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Research Interests

Plant physiologist experienced in biochemistry, specifically the application of chromatographic analyses (GC-MS, HPLC) to research problems in genomics, bioenergy crop production, and environmental stress physiology. Current research includes metabolomics for phenotypic characterization of *Populus* and *Arabidopsis*, and the application of genomic tools for the accelerated domestication of *Populus*, including increasing the drought tolerance of *Populus* to increase biomass productivity, and manipulating secondary metabolite production for increased carbon sequestration potential.

Education and Training

1987-90 **Postdoctoral Research Associate**, Environmental Sciences Division
Oak Ridge National Laboratory, Oak Ridge, TN
1982-87 **Ph.D. Forestry** - University of Toronto, Toronto, Ontario, Canada
1980-82 **M.Sc. Forestry** - University of Toronto, Toronto, Ontario, Canada
1976-80 **B.Sc. Biology** - Carleton University, Ottawa, Ontario, Canada

Professional Experience

2007-present **Distinguished Scientist**, Environmental Sciences Division,
Oak Ridge National Laboratory, Oak Ridge, TN
2004-present **Adjunct Faculty**, UT-ORNL Genome Science & Technology Graduate School
University of Tennessee, Knoxville, TN
2003-present **Adjunct Full Professor**, Department of Plant Sciences
University of Tennessee, Knoxville, TN
2002-2006 **Senior Scientist**, Environmental Sciences Division,
Oak Ridge National Laboratory, Oak Ridge, TN
1995-1997 **Adjunct Professor**, Institute of Agriculture
University of Tennessee, Knoxville, TN
1990-2002 **Research Staff**, Environmental Sciences Division, ORNL, Oak Ridge, TN

Publications - 52 total

Morse, A.M., T.J. Tschaplinski, C. Dervinis, P.M. Pijut, E.A. Schmelz, W. Day, and J.M. Davis. 2007. A salicylate hydroxylase transgene in poplar induces compensatory mechanisms in the shikimate and phenylpropanoid pathways. *Phytochemistry* (accepted pending revision).
Sewell, M.M., L.E. Gunter, T.J. Tschaplinski, and G.A. Tuskan. 2007. Identification of QTLs associated with biomass production in hybrid poplar. I. Heterosis and the stability of QTLs across contrasting environments. *Tree Genetics and Genomes* (accepted pending revision).
Sewell, M.M., L.E. Gunter, T.J. Tschaplinski, T.M. Yin, S. DiFazio and G.A. Tuskan. 2007. Identification of QTLs associated with biomass production in hybrid poplar. II. Relationship among QTLs for crown architecture and stem growth. *Tree Genetics and Genomes* (accepted pending revision).

- Tsai, C.-J., S.A. Harding, T.J. Tschaplinski, R.L. Lindroth, and Y. Yuan. 2006. Genome-wide analysis of the structural genes regulating defense phenylpropanoid metabolism in *Populus*. *New Phytol.* 172:47-62.
- Busov, V., Meilan, R., Pearce, D., Rood, S., Ma, C., Tschaplinski, T., and S. Strauss. 2006. Transgenic modification of *gai* or *rgl1* causes dwarfing and alters gibberellins, root growth, and metabolite profiles in *Populus*. *Planta* 224:288-299.
- A.J. Ragauskas, C.K. Williams, B.H. Davison, G. Britovsek, J. Cairney, C.A. Eckert, J. Frederick, J.P. Hallett, D. Leak, C.L. Liotta, J.R. Mielenz, R. Murphy, R. Templer, and T. Tschaplinski. 2006. The path forward for biofuels and biomaterials. *Science* 27:484-489.
- Norby, R.J., S.D. Wullschleger, P.J. Hanson, C.A. Gunderson, T.J. Tschaplinski and J. D. Jastrow. 2006. CO₂ enrichment of a deciduous forest: The Oak Ridge FACE Experiment. pp. 231-251. *In* Nösberger J., Long S.P., Norby R.J., Stitt M., Hendrey G.R., Blum H. (eds.) *Managed ecosystems and CO₂: Case Studies, Processes and Perspectives*. Ecological Studies, Vol. 187. Springer, Berlin. 459 p.
- Davis, M.F., G.A. Tuskan, M.M. Payne, T.J. Tschaplinski and R. Meilan. 2006. Assessment of *Populus* wood chemistry following the introduction of a Bt toxin gene. *Tree Physiol.* 26:557-564.
- Tschaplinski, T., G.A. Tuskan, M.M. Sewell, G.M. Gebre, D.E. Todd and C.D. Pendley. 2006. Phenotypic variation and QTL identification for osmotic potential in an interspecific hybrid inbred F₂ poplar pedigree growing under contrasting environments. *Tree Physiol.* 26:595-604.
- Wullschleger, S.D., T.M. Yin, S.P. DiFazio, T.J. Tschaplinski, L.E. Gunter, M.F. Davis, and G.A. Tuskan. 2005. Phenotypic variation in growth and biomass distribution for two advanced-generation pedigrees of hybrid poplar. *Can. J. For. Res.* 35:1779-1789.
- Hanson, P.J., S.D. Wullschleger, R.J. Norby, T.J. Tschaplinski and C.A. Gunderson. 2005. Importance of changing CO₂, temperature, precipitation, and ozone on carbon and water cycles of an upland oak forest: Incorporating experimental results into model simulations. *Global Change Biol.* 11:1402-1423.
- Tschaplinski, T.J. and P.J. Hanson. 2003. Dormant season nonstructural carbohydrate storage. *In* P.J. Hanson and S.D. Wullschleger (eds.). *North American Temperate Deciduous Forest Response to Changing Precipitation Regimes*. Springer, New York, pp. 67-84.
- Tschaplinski, T.J. and G.M. Gebre. 2003. Leaf water potential, osmotic potential, and solute potential of several hardwood species as affected by manipulation of throughfall precipitation in an upland oak forest. *In* P.J. Hanson and S.D. Wullschleger (eds.). *North American Temperate Deciduous Forest Response to Changing Precipitation Regimes*. Springer, New York, pp. 121-139.
- Hanson, P.J., N.T. Edwards, T.J. Tschaplinski, S.D. Wullschleger and J.D. Joslin. 2002. Estimating the net primary and net ecosystem production of a southeastern upland *Quercus* forest from an 8-year biometric record. *In* P.J. Hanson and S.D. Wullschleger (eds.). *North American Temperate Deciduous Forest Response to Changing Precipitation Regimes*. Springer, New York, pp. 378-395.
- Edwards, N.T., T.J. Tschaplinski and R.J. Norby. 2002. Respiration responses in stems of mature sweetgum trees to CO₂ enrichment. *New Phytol.* 155:239-248.
- Wullschleger, S.D., T.J. Tschaplinski, and R.J. Norby. 2002. Plant water relations at elevated CO₂ – interactions with drought. *Plant, Cell and Environ.* 25:319-331.
- Gebre, G.M., and T.J. Tschaplinski. 2002. Solute accumulation of chestnut oak and dogwood leaves in response to throughfall manipulation of an upland oak forest. *Tree Physiol.* 22:251-260.
- Norby, R.J., P.J. Hanson, E.G. O'Neill, T.J. Tschaplinski, J.F. Weltzin, R.T. Hansen, W. Cheng, S.D. Wullschleger, C.A. Gunderson, N.T. Edwards, and D.W. Johnson. 2002. Net primary

- productivity of a CO₂-enriched deciduous forest and the implication for carbon storage. *Ecol. Appl.* 12:1261-1266.
- Paez, A., G.M. Gebre, M.E. Gonzalez, and T.J. Tschaplinski. 2000. Growth, soluble carbohydrates, and aloin concentration of *Aloe vera* plants exposed to three irradiance levels. *Environ. and Exp. Bot.* 44:133-139.
- Tschaplinski, T.J., G.A. Tuskan, G.M. Gebre, and D.E. Todd. 1998. Drought resistance of two hybrid *Populus* clones grown under irrigation in large-scale plantations. *Tree Physiol.* 18:653-658.
- Gebre, G.M., T.J. Tschaplinski, G.A. Tuskan, and D.E. Todd. 1998. Clonal and seasonal differences in leaf osmotic potentials and organic solutes of five hybrid poplar clones grown under field conditions. *Tree Physiol.* 18:645-652.
- Tschaplinski, T.J., G.M. Gebre, and T.L. Shirshac. 1998. Osmotic potential of several hardwood species as affected by throughfall manipulation of an upland oak forest during a dry year. *Tree Physiol.* 18:291-298.
- Gebre, G.M., T.J. Tschaplinski, and T.L. Shirshac. 1998. Response in water relations of several hardwood species to throughfall manipulation in an upland oak forest during a wet year. *Tree Physiol.* 18:299-305.
- Wullschleger, S.D., P.J. Hanson, and T.J. Tschaplinski. 1998. Whole-plant water flux in understory red maple exposed to altered precipitation regimes. *Tree Physiol.* 18:71-79.
- Blake, T.J., J. Sperry, T.J. Tschaplinski, and S.S. Wang. 1997. Water relations. In Stettler, R.F., H.D. Bradshaw, P.E. Heilman, and T.M. Hinckley (eds.). *Biology of Poplar*. Natural Sciences and Research Council of Canada, Ottawa, Canada, pp. 401-422.
- Land, S.B., A.W. Ezell, S.H. Schoenholtz, G.A. Tuskan, T.J. Tschaplinski, R.C. Kellison, M. Stine, and H.D. Bradshaw. 1997. *Intensive culture of cottonwood and hybrid poplar*. LSU Press.
- Tschaplinski, T.J., D.B. Stewart, and R.J. Norby. 1995. Interactions between drought and elevated CO₂ on osmotic adjustment and solute concentrations of tree seedlings. *New Phytol.* 131:169-177.
- Tschaplinski, T.J., G.M. Gebre, J.E. Dahl, G.T. Roberts, and G.A. Tuskan. 1995. Growth and solute adjustment of calli of *Populus* clones cultured on nutrient media containing polyethylene glycol. *Can. J. For. Res.* 25:1425-1433.
- Tschaplinski, T.J., and T.J. Blake. 1995. Carbohydrate status of coppice shoots of hybrid poplar following shoot pruning. *Tree Physiol.* 15:333-338.
- Tschaplinski, T.J., D.B. Stewart, P.J. Hanson, and R.J. Norby. 1995. Interactions between water stress and elevated CO₂ on growth and gas exchange of seedlings of three deciduous tree species. *New Phytol.* 129:63-71.
- Tschaplinski, T.J., and L.L. Wright. 1994. Woody plant research of the biofuels feedstock development program. *Biologue* 12:32-35.
- Tschaplinski, T.J., G.A. Tuskan, and C.A. Gunderson. 1994. Water-stress tolerance of black cottonwood and eastern cottonwood clones and four of their hybrid progeny. I. Growth, water relations and gas exchange. *Can. J. For. Res.* 24:346-371.
- Tschaplinski, T.J., and G.A. Tuskan. 1994. Water-stress tolerance of black cottonwood and eastern cottonwood clones and four of their hybrid progeny. II. Metabolites and inorganic ions that constitute osmotic adjustment. *Can. J. For. Res.* 24:681-687.
- Van Miegroet, H., R.J. Norby, and T.J. Tschaplinski. 1994. Optimum nitrogen fertilization in a short-rotation sycamore plantation. *For. Ecol. and Manage.* 64:13-24.
- Tschaplinski, T.J., and T.J. Blake. 1994. Carbohydrate mobilization following shoot defoliation and decapitation in hybrid poplar. *Tree Physiol.* 14:141-151.
- Tschaplinski, T.J., R.J. Norby, and S.D. Wullschleger. 1993. Responses of loblolly pine seedlings to elevated CO₂ and fluctuating water supply. *Tree Physiol.* 13:283-296.

- Tschaplinski, T.J., and R.J. Norby. 1993. Physiological indicators of nitrogen response in short rotation sycamore plantations. II. Nitrogen metabolism. *Can. J. Bot.* 71:841-847.
- Marland, G., V. Dale, R. Graham, R. Luxmoore, S. Marland, S. McLaughlin, R. Norby, W. M. Post, T. Tschaplinski, J. Tuskan, and L. Wright. 1993. Forest management for fixing and sequestering carbon. *Proceedings of the Second U.S./Japan Workshop on Global Change Research: Environmental Response Technologies (Mitigation and Adaptation)*. Honolulu, Hawaii, U.S.A., Feb. 1-3, 1993. pp. 265-269.
- D'Surney, S.J., T.J. Tschaplinski, N.T. Edwards, and L.R. Shugart. 1993. Biological responses of two soybean cultivars exposed to enhanced UVB radiation. *Environ. and Exp. Bot.* 33:1-10.
- Blake, T.J., and T.J. Tschaplinski. 1992. Water relations. *In* P.C. Mitchell, L. Sennerby-Forse, and T. M. Hinckley (eds.). *Ecophysiology of Short Rotation Forest Crops*. Elsevier, Amsterdam. pp. 66-94.
- Koppelaar, R.S., T.J. Tschaplinski, and S.J. Colombo. 1992. Carbohydrate accumulation and turgor maintenance in seedling shoots and roots of two boreal forest conifers subjected to water stress. *Can. J. Bot.* 69:2522-2528.
- Tschaplinski, T.J., and R.J. Norby. 1991. Physiological indicators of nitrogen response in short rotation sycamore plantations. I. CO₂ assimilation, photosynthetic pigments, and soluble carbohydrates. *Physiol. Plant.* 82:117-126.
- Grossnickle, S.C., J.T. Arnott, J.E. Major, and T.J. Tschaplinski. 1991. Dormancy induction treatment influence on western hemlock seedlings. I. Seedling development and stock quality assessment. *Can. J. For. Sci.* 21:164-174.
- Tschaplinski, T. J., D. W. Johnson, R. J. Norby, and D. E. Todd. 1991. Biomass and soil nitrogen relationships of a one-year-old sycamore plantation. *Soil Sci. Am. J.* 55:841-847.
- McCarthy, J.F., and T.J. Tschaplinski. 1991. Biological markers in animals and plants to establish exposure to, and effects of, atmospheric toxicants. *In* T. J. Moser, J. R. Baker, and D. T. Tingey (eds.). *Ecological Exposure and Effects of Airborne Toxic Chemicals: An Overview*. U.S. Protection Agency, Corvallis, OR. Report No. 600/3-91/001, pp. 107-127.
- Tschaplinski, T.J., and T.J. Blake. 1989. Water relations, photosynthetic capacity, and root/shoot partitioning of photosynthate as determinants of productivity in hybrid poplar. *Can. J. Bot.* 67:1689-1697.
- Tschaplinski, T.J., and T.J. Blake. 1989. Correlation between early root production, carbohydrate metabolism, and biomass production in hybrid poplar. *Can. J. Bot.* 67:2168-2174.
- Tschaplinski, T.J., and T.J. Blake. 1989. Water stress tolerance and late-season organic solute accumulation in hybrid poplar. *Can. J. Bot.* 67:1681-1688.
- Tschaplinski, T.J., and T.J. Blake. 1989. Photosynthetic reinvigoration following shoot decapitation, and accelerated growth of coppice shoots. *Physiol. Plant.* 75:157-165.
- Tschaplinski, T.J., and T.J. Blake. 1989. The role of sink demand in carbon partitioning and photosynthetic reinvigoration following shoot decapitation. *Physiol. Plant.* 75:166-173.
- Blake, T.J., and T.J. Tschaplinski. 1986. The role of water relations and photosynthesis in the early reinvigoration of decapitated poplar hybrids. *Physiol. Plant.* 68:287-293.
- Tschaplinski, T.J., and T.J. Blake. 1985. Effects of root restriction on growth correlations, water relations, and senescence of alder seedlings. *Physiol. Plant.* 64:167-176.
- Blake, T.J., T.J. Tschaplinski, and A. Eastham. 1984. Stomatal control of water use efficiency in poplar clones and hybrids. *Can. J. Bot.* 62:1344-1351.

Theses

- Ph.D. Physiological correlatives of vigorous growth in hybrid poplar.
M.Sc.F. The effects of root restriction on growth, water relations and senescence of European alder (*Alnus glutinosa* Gaertn.) seedlings.
B.Sc. The age composition of a collection of rabid and nonrabid Big Brown Bats (*Eptesicus fuscus*) as determined by dental annuli.

Synergistic Activities

DOE 30x30 Workshop on Biomass Energy – Member of Wood Crop Development panel (2006)
Southeast Regional Biomass Consortium – Lead of Woody Crop Development (2006)
International Poplar Genome Consortium – Coordinator of the Metabolic Characterization and Metabolomics section of the Science Plan for post-genome sequencing research
Environmental and Experimental Botany – member of Editorial Board (2002 – present)
Tree Physiology – member of Editorial Review Board (1994 – present)