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Education:

Ph.D. Biochemistry, University of New Hampshire, Durham, NH, 1985.
M.S. Zoology, University of New Hampshire, Durham, NH, 1978.
M.Sc. (Hons), Zoology, Panjab University, Chandigarh, India, 1976.
B.Sc. (Hons), Zoology, Panjab University, Chandigarh, India, 1975.

Professional Positions:

1986 - Present. Research Biochemist, USDA Forest Service, Northeastern Research Station, Forestry Sciences Laboratory, Durham, NH; Affiliate Associate Professor, University of New Hampshire, Department of Plant Biology since 1991 and Department Natural Resources since 1997.

1996 - (January to July). Visiting Scientist, Forestry Research Institute, Rotorua, New Zealand.

1991 - (Summer). Visiting Scientist, Agricultural University of Norway, Ås, Norway.

1989 - (January-August). National Science Foundation Visiting Research Scientist, Biological Institute, Tohoku University, Sendai, Japan.

1987 - (March-September). Research Scientist and Principal Investigator, AETA Corporation, Portsmouth, NH. Part-time position supported by National Science Foundation grant.

1984-85 - (September-May). Dissertation Fellow for Ph.D. University of New Hampshire.

1982-84 - (September-May). Research Assistant, Ph.D. Student, University of New Hampshire.

1981-82 - (September-April). Visiting Graduate Student, University of Frankfurt, Germany.

Current Research: Long-term goals of my research are: 1) to develop early biochemical indicators of abiotic and biotic stress in forest trees 2) to be able to predict early on any changes in forest productivity caused by abiotic or biotic factors via the study of several physiological parameters including changes in cellular levels of certain nitrogenous metabolites and the activities of their enzymes and rates of photosynthetic activity. At present, as a part of various interdisciplinary research teams, our project is also involved in several studies to determine the wood core chemistry and foliar chemistry (including inorganic cations, polyamines, amino acids, soluble proteins, and chlorophyll) at various sites in the Northeastern US in order to determine correlation between these parameters and other data on root, soil, and soil solution chemistry collected by our cooperators and collaborators. So far, putrescine, a polyamine, and arginine have shown the potential to be used as early indicators of physiological stress under field conditions.

Collaborators In Past 5 Years: Aber, John D. (Univ. of New Hampshire), Ackerman, Steven (University of Massachusetts), Bailey, Scott (USFS), Bazzaz, Fakhari A. (Harvard, Univ.), Blum, Joel (Univ. of Michigan), Eagar, Christopher (USFS), Fagerberg, Wayne (Univ. of New Hampshire), Fahey, Tim (Cornell University), Fernandez, Ivan (Univ. of Maine), Hallett, Rich (USFS), Hollinger, Dave (USFS), Horsley, Stephen, (USFS), Janhke, Leland (Univ. of New Hampshire), Koch, Jennifer (USFS), Lee, Jae Soon (Forest Research Institute, Korea), Long, Robert (USFS), Magill, Alison (Univ. of New Hampshire), Maki, Hisae (Japan Womens's Univ., Japan), Martin, Mary (Univ. of New Hampshire), Minocha, Subhash C. (Univ. of New Hampshire), McDowell, Bill (Univ. of New Hampshire), McQattie, Carolyn, (USFS), Noh, Eun Woon (Forest Research Institute, Korea), Ollinger, Scott (Univ. of New Hampshire), Rebbeck, Joanne (USFS), Ross, Don, (University of Vermont, Burlington), Rustad, Linsey (USFS), Shortle, Walter (USFS), Smith, Kevin (USFS), Yanai, Ruth (SUNY-ESF), Wargo, Philip (USFS), Wong, Betty (USFS).

Subject Area Index: Biochemistry, Biotechnology, Acidic Deposition, Global Change, Physiology, Nutrient Cycling, Soils, Ecosystem Management, Research Techniques, Environmental Stress.

Selected Publications:

01. Bhatnagar, P, Minocha R and Minocha SC. 2002.
Genetic manipulation of the metabolism of polyamines in poplar cells. The regulation of putrescine catabolism. *Plant Physiol.* 128:1455-1469.
02. Wargo PM, Minocha R, Wong BL, Long RP, Horsley SB and Hall TJ. 2002.
Measuring changes in stress and vitality indicators in limed sugar maple on the Allegheny Plateau in north-central Pennsylvania. *Can. J. For. Res.* 32: 629-641.
03. Quan Y, Minocha R and Minocha SC. 2002.
Genetic manipulation of polyamine metabolism in poplar II. Effects on ethylene biosynthesis. *Plant Physiol. Biochem.* 40: 929-937.

04. Minocha R, Minocha SC and Long S. 2003.
Monitoring environmental stress in forest trees using biochemical and physiological markers. In Sustainable Forestry, Wood Products, and Biotechnology. Espinel S, Barredo Y and Ritter E (eds.), DFA-AFA Press, Victoria-Gasteiz, Spain. p.109-116.
05. Minocha SC, Bhatnagar P, Minocha R and Long S. 2003.
Genetic manipulation of polyamine metabolism in poplar. In Sustainable Forestry, Wood Products, and Biotechnology, Espinel S, Barredo Y and Ritter E (eds.), DFA-AFA Press, Victoria-Gasteiz, Spain. p.179-194.
06. Minocha R and Long S. 2004.
Effects of aluminum on organic acid metabolism and secretion by red spruce cell suspension cultures and the reversal of Al effects on growth and polyamine metabolism by exogenous organic acids. *Tree Physiol.* 24:55-64.
07. Minocha R, Lee JS, Long S, Bhatnagar P and Minocha SC. 2004.
Physiological responses of wild type and putrescine-overproducing transgenic cells of poplar to variations in the form and concentration of nitrogen in the medium. *Tree Physiol.* 24:551-560.
08. Bauer GA, Bazzaz FA, Minocha R, Long S, Magill A, Aber J and Berntson GM. 2004.
Effects of chronic N additions on tissue chemistry, photosynthetic capacity, and carbon sequestration potential of a red pine (*Pinus resinosa* Ait.) stand in the NE United States. *For. Ecol. Manage.* 196:173-186.
09. Minocha R and Long S. 2004.
Simultaneous separation and quantitation of amino acids and polyamines of forest tree tissues and cell cultures within a single high-performance liquid chromatography run using dansyl derivatization. *J. Chromatogr. A.* 1035 (1): 63-73.
10. Minocha R, Minocha SC and Long S. 2004.
Polyamines and their biosynthetic enzymes during somatic embryo development in red spruce (*Picea rubens* Sarg.). *In vitro Cell. Dev. Biol.* 40:572-580.