

CHERYL L. MACKOWIAK

BUSINESS ADDRESS

University of Florida, NFREC, 155 Research Rd., Quincy, FL 32351
Phn: (850) 875-7126 Fax: (850) 875-7188 email:echo13@ufl.edu

EDUCATION

Ph.D. Degree. December, 2001.

Utah State University, Logan, UT

Department of Plants, Soils, and Biometeorology (soil fertility/plant nutrition)

Dissertation: The efficacy of plant residue degradation products on phosphorus, iron, fluorine, and iodine bioavailability to plants.

MS Degree. December, 1990.

Southern Illinois University, Carbondale, IL

Department of Plant and Soil Science

Thesis: Micropropagation of *Hibiscus Rosa-sinensis* L.

BS Degree. May, 1984.

Southern Illinois University, Carbondale, IL

Department of Plant and Soil Science.

Major: Plant and Soil Science. Minor: Chemistry

EXPERIENCE

Assistant Professor, University of Florida, NFREC, Quincy, FL (01/2004 – present)

- Determine nitrogen cycling in subtropical forage soils
- Determine the effect fertilizer sources and inputs have on forage N removal
- Nitrogen mitigation and water quality protection development using select forage and forage blends

Postdoctoral soil scientist, USDA FS-RMRS, Logan, UT (01/2001 – 04)

- Characterize Se and other trace element uptake by native and forage species at phosphate mine sites
- Soil moisture effects on Se and other trace element bioavailability
- Se remediation using soil immobilization and vegetation management strategies

Research assistant, Utah State University, Logan, UT (09/1997 – 12/01)

- Sorption chemistry of P on ferrihydrite, with and without SOM
- Biogeochemistry of Fe, F, and I in a plant-solution system as affected by HEDTA and SOM
- Instructor for an introductory soils lab

Lead Horticulturist, Dynamac Corp., Kennedy Space Center, FL (01/95 – 09/97)

- Hydroponic crop production using microbially degraded biosolid leachates
- Salinity effects on Na partitioning in crop plants
- Crop development under supraoptimal atmospheric CO₂.

Lead Horticulturist, Bionetics Corp., Kennedy Space Center, FL (10/85 – 01/95)

- Mineral recovery from bioreactor waste processors
- Budget crop nutrients in recirculating hydroponics

- Crop cultivar selection and solution culture development in hydroponics

ACTIVITIES/HONORS

- Member of Analytic Research/Extension Lab Oversight Committee (01/06 – present)
- Chair-elect Working Group for Southern Pastures Forage Crop Improvement Conf. (04/06 – 04/07)
- Applicant Research Advisor, USGS Mendenhall Postdoctoral Research Fellowship Program (07/05 – present)
- Departmental representative to the USU graduate student senate (05/99 – 05/00)
- Recipient of NASA's Graduate Student Research Program Fellowship (07/98 – 12/01)
- Recipient of the Arch T. Colwell Merit Award (1994) from the Engineering Society for Advancing Mobility Land Sea Air and Space (SAE), for a publication on plant nutrient recycling from aerobic bioreactor effluent

PROFESSIONAL AFFILIATIONS

- Soil Science Society of America (SSSA)
- Southern Pastures Forage and Crop Improvement Conference (SPFCIC)
- Perennial Peanut Producers Association (PPPA)
- Florida Cattlemen's Association (FCA)
- International Humic Substances Society (IHSS)
- NCR-101 Committee on Controlled Environment Technology and Use

REFEREED PUBLICATIONS

- Mackowiak, C.L., P.R. Grossl, and K.L. Cook. 2005. Iodine toxicity in a plant-solution system with and without humic acid. *Plant and Soil*. 269:141-150.
- Wheeler, R.M., K.A. Corey, G.M. Volk, C.L. Mackowiak, N.C. Yorrio, and J.C. Sager. 2004. Soybean canopy gas exchange rates: Effects of lighting. *Eco-Engineering* 16: 209-214.
- Mackowiak, C.L., M.C. Amacher, J.O. Hall, and J.R. Herring. 2004. Uptake of selenium and other contaminant elements into plants and implications for grazing animals in southeast Idaho. In J.R. Hein (ed), *Life cycle of the Phosphoria Formation: from deposition to the post-mining environment*. Handbook of Exploration Geochemistry, Vol. 8. Elsevier Science, New York.
- Mackowiak, C.L., P.R. Grossl, and B.G. Bugbee. 2003. Biogeochemistry of fluoride in a plant-solution system. *JEQ*. 32:2230-2237.
- Mackowiak, C.L., P.R. Grossl, and B.G. Bugbee. 2001. Beneficial effects of humic acid on micronutrient availability to wheat. *SSSAJ*. 65:1744-1750.
- Grossl, P.R. and C.L. Mackowiak. 1999. The use of soluble organic matter (SOM) to promote plant nutrient bioavailability in bioregenerative life support systems. SAE Tech. Paper 1999-01-2068.
- Loader, C.A., J.L. Garland, L.H. Levine, K.L. Cook, C.L. Mackowiak, and H.R. Vivencio. 1999. Direct recycling of human hygiene water into hydroponic plant growth systems. *Life Supp. and Biosph. Sci.* 6:141-152.
- Gunter, S.V., C.L. Mackowiak, and R.M. Wheeler. 1999. Recycling Na in advanced life support: Strategies based on crop production systems. *Life Supp. and Biosph. Sci.* 6:153-160.
- Mackowiak, C.L. and P.R. Grossl. 1999. Iodate and iodide effects on iodine uptake and partitioning in rice (*Oryza sativa* L.) grown in solution culture. *Plant and Soil*. 212:135-143.
- Mackowiak, C.L., G.W. Stutte, R.M. Wheeler, L.M. Ruffe, and N.C. Yorrio. 1999. Tomato and soybean production on a shared recirculating hydroponic system. *Acta Hort*. 481:259-266.
- Stutte, G.W., C.L. Mackowiak, N.C. Yorrio, and R.M. Wheeler. 1999. Theoretical and practical considerations of staggered crop production in a BLSS. *Life Supp. And Biosph. Sci.* 6:287-291.

- Wheeler, R.M., C.L. Mackowiak, W.L. Berry, N.C. Yorio, G.W. Stutte, J.C. Sager, and L.M. Ruffe. 1999. Nutrient, acid and water budgets of hydroponically grown crops. *Acta Hort.* 481:655-661.
- Wheeler, R.M., C.L. Mackowiak, N.C. Yorio, and J.C. Sager. 1999. Effects of CO₂ on stomatal conductance: Do stomata open at very high CO₂ concentrations? *Ann. Bot.* 83:243-251.
- Mackowiak, C.L., R.M. Wheeler, G.W. Stutte, N.C. Yorio, and L.M. Ruffe. 1998. A recirculating hydroponic system for studying peanut (*Arachis hypogaea* L.). *HortSci.* 33:650-651.
- Yorio, N.C., R.M. Wheeler, G.D. Goins, M.M. Sanwo-Lewandowski, C.L. Mackowiak, C.S. Brown, J.C. Sager, and G.W. Stutte. 1998. Blue light requirements for crop plants used in bioregenerative life support systems. *Life Support Biosphere Sci.* 5:119-129.
- Garland, J.L., C.L. Mackowiak, R.F. Strayer, and B.W. Finger. 1997. Integration of waste processing and biomass production systems as part of the KSC Breadboard Project. *Adv. Space Res.* 20(10):1821-1826.
- Mackowiak, C.L., G.W. Stutte, J.L. Garland, B.W. Finger, and L.M. Ruffe. 1997. Hydroponic potato production on nutrients derived from anaerobically processed potato plant residues. *Adv. Space Res.* 20(10):2017-2022.
- Mackowiak, C.L., G.W. Stutte, N.C. Yorio, R.M. Wheeler, and J.C. Sager. 1997. Use of biologically reclaimed minerals for continuous hydroponic potato production in a CELSS. *Adv. Space Res.* 20(10):1815-1820.
- Wheeler, R.M., C.L. Mackowiak, G.W. Stutte, N.C. Yorio, and W.L. Berry. 1997. Effect of elevated carbon dioxide on nutritional quality of tomato. *Adv. Space Res.* 20(10):1975-1978.
- Mackowiak, C.L., J.L. Garland, and J.C. Sager. 1996. Recycling crop residues for use in recirculating hydroponic crop production. *Acta Hort.* 440:19-24.
- Mackowiak, C.L., J.L. Garland, R.F. Strayer, B.W. Finger, and R.M. Wheeler. 1996. Comparison of aerobically-treated and untreated crop residue as a source of recycled nutrients in a recirculating hydroponic system. *Adv. Space Res.* 18(1/2):281-287.
- Mackowiak, C.L. and R.M. Wheeler. 1996. Growth and stomatal behavior of hydroponically cultured potato (*Solanum tuberosum* L.) at elevated and super-elevated CO₂. *J. Plant Physiol.* 149:205-210.
- Wheeler, R.M., C.L. Mackowiak, J.C. Sager, W.M. Knott, and W.L. Berry. 1996. Proximate composition of CELSS crops grown in NASA's biomass production chamber. *Adv. Space Res.* 18(1/2):43-47.
- Wheeler, R.M., C.L. Mackowiak, G.W. Stutte, J.C. Sager, N.C. Yorio, L.M. Ruffe, R.E. Fortson, T.W. Dreschel, W. M. Knott, and K.A. Corey. 1996. NASA's Biomass Production Chamber: A testbed for bioregenerative life support studies. *Adv. Space Res.* 18(1/2):215-224.
- Loretan, P.A., C.K. Bonsi, D.G. Mortley, R.M. Wheeler, C.L. Mackowiak, W.A. Hill, C.E. Morris, A.A. Trotman, and P.P. David. 1994. Effects of several environmental factors on sweetpotato growth. *Adv. Space Res.* 14(11):277-280.
- Mackowiak, C.L., J.L. Garland, and G.W. Stutte. 1994. Growth regulator effects of water soluble materials from crop residues for use in plant hydroponic culture. *Proc. 21st Annual Meeting PGRSA.* pp. 233-239.
- McKeenhen, J.D., D.J. Smart, C.L. Mackowiak, R.M. Wheeler, and S.S. Nielsen. 1994. Effect of CO₂ levels on nutrient content of lettuce and radish. *Adv. Space Res.* 18(1/2):85-92.
- Stutte, G.W., R.M. Wheeler, and C.L. Mackowiak. 1994. Plant growth regulation strategies in controlled ecological life support systems. *Proc. 21st Annual Meeting PGRSA.* pp. 252-257.
- Wheeler, R.M., C.L. Mackowiak, J.C. Sager, and W.M. Knott. 1994. Growth of soybean and potato at high CO₂ partial pressures. *Adv. Space Res.* 14(11):227-280.

- Wheeler, R.M., C.L. Mackowiak, J.C. Sager, N.C. Yorrio, and W.M. Knott. 1994. Growth and gas exchange by lettuce stands in a closed, controlled environment. *J. Amer. Soc. Hort. Sci.* 119:610-615.
- Yorrio, N.C., C.L. Mackowiak, R.M. Wheeler, and J.C. Sager. 1994. Vegetative growth of potato under high-pressure sodium, high-pressure sodium Son-Agro, and metal halide lamps. *HortSci.* 30:374-376.
- Wheeler, R.M., C.L. Mackowiak, L.M. Siegriest, and J.C. Sager. 1993. Supraoptimal carbon dioxide effects on the growth of soybean [*Glycine max. (L.) Merr.*]. *J. Plant Physiol.* 142:173-178.
- Wheeler, R.M., W.L. Berry, C.L. Mackowiak, K.A. Corey, J.C. Sager, M.M. Heeb, and W.M. Knott. 1993. A data base of crop nutrient use, water use, and carbon dioxide exchange in a 20 square meter growth chamber: I. Wheat as a case study. *J. Plant Nutri.* 16:1881-1915.
- Hill, W.A., D.G. Mortley, C.L. Mackowiak, P.A. Loretan, T.W. Tibbitts, R.M. Wheeler, C.K. Bonsi, and C.E. Morris. 1992. Growing root, tuber, and nut crops hydroponically for CELSS. *Adv. Space Res.* 12(5):125-131.

NONREFEREED PUBLICATIONS

- Mackowiak, C.L. and M.C. Amacher. 2003. Plant uptake of selenium in phosphatic shale deposits and mine waste rock dumps. Western Nutrient Management Conference, Salt Lake City, UT. Proceedings, vol. 5. Potash & Phosphate Institute, Brookings, ND. p. 136-148.
- Grossl, P.R., S.E. Bohrer, and C.L. Mackowiak. 1998. The fate of iodine in calcareous systems. 16th World Congress of Soil Sci. Montpellier, France. Paper 1013.
- Goins, G.D., H.G. Levine, C.L. Mackowiak, R.M. Wheeler, J.D. Carr, and D.W. Ming. 1997. Comparison studies of candidate nutrient delivery systems for plant cultivation in space. SAE Tech. Paper 972304.
- Finger, B.W. R.F. Strayer, J.L. Garland, C.L. Mackowiak, and C.F. Atkinson. 1996. Planning for the rapid aerobic bioreactor integration test (RABIT) at the Kennedy Space Center's Advanced Life Support Breadboard Project. SAE Tech. Paper 961509.
- Drysdale, A.E., H.A. Dooley, W.M. Knott, J.C. Sager, R.M. Wheeler, G.W. Stutte, and C.L. Mackowiak. 1994. A more completely defined CELSS. SAE Tech. Paper 941292.
- Fortson, R.E., R.F. Strayer, B.W. Finger, C.L. Mackowiak, and J.C. Sager. 1994. Recycling plant nutrients in the CELSS breadboard project. ASAE Tech. Paper 946562.
- Mackowiak, C.L., L.M. Ruffe, N.C. Yorrio, and R.M. Wheeler. 1994. Effect of carbon dioxide enrichment on radish production using nutrient film technique (NFT). NASA Tech. Mem. 109198.
- Garland, J.L., C.L. Mackowiak, and J.C. Sager. 1993. Hydroponic crop production using recycled nutrients from inedible crop residues. SAE Tech. Paper 932173.
- Stutte, G.W., P.V. Chetirkin, C.L. Mackowiak, and R.E. Fortson. 1993. Statistical analysis of environmental variability within the CELSS Breadboard project's Biomass Production Chamber. NASA Tech. Mem. 109188.

RECENT PRESENTATIONS

- Mackowiak, C.L. and A.R. Blount. Nov. 2006. Bahiagrass genotypic root variation and its effect on soil nitrogen. American Society of Agronomy, Indianapolis, IN.
- Mackowiak, C.L. and A.R. Blount. Nov. 2005. The nutrient status of summer forages grown in three subtropical soils. American Society of Agronomy, Salt Lake City, UT.
- Mackowiak, C.L. and M.C. Amacher. Nov. 2004. Sulfur fertilization as a selenium mitigation strategy for forages on post-mined Phosphoria Formation shale. American Society of Agronomy, Seattle, WA.

- Mackowiak, C.L. and M.C. Amacher. Nov. 2003. Selenium uptake by diverse plant taxa to assess bioavailability in phosphatic shale. American Society of Agronomy, Denver, CO.
- Mackowiak, C.L., M.C. Amacher. Jun. 2003. Selenium availability and uptake by vegetation growing in the southeast Idaho phosphate mining region. Invited speaker. 9th Annual Billings Land Reclamation Symposium and the 20th Annual Meeting of American Society of Mining and Reclamation, Billings, MT.
- Mackowiak, C.L., M.C. Amacher. Mar. 2003. Plant uptake of selenium in phosphatic shale deposits and mine waste rock dumps. Western Nutrient Management Conference, Salt Lake City, UT.
- Mackowiak, C.L. Feb. 2003. Selenium uptake by vegetation from the southeast Idaho phosphate mines region. Invited speaker. Plant Sciences and Plant Pathology Dept., Montana State University, Bozeman, MT.
- Mackowiak, C.L., M.C. Amacher, and J.R. Herring. Nov. 2002. Selenium uptake by vegetation from the Southeast Idaho phosphate mines region. Society of Environmental Toxicology and Chemistry Salt Lake City, UT.
- Mackowiak, C.L. and M.C. Amacher. Nov. 2002. Selenium uptake by forage species grown on phosphate mining waste rock. American Society of Agronomy, Indianapolis, IN.
- Mackowiak, C.L., P.R. Grossl., K.L. Cook. Oct. 2001. Iodine toxicity effects in rice and root-associated bacteria. American Society of Agronomy, Charlotte, NC.
- Mackowiak, C.L. and P.R. Grossl. Oct. 2000. The biogeochemistry of fluoride in a plant-solution system. American Society of Agronomy, Minneapolis, MN.
- Mackowiak, C.L., P.R. Grossl, R.M. Wheeler, M. Grafe, and M. Eick. Aug. 2000. Interactions of human essential nutrients with crops and nutrient solutions in a bioregenerative life support system. Life Support and Biosphere Science, Baltimore, MD.