ANNUAL REPORT

Calendar Year 2004

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	Secretary (2005)	J. C. Miller, Jr.
Western Region		A. R. Mosley
North Central Region	Chairman (2005)	D. S. Douches
Northeastern Region	Vice Chair (2005)	W. De Jong

United States Department of Agriculture		
Agricultural Research Service		
Technical Representative		C. R. Brown
National Program Staff		P. K. Bretting
Area Director, Midwest Area		A. D. Hewings
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 Chiricahua Wilderness in southeast Arizona in September of 2004 (supported with extramural funding from USDA). They collected 17 new accessions of *S. fendleri* (now reclassified as *stoloniferum*). 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?

A total of 29 accessions were assigned PI numbers in 2004: five from Peru, one from South Africa, six from Korea, and 17 from the southwest 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 trifold pamphlet was printed for distribution to school and tour groups and is available on the web page.

B. Preservation and Increase of Stocks

In 2004, a total of 268 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 1,044 accessions, ploidy determinations were made on 32 accessions, and tetrazolium seed viability tests were done on 32 seedlots.

In 2003 tetrazolium testing was initiated to determine the cause of poor germination on some seedlots. For some lots, it was confirmed that poor germination was due to inviable seeds and not germination protocol. In 2004 we recalled 69 of these zero-germ seedlots from long-term storage at NSSL. So far we have gotten good seed increases on 53 of these. A project with NSSL on long-term potato seed viability in different storage systems and methods of prestorage handling was initiated in 2003, and the last of the seed for this project was shipped in 2004.

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. 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*. 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 potenetial 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 -5^{o}C. 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*.

The cooperative project with NDSU for screening *S. andigena* populations for Sugar-end disorder did not progress as much as hoped in 2004, since winter tuberization in Weslaco, TX was poor. In 2005 we started cooperating with a grower in southern CA to assess the utility of that environment. In 2005 we are undertaking a backup plan to make F1 families of *S. andigena* accessions with a susceptible tester cultivar.

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.

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.

C. Classification

Dr. Spooner et al. have published Wild Potatoes (*Solanum* section *Petota)* of North and Central America. Dr. Spooner continues to resolve problems in taxonomic classification that impede efficient documentation and use of the germplasm. At present he is working on a use-based classification of varieties, and predictive value of taxonomy.

D. Distribution

NRSP-6 distributed 4,234 units of seed (not including in-house use); 258 tuber families; 2,052 tuber clones; 1,512 in vitro stocks; 47 DNA samples; 231 plants in plugs; and 61 herbarium samples to clientele in 30 states of the USA and 12 other countries. Internally NRSP-6 used 3,819 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	2,007	258	1,834	1,199	38	231	61	5,628	4,195
Foreign	2,227	0	218	313	9	0	0	2,767	1,953
NRSP-6[2]	3,819	0	0	0	0	0	0	3,819	1,126
Total	8,053	258	2,052	1,512	47	231	61	12,214	7,274

[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. L. Lopez	Peru
Dr. W. Roca	Peru
Dr. A. Villegas	Columbia
Dr. E. Sofiare	Indonesia
Dr. M. Herman	Indonesia
Dr. Kaushik	India

Dr. Swarup	India
Dr. G. P. Das	Bangladesh
Dr. V. Anand	India

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 contributes to better exploitation of the germplasm resource.

Four cultivar releases were published in the American Journal of Potato Research in 2004: 'Pacific Russet', 'Red Pearl', 'Alta Russet', and 'Monticello'. 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 86 papers, 25 abstracts, and 3 theses which report the use of NRSP-6 *Solanum* introductions this year.

5. WORK PLANNED FOR 2005

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 strengthening 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. 2004. Genetic heterogeneity estimated by RAPD polymorphism of four tuber-bearing potato species differing by breeding system. Am. J. Potato Res. 81:377-383.

Brown, C.R., H. Mojtahedi and J. Bamberg. 2004. Evaluation of *Solanum fendleri* as a source of resistance to *Meloidogyne chitwoodi*. Am. J. Potato Res. 81:415-419.

Busse, James S., John B. Bamberg and Jiwan P. Palta. 2004. Genetic variations for calcium accumulation efficiency in tuber and aerial shoot tissues. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 36. (Abstract)

del Rio, Alfonso and J.B. Bamberg. 2004. Ten years of research at the US Potato Genebank using molecular markers to study efficiency in the acquisition and management of Potato Genetic Diversity. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 77. (Abstract)

del Rio, Alfonso, J.B. Bamberg and Z. Huaman. 2004. Assessment of putative identical germplasm collections at CIP and US Potato genebanks determined by RAPD and SSR markers. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 32. (Abstract)

Fernandez, Charles J. and John B. Bamberg. 2004. A new *Solanum fendleri* mutant lacking purple pigment. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 78. (Abstract)

Ghislain, M., D.M. Spooner, F. Rodriguez, F. Villamon, J. Nunez, C. Vasquez, R. Waugh, and M. Bonierbale. 2004. Selection of highly informative and user-friendly microsatellites (SSRs) for genotyping of cultivated potato. Theor. Appl. Genet. 108:881-890.

Knapp, S., L. Bohs, M. Nee, and D.M. Spooner. 2004. Solanaceae – a model for linking genomics with biodiversity. In: Plant & Animal Genome XII Conference, San Diego, CA, January 10-14, 2004. Comp. Func. Genomics 5(3):285-291.

Spooner, D.M., G.J. Bryan, R.G. van den Berg, and A. del Rio. 2003. Species concepts and relationships in wild and cultivated potatoes. In: Potatoes – Healthy food for Humanity: International Developments in Breeding, Production, Protection and Utilization. Proc. of XXVI International Hort. Congress, Toronto, Canada, Aug. 11-17, 2002. (Ed: R.Y. Yada). Acta Hort. 619:63-75.

Spooner, David and W.L.A. Hetterscheid. 2004. Origin of the modern cultivated potato. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 47. (Abstract)

Spooner, David and W.L.A. Hetterscheid. 2004. Cultivar-group classification of modern cultivated potato. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 47. (Abstract)

Spooner, D.M. and K.A. Williams. 2004. Germplasm acquisition. Encyclopedia of Plant and Crop Science, Ed.: R.M. Goodman, 537-540. Dekker Agropedia, New York, New York.

Vega, S.E., J.B. Bamberg and J.P. Palta. 2004. Characterization of gibberellin requirements for various diploid and tetraploid gibberellin deficient mutants. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 60. (Abstract)

Vega, S.E., J.P. Palta and J.B. Bamberg. 2004. Evidence for the mitigation of gibberellin deficiency symptoms by root zone calcium in GA-deficient mutants of potato. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 61. (Abstract)

Vega, S.E., A.H. del Rio, J.B. Bamberg, and J.P. Palta. 2004. Evidence for the up-regulation of stearoyl-ACP (Δ9) desaturase gene expression during cold acclimation. Am. J. Potato Res. 81:125-135.

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

Alcalde-Eon, C., G. Saavedra, S. de Pascual-Teresa, and J.C. Rivas-Gonzalo. 2004. Identification of anthocyanins of pinta boca (*Solanum stenotomum*) tubers. Food Chem. 86(3):441-448.

Anderson, J.A.D., S.L. Lewthwaite, R.A. Genet, and W.F. Braam. 2004. Moonlight: A new dual-purpose main crop potato (*Solanum tuberosum*) cultivar. New Zealand J. Crop Hort. Sci. 32(1):153-156.

Arnone, S., S. Musmeci, V. Fonzo, M. Cristofaro, O. Temperini, F. Saccardo, and A. Sonnino. 2002. Breeding for resistance to *Leptinotarsa decemlineata* (Colorado potato beetle), *Phthorimaea operculella* (tuber moth), *Agriotes* spp. (wireworm) in potato. Rivista di Ag. 36 (Suppl. 1):33-38.

Banyal, Jeena, Meetul Kumar, S.D. Chakrabarti, D. Pattanayak, V.P. Chimote, Singh Lokendra, and P.S. Naik. 2003. Cloning and sequencing of an *Osmotin*-like gene fragment from the late blight resistant wild potato species *Solanum chacoense*. In: Symposium on 'Potato research towards national food and nutritional security', 2-3 October, 2003. (Eds: S.K. Pandey and Singh Brajesh). J. Indian Potato Assn. 30(1/2)37-38.

Blessington, T., A.L. Hale, D.C. Sheuring, and J.C. Miller, Jr. 2004. Effect of cooking and storage on antioxidant activity in potato (*Solanum tuberosum* L.). HortSci. 39:879. (Abstract)

Blessington, T., A.L. Hale, D.C. Sheuring, and J.C. Miller, Jr. 2004. Effect of cooking ,storage, and gamma irradiation on antioxidant activity in potato (*Solanum tuberosum* L.). Am. J. Potato Res. 81:. (Abstract)

Blotskaya, Z.V. and N.V. Rusetsky. 2002. Evaluation of potato selection material for complex virus resistance. Zashichita Rastenii 25:40-45.

Brigneti, G., A.M. Martin-Hernandez, et al. 2004. Virus-induced gene silencing in *Solanum* species. Plant J. 39(2):264-272.

Brown, C.R., H. Mojtahedi, and G.S. Santo. 2003. Characteristics of resistance to Columbia root-knot nematode introgressed from several Mexican and North American wild potato species. In: Potatoes – Healthy food for Humanity: Internatl Developments in Breeding, Production, Protection and Utilization. Proc. of XXVI Internatl Hort. Congress, Toronto, Canada, Aug. 11-17, 2002. (Ed: R.Y. Yada). Acta Hort. 619:117-125.

Brown, C.R. and H. Mojtahedi. 2004. Evidence of systemic acquired resistance to *Meloidogyne chitwoodi*, race 2, conferred by gene for resistance to race 1 from *Solanum bulbocastanum*. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 59. (Abstract)

Cardi, T., F. Consiglio, F. Fiorentino, L. Frusciante, and S. Grillo. 2002. Agronomic evaluation and frost tolerance of potato progenies derived from somatic hybridization with wild species *Solanum commersonii*. Rivista di Agronomia 36 (Supplement 1):18-25.

Carputo, D., A. Barone, M.R. Ercolano, L. Frusciante, M. Iovene, M. Parisi, A. Sebastiano, L. Monti, and V. Marzi. 2002. Evaluation and selection of BC_1, BC_2, and BC_3 genotypes derived from interspecific hybridization *Solanum tuberosum* – *S. commersonii*. Rivista di Agronomia 36 (Supplement 1):26-32.

Carputo, D., A. Terra, A. Barone, F. Esposito, V. Fogliano, L. Monti, and L. Frusciante. 2003. Glycoalkaloids and acclimation capacity of hybrids between *Solanum tuberosum* and the incongruent hardy species *Solanum commersonii*. Theor. Appl. Genet. 107(7):1187-1194.

Chen, Q., D. Lynch, H.W. (Bud) Platt, H.Y. Li, Y. Shi, H.J. Li, D. Beasley, L. Rakosy-Tican, and R. Theme. 2004. Interspecific crossability and cytogenetic analysis of sexual progenies of Mexican wild diploid 1EBN species *Solanum pinnatisectum* and *S. cardiophyllum*. Am. J. Potato Res. 81:159-169.

Chen, Q., S. Sun, Q. Ye, S. McCuine, E. Huff, and H.B. Zhang. 2004. Construction of two BAC libraries from the wild Mexican diploid potato, *Solanum pinnatisectum*, and the identification of clones near the late blight and Colorado potato beetle resistance loci. Theor. Appl. Genet. 108(6):1002-1009.

Coombs, Joseph, David Douches, Susannah Cooper, and Edward Grafius. 2004. Colorado potato beetle and potato resistance mechanisms: more than just a defoliation issue. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 54. (Abstract)

Conicella, C., A. Capo, M. Cammareri, A. Errico, N. Shamina, and L.M. Monti. 2003. Elucidation of meiotic nuclear restitution mechanisms in potato through analysis of microtubular cytoskeleton. Euphytica 133(1):107-115.

Conner, T. 2003. Somatic hybrids—a GE alternative? An example in potato. Grower 58(11):38-40.

De Jong, W., D.M. De Jong and M. Bodis. 2004. An approach to measure allele dosage in autotetraploid potato. Am. J. Potato Res. 81:55.

De Medeiros, Ane H., Ward M. Tingey and Walter S. De Jong. 2004. Mechanisms of resistance to potato leafhopper, *Empoasca fabae* (Harris), in potato. Am. J. Potato Res. 81:431-441.

Deahl, K.L., T. Oosumi, D.R. Rockhold, M.M. Maccree, and W.R. Belknap. 2004. Accessing horizontal resistance to late blight in potato germplasm derived from *Solanum bulbocastanum*. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 68. (Abstract)

Douches, David S. and Kelly Zarka. 2004. Engineered approaches to develop potatoes for sub-optimal irrigation conditions. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 57. (Abstract)

Ewing, E.E., I. Simko, E.A. Omer, and P.J. Davies. 2004. Polygene mapping as a tool to study the physiology of potato tuberization and dormancy. Am. J. Potato Res. 81:281-289.

Frost, K.E., D.I. Rouse and S.H. Jansky. 2004. Distributional dynamics of Verticillium dahliae in potato plant tissue through the growing season. Phytopathology 94:S32.

Gebhardt, C., A. Ballvora, B. Walkemeier, P. Oberhagemann, and K. Schuler. 2004. Assessing genetic potential in germplasm collections of crop plants by marker-trait association: a case study for potatoes with quantitative variation of resistance to late blight and maturity type. Molecular Breeding 13(1):93-102.

Gillen, A.M. and R. Novy. 2004. Development of SSRs and conversion of RFLP markers to PCR-based markers for introgression of viral resistance genes from *Solanum etuberosum*. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 78. (Abstract)

Gonzales-Vigil, Eliana, Kelly Zarka, Pavani Tumbalum, Willie Kirk, and David Douches. 2004. Combining engineered and natural host plant resistance to *Phytophthora infestans* in cultivated potato. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 80. (Abstract)

Groza, H.I., B.D. Bowen, D. Kichefski, S.J. Peloquin, and J. Jiang. 2004. Red Pearl: A new gourmet red potato variety. Am. J. Potato Res. 81:209-213.

Habib, A. and D.J. Donnelly. 2004. Calcium translocation and accumulation into potato tubers. Potato Research 45:17-24.

Hannapel, David J., Hao Chen, Faye M. Rosin, Anjan K. Banerjee, and Peter J. Davies. 2004. Molecular controls of tuberization.

Hayashi, K., M. Mori, Y.M. Knox, T. Suzutan, M. Ogasawara, I. Yoshida, K. Hosokawa, A. Tsukui, and M. Azuma. 2003. Anti influenza virus activity of a red-fleshed potato anthocyanins. Food Sci. Tech. Res. 9(3):242-244.

Haynes, Kathleen G. and D. Peter Weingartner. 2004. The use of area under the disease progress curve to assess resistance to late blight in potato germplasm. Am. J. Potato Res. 81:137-141.

Hosaka, Kazuyoshi. 2004. Evolutionary pathway of T-type chloroplast DNA in potato. Am. J. Potato Res. 81:153-158.

HuaiJun, Si and Di Wang. 2003. Fertility and genetic improvement of interspecific somatic hybrids of potato. Acta Agro. Sinica 29(2):280-284.

Jakuczun, Henryka and Ewa Zimnoch-Guzowska. 2004. Inheritance of glucose content in tubers of diploid potato families. Am. J. Potato Res. 81:359-370.

Jansky, Shelley. 2004. Resistance to white mold in wild *Solanum* species. Presented at 88th Annual Meeting of PAA, Scottsbluff, NE, Aug. 8-12, 2004. p. 59. (Abstract)

Jansky, S.H., E.D. Mauritz, J.J. Clark, and D.I. Rouse. 2003. Disease resistance in potato haploids. In: Potatoes – Healthy food for Humanity: Internatl Developments in Breeding, Production, Protection and Utilization. Proc. of XXVI Internatl Hort. Congress, Toronto, Canada, Aug. 11-17, 2002. (Ed: R.Y. Yada). Acta Hort. 619:135-144.

Jansky, S.H., G.L. Davis and S.J. Peloquin. 2004. A genetic model for tuberization in potato haploid-wild species hybrids grown under long-day conditions. Am. J. Potato Res. 81:335-339.

Jansky, S.H., D.I. Rouse and P.J. Kauth. 2004. Inheritance of resistance to Verticillium dahliae in diploid interspecific potato hybrids. Plant Disease 88:1075-1078.

Karlsson, B.H. and J.P. Palta. 2003. Enhancing tuber calcium by in-season calcium application can reduce tuber bruising during mechanical harvest. In: Potatoes – Healthy food for Humanity: Internatl Developments in Breeding, Production, Protection and Utilization. Proc. of XXVI Internatl Hort. Congress, Toronto, Canada, Aug. 11-17, 2002. (Ed: R.Y. Yada). Acta Hort. 619:285-291.

Kiru, S.D., M.V. Patrikeeva, L.A. Gus'kova, and S.A. Makovskaya. 2003. Use of *Solanum andigena* in potato breeding. Zashcita i Karantin Rastenii 8:40.

Kovacs, K., C. Catana and D. Pamfil. 2003. Somatic hybridization on potato. Bul. Uni. De Stiinte Ag. Si Med. Vet. Cluj-Napoca, Seria Zootehnie si Biotehn. 59:279-283.

Kulawiec, M., N. Tagashira, W. Plader, G. Bartoszewski, D. Kuc, R. Sniezko, and S. Malepszy. 2003. Chromosome number variation in somatic hybrids between transgenic tomato (*Lycopersicon esculentum*) and *Solanum lycopersicoides*. J. Appl. Genetics. 44(4):431-447.

Kumar, Raj and Jai Gopal. 2003. Combining ability of andigena accessions for yield components and tuber dry matter in third clonal generation. In: Symposium on 'Potato research towards national food and nutritional security', 2-3 October, 2003. (Eds: S.K. Pandey and Singh Brajesh). J. Indian Potato Assn. 30(1/2)3-4.

Lagace, M. and D.P. Matton. 2004. Characterization of a WRKY transcription factor expressed in late torpedo-stage embryos of *Solanum chacoense*. Planta 219(1):185-189.

Lampert, E. de S. and C.A.B.P. Pinto. 2002. Agronomic performance of potato interspecific hybrids. Crop Breeding Appl. Biotech. 2(2):179-187.

Lebecka, R. and E. Zimnoch-Guzowska. 2004. The inheritance of resistance to soft rot (*Erwinia carotovora* subsp. *atroseptica*) in diploid potato families. Am. J. Potato Res. 81:395-401.

Levy-Lior, A., S. Weiner and L. Addadi. 2003. Achiral calcium-oxalate crystals with chiral morphology from the leaves of some Solanacea plants. Helvetica Chimica Acta 86(12):4007-4017.

Love, S.L., T. Salaiz, A.R. Mosley, B. Shafii, W.J. Price, and R.E. Thornton. 2003. Ascorbic acid concentration and stability in North American potato germplasm. In: Potatoes – Healthy food for Humanity: Internatl Developments in Breeding, Production, Protection and Utilization. Proc. of XXVI Internatl Hort. Congress, Toronto, Canada, Aug. 11-17, 2002. (Ed: R.Y. Yada). Acta Hort. 619:87-93.

Lynch, D.R., Q. Chen, L.M. Kawchuk, and D. Driedger. 2004. Verticillium wilt resistant germplasm-release of clone LRC18-21 and derivatives. Am. J. Potato Res. 81:295-297.

Lynch, D.R., L.M. Kawchuk, Q. Chen, M. Konschuh, J. Holley, D.K. Fujimoto, D. Driedger, H. Wolfe, L. Dunbar, D. Waterer, P. Bains, J. Wahab, and P. McAllister. 2004. Alta Russet: An early-maturing, high-quality russet cultivar for wedge-cut french fry production. Am. J. Potato Res. 81:195-201.

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7. APPROVED

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D. S. Douches, Chairman, Technical Committee Date

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S.A. Slack, Lead Administrative Advisor Date