ANNUAL REPORT

Calendar Year 1996

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

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

2. COOPERATIVE AGENCIES AND PRINCIPAL LEADERS

State Agricultural Experimental Stations		**Representative**
Southern Region	Chairman	J. C. Miller, Jr.
Western Region	Vice Chairman	A. R. Mosley
North Central Region	Secretary	F. I. Lauer
North Eastern Region		A. F. Reeves

United States Department of Agriculture

Agricultural Research Service	
Technical Representative	J. J. Pavek
National Program Staff	H. L. Shands
Area Director, Midwest Area	R. L. Dunkle
Cooperative States Research Education & Extension Service	C. Stushnoff
Animal and Plant Health Inspection Service	A. T. Tschanz
Inter-Regional Potato Introduction Project	J. B. Bamberg

Agriculture Canada T. R. Tarn

Administrative Advisors

North Central Region	Lead	R. L. Lower
Western Region		A. B. Bennett
Southern Region		E. Young
North Eastern Region		R. C. Seem

3. PROGRESS AND PRINCIPAL ACCOMPLISHMENTS

A. Introduction of New Stocks

Dr. Spooner, in collaboration with Ing. Walter Quiros (Costa Rica) participated in a successful expedition to collect wild species of potato in Costa Rica from November 17th to December 15th. This collection trip procured 13 new accessions of *S. longiconicum.* Prior to the collection trip NRSP-6 had only one sample of this species.

Dr. Bamberg collected 15 accessions in two expeditions to the southwestern-region of the United States. Three of these accessions were from areas further north than any of the current holdings for *S. jamesii* in the genebank, and this is the first wild potato germplasm from Texas, Utah, and Colorado.

A total of 137 accessions were brought through Quarantine in 1996, assigned PI's, and are now available from the NRSP-6 *Solanum* germplasm collection, 94 accessions as true seed and 43 as in vitro clones.

Dr. Spooner, in collaboration with scientists from the associated countries, had 14 accessions come through Quarantine from Bolivia, Ecuador, and Chile. There were 30 accessions added from Mexico, 27 of them collected by Dr. Spooner's former graduate student, Aaron Rodriguez.

There were an additional 24 accessions brought in through Quarantine for their late blight resistance, 12 of these were from the VIR (Russia) collection, 8 from the BGRC (German) collection, and 4 clones from Dr. L. Colon (Holland).

An additional 43 clones were added to the in vitro collection in 1996 as foreign varieties or genetic stocks.

A new catalog of NRSP-6's holdings, "Inventory of Tuber-bearing *Solanum* Species", was published and distributed to over 320 cooperators.

B. Preservation and Increase of Stocks

In 1996, 178 accessions were increased. Eighty-seven accessions were received from US Quarantine for a joint seed increase and quarantine virus testing at NRSP-6. Of the 87 accessions, 55 failed to germinate, and 32 are being incorporated into the NRSP-6 inventory.

This year a total of 1200 potato spindle tuber viroid (PSTV) tests were performed on seed increases, seed lots and research materials. Germination tests were performed on 946 accessions, and ploidy determinations were done on 342accessions.

C. Classification

Dr. Spooner continues to resolve problems in taxonomic classification which impede efficient documentation and use of the germplasm. This year, in cooperation with Dr. R. G. van den Berg (Netherlands) and Ph.D. candidate Joe Miller, an extensive study of the Series *Longipedicellata* complex of species was initiated. Insights gained from this study will allow accessions to be assigned stable species' names based on empirical differences.

D. Distribution

NRSP-6 distributed 4,645 units of seed (50 seeds per unit), 362 tuber families and 1,773 in vitro stocks to clientele in 22 states of the United States and 16 other countries. Internally, NRSP-6 used 5,866 units of seed for 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	HERB	S	TF	IVS	TOTAL	PI'S
Domestic	12	3,482	137	1,156	4,787	3,088
Foreign	0	1,163	225	617	2,005	1,044
NRSP-6[2]	0	5,866	0	0	5,866	1,124
Total	12	10,511	362	1,773	12,658	5,256

1 Types of stocks sent/(number of seeds, tubers or plantlets per standard shipping unit): H=Herbarium pressed plant(1), S= True Seeds/(50), TF= Tuber Families/(10), IVS=in vitro stocks/(1).

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

E. Evaluation of Stocks

Mission

The project's mission with respect to evaluation is to locate and characterize useful traits so that the best materials and most efficient approaches are available for subsequent germplasm enhancement.

1. Special Quarantine Seed Increases

This cooperative project with the US Quarantine Lab, by which quarantine testing and seed increases are done concurrently at NRSP-6, has greatly reduced time and effort required to import valuable germplasm. This year we received elite late blight breeding stocks from VIR (Russia), and BGRC (Germany), and were able to rapidly process them through quarantine and have them available for screening.

2. Late Blight Screening

New forms of the late blight pathogen have developed into a severe threat to the US potato crop. In 1996 there were four cooperative late blight screening projects:

1) BC, Canada with Dr. Ormrod: This project facilitated screening of promising germplasm from the collection in an area of BC, Canada where climate and pathogen diversity combine for a consistent and severe challenge from late blight.
2) Cornell, New York with Dr. Fry: This project facilitated inoculated tests of promising germplasm from the NRSP-6 genebank collection at Cornell, NY.
3) Toluca, Mexico with Dr. Lozoya-Saldana: This project facilitated field screening of germplasm and other breeding stocks in the Toluca valley.
4) Lansing, Michigan with Dr. Douches: This project involves inoculated greenhouse testing of the best late blight resistant accessions from the above screening projects. This project conducts evaluation at the genotype level (fine screening) to identify elite parents from within segregating families.

3. Tuber Traits

Wild species do not produce tubers in the long days of North American summers, so their tuber traits cannot be assessed in the field. A project was initiated in 1993 in which wild accessions are being systematically crossed with adapted (cultivated) forms to produce F_2 true seed families. This moved the potentially valuable tuber traits of species to a background in which they can be revealed. We will advertise these to our cooperators as they become available.

4. Frost Hardiness

In cooperation with Dr. Palta and Yu-Kuang Chen, work was continued on frost hardiness. New sources of hardiness and breeding combinations exhibited outstanding frost resistance. Crosses made in 1995 were evaluated and seedlings with good frost tolerance and earliness were identified. In 1996 evidence of interspecific variation for speed of cold acclimation and deacclimation among wild species was found.

5. Tuber Calcium

Progress was made on a stepwise "fine screening" program identifying species, then accessions within species, and then individuals within accessions with outstanding ability to accumulate tuber calcium. This trait has been shown to be closely associated with resistance to important storage rots and other tuber quality traits.

6. Colorado Potato Beetle (CPB)

In 1995 screening identified a population nearly pure for extreme CPB resistance. But these are high in glycoalkaloids. We are following up on this by selecting progeny with low glycoalkaloids to determine whether glycoalkaloids are the necessary basis of resistance in this family.

7. Glycoalkaloids

A spectrum of species were evaluated for leaf and tuber glycoalkaloids in cooperation with Dr. K. Deahl. Accessions with reputed high resistance to Colorado potato beetle and high foliar glycoalkaloids (not leptines in S. *chacoense*) were deliberately chosen. Some accessions had as much as 18 times the TGA in leaves as tubers. These materials are being further investigated in hopes of finding and characterizing new genetic systems for controlling tissue specificity of anti-bug glycoalkaloids.

8. Root Mass and Nutrient Uptake

A working aeroponic system was developed by Dr. P. Barak and calibrated for potato species to assess root parameters that may be valuable for breeding. We are now screening a preliminary sample of *Solanum* germplasm and will eventually screen the entire mini-core collection. This research will provide the first precise characterization of the diversity available in potato germplasm with respect to root mass and nutrient uptake.

9. Screening the Wild Species for Rooting Vigor

The mini-core collection was screened for rooting vigor in cooperation with Dr. J. Lorenzen. The plants were grown in the greenhouse and field in extended tree planting tubes, and a marker herbicide was used causing rapid foliar symptoms when the roots reached the herbicide treated soil layer. These techniques are a promising new screening method, and have made a start in characterizing exotic germplasm with respect to rooting features which may be valuable for breeding.

10. Characterization for Utility Traits

The success of using *Solanum* germplasm for breeding is influenced by relative plant vigor, flowering, pollen shed and pollen viability. Relative scores for these parameters were published in the *Elite Selections*... publication. Characterization of the collection for these traits continued in 1996.

F. Inter-genebank Collaboration

The association of Potato Intergenebank Collaborators (APIC) has initiated a joint research project to investigate the effects of seed increases on the genetic integrity of germplasm conserved *ex situ*, and whether germplasm in genebanks still represents the *in situ* populations from which they were collected. RAPD markers were used to establish genetic relationships between various generations of the same accession increased in the genebank, and between these populations and the samples currently growing *in situ* at there original collection sites in nature. *Solanum jamesii* (2n=2x=24) and *S. fendleri* (2n=4x=48) were used as models. In both species populations separated by one generation and sister populations generated from a common original source were never significantly different and averaged greater than 96% similarity. In contrast, significant genetic differences were found between genebank-conserved populations and populations collected from original sites 14 to 35 years later. Our results showed that although current *ex situ* seed increase procedures cause only minor genetic changes, there might be major differences between *ex situ* and *in situ* populations due to natural evolution in the latter. In 1996 we continued

collecting individuals for the 3rd phase of this project (Evaluating factors which predict genetic diversity) by collecting germplasm from the extremes of the natural range in the US (CO, TX, UT).

4. USEFULNESS OF FINDINGS

NRSP-6's purpose is to provide a ready source of raw materials, technology and information which support potato enhancement, breeding and research in the US and around the world. Thus, one way the success of NRSP-6 can be measured is by the use 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 also ultimately contribute to human utilization of the potato crop, these being reflected in publications.

Three cultivar releases were published in the American Potato Journal in 1996: 'OAC Ruby Gold', 'OAC Temagami', and 'St. Johns'. All are known to have wild species' introductions in their pedigrees.

Section 6 lists 73 papers, 28 abstracts, and 5 theses from which report the use of NRSP-6 *Solanum* introductions this year.

5. WORK PLANNED FOR 1996

Dr. Spooner will participate in a collecting expedition to Mexico September-October 1997.

Evaluation experiments will be continued on *Solanum* species for the following traits: nitrogen-use efficiency, frost tolerance, rooting vigor, tuber calcium, tuber and foliar glycoalkaloids, late blight, Rhizoctonia, gibberellin mutant genetics, and fertility in heat stress.

The general objective of NRSP-6 to promote and facilitate potato research and breeding will be pursued by continuing high quality service with respect to introduction, preservation, classification, evaluation, and distribution of potato germplasm to clients in the U.S. and around the world.

We will continue APIC intergenebank research projects determining the cause of observed differences *in situ* and genebank accessions, and correlations of geographic/habitat data with partitioning of diversity. An APIC meeting is tentatively planned for this summer in Scotland.

6. PUBLICATIONS ISSUED DURING THE YEAR

A. Publications issued by NRSP-6 Personnel

Bamberg, J. B. and Max Martin. 1996. Interregional Potato Introduction Project, NRSP-6. National Potato Evaluation and Enhancement Report, 1995.

Bamberg, J. B., A. Salas, Sandra Vega, R. Hoekstra, and A. Huaman. 1996. Notes on wild potato populations in Arizona and New Mexico. Am. Potato J. 73(8):342. (Abstract)

Bamberg, J. B., C. A. Longtine and E. B. Radcliffe. 1996. Fine screening *Solanum* (potato) germplasm accessions for resistance to Colorado potato beetle. Am Potato J. 73(5):211-223.

Bamberg, J. B., M. W. Martin, J. S. Schartner, and David M. Spooner. 1996. Inventory of tuber-bearing Solanum species - catalog of potato germplasm. NRSP-6 publication, 4312 Hwy 42, Sturgeon Bay, WI 54235.

Castillo, R., and D. M. Spooner. In press. Amer. J. Bot. Phylogenetic relationships of wild potatoes, Solanum series Conicibaccata (sect. Petota). Syst. Bot.

Chen, Yu-Kuang, John B. Bamberg, and Jiwan P. Palta. 1996. Expression of freezing tolerance in interspecific F1 of potatoes. Am. Potato J. 73(8):348-349. (Abstract)

Chen, Yu-Kuang, Jiwan P. Palta, J. B. Bamberg, J. P. Helgeson, and Geri T. Haberlach. 1996. Expression of freezing tolerance in somatic hybrids between hardy wild and cultivated potato species. Am. Potato J. 73(8):348. (Abstract)

Contreras-M. A. and D. M. Spooner. In press. Revision of Solanum section Etuberosum. In M. Nee, D. E. Symon, J. P. Jessop (eds). Solanaceae IV: taxonomy, chemistry, evolution, Royal Botanic Gardens, Kew.

Del Rio, A., J. B. Bamberg, Z. Huaman, R. Hoekstra, A. Salas, and Sandra Vega. 1996. Assessing changes in the genetic diversity of potato genebanks. Am. Potato J. 73(8):381. (Abstract)

Douches, D. S., R. W. Chase, J. J. Pavek, A. Pavlista, J. B. Sieczka, R. Davidson, and D. M. Spooner. 1996. Plant variety protection for potato in the U.S. Am. Potato J. 73:279.

Errebhi, M., C. J. Rosen, F. Lauer, M. W. Martin, and J. B. Bamberg. 1996. Evaluation of tuber-bearing Solanum species for nitrogen use efficiency and biomass production. Am. Potato J. 73(8):353-354. (Abstract)

Huaman, Z., R. Hoekstra and J. Bamberg. 1996. The Intergenebank Potato Database. Potato Res.

Jha, P. K., K. K. Shrestha, M. P. Upadhyay, D. P. Stimart, and D. M. Spooner. 1996. Plant genetic resources of Nepal: a guide for plant breeders of agricultural, horticultural, and forestry crops. Euphytica 87:189-210.

Miller, J. T. and D. M. Spooner. In press. Introgression of Solanum chacoense (Solanum sect. Petota) upland populations reexamined. Syst. Bot.

Miller, J.T. and D. M. Spooner. 1995. Reinvestigation of the Solanum chacoense/S. microdontum hybridization hypothesis. Amer. Potato J. 72:316. (Abstract).

Rodríguez, A. and D. M. Spooner. In press. Chloroplast DNA analysis of Solanum bulbocastanum and S. cardiophyllum, and evidence for the distinctiveness of S. cardiophyllum subsp. ehrenbergii (sect. Petota). Syst. Bot.

Rodríguez, A., O. Vargas, E. Villegas, and D. M. Spooner. 1995. Wild potato (Solanum sect. Petota) germplasm collecting expedition to Mexico in 1993, with special reference to Solanum bulbocastanum Dunal and S. cardiophyllum Lindley. Potato Res 38:47-52.

Spooner, D. M. and H. E. Ballard, Jr. 1996. Phylogenetic analysis of Solanum sect. Petota based on ITS sequence data. Amer. J. Bot. 83 Suppl. 193-194 (Abstract).

Spooner, D. M. and R. Castillo. In press. Reexamination of series relationships of South American wild potatoes (Solanaceae: Solanum sect. Petota): evidence from chloroplast DNA restriction site variation. Amer. J. Bot.

Spooner, D. M., D. C. D. DeJong, B.-Y. Sun, T. F. Stuessy, K. M. Gengler, G. M. Nesom, and P. E. Berry. 1995. Chromosome counts of Compositae from Ecuador and Venezuela. Ann. Missouri Botanical Gardens 82: 596-602.

Spooner, D. M., J. Tivang, J. Nienhuis, J. P. Miller, D. S. Douches, and A. Contreras-M. 1995. Comparison of four molecular markers in measuring relationships among the wild potato relatives Solanum section Etuberosum (subgenus Potatoe). Theor. Appl. Genet. 92: 532-540.

Spooner, D. M., J. Tivang, J. Nienhuis, J. P. Miller, D. S. Douches, and A. Contreras-M. 1995. Comparison of four molecular markers in measuring relationships among Solanum section Etuberosum (subgenus Potatoe). Amer. Potato J. 72:316. (Abstract).

Spooner, D. M., R. Castillo T., L. López J., R. Pineda, R. León P., A. Vargas, M. L. García, and J. B. Bamberg. 1995. Colombia and Venezuela 1992 wild potato (Solanum sect. Petota) germplasm collecting expedition: taxonomy and new germplasm resources. Euphytica 81:45-56.

Spooner, D. M., R. G. van den Berg, and J. B. Bamberg. 1995. Examination of species boundaries of Solanum series Demissa and potentially related species in ser. Acaulia and series Tuberosa (sect. Petota). Syst. Bot. 20: 295-314.

Spooner, D. M., R. G. van den Berg, M. L. Ugarte, J. Kardolas, J. Villand, and D. M. Spooner. 1996. Morphological and molecular systematics of the wild potato Solanum brevicaule complex. Amer. J. Bot. Suppl. 83: 179 (Abstract).

Van den Berg, R. G., J. T. Miller, M. L. Ugarte, J. Kardolus, J. Villand, J. Nienhuis, and D. M. Spooner. In press. Collapse of morphological species in the wild potato Solanum brevicaule complex (sect. Petota). Amer. J. Bot.

Vega-Semorile, Sandra E., Jiwan P. Palta, and J. B. Bamberg. 1996. Evidence for variability in the speed of cold deacclimation among tuber-bearing wild potato species. Am. Potato. J. 73(8):390. (Abstract)

Vega-Semorile, S. E., J. B. Bamberg, and J. P. Palta. 1996. Potential for improving freezing stress tolerance of wild potato germplasm by supplemental calcium fertilization. Am. Potato J. 73(9):397-409.

B. <u>Journal Articles and Abstracts Reporting Research with NRSP-6 Stocks</u>
(Note: Publications from previous years are included if missed in previous annual reports.)

Ali-Khan, S. T., G. R. Johnston, R. Coffin, V. Currie, J. Wilson, A. McKeown, and W. Langenberg. 1996. OAC Ruby Gold: A new red-skinned yellow fleshed table potato cultivar. Am. Potato J. 73(7):301-304.

Ali-Khan, S. T., G. R. Johnston, R. Coffin, V. Currie, J. Wilson, A. McKeown, and W. Langenberg. 1996. OAC Temagami: A new red-skinned white fleshed table potato cultivar. Am. Potato J. 73(7):305-308.

Allefs, J. J. H. M., W. van Dooijeweert, E. R. de Jong, W. Prummel, and J. Hoogendoorn. 1995. Resistance to *Erwinia carotovora* subsp. *atroseptica* in second backcross populations of somatic hybrids between *Solanum tuberosum* and *S. brevidens.* Potato Res. 38(1):11-21.

Baggen, L. R. and G. M. Gurr. 1995. Lethal efects of foliar pubescence of solanaceous plants on the biological control agent *Copidosoma koehleri* Blanchard (Hymenoptera: Encyrtidae). Pl. Protection Qrtly. 10(3):116-118.

Balbyshev, N. F. and J. H. Lorenzen. 1996. Breeding for resistance to the Colorado potato beetle. Am. Potato J. 73(8):341-342. (Abstract)

Baudo, M. M., L. A. Meza-Zepeda, E. T. Palva, and P. Heino. 1996. Induction of homologous low temperature and ABA-responsive genes in frost resistant (*Solanum commersonii*) and frost-sensitive (*Solanum tuberosum* cv. Bintje) potato species. Pl. Molecular Bio. 30(2):331-336.

Birhman, R. K., M. Brault, and M. Cappadocia. 1994. Genetic analysis of in vitro growth and microtuber production in *Solanum chacoense* Bitt. J. Indian Potato Assoc. 21(3-4):195-200.

Bouafia, S., G. Lairy, A. Blanc, E. Bonnel, and J. Dereuddre. 1995. Cryopreservation of axillary shoot tips of in vitro cultured potatoes (*Solanum phureja* and *S. tuberosum*) by encapsulation-dehydration: effects of preculture. Acta Bot. Gallica 142(4):393-402.Caithness Potato Breeders Ltd. 1994. Variety 'Nadine', Application no. 92/075. Pl. Var. J. 7(4):8-9.

Brown, C. R., C. P. Yang, H. Mojtahedi, G. S. Santo, and R. Masuelli. 1996. RFLP analysis of resistance to Columbia rootknot nematode derived from *Solanum bulbocastanum* in a BC_2 population. Theor. Appl. Genet. 92(5):572-576.

Brown, Charles R., Mark McNabnay, and Bill B. Dean. 1996. Enzymatic darkening of tuber flesh in *Solanum hjertingii* and selected cultivated potatoes. Am. Potato J. 73(8):346. (Abstract)

Campbell, William L. 1996. Disease-tested cultivar maintenance. Am. Potato J. 73(8):347. (Abstract)

Chani, Eduard and Richard E. Veilleux. 1996. Factors influencing anther culture of interspecific diploid potato clones. Am. Potato J. 73(8):347-348. (Abstract)

Cisneros, P. L. and C. F. Quiros. 1995. Variation and phylogeny of the triploid cultivated potato *Solanum chaucha* Juz. et Buk. based on RAPD and isozyme markers. Genet. Res. Crop Evolution 42(4):373-386.

Corsini, Dennis and Joseph J. Pavek. 1996. Agronomic performance of potato germplasm selected for high resistance to verticillium wilt. Am. Potato J. 73(6):249-260.

Dai ChaoXi, Sun ShunDi, and Li JiHong. 1995. Studies on the techniques of protoplast culture as well as somatic fusion and hybridization in potato. Acta Ag. Sinica No. 2:144-151.

Desjardins, A. E., S. P. McCormick, and D. L. Corsini. 1995. Diversity of sesquiterpenes in 46 potato cultivars and breeding selections. J. Ag. & Food Chem. 43(8):2267-2272.

Fambrini, M. and C. Pugliesi. 1995. In vitro tuberization from regenerated plants of diploid and tetraploid potatoes. Adv. Hort. Sci. 9(3):103-105.

Flanders, K. L., J. G. Hawkes, and E. B. Radcliffe. 1996. Association of insect resistance in wild potato with geographic origin. Euphytica (in press).

Flanders, K. L., S. Arnone, and E. B. Radcliffe. 1996. The Potato: Genetic resources and insect resistance. P. 703 in: Proceedings, XX International Congress of Entomology, Firenze, Italy, Aug. 25-31, 1996.

Franklin, Perez U. and Carlos F. Quiros. 1996. Comparative mapping of the A and E genomes in *Solanum*. Am. Potato J. 73(8):355. (Abstract)

Garbarino, J. E., T. Oosumi, and W. R. Belknap. 1995. Isolation of a polyubiquitin promotor and its expression in transgenic potato plants. Pl. Physio. 109(4):1371-1378.

Gopal, J. 1994. Genetic resources of potato: flowering and fruiting behavior in north-western plains of India. J. Indian Potato Assoc. 21(3-4):211-215.

Goth, Robert W. and Judith Keane. 1996. Use of detached leaf assay for evaluating late blight reactions of potato and tomato. Am. Potato J. 73(8):357. (Abstract)

Hamernik, A. J. and R. E. Hanneman, Jr. 1996 Incorporating wild potato species for the development of cold chipping (2 C) diploids. Am. Potato J. 73: 359-360. (Abstract)

Hanneman, R. E. Jr. 1996. Ecology and reproductive biology of potato: The potential for and the environmental implications of gene spread. pp 19-38. In: R. J. Frederick, I. Virgin and E. Lindarte (eds.), Environmental Concerns with Transgenic Plants in Centers of Diversity: Potato as a Model. Stockholm Environment Institute, Stockholm, Sweden.

Hanneman, R. E. Jr. 1996. Evaluation of wild species for new sources of germplasm that chip directly from cold storage. Am. Potato J. 73:360. (Abstract)

Hanneman, R. E. Jr. 1996. Summary of the National Cooperative Enhancement Project questionaire. Am. Potato J. 73:360-361. (Abstract)

Havaux, M. Temperature sensitivity of the photochemical function of photosynthesis in potato (*Solanum* x *juzepczukii*). J. Pl. Physio. 146:47-53.

Helgeson, J. P., G. T. Haberlach, M. J. McGrath, R. V. James, and W. R. Stevenson. 1996. Multiple site tests of resistance to late blight of *Solanum bulbocastanum*--potato somatic hybrids and their progeny. Am. Potato J. 73(8):362. (Abstract)

Iglesias, L. 1994. Use of biochemical and molecular markers in breeding potato. Cultivos Tropicales 15(2):108-120.

Inglis, D., B. Gunderson, D. Corsini, J. Pavek, S. Love, A. Mosley, and R. Thornton. 1996. Evaluation of potato germplasm from the Pacific Northwest for resistance to late blight. Am. Potato J. 73(8):364-365. (Abstract)

Jackson, S. A. and R. E. Hanneman, Jr. 1996. An assessment of crossability between cultivated potato and its wild relatives. Am. Potato J. 73:365-366. (Abstract)

Jackson, S. D., A. Heyer, J. Dietze, and S. Prat. 1996. Phytochrome B mediates the photoperiodic control of tuber formation in potato. Plant J. 9(2):159-166.

Jacobs, J. M. E., H. J. van Eck, K. Horsman, P. F. P. Arens, B. Verkerk-Bakker, E. Jacobsen, A. Pereira, and W. J. Stiekema. 1996. Mapping of resistance to the potato cyst nematode *Globodera rostochiensis* from the wild potato species *Solanum vernei*. Molecular Breeding 2:51-60.

Johnston, S. A. and R. E. Hanneman, Jr. 1996. Genetic control of Endosperm Balance Number (EBN) in the Solanaceae based on trisomic and mutation analysis. Genome 39:314-321.

Koivu, K., J. P. T. Valkonen, S. Suomaa, R. Tavazza, and E. Pehu. 1995. *Agrobacterium tumefaciens*-mediated transformation of *Solanum brevidens* and *S. tuberosum* cv. Pito. Acta Ag. Scandinavica. Sec. B, Soil & Pl. Sci. 45(1):78-87.

Lanetskii, V. P., E. V. Golovan, and E. V. Egorova. 1995. A phytoncidal property of the surface of potato tubers. Zashchita Rastenii No. 11, 43.

Levy, D., E. Fogelman, A. Levine, and Y. Itzhak. 1995. Tuberization in vitro and dormancy of potato (*Solanum tuberosum* L.) microtubers. In: Current issues in plant molecular and cellular biology. Proceedings of the 8th Internatl Congress on Plant Tissue and Cell Culture, Florence, Italy, June 12-17, 1994 (M. Terzi, R. Cella, and A. Falavigna, Eds.) p. 123-125.

Liu, T. H. A., L. C. Stephens, and D. J. Hannapel. 1995. ransformation of *Solanum brevidens* using *Agrobacterium tumefaciens*. Pl. Cell reports 15:196-199.

Malkamaki, U., M. S. Clark, H. Rita, J. P. T. Valkonen, and E. Pehu. 1996. Analyses of solanaceous species using repetitive genomic DNA sequences isolated from *Solanum brevidens*. Plant Sci. 117:121-129.

Marty, Pascale, Renee Goldberg, Michele Liberman, Brigitte Vian, Yves Bertheau, and Bernard Jouan. 1995. Composition and localization of pectic polymers in the stems of two *Solanum tuberosum* genotypes. Plant Physiol. Biochem. 33(4):409-417.

Mason, H. S. and C. J. Arntzen. 1995. Transgenic plants as vaccine production systems. Trends in Biotech. 13(9):388-392.

Matsui, M., S. Monma, and K. Koyama. 1995. Screening of resistant plants in the genus *Solanum* to *Thrips palmi* Karny (Thysanoptera: Thripidae) and factors related to their resistance. Bull. Natl Res. Inst. Veg., Orn. Pl. & Tea. Series A: Veg. & Ornamental Plants No. 10:13-24.

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7. **APPROVED**

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