Curriculum Vitae for Mary A. Topa, Ph.D.

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RESEARCH INTERESTS: Stress physiology of trees, with an emphasis on shoot-root interactions and *in situ* root system function; genetic variation in carbon source/sink relationships and its relationship to tree growth; rhizosphere ecology and root system function.

EDUCATION

Ph.D. in Plant Physiology, Duke University, School of Forestry and Environmental Studies, Durham, NC.
B.A. in Biology, Case Western Reserve University, Cleveland, OH.

EMPLOYMENT

2004-present	Director of Research, The Holden Arboretum, Kirtland, OH 44094
1998-2004	Associate Plant Physiologist, Boyce Thompson Institute for Plant Research, Tower Road, Ithaca, NY 14853-1801.
1992-1998	Assistant Plant Physiologist, Boyce Thompson Institute for Plant Research, Tower Road, Ithaca, NY 14853-1801.

PROFESSIONAL EXPERIENCE

2008-2010	Member of International Scientific Committee for the Fifth International Symposium on "Physiological Processes in Roots of Woody Plants" in Victoria, British Columbia in 2010.
2006-present	Adjunct Professor, Department of Biology, Case Western Reserve University, Cleveland OH
2007-2009	Member of Oversight Council and Holden institutional liaison for the Biodiversity Alliance of Cleveland
2008	Organized statewide seed collection of five species of native ash from quarantined counties in Ohio to help establish a seed bank for the National Seed Laboratory for future research.
2006	Member of Harvard University's Overseers' Committee to Visit the Arnold Arboretum.
2005-2007	Member of Scientific Committee for the Fourth International Symposium "Physiological Processes in Roots of Woody Plants" in Bangor, Wales, September 16-19th, 2007.
1995-2005	Chairperson, IUFRO (International Union of Forestry Research Organizations) Root Physiology and Symbiosis Working Party S2.01.13.
1997-2004	Organizer/chair of the Cornell/USDA/BTI Mini-Symposium on Root-Soil Research in April.

2001-2003 Member of Scientific Committee for the Third International Symposium "Dynamics of Physiological Processes in Woody Roots" in Perth, Australia, September 29-October 2, 2003.

1998-1999 Member of Scientific and Organizing Committees for the Second International Symposium "Dynamics of Physiological Processes in Woody Roots" in Nancy, France, September 26-30, 1999.

1998-1999 Organizer/moderator of Workshop "An evaluation of methods to assess the demographics and dynamics of tree roots", the Second International Symposium "Dynamics of Physiological Processes in Woody Roots" in Nancy, France, September 26-30, 1999.

1996-1998 Member of Organizational and Scientific Committees for the International Symposium "The Supporting Roots: Structure and Function", an IUFRO conference in Bordeaux, France, in 1998.

Chair of Steering Committee for the Second International Symposium "Dynamics of Physiological Processes Woody Roots" in Nancy, France, in 1999.

1994-95 Chair of Organizing and Scientific Committees for the International Symposium "Dynamics of Physiological Processes in Woody Roots", Ithaca, NY, October 8-11, 1995.

Reviewer for:

Australian Journal of Botany, Canadian Journal of Forest Research, Canadian Journal of Botany, Environmental and Experimental Biology, Environmental Microbiology, Functional Ecology, New Phytologist, Physiologia Plantarum, Plant and Soil, Tree Physiology, Trees, and Kluwer Academic Publishers. Member of Editorial Review Board for Tree Physiology.

USDA Competitive Grants (Plant Responses to the Environment, Forest Biology, Managed Ecosystems, Soils and Soil Biology), and NSF Competitive Grants (Physiology and Behavior, Ecological and Evolutionary Physiology, and Metabolic Biology), and served as a panel member for Managed Ecosystems.

SELECTED PROFESSIONAL PUBLICATIONS

Burke, D.J., Martin, K.J., Rygiewicz, P.T., & Topa, M.A. 2006. Relative abundance of ectomycorrhizas in a managed loblolly pine (*Pinus taeda* L.) genetics plantation as determined through terminal restriction fragment length polymorphism (TRFLP) profiles. Canadian Journal of Botany **84**: 924-932.

Burke, D.J., Kretzer, A.M., Rygiewicz, P.T., & Topa, M.A. 2006. Soil bacterial diversity in a loblolly pine plantation: Influence of ectomycorrhizas and fertilization. FEMS Microbiological Ecology **57**: 409-419.

Martin, T.A., Dougherty, P.M., Topa, M.A. & McKeand, S.E. 2005. Strategies and case studies for incorporating ecophysiology into southern pine tree improvement programs. Southern Journal of Applied Forestry **29**(2): 70-80.

Burke, D.J., Martin, K.J., Rygiewicz, P.T., & Topa, M.A. 2005. Ectomycorrhizal fungi identification in single and pooled root samples: terminal restriction fragment length polymorphism (TRFLP) and morphotyping compared. Soil Biology and Biochemistry **37**: 1683-1694.

Topa, M.A., McDermitt, D.J., Yun, S.-C. & King, P.S. 2004. Do elevated ozone and variable light alter carbon transport to roots in sugar maple? New Phytologist **162**: 173-186.

Topa, M.A. 2004. Tree Physiology: Root System Physiology. *In:* The Encyclopedia of Forest Sciences, (J. Burley, J.Evans and J. Youngquist, eds.). Elsevier Science Ltd., London, UK. pp. 1606-1616.

Yang, W.Q., Murthy, R., King, P.S. & Topa, M.A. 2002. Diurnal changes in gas exchange and carbon partitioning in needles of fast- and slow-growing families of loblolly pine (*Pinus taeda*). Tree Physiology **22**: 489-498.

Retzlaff, W.A., Blaisdell, G.K. & Topa, M.A. 2001a. Seasonal changes in water source of four families of loblolly pine (*Pinus taeda* L.). Trees Structure and Function **15**: 154-162.

Retzlaff, W.A., Handest, J.A., O'Malley, D.M., McKeand, S.E. & Topa, M.A. 2001b. Whole-tree biomass and carbon allocation of juvenile trees of loblolly pine (*Pinus taeda* L.): influence of genetics and fertilization. Canadian Journal of Forest Science **31**: 960-970.

Topa, M.A., Vanderklein, D.W. Corbin & Corbin, A.T. 2001. Effects of elevated ozone and low light on diurnal and seasonal carbon gain in sugar maple (*Acer saccharum* Marsh.). Plant Cell and Environment **24**: 663-677.

Bäck, J., Vanderklein, D.W. & Topa, M.A. 1999. Effects of elevated ozone on CO_2 uptake and leaf structure in sugar maple under two light environments. Plant, Cell and Environment **22**: 137-147.

Kuehny, J. & Topa, M.A. 1998. Diurnal changes in allocation and partitioning of recently-assimilated carbon in loblolly pine seedlings. Physiologia Plantarum **104**: 317-328.

Topa, M.A. & Sisak, C.L. 1997. Characterization of phosphorus uptake in slow- and fast-growing southern pine seedlings grown in solution culture. Plant and Soil **190**: 317-329.

Topa, M.A. 1996. Seed source variation in ^{32}P uptake and transport in *Pinus taeda* L. seedlings: A possible regulatory role for efflux. Plant and Soil **182**: 259-265.

Topa, M.A. & Cheeseman, J.M. 1994. Maintenance of ^{32}P uptake and transport in *Pinus serotina* seedlings under hypoxic growth conditions. Physiologia Plantarum **92**: 171-180.

Topa, M.A. & McLeod, K.W. 1988. Promotion of aerenchyma formation in *Pinus serotina* seedlings by ethylene. Canadian Journal of Forest Research **18**: 276-280.

Topa, M.A. & McLeod, K.W. 1986. Aerenchyma and lenticel formation in pine seedlings: A possible avoidance mechanism to anaerobic growth conditions. Physiologia Plantarum **68**: 540-550.

SELECTED CONTRIBUTED PAPERS AT SCIENTIFIC MEETINGS

Burke, D.J., Topa, M.A. & Kretzer, A.M. "Bacterial diversity in soil associated with ectomycorrhizal root tips of loblolly pine: effects of long-term fertilization", Ecological Society of America Annual Meeting, Montreal, Quebec, August 7-11, 2005 (Oral Presentation).

Burke, D.J., Martin, K.J., Rygiewicz, P.T. & Topa, M.A. "Utilization of T-RFLP (terminal restriction fragment length polymorphism) to characterize mixed ectomycorrhizal fungal communities", Third International Symposium Dynamics of Physiological Processes of Woody Roots, Perth, Australia, September 29-October 3, 2003 (Poster Presentation).

Sheppard, P.R. & Topa, M.A. "Physico-chemical pretreatment of wood for measuring tree-ring nitrogen", 6th International Conference on Dendrochronology, Environmental Change and Human History, Quebec City, August 22-27, 2002 (Oral Presentation).

Burke, D., Martin, K., Rygiewicz, P. & Topa, M. "Ectomycorrhizal community composition in loblolly pine ecotypes as determined by terminal restriction fragment length comparisons", Ithaca, NY, Mini-symposium on Root-Soil Research, Boyce Thompson Institute at Cornell University, April 24, 2002 (Oral Presentation).

McKeand, S.E., Topa, M.A., O'Malley, D.M. & Allen, H.L. "Responsiveness of diverse families of loblolly pine to fertilization: Six-year results from SETRES-2, Southern Forest Science Conference, November 26-28, 2001 (Oral Presentation).

Topa, M.A. & McDermitt, D. "Ozone and low light effects on allocation and partitioning of recently-assimilated carbon in sugar maple", Ecological Society of America Annual Meeting, Madison, Wisconsin, August 5-10, 2001 (Poster Presentation).

Yang, W.Q., Phillips, R.P., Dunbar-Wallis, A.K. & Topa, M.A. "Seasonal ^{15}N acquisition and allocation in slow- and fast-growing families of loblolly pine (*Pinus taeda* L.)", Ecological Society of America Annual Meeting, Madison, Wisconsin, August 5-10, 2001 (Poster Presentation).

Yang, W.Q., Dunbar-Wallis, A.K. & Topa, M.A. "Fine root turnover and mycorrhizal morphotypes in loblolly pine (*Pinus taeda* L.)", Ecological Society of America Annual Meeting, Snowbird, UT, August 6-10, 2000 (Poster Presentation).

Topa, M.A., Yang, W.Q., King, P.S. & Phillips, R.P. "Carbon acquisition and partitioning strategies of slow- and fast-growing families of loblolly pine", Ecological Society of America Annual Meeting, Snowbird, UT, August 6-10, 2000 (Poster Presentation).

Retzlaff, W.A. & Topa, M.A. "Use of hydrogen isotope analysis to identify source water of diverse provenances of loblolly pine (*Pinus taeda* L.)", Second International Symposium "Dynamics of Physiological Processes of Woody Roots" in Nancy, France, September 26-30, 1999 (Poster Presentation).

Retzlaff, W.A.,G.K. Blaisdell & M.A. Topa. "Seasonal water source of diverse provenances of loblolly pine (*Pinus taeda* L.)", Toward the Application of Process Models to Sustainable Management of Southern Pine Forests Symposium, Asheville, NC, June 8-11, 1999 (Oral Presentation).

Retzlaff, W.A., Blaisdell, G.K. & Topa, M.A. "Belowground carbon allocation of fast- and slow-growing families of loblolly pine", International Symposium The Supporting Roots: Structure and Function, Bordeaux, France, July 20-24, 1998 (Oral Presentation).

Ayling, S.M. & Topa, M.A. "Phosphorus storage in *Pinus serotina* Michx. (Pond pine)", International Symposium The Supporting Roots: Structure and Function, Bordeaux, France, July 20-24, 1998 (Poster Presentation).

Topa, M.A., McDermitt, D.J. & Crisfield, S.K. "Ozone-induced patchiness on CO_2 uptake in sugar maple", Ecological Society of America Annual Meeting, Albuquerque, NM, August 10-14, 1997 (Poster Presentation).

Bäck, J., Vanderklein D.W. & Topa, M.A. "CO_2 uptake and short-term carbohydrate allocation in sugar maple (*Acer saccharum* Marsh.) in two light levels under elevated ozone", Stress Factors and Air Pollution, 17th International Meeting for Specialists in Air Pollution Effects on Forest Ecosystems, IUFRO, Firenze, Italy, September 14-19, 1996 (Oral Presentation).

Ayling, S.M. & Topa, M.A. "Phosphorus compartmentation in *Pinus serotina*: Observations from *in vivo* ^{31}P nuclear magnetic resonance", International Symposium Dynamics of Physiological Processes in Woody Roots, Ithaca, NY, October 8-11, 1995 (Oral Presentation).

Kuehny, J. & Topa, M.A. "Carbon allocation patterns in roots of loblolly pine", Cornell Mini-symposium on Root-Soil Research, in Ithaca, NY, April 14, 1994 (Oral Presentation).

Topa, M.A. "Phosphorus uptake strategies of slow- and fast-growing southern pines", Ecological Society of America Annual Meeting, Knoxville, TN, August 7-11, 1994 (Poster Presentation).

Kuehny, J. & Topa, M.A. "Diurnal changes in ^{14}C assimilation, allocation and partitioning in loblolly pine seedlings", Annual Ecological Society of America Meeting, Knoxville, TN, August 7-11, 1994 (Poster Presentation).

Topa, M.A. & Cheeseman, J.M. "Coregulation of plant growth and P acquisition in *Pinus serotina* seedlings under hypoxic solution conditions", 12th North American Forest Biology Workshop, The Role of Physiology and Genetics in Forest Ecosystem Research and Monitoring, Saulte Ste. Marie, Ontario, Aug. 17-20, 1992 (Oral Presentation).

SELECTED INVITED SCIENTIFIC TALKS

Topa, M.A. "Genetic x environmental interactions in root system response to environmental stress", COSTE38: Woody Root Processes: Revealing the Hidden Half, Sede Boqer, Israel, February 4-8, 2006.

Topa, M.A. "Sugar maple decline in the northeastern USA: A causal link between ozone and whole-tree carbon source-sink relationships", Department of Biology, Case Western Reserve University, Cleveland, OH, March 3, 2005.

Topa, M.A. "Carbon transport to roots in sugar maple: Evidence suggesting shared control", Third International Symposium Dynamics of Physiological Processes of Woody Roots, Perth, Australia, September 29-October 3, 2003.

Topa, M.A. “Carbon acquisition and allocation strategies in trees: A role for carbon in the defense against stress”, USDA ARS Plant Protection Research Unit, Ithaca, NY, March 19, 2003.

Dougherty, P., Martin, T., Topa, M. & McKeand, S. “Can a better understanding of ecophysiology help in selecting and developing improved genotypes?”, Silviculture and Genetic Impacts on Productivity of Southern Pine Forests, Wrightsville Beach, NC, September 17-19, 2002.

Topa, M.A. “Assessing the significance of belowground carbon allocation of fast- and slow-growing families of loblolly pine”, DOE Agenda 2020 Meeting, July 2001.

McKeand, S.E., Topa, M.A., O’Malley, D.M. & Allen, H.L. “Responsiveness of diverse families of loblolly pine to fertilization: Six-year results from SETRES-2”, Southern Forest Science Conference, November 26-28, 2001.

Topa, M.A. “Root system carbon demands in trees: the “poor relations” or major carbon sink?”, Syracuse University, Department of Biology, December 3, 1999.

Topa, M.A. “Modeling belowground processes: Current gaps in experimental research”, Toward the Application of Process Models to Sustainable Management of Southern Pine Forests, Symposium, Asheville, NC, June 8-11, 1999.

Retzlaff, W.A. & Topa, M.A. “Use of hydrogen isotope analysis to identify source water of diverse provenances of loblolly pine (*Pinus taeda* L.)”, Second International Symposium Dynamics of Physiological Processes of Woody Roots in Nancy, France, September 26-30, 1999.

Retzlaff, W.A.,G.K. Blaisdell & Topa, M.A. “Seasonal water source of diverse provenances of loblolly pine (*Pinus taeda* L.)”, Toward the Application of Process Models to Sustainable Management of Southern Pine Forests Symposium, Asheville, NC, June 8-11, 1999.

Topa, M.A. “Functional differences between woody and fine roots: Inferences from seedling studies", International Symposium The Supporting Roots: Structure and Function, Bordeaux, France, July 20-24, 1998.

Topa, M.A. “Assessing the significance of belowground carbon allocation of fast- and slow-growing families of loblolly pine”, SETRES 1997 meeting, North Carolina State University, Raleigh, NC, November.

Topa, M.A. “Characterizing phosphorus uptake in fast- and slow-growing southern pines”, Agricultural Experimental Station in Geneva in Plant Pathology, October, 1996.

Topa, M.A. “Phosphorus uptake and utilization strategies of fast- and slow-growing southern pines”, Dept. of Forestry, North Carolina State University, Raleigh, NC, July, 1995.

Topa, M.A. “Characterization of phosphorus uptake in a southern pine”, Plant Biology Seminar Series, Cornell University, Ithaca, NY, November, 1995.

SELECTED INVITED TALKS (GREEN INDUSTRY AND POPULAR)

Topa, M.A. "Tree Biology", Ohio Chapter ISA Certified Arborist Preparation Course at The Holden Arboretum, November 3, 2010.

Topa, M. "Root response to soil stresses", 2010 Ohio Tree Care Conference in Columbus, OH, February 14, 2010.

Topa, M. "The root-microbe-soil continuum", 2010 Ohio Tree Care Conference in Columbus, OH, February 14, 2010.

Topa, M. "Lessons learned by a tree root physiologist", 2009 Sustainability Symposium: In Your Own Backyard, at the Cleveland Botanical Garden on February 7, 2009. Keynote speaker.

Topa, M.A. "Tree root structure and function", Ohio Tree Care Conference and Trade Show, Columbus, OH, February 14, 2006.

Topa, M.A. "The root-microbe-soil continuum", Ohio Tree Care Conference and Trade Show, Columbus, OH, February 14, 2006.

Topa, M.A. "How roots adapt to different soil environments", Ohio Chapter of the International Society for Arborists Annual Meeting: Dirt the Final Frontier, Kirtland, OH, Sept 25, 2005.

MEMBERSHIP IN SCIENTIFIC SOCIETIES

Ecological Society of America, International Union of Forestry Research (IUFRO), IUFRO Root Physiology and Symbiosis Working Party, American Public Gardens Association.

POSTDOCTORAL AND RESEARCH ASSOCIATES TRAINED:

Dr. Dirk Vanderklein, Associate Professor, Department of Biology and Molecular Biology, Montclair State University, NJ.

Dr. Jeff Kuehny, Professor, School of Plant, Environmental and Soil Science, Louisiana State University, LA.

Dr. Sarah Ayling, Veterinary Pathology, Infections and Immunity, University of Bristol, UK.

Dr. Jaana Bäck, Researcher Coordinator, Department of Forest Ecology, University of Helsinki, Finland.

Dr. William Retzlaff, Associate Dean, College of Arts and Sciences, Southern Illinois University at Edwardsville, IL.

Dr. Wei Qiang Yang, Assistant Professor, North Williamette Research & Extension Center, OR.

Dr. David Burke, Scientist, The Holden Arboretum, Cleveland, OH.

Have mentored over 30 undergraduate students.