamberg, and A. del Rio. 2005. New sources of resistance to race Ro1 of the Golden nematode (Globodera rostochiensis Woll.) among reputed duplicate germplasm accessions of *Solanum tuberosum* L. subsp. andigena (Juz. et Buk.) Hawkes in the VIR (Russian) and US Potato Genebanks. Genet. Resources and Crop Evol. 52:145-149.

Lara-Cabrera, S.I. and D.M. Spooner. 2004. Taxonomy of North and Central American diploid wild potato (*Solanum* sect. Petota) species: AFLP data. Pl. Syst. & Evol. 248:129-142.

Lara-Cabrera, S. and D.M. Spooner. 2005. Taxonomy of Mexican diploid wild potatoes: (*Solanum* sect. *Petota*) morphological and microsatellite data. Monogr. Syst. Bot., Missouri Bot. Gard. 104:199-205.

Lozoya-Saldana, H., O. Barrios and J. Bamberg. 2005. *Phytophthora infestans*; races vs genotypes in the Toluca Valley, Mexico. Am. J. Potato Res. 83:122. (Abstract)

Moreyra, R., J.B. Bamberg and A.H. del Rio. 2004. Genetic consequences of collecting tubers vs. seeds of wild potato species indigenous to the USA. Am. J. Potato Res. 81:76. (Abstract)

Nzaramba, Ndambe M., John Bamberg, Douglas C. Scheuring, and J. Creighton Miller, Jr. 2005. Antioxidant activity in *Solanum* species as influenced by seed type and growing location. Presented at 89th Annual Meeting of The Potato Association of America, Calgary, Canada, July 17-21, 2005. (Abstract)

Spooner, D.M. and W.L.A. Hetterscheid. 2005. Origins, evolution, and group classification of cultivated potatoes. In: Darwin's Harvest: New Approaches to the Origins, Evolution, and Conservation of Crops. T.J. Motley, N. Zerega, and H. Cross (eds.). pp. 285-307. Colombia University Press, New York.

Spooner, D.M., K. McLean, G. Ramsay, R. Waugh, and G.J. Bryan. 2005. A single domestication for potato based on multilocus AFLP genotyping. Proc. Natl. Acad. Sci. USA. 120:14694-14699.

Spooner, D.M., J. Nunez, F. Rodriguez, P.S. Naik, and M. Ghislain. 2005. Nuclear and chloroplast DNA reassessment of the origin of Indian potato varieties and its implications for the origin of the early European potato. Theor. Appl. Genet. 110:1020-1026.

Spooner, D.M., I. Peralta and S. Knapp. 2005. AFLP phylogeny of wild tomatoes (*Solanum* L. section Lycopersicon [Mill.] Wettst. subsection Lycopersicon. Taxon. 54:43-61.

Vega, S.E., J.B. Bamberg and J.P. Palta. 2005. Characterization of gibberellin requirements for various diploid and tetraploid gibberellin deficient mutants. Am. J. Potato Res. 82:94. (Abstract)

Vega, S.E., J.P. Palta and J.B. Bamberg. 2005. Evidence for the mitigation of gibberellin deficiency symptoms by root zone calcium in GA-deficient mutants of potato. Am. J. Potato Res. 82:94-95. (Abstract)

Villamon, F.G., D.M. Spooner, M. Orillo, E. Mihovilovich, W. Perez, and M. Bonierbale. 2005. Late blight resistance linkages in a novel cross of the wild potato species *Solanum paucissectum* (series Piurana). Theor. Appl. Genet. 111:1201-1214.

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

Albernino, S., D. Carputo, G. Caruso, M.R. Ercolano, and L. Frusciante. 2004. Field performance of families and clones obtained through unilateral sexual polyploidization in potato (*Solanum tuberosum*). Advances in Hort. Sci. 18(2):47-52.

Anjum, M.A. and Ali Hakoomat. 2004. Effect of culture medium on direct organogenesis from different explants of various potato genotypes. Biotech. 3:187-193.

Aversano, R., M.J. Sanchez, D. Carputo, L. Frusciante, and J.M. Bradeen. 2005. Molecular strategies for the efficient characterization of resistance gene marker and allelic diversity in *Solanum* species. Solanaceae Genome Workshop, Ischia, Italy, September 2005. (Abstract)

Aversano, R., R.L. Syverson, E.A. Quirin, D. Carputo, and J.M. Bradeen. 2005. Development of integrated molecular marker resources for resistance gene mapping and exploration of resistance gene diversity in the genus *Solanum*. Presented at Annual Congress "Societa' Italiana di Genetica Agraria XLIX", Potenza, September 12-15, 2005. (Abstract)

Aversano, R., R.L. Syverson, E.A. Quirin, D. Carputo, and J.M. Bradeen. 2005. R gene mapping and isolation in the genus *Solanum*: Towards an expandable, communal resource of integrated physical and genetic maps for candidate R genes. Presented at Triennial Conference of the European Assoc. for Potato Research XVI, Bilbao, Spain, July 2005. (Abstract)

Aversano, R., E.A. Quirin, R.L. Syverson, D. Carputo, and J.M. Bradeen. 2005. Development of integrated *Solanum bulbocastanum* genetic and physical maps as a communal resource for mapping and isolation of R genes. Presented at Plant & Animal Genome XIII, San Diego, CA, January 2005. (Abstract)

Belknap, W.R. 2005. Modification of potato alkaloids- a lesson in applied metabolomics. Presented at American Chemical Society, Agrochemicals Division Symposium, ACS National Meeting, San Diego, California, March 2005. (Abstract)

Bisognin, D.A., D.S. Douches, L. Buszka, G. Bryan, and D. Wang. 2005. Mapping late blight resistance in *Solanum microdontum* Bitter. Crop Sci. 45:340-345.

Boltowicz, D., A. Szczerbakowa and B. Wielgat. 2005. RAPD analysis of the interspecific somatic hybrids *Solanum bulbocastanum* (+) *S. tuberosum*. Cell. Mol. Bio. Letters 10(1):151-162.

Braden, J.M., M.J. Sanchez, R.L. Syverson, R. Aversano, D.S. Mollov, and D. Carputo. 2005. Understanding molecular diversity: towards strategic sampling of genebank collections. Solanaceae Genome Workshop, Ischia, Italy, September 2005. (Abstract)

Bradshaw, J.E., G.J. Bryan, M.F.B. Dale, K. McLean, and B. Pande. 2004. Dissection and analyses of quantitative disease resistance in potatoes. Aspects of Appl. Bio. 72:133-138.

Brown, C.R. 2005. Antioxidants in Potato. Am. J. Potato Res. 82:163-172.

Brown, C.R., D. Culley, C.P. Yang, R. Durst, and R. Wrolstad. 2005. Variation of anthocyanins and Carotenoid contents and associated antioxidant values in potato breeding lines. J. Am. Soc. Hort. Sci. 130:174-180.

Brown, C.R., W. De Jong and C.-P. Yang. 2005. Inheritance of total Carotenoid in high-content diploid germplasm. Presented at 89th Annual Meeting of The Potato Association of America, Calgary, Canada, July 17-21, 2005. (Abstract)

Bu QingYun, Wu Liang, Yang ShiHu, and Wan JianMin. 2005. Cloning, characterization and expression vector construction of potato protease-inhibitor II gene (*PIN* II-2x) from diploid potato (*Solanum phureja*). Hereditas 27:417-422.

Burkhart, C.R., B.J. Christ and K.G. Haynes. 2005. The relative virulence of various isolates of Fusarium species on potato. Presented at the American Phytopathology Meeting 2005.

Burkhart, C.R., B.J. Christ and K.G. Haynes. 2005. Heritability of resistance to Fusarium dry rot in a diploid hybrid potato population. Presented at the American Phytopathology Meeting 2005.

Camadro, E.L., D. Carputo and S.J. Peloquin. 2004. Substitutes for genome differentiation in tuber-bearing *Solanum*: interspecific pollen-pistil incompatibility, nuclear-cytoplasmic male sterility, and endosperm. Theor. Appl. Genetics 109:1369-1376.

Carputo, D. and A. Barone. 2005. Ploidy level manipulations in potato through sexual hybridization. Annals of Appl. Bio. 146:71-79.

Chen, Qin and H.Y. Li. 2005. An improved technique for high-resolution mitotic chromosome studies in *Solanum*. HortSci. 40:54-56.

Chen, Q., H.B. Zhang and D. De Koeyer. 2005. Development of genomic tools for large-scale physical mapping and map-based cloning of disease and insect resistance genes in potato. Presented at 89th Annual Meeting of The Potato Association of America, Calgary, Canada, July 17-21, 2005. (Poster Abstract)

Cooper, S.G., D.S. Douches and E.J. Grafius. 2004. Combining genetic engineering and traditional breeding to provide elevated resistance in potatoes to Colorado potato beetle. Ent. Exp. et Appli. 112(1):37-46.

Coombs, J.J., L.M. Franke and D.S. Douches. 2004. An applied fingerprinting system for cultivated potato using simple sequence repeats. Am. J. Potato Res. 81:243-250.

Costanzo, S., B.J. Christ, and K.G. Haynes. 2004. Late blight resistance in a diploid full-sib potato family. Plant Breeding 123(4):377-381.

Costanzo, S., I. Simko, B.J. Christ, and K.G. Haynes. 2005. QTL analysis of late blight resistance in a diploid potato family of *Solanum phureja* x *S. stenotomum*. Theor. Appl. Genet. 111:609-617.

Davenport, J.R., P.H. Milburn, C.J. Rosen, and R.E. Thornton. 2005. Environmental impacts of potato nutrient management. Am. J. Potato Res. 82:321-328.

Davis, Jeffrey A., Edward B. Radcliffe, David W. Ragsdale, and Christian A. Thill. 2005. Identifying resistance to aphids in crosses with somatic fusions of *Solanum tuberosum* L. and *Solanum bulbocastanum* Dun. Presented at 89th Annual Meeting of The Potato Association of America, Calgary, Canada, July 17-21, 2005. (Abstract)

De Koeyer, D., Y. Pelletier, D. Ronis, C. Clark, and V. Burns. 2005. *Solanum oplocense*: A new source of resistance to Colorado potato beetle and processing quality attributes. Presented at 89th Annual Meeting of The Potato Association of America, Calgary, Canada, July 17-21, 2005. (Abstract)

Dinu, I.I., R.J. Hayes, R.G. Kynast, R.L. Phillips, and C.A. Thill. 2005. Novel inter-series hybrids in *Solanum*, section *Petota*. Theor. Appl. Genet. 110:403-415.

Ercolano, M.R., D. Carputo, J. Li, L. Monti, A. Barone, and L. Frusciante. 2004. Assessment of genetic variability of haploids extracted from tetraploid (2*n*=4*x*=48) *Solanum tuberosum*. Genome 47(4):33-638.

Estrada, Maria A. and David S. Douches. 2005. Potato tuberworm (Lepidoptera: Gelichiidae) resistance in potato lines with the *Bacillus thuringiensis-cry1Ac* gene and natural resistance factors. Presented at 89th Annual Meeting of The Potato Association of America, Calgary, Canada, July 17-21, 2005. (Poster Abstract)

Estrada-Luna, A.A., M. Garcia-Aguilar and J.P. Vielle-Calzada. 2004. Female reproductive development and pollen tube growth in diploid genotypes of *Solanum cardiophyllum* Lindl. Sexual Pl. Repro. 17:117-124.

Feingold, S., J. Lloyd, N. Norero, M. Bonierbale, and J. Lorenzen. 2005. Mapping and characterization of new EST-derived microsatellites for potato (*Solanum tuberosum* L.). Theor. Appl. Genet. 111:456-466.

Flis, B., J. Hennig, D. Strzelczyk-Zyta, C. Gebhardt, and W. Marczewski. 2005. The *Ry-f_{sto}* gene from *Solanum stoloniferum* for extreme resistant to *Potato virus Y* maps to potato chromosome XII and is diagnosed by PCR marker $GP122_{718}$ in PVY resistant potato cultivars. Molecular Breeding 15:95-101.

Ganga, Z.N., G.A. Porter, D. Lambert, G. Sewell, and A. Bushway. 2005. Reeves Kingpin: A high yielding mid-season variety suitable for fry processing. Presented at 89th Annual Meeting of The Potato Association of America, Calgary, Canada, July 17-21, 2005. (Poster Abstract)

Germain, H., E. Chevalier, S. Caron, and D.P. Matton. 2005. Characterization of five RALF-like genes from *Solanum chacoense* provides support for a developmental role in plants. Planta 220:447-454.

Gopal, J., Vinod Kumar and S.S. Thakur. 2004. Hybrid and open-pollinated true potato seed production: some considerations. J. Indian Potato Assoc. 31:13-20.

Gounaris, Y. 2005. Asymmetric potato cybrids derived from protoplast fusion between the selection ND860-2 and the cultivar Russet Burbank. J. Food, Ag. Environ. 3:157-160.

Groza, H.I., B.D. Bowen, D. Kichefski, S.J. Peloquin, W.R. Stevenson, A.J. Bussan, and J. Jiang. 2005. Millennium Russet: A dual purpose russet potato variety. Am. J. Potato Res. 82:211-219.

Hayes, R.J., I.I. Dinu and C.A. Thill. 2005. Unilateral and bilateral hybridization barriers in inter-series crosses of 4x 2EBN *Solanum stoloniferum, S. pinnatisectum, S. cardiophyllum*, and 2x 2EBN *S. tuberosum* haploids and haploid-species hybrids. Sexual Plant Reproduction 17:303-311.

Haynes, K.G. and B.J. Christ. 2005. Improvements in foliar late blight resistance in a diploid hybrid *Solanum phureja – S. stenotomum* population. Presented at 89th Annual Meeting of The Potato Association of America, Calgary, Canada, July 17-21, 2005. (Abstract)

Haynes, K.G., B.J. Christ, R.T. Zink, R.D. Davidson, and J.S. Miller. 2005. Powdery scab trials of potato varieties and advanced selections in 2003. Presented at 89th Annual Meeting of The Potato Association of America, Calgary, Canada, July 17-21, 2005. (Poster Abstract)

Iovene, M., A. Barone, L. Frusciante, L. Monti, and D. Carputo. 2004. Selection for aneuploid potato hybrids combining a low wild genome content and resistance traits from *Solanum commersonii*. Theor. Appl. Genetics 109:1139-1146.

Ishizaki, T. and A. Kato. 2005. Introduction of the tobacco Retrotransposon *Tto1* into diploid potato. Plant Cell Reports 24(1):52-58.

Jakuczun, H. and I. Wasilewicz-Flis. 2004. New sources of potato resistance to *Phytophthora infestans* at the diploid level. Pl. Breed. Seed Sci. 50:137-145.

Jung, C.S., H.M. Griffiths, D.M. De Jong, S. Cheng, M. Bodis, and W.S. De Jong. 2005. The potato *P* locus codes for flavonoid 3',5'-hydroxylase. Theor. Appl. Genetics 110:269-275.

Khu, D.M., S.L. Love and J.H. Lorenzen. 2005. Identification of AFLP and SSR markers associated with corky ringspot disease resistance in a tetraploid population (*Solanum tuberosum* ssp. *tuberosum*). Am. J. Potato Res. 83:117. (Abstract)

Kim-Lee, Neiyoung, J.S. Moon, Y.J. Hong, M.S. Kim, and H.M. Cho. 2005. Bacterial wilt resistance in the progenies of the fusion hybrids between haploid of potato and *Solanum commersonii*. Am. J. Potato Res. 82:129-137.

Kirk, W.W., F.M. Abu-El Samena, J.B. Muhinyuzaa, R. Hammerschmidt, D.S. Douches, C.A. Thill, H. Groza, and A.L. Thompson. 2005. Evaluation of potato late blight management utilizing host plant resistance and reduced rates and frequencies of fungicide applications. Crop Protection 24:961-970.

Kouassi, A.B., M.C. Kerlan, M. Sobczak, J.P. Dantec, C. Rouaux, D. Ellisseche, and D. Mugniery. 2004. Resistance to the root-knot nematode *Meloidogyne fallax* in *Solanum sparsipilum*: analysis of the mechanisms. Nematology 6:389-400.

Kuhl, Joseph C. and D.S. Douches. 2005. Characterization of *RB* transgenic potato lines. Presented at 89th Annual Meeting of The Potato Association of America, Calgary, Canada, July 17-21, 2005. (Abstract)

Lambert, D.H., M.L. Powelson, and W.R. Stevenson. 2005. Nutritional interactions influencing diseases of potato. Am. J. Potato Res. 82:309-319.

Lebecka, R., E. Nimnoch-Guzowska, and Z. Kaczmarek. 2005. Resistance to soft rot (*Erwinia carotovora* subsp. *atroseptica*) in tetraploid potato families obtained from 4*x*-2*x* crosses. Am. J. Potato Res. 82:203-210.

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7. APPROVED

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W.De Jong, Chairman, Technical Committee Date

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S.A. Slack, Lead Administrative Advisor Date