

STAN D. WULLSCHLEGER

Environmental Sciences Division
Oak Ridge National Laboratory, Oak Ridge, TN 37831-6422
Tel (865) 574-7839; Fax (865) 576-9939
E-mail wullschlegd@ornl.gov

EDUCATION

Ph.D. Crop Physiology, University of Arkansas--1990
M.S. Tree Physiology, Colorado State University--1982
B.S. Forest Management, Colorado State University--1979

STATEMENT OF RESEARCH INTEREST

Current research interests include quantifying plant response to environmental change, modeling plant, regional, and global carbon and water cycles, and incorporating emerging capabilities of plant genomics into studies of plant physiology and ecology. Field experiments are conducted to examine the response of plants to atmospheric CO₂ enrichment, drought, and warming, focusing on carbon, water, and energy exchange. Mechanistic understanding gained in these investigations is incorporated into models and used to assess leaf, plant, stand, and ecosystem-scale responses to global climatic change. Studies are being expanded to consider how genomics can be used and interpreted within an ecological context; what new approaches can be used to model hierarchical systems in ecology; and how sensors and sensor networks can best be developed and deployed for high-resolution measurements in the ecological sciences.

PROFESSIONAL EXPERIENCE

Chief Scientist, Detection and Simulation of Ecosystem Response (2005-present); Oak Ridge National Laboratory, Oak Ridge, TN. Lead a lab-wide initiative to develop and apply new technologies in the field of ecology. Areas of interest include sensors and sensor networks, genomics, next-generation facilities, and simulation and visualization of terrestrial ecosystems.

Team Leader, Plant Molecular Ecology (2005-present); Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN. Provide scientific leadership to a highly talented and multi-disciplinary group of researchers involved in applying new tools of molecular biology to questions of interest to DOE and to the Nation. Specific areas include fundamental understanding of plant biology, bioenergy crop development, enhancing soil carbon sequestration, and ecological genomics.

Distinguished Scientist (2005-present); Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN. Conduct field and laboratory studies on the physiological and ecological response of terrestrial ecosystems to global environmental change. Participate in functional genomic investigations of plant carbon allocation and biomass distribution in trees.

Senior R&D Staff Scientist (2002-2005); Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN. Conduct field and laboratory studies on the physiological and ecological response of terrestrial ecosystems to global environmental change. Participate in functional genomic investigations of plant carbon allocation and biomass distribution in trees. Assist in coordination of DOE effort to sequence the poplar genome and co-lead International *Populus* Genome Consortium.

Staff Research Member (1995-2002); Environmental Sciences Division, Oak Ridge National

Laboratory, Oak Ridge, TN. Identified and modeled mechanisms by which plants respond to global environmental change. Research emphasized carbon and water cycles, carbon sequestration, advanced instrumentation for the ecological sciences, bioenergy crops, and ecosystem genomics.

Staff Research Associate (1992-1995); Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN. Examined response of plants and ecosystems to changing global climate.

Alexander Hollaender Distinguished Postdoctoral Fellow (1990-1992); Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN. Established physiological and biochemical mechanisms of plant response to environmental stresses.

Research Assistant (1985-1990); Department of Agronomy, University of Arkansas, Fayetteville, AR. Documented the effects of environmental and nutritional stresses on foliar gas-exchange, carbon allocation, and plant productivity.

Plant Physiologist (1981-1985); USDA-ARS, Fort Collins, CO. Investigated soil and environmental influences on root hydraulic conductivity and whole-plant nutrient uptake. Served as irrigation specialist and participated in the development of instrumentation for crop water scheduling.

Graduate Research Assistant (1979-1981); Department of Forest and Wood Sciences, Colorado State University, Fort Collins, CO. Investigated hormone biosynthesis by ectomycorrhizal fungi and the influence of ectomycorrhizal fungi in determining pine seedling vigor.

PROFESSIONAL AWARDS AND HONORS

ORNL Biological and Environmental Sciences Directorate, Science Council (2004-present); Editor – Tree Physiology (2000-present); Editorial Review Board – Tree Physiology (1992-2000); Annual Scientific Achievement Award (1998), Environmental Sciences Division, Oak Ridge, TN; Alexander Hollaender Distinguished Postdoctoral Fellowship (1990), Oak Ridge Associated Universities, Oak Ridge, TN; Technical Review Board, Savanna River Short-rotation Woody Crops Coop (1999-present); Research Council, Southern Man and the Biosphere (1999-present); Outstanding Graduate Student Presentation Award (1990), Southern Regional Meeting, American Society of Agronomy; Gerald O. Mott Scholarship for Meritorious Graduate Students in Crop Science (1989), Crop Science Society of America; BASF Outstanding Presentation Award (1989), Beltwide Cotton Production Research Conferences; Aubrey E. Harvey Award (1988), Sigma Xi Research Society, University of Arkansas; Outstanding Agronomy Ph.D. Student (1987), Department of Agronomy, University of Arkansas; Hill Memorial Fellowship (1981), College of Forestry and Natural Resources, Colorado State University; Colorado Graduate Scholarship (1980), Graduate School, Colorado State University.

PUBLICATIONS

BOOKS EDITED - 1 total

1. Hanson, P.J. and S.D. Wullschleger (eds.) North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes. 2003. Springer, New York, NY. Pp. 472.

BOOK CHAPTERS - 13 total

1. Oosterhuis, D. M. and S. D. Wullschleger. 1989. Psychrometric water potential analysis in leaf discs. pp. 113-133. *In* Modern Methods of Plant Analysis, New Series, Volume 9, Gases in Plant and

Microbial Cells. H. F. Linskens and J. F. Jackson (eds.). Springer-Verlag, Berlin.

2. Wullschleger, S.D., W.M. Post and A.W. King. 1995. On the potential for a CO₂ fertilization effect in forest trees - An assessment of 58 controlled-exposure studies and estimates of the biotic growth factor. Pp.85-107. *In* Biotic Feedbacks in the Global Climate System: Will Warming Feed the Warming? G.M. Woodwell and F.T. Mackenzie (eds.). Oxford Press.
3. Norby, R.J., E.G. O'Neill and S.D. Wullschleger. 1995. Belowground responses to atmospheric carbon dioxide in forests. Pp. 397-418. *In* Carbon Forms and Functions in Forest Soils. W.F. McFee and J.M. Kelly (eds.). American Society of Agronomy, Madison, WI.
4. Norby, R.J., S.D. Wullschleger and C.A. Gunderson. 1996. Tree Responses to Elevated CO₂ and Implications for Forests. Pp. 1-21. *In* Carbon Dioxide and Terrestrial Ecosystems. G.W. Koch and H.A. Mooney (eds.). Academic Press.
5. McLaughlin, S.B., J.D. Joslin, A. Stone, R. Wimmer and S.D. Wullschleger. 1996. Effects of acid deposition on calcium nutrition and health of Southern Appalachian Spruce-Fir forests. *In* Proc. IUFRO Symp. Air Pollution and Multiple Stresses. R. Cox, K.Percy, K. Jensen and C. Simpson (eds.). p. 207-215. Fredericton, New Brunswick, Canada. September 7-9, 1994.
6. Post, W.M., A.W. King and S.D. Wullschleger. 1996. Soil organic matter models and global estimates of soil organic carbon. D.S. Powlson, P. Smith, and J.U. Smith (eds.), NATO Advanced Science Institute, Series I, vol. 38:201-222.
7. Wullschleger, S.D., R.J. Norby and C.A. Gunderson. 1997. Forest trees and their response to atmospheric CO₂ Enrichment - A Compilation of Results. Pg. 79-100. *In* Advances in Carbon Dioxide Effects Research. L.H. Allen, Jr. (ed.). American Society of Agronomy Special Publication
8. McLaughlin, J.D. Joslin, W. Robarge, A. Stone, R. Wimmer and S.D. Wullschleger. 1997. The impact of acidic deposition and global change on high elevation Southern Appalachian Spruce-Fir forests. Pg. 255-277. *In* The Productivity and Sustainability of Southern Forest Ecosystems in a Changing Environment. R.A. Mickler and S. Fox (eds.). Forest Service, Southern Global Change Program.
9. Wullschleger, S.D. and P.J. Hanson. 2003. Sensitivity of saplings and mature-tree water use to altered precipitation regimes. pg. 87-99. *In* North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes. P.J. Hanson and S.D. Wullschleger (eds.). Springer, New York.
10. Wullschleger S.D., P.J. Hanson and D.E. Todd. 2003. Forest water use and the influence of precipitation change. pg. 363-377. *In* North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes. P.J. Hanson and S.D. Wullschleger (eds.). Springer, New York, NY.
11. Wullschleger S.D., C.A. Gunderson, L.M. Tharp, D.C. West and W.M. Post. 2003. Simulated patterns of forest succession and productivity as a consequence of altered precipitation. pg. 433-446. *In* North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes. P.J. Hanson and S.D. Wullschleger (eds.). Springer, New York.
12. Hanson, P.J., N.T. Edwards, T.J. Tschaplinski, S.D. Wullschleger and J.D. Joslin. 2003. Estimating the net primary and net ecosystem production of a southeastern upland *Quercus* forest from an 8-year

biometric record. pg. 378-395. *In* North American Temperate Deciduous Forest Responses to Changing Precipitation Regimes. P.J. Hanson and S.D. Wullschleger (eds.). Springer, New York.

13. Norby R.J., L.A. Joyce and S.D. Wullschleger. 2004. Modern and future forests in a changing atmosphere. Pg. 394-414. *In* History of Atmospheric CO₂ and the Impacts on Plants, Animals, and Ecosystems. J. Ehleringer, T. Cerling and D. Dearing (eds.). Springer, New York.

REFEREED PUBLICATIONS – 102 total

1. Kidd, F. A., S. D. Wullschleger, K. Dawley and C. P. P. Reid. 1982. Use of Gentamicin in axenic culturing of ectomycorrhizal plants. *Applied Environmental Microbiology* 44:506-508.
2. Schaffer, B., F. G. Hawksworth, S. D. Wullschleger and C. P. P. Reid. 1983. Cytokinin-like activity related to host reactions to Dwarf mistletoe (*Arceuthobium* spp.). *Forest Science* 29:66-70.
3. Fiscus, E. L., S. D. Wullschleger and H. R. Duke. 1984. Integrated stomatal opening as an indicator of water stress in *Zea*. *Crop Science* 24:245-249.
4. Wullschleger, S. D. and D. M. Oosterhuis. 1986. A rapid leaf- disc sampler for psychrometric water potential measurements. *Plant Physiology* 81:684-685.
5. Tyree, M. T., E. L. Fiscus, S. D. Wullschleger and M. A. Dixon. 1986. Detection of xylem cavitation in corn under field conditions. *Plant Physiology* 82:597-599.
6. Wullschleger, S. D. and D. M. Oosterhuis. 1987. Electron microscope study of cuticular abrasion on cotton leaves in relation to water potential measurements. *Journal of Experimental Botany* 38:660-667.
7. Oosterhuis, D. M. and S. D. Wullschleger. 1987. Water flow through cotton roots in relation to xylem anatomy. *Journal of Experimental Botany* 38:1866-1874.
8. Oosterhuis, D. M. and S. D. Wullschleger. 1987. Osmotic adjustment in cotton (*Gossypium hirsutum* L.) leaves and roots in response to water stress. *Plant Physiology* 84:1154-1157
9. Oosterhuis, D. M., M. L. Parker, S. D. Wullschleger and K. S. Kim. 1988. The citrus leaf cuticle in relation to measurement of leaf water potential using thermocouple psychrometers. *Plant, Cell and Environment* 11:129-135.
10. Wullschleger, S. D., M. A. Dixon and D. M. Oosterhuis. 1988. Field measurement of leaf water potential with a temperature-corrected *in situ* thermocouple psychrometer. *Plant, Cell and Environment* 11:129-135.
11. Wullschleger, S. D. and D. M. Oosterhuis. 1989. The occurrence of an internal cuticle in cotton (*Gossypium hirsutum* L.) leaf stomates. *Environmental and Experimental Botany* 29:229-235.
12. Wullschleger, S. D. and D. M. Oosterhuis. 1989. Water use efficiency as a function of leaf age and position within the cotton canopy. *Plant and Soil* 120:79-85.
13. Oosterhuis, D. M., H. D. Scott, R. E. Hampton and S. D. Wullschleger. 1990. Physiological response of two soybean [*Glycine max* (L.) Merr] cultivars to short-term soil flooding. *Environmental and*

Experimental Botany 30:85-92.

14. Wullschleger, S. D. and D. M. Oosterhuis. 1990. Photosynthesis of individual field-grown cotton leaves during ontogeny. *Photosynthesis Research* 23:163-170.
15. Oosterhuis, D. M., S. D. Wullschleger, R. E. Hampton and R. A. Ball. 1990. Physiological response of rice (*Oryza sativa* L.) to fenoxaprop-induced injury. *Weed Science* 38:459-462.
16. West, C. P., D. M. Oosterhuis and S. D. Wullschleger. 1990. Osmotic adjustment in tissues of tall fescue in response to water deficit. *Environmental and Experimental Botany* 30:149-156.
17. Wullschleger, S. D. and D. M. Oosterhuis. 1990. Photosynthetic carbon production and use by developing cotton leaves and bolls. *Crop Science* 30:1259-1264.
18. Wullschleger, S. D. and D. M. Oosterhuis. 1990. Photosynthetic and respiratory activity of fruiting forms within the cotton canopy. *Plant Physiology* 94:463-469.
19. Oosterhuis, D. M. and S. D. Wullschleger. 1990. Drought tolerance and irrigation scheduling of vegetable crops. *Acta Horticulturae* 278:351-358.
20. Wullschleger, S. D. and D. M. Oosterhuis. 1990. Canopy development and photosynthesis of cotton as influenced by nitrogen nutrition. *Journal of Plant Nutrition* 13: 1141-1151.
21. Hampton, R. E., S. D. Wullschleger and D. M. Oosterhuis. 1990. Impact of *Verticillium* wilt infection on net photosynthesis, respiration, and photorespiration of field-grown cotton. *Physiological and Molecular Plant Pathology* 37:271-280.
22. Wullschleger, S. D. and C. P. P. Reid. 1990. Implication of ectomycorrhizal fungi in the cytokinin relations of loblolly pine. *New Phytologist* 116:681-688.
23. Wullschleger, S. D., J. E. Cahoon, J. A. Ferguson and D. M. Oosterhuis. 1991. SURFTEMP: Simulation of soil surface temperature using the energy balance equation. *Journal of Agronomic Education* 20:11-15.
24. Oosterhuis, D. M., R. E. Hampton and S. D. Wullschleger. 1991. Water deficit effects on the cotton leaf cuticle and the efficiency of defoliant. *Journal of production Agriculture* 4:260-265.
25. Wullschleger, S. D. and D. M. Oosterhuis. 1991. Osmotic adjustment and the growth response of seven vegetable crops following water-deficit stress. *HortScience* 26:1210-1212.
26. Kirkpatrick, T. L., D. M. Oosterhuis and S. D. Wullschleger. 1991. Interaction of root-knot nematodes and water stress in two cotton cultivars. *Journal of Nematology* 23:462-467.
27. Wullschleger, S. D., D. M. Oosterhuis, R. E. Hurrion and P. J. Hanson. 1991. Evidence for light-dependent recycling of respired CO₂ by the cotton fruit. *Plant Physiology* 97:574-579.
28. Wullschleger, S. D. and D. M. Oosterhuis. 1991. Photosynthesis, transpiration, and water-use efficiency of cotton leaves and fruit. *Photosynthetica* 25:505-515.
29. Wullschleger, S. D., R. J. Norby and D. L. Hendrix. 1992. Carbon exchange rates, chlorophyll

- concentration, and carbohydrate status of two forest tree species to carbon dioxide enrichment. *Tree Physiology* 10:21-31.
30. Wullschleger, S. D., P. J. Hanson and R. F. Sage. 1992. PHOTOBIO: Modeling the stomatal and biochemical control of plant gas-exchange. *Journal of Natural Resources and Life Sciences Education* 21:141-145.
 31. Wullschleger, S. D. and D. M. Oosterhuis. 1992. Canopy leaf area development and age-class dynamics in cotton. *Crop Science* 32:451-456.
 32. Norby, R. J., C. A. Gunderson, S. D. Wullschleger, E. G. O'Neill and M. K. McCracken. 1992. Productivity and compensatory growth responses of yellow-poplar trees to elevated CO₂. *Nature* 357:322-324.
 33. Wullschleger, S. D., R. J. Norby and C. A. Gunderson. 1992. Growth and maintenance respiration in leaves of *Liriodendron tulipifera* L. saplings exposed to long-term carbon dioxide enrichment in the field. *New Phytologist* 121:515-523.
 34. Wullschleger, S. D., P. J. Hanson and C. A. Gunderson. 1992. Assessing the influence of exogenous ethylene on electron transport and fluorescence quenching in leaves of *Glycine max*. *Environmental and Experimental Botany* 32:449-455.
 35. Wullschleger, S.D. and R.J. Norby. 1992. Respiratory cost of leaf growth and maintenance in white oak saplings exposed to atmospheric CO₂ enrichment. *Canadian Journal of Forest Research* 22:1717-1721.
 36. Edwards, G.S., S.D. Wullschleger and J.M. Kelly. 1993. Growth and physiology of northern red oak: Preliminary comparisons of mature and seedling responses to ozone. *Environmental Pollution* 83:215-221.
 37. Hanson, P.J., S.D. Wullschleger, S.A. Bohlman and D.E. Todd. 1993. Seasonal and topographic patterns of forest floor CO₂ efflux from an upland oak forest. *Tree Physiology* 13:1-15.
 38. Wullschleger, S.D. 1993. Biochemical limitations to carbon assimilation in C₃ plants - A retrospective analysis of the A/C_i curves from 109 species. *Journal of Experimental Botany* 44:907-920.
 39. Gunderson, C.A. and S.D. Wullschleger. 1993. Photosynthetic acclimation of trees to a doubling of atmospheric CO₂: A broader perspective. *Photosynthesis Research* 39:369-388.
 40. Wullschleger, S.D., L.H. Ziska and J.A. Bunce. 1994. Respiratory responses of higher plants to atmospheric CO₂ enrichment. *Physiologia Plantarum* 90:221-229.
 41. Gunderson, C.A., R.J. Norby and S.D. Wullschleger. 1993. Foliar gas exchange of two deciduous hardwoods during three years of growth in elevated CO₂: No loss of photosynthetic enhancement. *Plant, Cell and Environment* 16:797-807.
 42. Tschaplinski, T.J., R.J. Norby and S.D. Wullschleger. 1993. Responses of loblolly pine seedlings to elevated CO₂ and fluctuating water supply. *Tree Physiology* 13:283-296.
 43. Luxmoore, R.J., S.D. Wullschleger and P.J. Hanson. 1993. Forest responses to CO₂ enrichment and

climate warming. *Water, Soil, and Air Pollution* 70: 309-323.

44. Bondada, B.R., Oosterhuis, D.M., Wullschleger, S.D., Kim, K.S. and Harris, W.M. 1994. Anatomical considerations related to photosynthesis in cotton (*Gossypium hirsutum* L.) leaves, bracts, and the capsule wall. *Journal of Experimental Botany* 45:111-118.
45. Wullschleger, S.D., Lynch, J.P. and Berntson, G.M. 1994. Modeling the belowground response of plants and soil biota to edaphic and climatic change - What can we expect to gain? *Plant and Soil* 165:149-160.
46. Wullschleger, S.D., R.J. Norby and P.J. Hanson. 1995. Growth and maintenance respiration in stems of *Quercus alba* after four years of CO₂ enrichment. *Physiologia Plantarum* 93:47-54.
47. Hanson, P.J., L.J. Samuelson, S.D. Wullschleger, T.A. Tabberer and G.S. Edwards. 1994. Seasonal patterns of light-saturated photosynthesis and leaf conductance for mature and seedling *Quercus rubra* L. foliage: differential sensitivity to ozone. *Tree Physiology* 14:1351-1366.
48. Norby, R.J., S.D. Wullschleger, C.A. Gunderson and C.T. Nietch. 1995. Increased growth efficiency of *Quercus alba* trees to a CO₂-enriched atmosphere. *New Phytologist* 131:91-97.
49. King, A.W., W.R. Emanuel, S.D. Wullschleger and W.M. Post. 1995. In search of the missing carbon sink: a model of terrestrial biospheric response to land-use change and atmospheric CO₂. *Tellus* 47B:501-519.
50. Kelly, J.M., L.J. Samuelson, G. Edwards, P.J. Hanson, D. Kelting, A. Mays and S.D. Wullschleger. 1995. Are seedlings reasonable surrogates for trees? An analysis of ozone impacts on *Quercus rubra*. *Water, Soil, and Air Pollution* 85:1317-1324.
51. Wullschleger, S.D., P.J. Hanson and G.S. Edwards. 1996. Growth and maintenance respiration in leaves of northern red oak seedlings and mature trees after three years of ozone exposure. *Plant, Cell and Environment* 19:577-584.
52. Wullschleger, S.D., M.A. Sanderson, S.B. McLaughlin, D.P. Biradar and A.L. Rayburn. 1996. Photosynthetic rates and ploidy levels among populations of switchgrass. *Crop Science* 36:306-312.
53. Gunter, L.E., G.A. Tuskan and S.D. Wullschleger. 1996. Diversity among populations of switchgrass based on RAPD markers. *Crop Science* 36:1017-1022.
54. Wullschleger, S.D., P.J. Hanson and D.E. Todd. 1996. Measuring stem water content in four deciduous hardwoods with a time domain reflectometer. *Tree Physiology* 16:809-815.
55. Reed, R.L., M.A. Sanderson, S.B. McLaughlin, S.D. Wullschleger, D.I. Bransby, B. Conger, C. Taliaferro, D.D. Wolfe, W.R. Ocumpaugh, M.A. Hussey, J. Read and C.R. Tischler. 1996. Switchgrass as a sustainable bioenergy crop. *Bioresource Technology* 56:83-93.
56. Post, W.M., A.W. King and S.D. Wullschleger. 1997. Historical variations in terrestrial biospheric carbon storage. *Global Biogeochemical Cycles* 11:99-109.
57. King, A.W., W.M. Post and S.D. Wullschleger. 1997. The potential response of terrestrial carbon storage to changes in climate and atmospheric CO₂. *Climatic Change* 35:199-227.

58. Norby, R.J., N.T. Edwards, J.S. Riggs, C.H. Abner, S.D. Wullschleger, C.A. Gunderson, E.G. O'Neill. 1997. Temperature-controlled open-top chambers for global change research. *Global Change Biology* 3:259-267.
59. Wullschleger, S.D., R.J. Norby, J.C. Love and C.D. Runck. 1997. Energetic cost of tissue construction in yellow-poplar and white oak saplings exposed to long-term CO₂ enrichment. *Annals of Botany* 80:289-297.
60. 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 Physiology* 18:71-79.
61. Wullschleger, S.D., F.C. Meinzer and R.A. Vertessy. 1998. A review of whole-plant water use studies in trees. *Tree Physiology* 18:499-512.
62. Norby, R.J., S.D. Wullschleger, C.A. Gunderson, D.W. Johnson and R. Ceulemans. 1999. Tree responses to rising CO₂ in field experiments: Implications for the future forest. *Plant, Cell and Environment* 22:683-714.
63. Garten, C.T. and S.D. Wullschleger. 1999. Soil carbon inventories under a bioenergy crop (Switchgrass): Measurement limitations. *Journal of Environmental Quality* 28:1359-1365.
64. Edwards, N.T. and S.D. Wullschleger. 1999. Carbon dioxide efflux rates from stems of mature *Quercus alba* L. and *Acer rubrum* L. trees do not appear to be affected by sap flow. *Journal of Sustainable Forestry* 10:125-11.
65. Drake, B.G., J. Azcon-Bieto, J. Berry, J. Bunce, R. Dahlman, P. Dijkstra, J. Farrar, R. Gifford, M. Gonzalez-Meler, G. Koch, H. Lambers, J. Siedow and S. Wullschleger. 1999. Does elevated atmospheric CO₂ concentration inhibit mitochondrial respiration in green plants? *Plant, Cell and Environment* 22:649-657.
66. Gunderson, C.A., R.J. Norby and S.D. Wullschleger. 2000. Acclimation of photosynthesis and respiration to simulated climatic warming in northern and southern populations of *Acer saccharum* Marsh: Laboratory and field evidence. *Tree Physiology* 20:87-96.
67. Becker, P., F.C. Meinzer and S.D. Wullschleger. 2000. Hydraulic limitation of tree height: a critique. *Functional Ecology* 14:4-11.
68. Garten, C.T., Jr. and S.D. Wullschleger. 2000. Soil carbon dynamics beneath switchgrass as indicated by stable isotope analysis. *Journal of Environment Quality* 29:645-653.
69. Wullschleger, S.D. and A.W. King. 2000. Radial variation in sap velocity as a function of stem diameter and sapwood thickness in yellow-poplar trees. *Tree Physiology* 20:511-518.
70. Wullschleger, S.D., K.B. Wilson and P.J. Hanson. 2000. Environmental control of whole-plant transpiration, canopy conductance and estimates of the decoupling coefficient for large red maple trees. *Agricultural and Forest Meteorology* 104:157-168.
71. Wullschleger, S.D., P.J. Hanson and D.E. Todd. 2001. Transpiration from a multi-species deciduous forest as estimated by xylem sap flow techniques. *Forest Ecology and Management* 143:205-213.

72. Wilson, K.B., P.J. Hanson, P.J. Mulholland, D.D. Baldocchi and S.D. Wullschleger. 2000. A comparison of methods for determining forest evapotranspiration rates and its components across scales: Sap-flow, soil moisture budget, eddy covariance and catchment water balance. *Agricultural and Forest Meteorology* 106:153-168.
73. Wullschleger, S.D. and R.J. Norby. 2001. Sap velocity and canopy transpiration for a 12-year-old sweetgum plantation exposed to free-air CO₂ enrichment. *New Phytologist* 150: 489-498.
74. Wullschleger, S.D., R.B. Jackson, W.S. Currie, A.D. Friend, Y. Luo, F. Mouillot, Y. Pan and G. Shao. 2001. Are below-ground processes needed in gap models to predict the response of forest succession as a consequence of global climatic change? *Climatic Change* 51:449-473.
75. Bugmann, H.K.M., A.M. Solomon, S.D. Wullschleger, D.T. Price, D.F. Clark and K. Ogle. 2001. Comparing the performance of forest gap models in North America. *Climatic Change* 51:349-388.
76. Wullschleger, S.D., T.J. Tschaplinski and R.J. Norby. 2001. Plant water relations and elevated CO₂ – Interactions with drought. *Plant, Cell Environment* 25:319-331.
77. Gunderson, C.A., J.D. Sholtis, S.D. Wullschleger, D.T. Tissue, P.J. Hanson and R.J. Norby. 2001. Environmental and stomatal control of photosynthetic enhancement in the canopy of a sweetgum (*Liquidambar styraciflua* L.) plantation during three years of CO₂ enrichment. *Plant, Cell Environment* 25:379-394.
78. Wullschleger, S.D., C.A. Gunderson, P.J. Hanson, K.B. Wilson and R.J. Norby. 2002. Sensitivity of stomatal and canopy conductance to elevated CO₂ concentration – Interacting variables and perspectives of scale. *New Phytologist* 153:485-496.
79. Tissue, D.T., J.D. Lewis, S.D. Wullschleger, J.S. Amthor and O.R. Anderson. 2002. Leaf respiration at different canopy positions in sweetgum (*Liquidambar styraciflua*) grown at ambient and elevated concentrations of carbon dioxide in the field. *Tree Physiology* 22:1157-1166.
80. Norby R.J., P.J. Hanson, E.G. O'Neill, T.J. Tschaplinski, J.F. Weltzin, R.T. Hanson, 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 implications for carbon storage. *Ecological Applications* 12:1261-1266.
81. Wullschleger, S.D., G.A. Tuskan and S.P. DiFazio. 2002. Genomics and the tree physiologist. *Tree Physiology* 22:1273-1276.
82. Wullschleger, S.D., S. Jansson and G. Taylor. 2002. Forest biology and genomics – *Populus* emerges as the perennial favorite. *Plant Cell* 14:2651-2655.
83. Martin, M.Z., S.D. Wullschleger, C.T. Garten, Jr. and A.V. Palumbo. 2003. Laser-induced breakdown spectroscopy for the environmental determination of total carbon and nitrogen in soils. *Applied Optics* 42:2072-2077.
84. Wullschleger, S.D. and S.P. DiFazio. 2003. Emerging use of gene expression microarrays in plant physiology. *Comparative and Functional Genomics* 4:216-224.

85. McLaughlin, S.B., S.D. Wullschleger and M. Nosal. 2003. Diurnal and seasonal changes in stem increment and water use by yellow poplar trees in response to environmental stress. *Tree Physiology* 23:1125-1136.
86. Reid, C.D., H. Maherali, H.B. Johnson, S.D. Smith, S.D. Wullschleger and R.B. Jackson. 2003. On the relationship between stomatal characters and atmospheric CO₂. *Geophysical Research Letters* 30 (vol. 19): 1983-1986.
87. Gunter, L.E., A.S. Black, S. Ratnayeke, G.A. Tuskan and S.D. Wullschleger. 2003. Assessment of genetic similarity among 'Alamo' switchgrass seed lots using RAPD markers. *Seed Science and Technology* 31:681-689.
88. Palumbo, A.V., J.F. McCarthy, J.E. Amonette, L.S. Fischer, S.D. Wullschleger and W.L. Daniels. 2004. Prospects for enhancing carbon sequestration and reclamation of degraded lands with fossil-fuel combustion products. *Advances in Environmental Research* 8:425-438.
89. Hanson P.J., J.S. Amthor, S.D. Wullschleger, K.B. Wilson, R.F. Grant, A. Hartley, D. Hui, E.R. Hunt, Jr., D.W. Johnson, J.S. Kimball, A.W. King, Y. Luo, S.G. McNulty, G. Sun, P.E. Thornton, S.S. Wang, M. Williams, and R.M. Cushman. 2004. Oak forest carbon and water simulations: Model intercomparisons and evaluations against independent data. *Ecological Monographs* 74:443-489.
90. Martin, M.Z., S.D. Wullschleger, C.T. Garten, A.V. Palumbo, and J.G. Smith. 2004. Elemental analysis of environmental and biological samples using laser-induced breakdown spectroscopy and pulsed Raman spectroscopy. *Dispersion Science and Technology* 25: 689-696.
91. Wullschleger, S.D., S.B. McLaughlin, and M.P. Ayers. 2004. High-resolution analysis of stem increment and sap flow for loblolly pine trees attacked by southern pine beetle. *Canadian Journal of Forest Research* 34: 2387-2393.
92. Palumbo, A.V., L.S. Fisher, M.Z. Martin, Z.K. Yang, J.R. Tarver, S.D. Wullschleger and W.L. Daniels. 2004. Application of emerging tools and techniques for measuring carbon and microbial communities in reclaimed mine soils. *Environmental Management* 33: S518-S527.
93. Wullschleger, S.D., T.M. Yin, S.P. DiFazio, T.J. Tschaplinski, L.E. Gunter, M. Davis, and G.A. Tuskan. 2005. Phenotypic variation in growth and biomass distribution for two advanced-generation pedigrees of hybrid poplar (*Populus* spp.). *Canadian Journal of Forest Research* 35:1779-1789.
94. 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 Biology* 11:1402-1423.
95. Madhavi, M.Z., N. Labbe, T.G. Rials, and S.D. Wullschleger. 2005. Analysis of preservative-treated wood by multivariate analysis of laser-induced breakdown spectroscopy spectra. *Spectra Chimica Acta* 60: 1179-1185.
96. Wullschleger, S.D. and P.J. Hanson. 2006. Sensitivity of forest water use to altered precipitation: evidence from a long-term manipulative field study. *Global Change Biology* 12: 97-109.
97. King, A.W., C.A. Gunderson, D.J. Weston, and S.D. Wullschleger. 2006. Plant respiration in a

warmer world. *Science* 312: 536-537.

98. Gu, L., T. Meyers, S.G. Pallardy, P.J. Hanson, B. Yang, M. Heuer, K.P. Hosman, J.S. Riggs, D. Sluss, and S.D. Wullschleger. 2006. Direct and indirect effects of atmospheric conditions and soil moisture on surface energy partitioning revealed by a prolonged drought at a temperate forest site. *Journal of Geophysical Research-Atmospheres* 111: Art. No. D16102.
99. McLaughlin, S.B., M. Nosal, S.D. Wullschleger, and G. Sun. 2007. Interactive effects of ozone and climate on tree growth and water use in a southern Appalachian forest in the USA. *New Phytologist* 174: 109-124.
100. McLaughlin, S.B., S.D. Wullschleger, G. Sun, and M. Nosal. 2007. Interactive effects of ozone and climate on water use, soil moisture content and streamflow in a southern Appalachian forest in the USA. *New Phytologist* 174: 125-136.
101. Gu, L., T. Meyers, S.G. Pallardy, P.J. Hanson, B. Yang, M. Heuer, K.P. Hosman, Q. Liu, J.S. Riggs, D. Sluss, and S.D. Wullschleger. 2007. Influences of biomass heat and biochemical energy storages on the land surface fluxes and radiative temperature. *Journal of Geophysical Research-Atmospheres* 112: Art No. D02107.
102. Martin, M.Z., S.D. Wullschleger, A.A. Vass, R.C. Martin and H. Grissino-Mayer. 2007. High resolution laser-induced breakdown spectroscopy used in homeland security and forensic applications. *Bulletin of Laser and Spectroscopy Society of India*. 14: 23-35.
103. Yang, B., P.J. Hanson, J.S. Riggs, S.G. Pallardy, M. Heuer, K.P. Hosman, T.P. Meyers, S.D. Wullschleger, and L. Gu. 2007. Biases of CO₂ storage in eddy covariance measurements in a forest pertinent to vertical configurations of a profile system and CO₂ density averaging. *Agricultural and Forest Meteorology* (in review).
104. Ranatunga, K., S.D. Wullschleger, W.M. Post, and M.L. Tharp. 2007. Soil carbon stocks as influenced by harvest management practices in New South Wales, Australia. Simulations with the forest succession model LINKAGES. *Forest Ecology and Management* (in review).
105. Wullschleger SD, Leakey DB, and St. Clair S. 2007. Functional genomics and ecology: A tale of two scales. *New Phytologist* (in review).

WORKSHOP PROCEEDINGS – 7 total

POPULAR-PRESS OR TRADE-RELATED PUBLICATIONS – 9 total

ABSTRACTS – 187 total