

CURRICULUM VITAE

Dr. T.J. "Tim" Mullin, RPF

BIODATA

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Citizenship: Canadian

Permanent resident: New Zealand

CAREER HIGHLIGHTS

- Director of the NC State University-Industry Cooperative Tree Improvement Program 2000-2005.
- Developer of POPSIM™, a computer software package for simulation of managed tree populations.
- Professional experience on 6 continents in the field of natural resource management.
- Established international scientific reputation in forest tree improvement and forest genetics
- Successful consultant providing services in Canada, the USA, Europe, Asia, North Africa, South America, and New Zealand, in the areas of nursery technology, forest genetics and management of genetic resources.
- Founder of the government-industry cooperative tree breeding program in Nova Scotia, Canada.

PROFESSIONAL EXPERIENCE

CONSULTANT AND CHIEF EXECUTIVE OFFICER

1990 – present

**BioSylve Forest Science NZ Limited (Hamilton and Wellington, New Zealand) and
Genesis Forest Science Canada Incorporated (Truro, NS and Québec, Canada)**

Founder and principal in successful consulting ventures in Canada and most recently in New Zealand, offering professional forestry services to government agencies and private industry on 6 continents, with specialization in forest genetics and tree improvement, nursery propagation, quantitative analysis, strategic planning for silvicultural investment, genetic resource management and international development.

Achievements:

- Served as Acting General Manager, Genetics for the New Zealand Crown Research Institute known as Scion (NZ Forest Research Institute Limited) from September 2007 to June 2008, and continue under contract to the present as a senior advisor to the Institute's executive management.
- Developed POPSIM™, a computer software package for simulation of managed tree populations. The package has been used as the basis for optimizing tree breeding strategies in several countries

and as a research tool supporting dozens of refereed scientific papers in the area of breeding strategy and conservation of genetic diversity.

- Transferred computer simulation technology and methods to the Centre for Prediction of Genetic Change (SLU) and the Forestry Research Institute (SkogForsk), resulting in continued collaboration with Sweden's tree breeders and scientists, co-supervision of 3 PhD students, successful grant applications worth over 2.2 million SEK (US\$220,000), collaboration in an FP7 European Union grants currently under review exceeding €5 million, and co-authorship of numerous scientific papers (since 1996).
- Participation in 3 National research program reviews:
 - Canadian Forest Service Biotechnology Program Review – 2002-2003
 - Tree Improvement Program Strategy, METLA Forest Research Institute – Finland 2003 (chair)
 - Korean Forest Research Institute, Tree Improvement and Orchards – Korea 2005
- External advisor to Government of Canada on regulation of transgenic technologies in forestry, including the provision of a landmark review of technical, environmental and regulatory issues (Mullin and Bertrand 1998), four species biology “consensus documents” submitted by Canada to the OECD Committee for Harmonization of Regulatory Oversight in Biotechnology, appointment to the “Expert Committee on Regulations Relating to Genetically Modified Trees”, and the “Environmental Effects of Novel Living Organisms (EENLO) Network”, Government of Canada.
- Completed several major research contracts funded by Federal-Provincial agreements in various Canadian provinces supporting local tree improvement programs, including an evaluation of the economics of alternative breeding and deployment strategies for northeastern conifers, accelerated progeny testing of selected material, and impacts of management activities on genetics of forest trees.
- Under contract to BCC AB (a reforestation technologies company based in Sweden), provided expertise and on-site supervisory services to correct engineering and construction deficiencies in six containerized tree nurseries established by a Nordic Development Bank project in Tunisia, North Africa (1998 to 2000).
- Evaluated the 3rd-cycle breeding plan for the NCSU-Industry Cooperative Tree Improvement Program, to help optimize the allocation of program resources, maximize genetic gains and maintain genetic diversity in seed orchards and planted stands in the southeastern United States (1998).
- Evaluated current nursery production methods, seedling requirements, seed availability, and species suitability for commercial forest production, and recommended appropriate forest nursery production technology to be implemented at each of two demonstration nurseries, established in the North Mesopotamia and Andes Patagonia regions of Argentina (1997).
- Provided consulting services on Nursery Systems, Seed Procurement and Technology Transfers to the Gansu Forest Tree Nursery Project, funded by the Canadian International Development Agency in Longnan Prefecture, Gansu Province, People's Republic of China. This included 5 overseas missions totaling 13 months in remote areas to adapt Canadian reforestation technology to local conditions (1992 to 1995).

RESEARCH PROFESSOR AND DIRECTOR

2000-2005

NCSU- Industry Cooperative Tree Improvement Program
Department of Forestry
North Carolina State University
Raleigh, NC 27695-8002, USA

Research, graduate teaching and direction of the world's largest cooperative breeding program supported by 17 forest companies and state agencies in the southeastern United States and producing genetically superior

germplasm for over 750 million loblolly pine seedlings planted each year in the southeastern United States, accounting for 50% of the annual tree planting in the US.

Achievements:

- Principal Investigator for a portfolio of research activity, with more than US\$850,000 per year in external funding from private industry and competitive grants.
- Successfully secured > US\$1.1 million in DOE/Agenda 2020 funding for research.
- Recruitment of 3 new industrial members to the Tree Improvement Coop (Hancock Timberlands, CellFor, Arborgen)
- Increased industry sponsor program support from US\$404,450 (FY2000) to US\$433,340 (FY2005), despite the loss of 4 members to corporate restructuring
- Led process of review and revision of coop membership and operating policies.
- Instituted transparent accounting and financial reporting procedures for all coop-related activities
- Management of a research unit within the Department of Forestry, consisting of 4 faculty members, 1 professional, 2 technical, 1 clerical, and various post-docs, graduate students and casual workers.
- Teaching and mentoring of undergraduate and graduate students: direct supervision of 1 PhD and 1 MS student, graduating in May 2005, committee member on other MSc and PhD student committees, undergraduate advisor. Offered 1 undergraduate course (FOR 411 Forest Tree Genetics and Biology) and one graduate level course (FOR (GN) 726 Advanced Topics in Quantitative Genetics), and special lectures as guest instructor in other credit courses.

MANAGER, TREE BREEDING

1978-1988

**Tree Breeding Section
Nova Scotia Department of Lands and Forests,
Tree Breeding Centre, Debert, Nova Scotia, Canada**

Development and implementation of breeding strategies for major reforestation species, coordination of government/industry cooperative tree improvement programs, and overall management of the Tree Breeding Centre.

Achievements:

- Founded and coordinated the activities of the government-industry cooperative tree breeding program.
- Secured funding through various Federal-Provincial agreements to support the construction of facilities and projects related to tree improvement in the Province of Nova Scotia.
- Supervised site acquisition, design, engineering and construction of the Tree Breeding Centre, a specialized research nursery and seed orchard complex.
- Managed the Tree Breeding Section, comprised of 3 professional staff, 4 technical, 1 clerical and numerous part-time and seasonal workers.

Forest Capability Subdivision
Nova Scotia Department of Lands and Forests
Truro, Nova Scotia, Canada

Applied research into site productivity, growth and yield prediction, establishment of natural and artificial regeneration, site preparation, management of natural and planted stands, control of competition, and forest nursery production methods.

Achievements:

- Negotiated the establishment of the Nova Scotia Tree Improvement Working Group, including membership agreements, appropriation of funds and setting of work programs.
- Conducted an analysis of tree improvement options for the province and proposed the establishment of a cooperative program involving the Federal and Provincial governments and the forest industry.
- Completed various projects related to modeling of growth and yield for natural and planted forests, plantation establishment and management, nursery propagation and seed production.

EDUCATION

Secondary Education:

Grade 13 University of Toronto Schools, Toronto, ON - 1971

Undergraduate Studies:

B.Sc.F. University of New Brunswick, Fredericton, NB - 1975 (G.P.A. 3.68)

Thesis: 10-year response of maturing balsam fir (*Abies balsamea*) and red spruce (*Picea rubens*) stands in a series of forest fertilization experiments

Supervisor: Professor H.H. Krause

Alumni Undergraduate Scholarship 1972, 1973, 1974

City of Fredericton Prize for Academic Excellence 1975

Post-Graduate Studies:

M.Sc.F. University of New Brunswick, Fredericton, NB - 1984 (G.P.A. 4.0)

Thesis: Genotype-nitrogen interactions in black spruce (*Picea mariana*)

Co-supervisors: Professor E.K. Morgenstern and Adjunct Professor D.P. Fowler

Ph.D. University of New Brunswick, Fredericton, NB - 1990 (G.P.A. 4.0)

Thesis: Genetic parameters for clonal selection of black spruce and implications for breeding.

Supervisor: Professor E.K. Morgenstern

Fraser Inc. Scholarship in Forestry 1988

Fraser Inc. Prize for Excellence in Forestry (best forestry thesis at UNB among those earning PhD, MScF, MscFE, MF or MFE degrees) 1990

PROFESSIONAL REGISTRATION

Registered Professional Forester (Assoc. Registered Professional Foresters of N.B., No. 429)

ACADEMIC SERVICE

- Adjunct Professor, Research School for Forest Genetics, SLU, Sweden: 2004 - 2009
- Professor, Department of Forestry, NC State University, Raleigh, NC: 2000 to 2005
- Associate Scientist and Graduate Student Supervisor, Centre for Prediction of Genetic Change, Swedish University of Agricultural Sciences, Umeå, Sweden: 1996 - 2004
- Honorary Research Associate and Graduate Student Supervisor, School of Graduate Studies and Research, University of New Brunswick, Fredericton, NB: 1988 – 1996
- Adjunct Professor, Department of Plant Science, NS Agricultural College, Truro, NS: 1987-1989
- External academic review panel member for faculty appointment:
 - Dr. Bengt Andersson (Professor, SLU, Sweden)
 - Dr. Matti Happanen (Professor, Univ. Helsinki, Finland)
 - Dr. Yousry El-Kassaby (Professor and NSERC Industrial Research Chair, UBC, Canada)
- External doctoral defense examiner:
 - Opponent, Dr. Seppo Ruotsalainen, Univ. Helsinki, Finland (2003)
 - Committee member, Dr. Jon Hallander, SLU, Sweden (2009)
- Graduate student supervision
 - Dr. Erik Andersson, SLU (1999 – co-supervised with Dag Lindgren)
 - Dr. Ola Rosvall, SLU (1999 – co-supervised with Dag Lindgren)
 - Dr. Adolfo Bila, SLU (2000 – co-supervised with Dag Lindgren)
 - Dr. Milan Lstiburek, PhD, NCSU (2005)
 - Joshua Sherrill, MS, NCSU (2005 – co-supervised with Bronson Bullock)
- Graduate student committees:
 - Bryce McInnis, MSc, NSAC (1989)
 - Dr. Zhu Xinbiao, PhD, Chinese Academy of Forestry (1993-1995)
 - Wm. Dan McCurdy, MScF, UNB (1990)
 - Wm. Patrick Cumbie, MS, NCSU (2003)
 - Chad Jordan, PhD, NCSU (2005)
 - Johan Kroon, PhD, Research School for Forest Genetics, SLU, Sweden (in progress)
 - Henrik Hällingbeck, PhD, Research School for Forest Genetics, SLU, Sweden (in progress)
- Post-doctoral Fellows:
 - Dr. Qibin Yu, NCSU (2003-2005)
 - Dr. Ewellyn Capanema, NCSU (2003-2005)
 - Dr. Yongqi Zheng, SLU, Sweden (1996-1997)
 - Dr. Kostas Spanos, SLU, Sweden (1996)
- Visiting Scholars:
 - Dr. Gunnar Jansson (SkogForsk, 2003)
 - Dr. Dag Lindgren (SLU 2002, 2004)
 - Dr. Evi Alizoti (University of Thessaloniki, Greece 2004)
- Undergraduate Advisees
 - Howard Frame (BScF, UNB, 1980)
 - Alan Eddy (BScF, UNB, 1980)
 - Robert Oxenham (BScF, UNB, 1981)
 - Alexander Brown (BScF, UNB, 1985)
 - Alison Curtis (BScF, UNB, 1985)
 - Timothy Bailey (BScF, UNB, 1987)
 - Bryce McInnis (BSc, NSAC, 1989)
 - Hilary Veen (BScF, UNB, 1989)
 - Jonathan Eckard (BSc, NCSU, 2005)
 - Steven Ball (BSc, NCSU, May 2005)
 - John McBryde (BSc, NCSU, May 2006)

OTHER PROFESSIONAL ACTIVITY

- IRD register of research providers under New Zealand R&D Tax Credit: 2008 to present
- The Royal Society of New Zealand: MRSNZ 2008 – present
- New Zealand Institute of Forestry: MNZIF 2007 – present
- Association of Registered Professional Foresters of New Brunswick: 1988 - present
- Canadian Institute of Forestry: 1974 - present
- Canadian Tree Improvement Association: 1976 - present (Chairman 1985-87)
- C.T.I.A. Tree Seed Working Group: 1983 - present
- C.T.I.A. Wood Quality Working Group: 1985 - 2005
- Society of American Foresters: 1989 - 2007
- Society of American Foresters Tree Genetics and Improvement Working Group: 1981 - 2007
- Society of American Foresters Silviculture Working Group: 1981 - 2007
- Southern Forest Tree Improvement Committee: 2000 - 2005
- Seed Orchard Pest Management Sub-Committee, SFTIC: 2000 – 2005
- Association Consulting Foresters of Nova Scotia: 1989–97 (V.-P. 1991-92, Pres. 1992-93)
- Nova Scotia Tree Improvement Working Group: Chairman 1976 – 1988
- Forintek Canada Corp. - Wood Characterization Subcommittee (Eastern): 1986 – 1988
- Cone and Seed Pest Management Action Group: Chairman 1987 – 1988
- Maritimes Tree Seed Handling Committee: 1981 - 1988
- Plant Tissue Culture Association for Atlantic Canada: 1988 - 1995
- Workshop Facilitator for *Project Learning Tree* (an environmental education program designed for teachers grades primary through 12)
- Special Advisor to the Canadian Forest Service – Science Branch, on the use and regulation of genetic engineering in forestry and serving on the Canadian Government’s “Expert Committee on Regulations Relating to Genetically Modified Trees”: 1996 – present
- Referee for many scientific articles published by:
 - Canadian Journal of Forest Research
 - Forest Genetics
 - Forestry Chronicle
 - Journal of Tropical Forest Science
 - Molecular Breeding
 - NZ Journal of Forest Science
 - Scandinavian Journal of Forest Research
 - Silvae Genetica
 - Theoretical and Applied Genetics
 - Tree Genetics and Genomes
- Program Review Panels:
 - Prince Edward Island Tree Improvement Program - 1985
 - Canadian Forest Service Biotechnology Program Review – 2002-2003
 - Tree Improvement Program Strategy, Forest Research Institute – Finland 2003 (chair)
 - Korean Forest Research Institute, Tree Improvement and Orchards – Korea 2005
- Scientific/Stakeholder Research Project Advisory Panels:
 - US Forest Service Resistance Screening Center Steering Committee – 2000 to 2005
 - Allele Discovery of Economic Pine Traits, USDA IFAFS (University of Florida, University of Georgia and University of California – Davis)
 - Wood and fiber quality of juvenile pine, USDA, IFAFS (NCSU)
 - Scientific Advisory Board, Research School for Forest Genetics, SLU, Sweden

PUBLICATIONS AND REPORTS

Peer-reviewed journal articles and book chapters:

1. Hargreaves, C.L., Reeves, C.B., Find, J.I., Gough, K., Menzies, M.I., Low, C.B., and **Mullin, T.J.** 2011. Improved methods for somatic embryogenesis initiation and early proliferation from control-pollinated seeds of *Pinus radiata*. *Can. J. For. Res.* (submitted)
2. **Mullin, T.J.**, Andersson, B., Bastien, J.-C., Beaulieu, J., Burdon, R.D., Dvorak, W.S., King, J.N., Kondo, T., Krakowski, J., Lee, S.J., McKeand, S.E., Pâques, L., Raffin, A., Russell, J., Skrøppa, T., Stoehr, M., and Yanchuk, A.D., 2011. Economic importance, breeding objectives and achievements. Chapter 2 *In: Genomics of Conifers. Edited by: C. Plomion and J. Bousquet. Volume in Genomics of Industrial Crops, Series editor: C. Kole. Science Publishers, Inc., New Hampshire; Edenbridge Ltd., UK. (in press)*
3. Sherrill, J.R., Bullock, B.P., **Mullin, T.J.**, McKeand, S.E., and Purnell, R.C. 2011. Total and merchantable stem volume equations for mid-rotation loblolly pine (*Pinus taeda* L.). *South. J. Appl. For.* (in press)
4. Weng, Y.H., Park, Y.S., Krasowski, M.J., and **Mullin, T.J.** 2010. Allocation of varietal testing efforts for implementing conifer multi-varietal forestry using white spruce as a model species. *Ann. For. Sci.* (in press)
5. Weng, Y.H., Park, Y.S., Simpson, D., and **Mullin, T.J.** 2009. Efficiencies of clonally replicated and seedling testing for spruce breeding and deployment strategies. *Silvae Genet.* **58**(5/6): 292-299.
6. Hargreaves, C.L., Reeves, C.B., Find, J.I., Gough, K., Josekutty, P., Skudder, D.B., van der Maas, S.A., Sigley, M.R., Menzies, M.I., Low, C.B., and **Mullin, T.J.** 2009. Improving initiation, genotype capture, and family representation in somatic embryogenesis of *Pinus radiata* by a combination of zygotic embryo maturity, media, and explant preparation. *Can. J. For. Res.* **39**(8): 1566-1574.
7. Kroon, J., Prescher, F., Wennström, U., Lindgren, D., and **Mullin, T.J.** 2009. Estimation of clonal variation in seed cone production over time in a Scots pine (*Pinus sylvestris* L.) seed orchard. *Silvae Genet.* **58**: 53-62.
8. Kroon, J., Andersson, B. and **Mullin, T.J.** 2008. Genetic variation in the diameter-height relationship in Scots pine (*Pinus sylvestris* L.). *Can. J. For. Res.* **38**(6): 1493-1503.
9. Baltunis, B.S., Wu, H.-X., Dungey, H.S., **Mullin, T.J.**, and Brawner, J.T. 2009. Comparisons of genetic parameters and clonal value predictions from clonal trials and seedling base population trials of radiata pine. *Tree Genet. Genom.* **5**: 269-278
10. Sherrill, J.R., **Mullin, T.J.**, Bullock, B.P., McKeand, S.E., Purnell, R.C., Gumpertz, M.L., and Isik, F. 2008. An evaluation of selection for volume growth in loblolly pine. *Silvae Genet.* **57**(1): 22-28.
11. Prescher, F., Lindgren, D., Almqvist, C., Kroon, J., Lestander, T.A., and **Mullin, T.J.** 2007. Female fertility variation in mature *Pinus sylvestris* clonal seed orchards. *Scand. J. For. Res.* **22**: 280-289.
12. Kang, K.-S. and **Mullin, T.J.** 2007. Variation in clone fertility and its effect on the gene diversity of seeds from a seed orchard of *Chamaecyparis obtusa* in Korea. *Silvae Genet.* **56**: 134-137.
13. Yu, Q., Li, B., Nelson, C.D., McKeand, S.E., Batista, V.B. and **Mullin, T.J.** 2006. Association of the *cad-n1* allele with increased stem growth and wood density in full-sib families of loblolly pine. *Tree Genetics and Genomes* **2**: 98-108.
14. McKeand, S.E., Jokela, E., Huber, D., Byram, T.D., Allen, H.A., Li, B. and **Mullin, T.J.** 2006. Performance of improved genotypes of loblolly pine across different soils, climates, and silvicultural inputs. *For. Ecol. Manage.* **227**: 178-184.
15. Lstibůrek, M., **Mullin, T.J.**, and El-Kassaby, Y.A. 2006. The impact of differential success of somatic embryogenesis on the outcome of clonal forestry programs. I. Initial comparison under multi-trait selection. *Can. J. For. Res.* **36**: 1376-1384.
16. Kang, K.-S., Lindgren, D., **Mullin, T.J.**, Choi, W.-Y., and Han, S.-U. 2005. Genetic gain and diversity of orchard crops under alternative management options in a clonal seed orchard of *Pinus thunbergii*. *Silvae Genet.* **54**(3): 93-144.
17. Lstibůrek, M., **Mullin, T.J.**, Mackay, T.F.C., Huber, D.A., and Li, B. 2005. Positive assortative mating with family size as a function of predicted parental breeding values. *Genetics*, **171**: 1311-1320.

18. Yu, Q., McKeand, S.E., Nelson, C.D., Li, B., Sherrill, J.R. and **Mullin, T.J.** 2005. Differences in wood density and growth of fertilized and non-fertilized loblolly pine associated with a mutant gene, *cad-n1*. *Can. J. For. Res.* 35: 1723-1730.
19. Byram, T.D., **Mullin, T.J.**, White, T.L, and van Buijtenen, J.P. 2005. The future of tree improvement in the southeastern United States: Alternative visions for the next decade. [Invited presentation: IEG-40 Meeting, 17-19 September 2002, Wrightsville Beach, NC.] *South. J. Appl. For.* 29(2): 88-95.
20. Kang, K.-S., Lindgren, D., and **Mullin, T.J.** 2004. Fertility variation, genetic relatedness, and their impacts on gene diversity of seed from a seed orchard of *Pinus thunbergii*. *Silvae Genet.* 58: 202-206.
21. Lstibůrek, M., **Mullin, T.J.**, Lindgren, D. and Rosvall, O. 2004. Open-nucleus breeding strategies compared to population-wide positive assortative mating. I. Equal distribution of testing effort. *Theor. Appl. Genet.* 109: 1196-1203.
22. Lstibůrek, M., **Mullin, T.J.**, Lindgren, D. and Rosvall, O. 2004. Open-nucleus breeding strategies compared to population-wide positive assortative mating. II. Unequal distribution of testing effort. *Theor. Appl. Genet.* 109: 1169-1177.
23. McKeand, S.E., Amerson, H.V., Li, B., and **Mullin, T.J.** 2003. Families of loblolly pine that are the most stable for resistance to fusiform rust are the least predictable. *Can J. For. Res.* 33: 1335-1339.
24. McKeand, S.E., **Mullin, T.J.**, Byram, T.D., and White, T.L. 2003. Deployment of genetically improved loblolly and slash pines in the southern US. *J. For.* 101(3): 32-37.
25. Rosvall, O., and **Mullin, T.J.** 2003. Positive assortative mating with selection restrictions on group coancestry enhances gain while conserving genetic diversity in long-term forest tree breeding. *Theor. Appl. Genet.* 107: 629-642.
26. Rosvall, O., Lindgren, D., and **Mullin, T.J.** 2003. Controlling parent contributions during positive assortative mating and selection increases gain in long-term forest tree breeding. *For. Genet.* 10(1): 35-53.
27. Tang, W., **Mullin, T.J.**, and Newton, R.J. 2003. Genetically engineering trees to enhance productivity, reduce disease, and improve wood properties. Pp. 209-230 *In: Recent Research Developments in Plant Science, Volume 1. Edited by: S.G. Pandalai. Research Signpost, Trivandrum, India.*
28. **Mullin, T.J.** 2002. Consensus document on the biology of *Pinus strobus* L. (eastern white pine). Series on Harmonization of Regulatory Oversight in Biotechnology No. 22, Organization for Economic Cooperation and Development, Paris. 50 pp.
29. **Mullin, T.J.** 2002. Consensus document on the biology of *Picea sitchensis* (Bong.) Carr. (Sitka spruce). Series on Harmonization of Regulatory Oversight in Biotechnology No. 21, Organization for Economic Cooperation and Development, Paris. 53 pp.
30. **Mullin, T.J.** 2002. *Pinus strobus* L. Pp. 424-449 *In: Pines of Silvicultural Importance. CAB International, Wallingford, Oxon, UK*
31. Kang, K.-S., Lindgren, D., and **Mullin, T.J.** 2001. Prediction of genetic gain and gene diversity in seed orchard crops under alternative management strategies. *Theor. Appl. Genet.* 103: 1099-1107.
32. **Mullin, T.J.** 2000. Consensus document on the biology of *Populus* L. (poplars). Series on Harmonization of Regulatory Oversight in Biotechnology No. 16, Organization for Economic Cooperation and Development, Paris. 53 pp.
33. **Mullin, T.J.** 2000. Monograph on *Picea glauca*. *In Forestry Compendium – Global Module on CD-ROM. CAB International, Wallingford, Oxon, UK.*
34. **Mullin, T.J.** 2000. Monograph on *Picea sitchensis*. *In Forestry Compendium – Global Module on CD-ROM. CAB International, Wallingford, Oxon, UK.*
35. **Mullin, T.J.** 2000. Monograph on *Pinus strobus*. *In Forestry Compendium – Global Module on CD-ROM. CAB International, Wallingford, Oxon, UK.*
36. Ruotsalainen, S., Lindgren, D., and **Mullin, T.J.** 2000. Some formulas concerned with pollen contamination have constrained use in Lindgren, D. and Mullin, T.J. 1998. Relatedness and status number in seed orchard crops. *Canadian Journal of Forest Research.* 28:276-283. *Can. J. For. Res.* 30(2): 333.

37. Bila, A.D., Lindgren, D., and **Mullin, T.J.** 1999. Fertility variation and its effect on diversity over generations in a Teak plantation (*Tectona grandis* L.f.). *Silvae Genet.* 14: 109-114.
38. **Mullin, T.J.** 1999. Consensus document on the biology of *Picea glauca* (Moench) Voss (white spruce). Series on Harmonization of Regulatory Oversight in Biotechnology No. 13, Organization for Economic Cooperation and Development, Paris. 47 pp.
39. Andersson, E.W., Lindgren, D., Spanos, K.A., and **Mullin, T.J.** 1998. Relationship after one round of selection. In: Proceedings Meeting of Nordic Group for Management of Genetic Resources of Trees, 9-11 June, 1997, Magleås, Denmark. *For. Tree Improve.* 26: 47-55
40. Andersson, E.W., Spanos, K.A., **Mullin, T.J.**, and Lindgren, D. 1998. Phenotypic selection can be better than selection for breeding value. *Scan. J. For. Res.* 13: 7-11.
41. Andersson, E.W., Spanos, K.A., **Mullin, T.J.**, and Lindgren, D. 1998. Phenotypic selection compared to restricted combined index selection for many generations. *Silva Fenn.* 32: 111-120.
42. Lindgren, D., and **Mullin, T.J.** 1998. Relatedness and status number in seed orchard crops. *Can. J. For. Res.* 28: 276-283
43. **Mullin, T.J.**, and Bertrand, S. 1998. Environmental release of transgenic trees in Canada – potential benefits and assessment of biosafety. *For. Chron.* 74(2): 203-219.
44. Park, Y.S., Adams, G.W., and **Mullin, T.J.** 1998. Incorporation of new information and technology in breeding and deployment strategies for black spruce in the Maritimes, Canada. Chapter 1 *In* Tree improvement: applied research and technology transfer. *Edited by* S. Puri, Oxford & IBH Co. pp. 3-23.
45. Park, Y.S., Bonga, J.M., and **Mullin, T.J.** 1998. Clonal forestry. Chapter 8 *In* Forest genetics and tree breeding. *Edited by* A.K. Mandal and G.L. Gibson. CBS Publishers, New Delhi, India. pp. 143-167.
46. Rosvall, O., Lindgren, D., and **Mullin, T.J.** 1998. Sustainability robustness and efficiency of a multi-generation breeding strategy based on within-family clonal selection. *Silvae Genet.* 47: 307-321.
47. Gea, L.D., Lindgren, D., Shelbourne, C.J.A., and **Mullin, T.** 1997. Complementing inbreeding coefficient information with status number: implications for structuring breeding populations. *N.Z. J. For. Sci.* 27(3): 255-271.
48. Lindgren, D., and **Mullin, T.J.** 1997. Balancing gain and relatedness in selection. *Silvae Genet.* 46: 124-129.
49. **Mullin, T.J.**, Adams, G.W., Simpson, J.D., Tosh, K.J., and Greenwood, M.S. 1995. Genetic parameters and correlations in tests of open-pollinated black spruce families in field and retrospective nursery test environments. *Can. J. For. Res.* 25(2): 270-285.
50. **Mullin, T.J.**, and Park, Y.S. 1995. Stochastic simulation of population management strategies for tree breeding: a new decision-support tool for personal computers. *Silvae Genet.* 44(2-3): 132-141.
51. **Mullin, T.J.**, and Park, Y.S. 1994. Genetic parameters and age–age correlations in a clonally replicated test of black spruce after 10 years. *Can. J. For. Res.* 24(12): 2330-2341.
52. **Mullin, T.J.**, and Park, Y.S. 1992. Estimating genetic gains from alternative breeding strategies for clonal forestry. *Can. J. For. Res.* 22: 14-23.
53. **Mullin, T.J.**, Morgenstern, E.K., Park, Y.S., and Fowler, D.P. 1992. Genetic parameters from a clonally replicated test of black spruce (*Picea mariana*). *Can. J. For. Res.* 22: 24-36.
54. Morgenstern, E.K., and **Mullin, T.J.** 1990. Growth and survival of black spruce in the range-wide provenance study. *Can. J. For. Res.* 20: 130-143.
55. **Mullin, T.J.** 1985. Can co-operative tree improvement programs work? *For. Ind.* 105: 40-43.
56. **Mullin, T.J.** 1985. Genotype-nitrogen interactions in full-sib seedlings of black spruce. *Can. J. For. Res.* 15: 1031-1038.

Conference Proceedings Papers and Abstracts

1. Hargreaves, C., Reeves, C., Find, J., Gough, K., M., Menzies, M., Low, C., and **Mullin, T.J.** 2009. Aiming for perfection: Somatic embryogenesis in *Pinus radiata* – initiation and early proliferation across families and genotypes. Proceedings 2009 IUFRO Tree Biotechnology Conference, Whistler, BC, June 28 – July 2, 2009.
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5. Yu, Q., McKeand, S.E., Nelson, C.D., Li, B., Sherrill, J.R. and **Mullin, T.J.** 2005. Is the *cad-n1* allele associated with increased wood density or growth in full-sib families of loblolly pine? Pp. 125 *In*: Proceedings of the 28th Southern Forest Tree Improvement Conference, North Carolina State University, Raleigh, NC, June 21-23, 2005. *Edited by*: S.E. McKeand and B. Li. Publ.50, Southern Forest Tree Improvement Committee.
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8. Capanema, E.A., Balakshin, M.Y., Heerman, M.L., Yeh, T., Yu, Q., Nelson, C.D., McKeand, S.E., Li, B., Jameel, H., Chang, H., and **Mullin, T.J.** 2005. Chemical properties in CAD-deficient pine and their effect on pulping. Pp. 170-176 *In*: Proceedings 13th International Symposium on Wood and Pulp Chemistry, 16-19 May 2005, Auckland, NZ.
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