

Curriculum Vitae of Bruce Bugbee

Education

B.S.	University of Minnesota	1975
M.S.	University of California, Davis	1977
Ph.D.	Penn State University, Horticulture (emphasis: Crop Physiology)	1981

Experience

Postdoctoral Fellow, Plant Science Dept., Utah State Univ.	1981-82
Research Assistant Professor, Plant Sci. Dept., Utah State Univ.	1983-86
Assistant Professor, Plant Science Dept., Utah State Univ.	1987-90
Associate Professor, Plants, Soils, & Biometeorology Dept.	1991-95
Professor, Plants, Soils, & Climate Dept.	96-present

Professional Memberships

Crop Science Society of America
American Society of Agronomy
American Society for Horticultural Science
Association of Education and Research Greenhouse Curators

National Committee Appointments and Positions

Elected chairman of the Crop Physiology division of the Am. Soc. of Agronomy (2003-2004).
Invited to serve on a National Research Council Committee to review NASA research (1996-1998).
Invited to serve on the American Association of Biological Sciences Advisory panel to review research proposals (1991-1992; 1999-2001; 2008).
Nominated for National Science Foundation "Presidential Young Investigator Award" 1987.

Professional Service

Reviewed 32 manuscripts and 39 proposals in the past 10 years (1999-2009) for the Agronomy, Horticulture, Plant Physiology, and other societies.

Awards

2005	Researcher of the Year	College of Agriculture
2001	Outstanding Graduate Mentor	Utah State University
2001	Top Professor Award	Utah State University

Book Chapters

- Doucette, W., E. Dettenmaier, **B. Bugbee** and D. Mackay . 2010. Mass Transport from Soil to Plants. *In:* L. Thibodeaux and D. Mackay (eds.). Handbook of Chemical Mass Transport in the Environment. CRC Press.
- Klassen, S. and **B. Bugbee**. 2005. Shortwave radiation. Chapter 3. pages 43-58 *In:* Micrometeorology in Agriculture Systems. Am. Soc. of Agronomy monograph no. 47. Madison, WI.
- Bugbee, B.** 2004. Nutrient Management in Recirculating Hydroponic Culture. *In:* Proceedings of the South Pacific Soilless Culture Conference. M. Nichols, ed. Acta Hort 648: 99-112.
- Klassen, S.P., G. Ritchie, J. M. Frantz, D. Pinnock, and **B. Bugbee**. 2003. Real-time Imaging of Ground Cover: Relationships with Radiation Capture, Canopy Photosynthesis, and Daily Growth rate. Chapter 1: Pages 3 - 14. *In:* Digital Imaging and Spectral Techniques: Applications to Precision Agriculture and Crop Physiology. Am. Soc. Agronomy special publication No. 66. Madison, WI.
- Doucette, W.J., **B. Bugbee**, S.C. Smith, C.J. Pajak, and J.S. Ginn. 2003. Uptake, Metabolism, and Phytovolatilization of TCE by Indigenous Vegetation. *In:* McCutcheon, S. and J. Schnoor. (eds). Phytoremediation: Transformation and Control of Contaminants. John Wiley and Sons, NY.
- Bugbee, B.** 1996. Growth Analysis and Yield Components. *In:* F.B. Salisbury (ed.). Units, Symbols, and Terminology for Plant Physiology. Oxford University Press.
- Bugbee, B.** 1994. Effects of Radiation Quality, Intensity, and Duration on Photosynthesis and Growth. p. 39-50. *In:* International Lighting in Controlled Environments Workshop. T. Tibbitts ed. NASA Tech Proceeding No. NASA-CP-95-3309. Kennedy Space Center, FL 32899.
- Bugbee, B.** and F.B. Salisbury. 1989. Controlled Environment Crop Production: Hydroponics versus Lunar Regolith. p. 107-129. *In:* D. Henninger and D. Ming (eds.) Lunar Agriculture. Am. Soc. of Agronomy.
- Salisbury, F.B. and **B. Bugbee**. 1985. Wheat Farming in a Lunar Base. *In:* Michael B. Duke and Wendell W. Mendell (eds.) Lunar Bases and Space Activities of the 21st Century. Lunar and Planetary Institute, 3303 NASA Road One, Houston, Texas 77048.

Books Edited

Advances in Space Research. 1992. Life Sciences and Space Research: Natural and Artificial Ecosystems. R. MacElroy, M. Averner, T. Tibbitts, **B. Bugbee**, G. Horneck, and E. Dunlop (eds). Pergamon Press, NY.

Publications in Refereed Journals (not including book chapters)

Slavens, M., P. Johnson, and **B. Bugbee**. 2010. Irrigation frequency differentially alters vegetative growth and seed-head development of *Poa annua* biotypes. *Crop Sci* 51:1-9.

Johnson, I., J. Thornley, J. Frantz, and **B. Bugbee**. 2010. A model of canopy photosynthesis incorporating protein distribution through the canopy and its acclimation to light, temperature and CO₂. *Annals of Botany* 106:735-749.

Blonquist, M., R. Allen, and **B. Bugbee**. 2010. An Evaluation of the Net Radiation Sub-model in the ASCE Standardized Reference Evapotranspiration Equation: Implications for Evapotranspiration Prediction. *Ag. Water Management*. 97:1026-1038.

Blonquist, M., J. Norman, and **B. Bugbee**. 2009. Automated measurement of canopy stomatal conductance based on infra-red temperature. *Ag. and Forest Meteorology* 149:1931-1945. doi: 10:1016.

Jones, S. **B. Bugbee**, R. Heinse, D. Or, and G. Bingham. 2009. Porous plant growth media design considerations for lunar and Martian habitats. SAE International paper no. 2009-01-2361.

Blonquist, M., B. Tanner, and **B. Bugbee** 2009. Evaluation of measurement accuracy and Comparison of Two New and Three Traditional Net Radiometers. *Ag. and Forest Meteorology* 149:1709-1721.

Dettenmaier, E, W. Doucette, **B. Bugbee**. 2008. Chemical Hydrophobicity and Uptake by Plant Roots. *Environmental Sci. and Technology* 43:324-329.

Chen, D. M. Liang, D. DeWald, B. Weimer, M. Peel, **B. Bugbee**, J. Michaelson, E. Davis, Y. Wu. 2008. Identification of dehydration responsive genes from two non-nodulated alfalfa cultivars using *Medicago truncatula* microarrays. *Acta Physiol. Plant* 30:183-189.

Frantz, J., N. Cometti, M. van Iersel, and **B. Bugbee**. 2007. Rethinking Acclimation of Growth and Maintenance Respiration of Tomato in Elevated CO₂: Effects of a Sudden Change in Light at Different Temperatures. *Jour. Plant Ecology* 31 (4)100-110.

Henry, A., W. Doucette, J. Norton, and **B. Bugbee**. 2007. Changes in Crested Wheatgrass Root Exudation caused by Flood, Drought, and Nutrient Stress. *Jour. Environmental Quality* 36:904-912.

- Chard, B., W. Doucette, J. Chard, and **B. Bugbee**. 2006. Trichloroethylene Uptake by Apple and Peach Trees and Transfer to Fruit. *Environ. Sci. and Technology* 40(15):4788-4793.
- Henry, A., W. Doucette, J. Norton, S. Jones, J. Chard, and **B. Bugbee**. 2006. Design and Maintenance of an Axenic Plant Culture system to Facilitate Optimal growth in Long-term studies. *Jour. Environmental Quality* 35(2):590-598.
- Frantz, J. and **B. Bugbee**. 2005. Acclimation of Plant Populations to Shade: Photosynthesis, Respiration, and Carbon Use Efficiency. *Jour. Am. Soc. Hort. Sci.* 130(6):918-927.
- Doucette, W. B. Wheeler, J. Chard, **B. Bugbee**, C. Naylor, J. Carbone, and R. Sims. 2005. Uptake of Nonylphenol and Nonylphenol Ethoxylates by Crested Wheatgrass. *Environ. Toxicology and Chemistry* 24:2965-2972.
- Klassen, S. and **B. Bugbee**. 2004. Ethylene Synthesis and Sensitivity in Crop Plants. *HortScience* 39:1546-1552.
- Frantz, J., D. Pinnock, S. Klassen, and **B. Bugbee**. 2004. Characterizing the Environmental Response of a Gibberellic Acid Deficient Rice for Use as a Model Crop. *Agronomy Jour.* 96:1172-1181.
- Dougher, T. and **B. Bugbee**. 2004. Long-term Blue Light Effects on the Histology of Lettuce and Soybean Leaves and Stems. *Jour. Am. Soc. Hort. Sci.* 129:467-472.
- Frantz, J., N. Cometti, and **B. Bugbee**. 2004. Night Temperature has a Minimal Effect on Respiration and Growth in rapidly Growing Plants. *Ann. Botany* 94:155-166.
- Frantz, J., G. Ritchie, N. Cometti, J. Robinson, and **B. Bugbee**. 2004. Exploring the Limits of Crop Productivity: Beyond the limits of tipburn in lettuce. *Jour. Am. Soc. Hort. Sci.* 129:331-338..
- Mackowiak, C., P. Grossl, and **B. Bugbee**. 2003. Biogeochemistry of Fluoride in a Plant-solution system. *Jour. of Environmental Quality* 32:2230-2238.
- Drysdale, A. and **B. Bugbee**. 2003. Optimizing a Plant Habitat for Space: A Novel Approach to Plant Growth on the Moon. *Int. Conf. Environ. Systems* 2003-01-2360.
- Klassen, S. and **B. Bugbee**. 2002. Sensitivity of Wheat and Rice to Low Levels of Atmospheric Ethylene. *Crop Sci.* 42:746-753.
- Frantz, J. and **B. Bugbee**. 2002. Anaerobic Conditions Improve Germination of a Gibberellic Acid Deficient Rice. *Crop Sci.* 42:651-654.
- Mackowiak, C., P. Grossl, and **B. Bugbee**. 2001. Beneficial effects of humic acid on micronutrient availability to wheat. *Soil Sci. Soc. Am.* 65:1744-1750.

- Campbell, W., F. Salisbury, **B. Bugbee**, S. Klassen, E. Nagle, D. Strickland, G. Bingham, M. Levinskikh, G. Iljina, T. Veselova, V. Sytchev, I. Podolsky, W. McManus, D. Bubenheim, J. Stieber, and G. Jahns. 2001. Comparative floral development of Mir-grown and ethylene treated Earth-grown Super Dwarf wheat. *Jour. Plant Physiol.* 158:1051-1060.
- Dougher, T. and **B. Bugbee**. 2001. Differences in the response of Wheat, Soybean, and Lettuce to reduced blue radiation. *Photochemistry and Photobiology.* 73:199-207.
- Dougher, T. and **B. Bugbee**. 2001. Evidence for yellow light suppression of lettuce growth. *Photochemistry and Photobiology.* 73:208-212.
- Van Iersel, M. and **B. Bugbee**. 2000. A multiple chamber, semi-continuous, crop carbon dioxide exchange system: Design, calibration, and data interpretation. *Jour. Amer. Soc. Hort. Sci.* 125:86-92.
- Orchard, B.J., W.J. Doucette, J.K. Chard and **B. Bugbee**. 2000a. A Novel Laboratory System for Determining the Fate of Trichloroethylene in Plants. *Environ. Tox. Chem.* 19:888-894.
- Orchard, B.J., W.J. Doucette, J.K. Chard and **B. Bugbee**. 2000b. Uptake of Trichloroethylene by Hybrid Poplar Trees Grown Hydroponically in High Rate, Flow-through Plant Growth Chambers. *Environ. Tox. Chem.* 19:895-903.
- J. Cavazzoni, T. Volk, **B. Bugbee**, and T. Dougher. 2000. Phasic Temperature and Photoperiod Control for Soybean using a Modified Crop Gro Model. *Life Supp. Biosphere Sci.* 6:273-278.
- Bugbee, B.** 1999. Engineering Plants for Spaceflight Environments. *American Soc. for Gravitational and Space Biology Bulletin.* 12:67-74.
- Stahl, R., P. Grossl, and **B. Bugbee**. 1999. Effect of 2(N-Morpholino)ethane Sulfonic Acid (MES) on the Growth and Tissue Composition of Cucumber. *Jour. Plant Nutrition* 22:315-330.
- Bugbee, B.**, M. Droter, O. Monje, and B. Tanner. 1999. Evaluation and Modification of Commercial Infra-red Transducers for Leaf Temperature Measurement. *Adv. In Space Res.* 22:1425-1434.
- Dougher, T. and **B. Bugbee**. 1998. Is Blue Light Good or Bad for Plants? *Life Support and Biosphere Science.* 5:129-136.
- Bishop, D. and **B. Bugbee**. 1998. Photosynthetic Capacity and Dry Mass Partitioning in Dwarf and Semi-dwarf Wheat. *Jour. Plant Physiology* 153:558-565.

- Smart, D., K. Ritchie, A. Bloom, and **B. Bugbee**. 1998. Nitrogen Balance for Wheat Canopies Grown under Elevated and Ambient CO₂ Concentrations. *Plant Cell Environ.* 21:753-763.
- Dougher, T. and **B. Bugbee**. 1998. Effect of Lamp Type and Temperature on Development, Carbon Partitioning, and Yield of soybean. *Adv. Space Res.* 5:129-136.
- Grotenhuis, T., J. Reuveni, and **B. Bugbee**. 1998. Super-optimal CO₂ Reduces Yield in Growth Chamber and Greenhouse Environments. *Adv. Space Res.* 20:1901-1904.
- Monje, O. and **B. Bugbee**. 1998. Adaptation to High CO₂ Concentration in an Optimal Environment: Radiation Capture, Canopy Quantum Yield, and Carbon Use Efficiency. *Plant Cell Environ.* 21:315-324.
- Jurgonski, L., D. Smart, **B. Bugbee**, and S. Nielsen. 1998. Controlled Environments Alter Nutrient Content of Soybeans. *Adv. Space Res.* 20:1979-1988.
- Bugbee, B.** and G. Koerner. 1997. Yield Comparisons and Unique Characteristics of the Dwarf Wheat Cultivar AUSU-Apogee". *Adv. Space Res.* 20:1891-1894.
- Volk, T., **B. Bugbee**, and F. Tubiello. 1997. Phasic Temperature Control Appraised with the CERES-Wheat Model. *Life Support & Biosphere Sci.* 4:49-54.
- Smart, D., K. Ritchie, J. Stark, and **B. Bugbee**. 1997. Evidence that Elevated CO₂ Levels and Indirectly Increase Rhizosphere Denitrifier Activity. *Applied & Environmental Microbiology* 63:4621-4624.
- Tubiello, F., T. Volk, and **B. Bugbee**. 1997. Diffuse Light and Wheat Radiation-Use Efficiency in a Controlled Environment. *Life Support & Biosphere Sci.* 4:77-85.
- Grotenhuis, T. and **B. Bugbee**. 1997. Super-optimal CO₂ reduces Seed Yield but not Vegetative Growth in Wheat. *Crop Sci.* 37:1215-1222.
- Reuveni, J. and **B. Bugbee**. 1997. Very High CO₂ Reduces Photosynthesis, Dark Respiration, and Yield in Wheat. *Annals of Botany* 80:539-546.
- Ferro, A., J. Kennedy, W. Doucette, S. Nelson, G. Jauregi, B. McFarland, and **B. Bugbee**. 1997. Fate of Benzene in Soils Planted with Alfalfa: Uptake, Volatilization, and Degradation. Chapt. 16. pp 223-237. IN: *Phytoremediation of Soil and Water Contaminants*. E. Kruger, T. Anderson, and J. Coats (eds). Symposium Series 664. Amer. Chemical Soc. Washington, DC.
- Bugbee, B.**, G. Koerner, R. Albrechtsen, W. Dewey, and S. Clawson. 1997. Registration of USU-Apogee Wheat. *Crop Science* 37:626.

- van Iersel, M. and **B. Bugbee**. 1997. Increased Organic Matter in the Growing Medium Decreases Benlate DF Phytotoxicity. *Plant Disease*. 81:743-748.
- van Iersel, M. and **B. Bugbee**. 1997. Dibutyl urea reduces photosynthesis and growth of Petunia and Impatiens. *Jour. Am. Soc. Hort. Sci.* 122:536-541.
- Monje, O. And **B. Bugbee**. 1996. Characterizing Photosynthesis and Transpiration of Plant Communities in Controlled Environments. *Acta Hort. ISHS* 440:123-128.
- Bugbee, B.** 1996. Growth Analysis and Yield Components. In: Units, Symbols, and Terminology for Plant Physiology. F. Salisbury (ed.). Oxford University Press.
- van Iersel, M. and **B. Bugbee**. 1996. Phytotoxic Effects of Benzimidazole Fungicides on Bedding Plants. *Jour. Am. Soc. Hort. Sci.* 121:1095-1102.
- Smart, D., K. Ritchie, and **B. Bugbee**. 1996. Mass Transfer in the Biological Fast Lane: High CO₂ and a Shallow Root-zone. *Life Support and Biosphere Sci.* 3:43-46.
- Bugbee, B.** O. Monje, and B. Tanner. 1996. Quantifying Energy and Mass Transfer in Crop Canopies. *Advances in Space Research* 18:149-156.
- McKeehen, J. C. Mitchell, R. Wheeler, **B. Bugbee**, and S. Nielsen. 1996. Excess Nutrients in Hydroponic Solutions alter Nutrient content of Rice, Wheat, and Potato. *Advances in Space Research.* 18:73-83.
- Bugbee, B.** 1995. The Components of Crop Productivity: Measuring and Modeling Plant Metabolism. *Am. Soc. of Gravitational and Space Biology.* 8:93-104.
- Smart, D., A. Ferro, K. Ritchie, and **B. Bugbee**. 1995. On the Use of Antibiotics to Reduce Rhizoplane Microbial Populations in Root Physiology and Ecology Investigations. *Physiol. Plantarum* 95:533-540.
- Volk, T, R. Wheeler, and **B. Bugbee**. 1995. An Approach to Crop Modeling with the Energy Cascade. *Life Support and Biosphere Science* 1:119-127.
- Bugbee, B.** B. Spanarkel, S. Johnson, O. Monje, and G. Koerner. 1994. CO₂ Crop Growth Enhancement and Toxicity in Wheat and Rice. *Advances in Space Research* 14:257-267.
- Smart, D., J. Chatterton, and **B. Bugbee**. 1994. The influence of Elevated CO₂ on Nonstructural Carbohydrate Distribution and Fructan Accumulation in Wheat. *Plant, Cell, and Environment* 17:435-442.

- Ferro, A., R. Simms, and **B. Bugbee**. 1994. Hycrest Crested Wheatgrass accelerates the Degradation of Pentachlorophenol in Soil. *Jour. Environmental Quality* 23:272-279.
- Barnes, C., T. Tibbitts, J. Sager, G. Deitzer, D. Bubenheim, G. Koerner, and **B. Bugbee**. 1993. Accuracy of Quantum Sensors Measuring Yield Photon Flux and Photosynthetic Photons Flux. *HortScience* 28:1197-1200.
- Bugbee, B.** and O. Monje. 1992. The Limits of Crop Productivity: Theory and Validation. *BioScience* 42:494-502.
- Bugbee, B.** 1992. Steady State Gas Exchange in Growth Chambers: System Design and Operation. *HortScience* 27:770-776.
- Barnes, C. and **B. Bugbee**. 1992. Morphological Responses of Wheat to Blue Light. *Jour. of Plant Physiol.* 139:339-342.
- Monje, O. and **B. Bugbee**. 1992. Inherent Limitations of Nondestructive Chlorophyll Meters: A Comparison of Two Types of Meters. *HortScience* 27:69-71.
- Bugbee, B.** 1991. Determining the Potential Productivity of Food Crops in Controlled Environments. *Adv. Space Res.* 12:85-95.
- Volk, T. and **B. Bugbee**. 1991. Modeling Light and Temperature Effects on Leaf Emergence in Wheat and Barley. *Crop Science* 31:1218-1224.
- Barnes, C. and **B. Bugbee**. 1991. Morphological Responses of Wheat to Changes in Phytochrome Photoequilibrium. *Plant Physiol.* 97:359-365.
- Bugbee, B.** and F.B. Salisbury. 1989. Current and Potential Productivity of Wheat for a Controlled Environment Life Support System. *Advances in Space Research.* 9:5-15.
- Bugbee B.** and F.B. Salisbury. 1988. Exploring the Limits of Crop Productivity: Photosynthetic Efficiency in High Irradiance Environments. *Plant Physiol.* 88:869-878.
- Bubenheim, D.L., **B. Bugbee** and F.B. Salisbury. 1988. Radiation in Controlled Environments: Influence of lamp type and filter material. *Jour. Am. Soc. of Hort. Sci.* 113:468-474.
- Salisbury, F.B., and **B. Bugbee**. 1988. Plant Productivity in Controlled Environments. *Symposium on Plant Productivity in Space.* *HortSci.* 23:293-299.
- Salisbury, F.B., **B. Bugbee**, and D. Bubenheim. 1987. Wheat Production in Controlled Environments. *Advances in Space Research* 7:123-132.

Bugbee, B. and F.B. Salisbury. 1985. An Evaluation of MES (2(N-Morpholino)ethanesulfonic Acid) and Amberlite IRC-50 as pH Buffers for Nutrient Solution Studies. *J. Plant Nutr.* 8:567-583.

Bugbee, B. and J.W. White. 1984. Tomato Growth as Affected by Root-zone Temperatures and the Addition of Gibberellic Acid and Kinetin to Nutrient Solutions. *J. Amer. Soc. Hort. Sci.* 109:121-125.