MARGARET WORTHINGTON

Assistant Professor	Office: 479.575.2122
University of Arkansas	Cell: 984.227.9787
Department of Horticulture	Skype: Margaret.Worthington5
306 Plant Sciences Building	Email: mlworthi@uark.edu
Fayetteville, AR 72701	ORCID: orcid.org/0000-0001-8019-165X

PROFESSIONAL EXPERIENCE

- Assistant Professor of Fruit Breeding and Genetics, University of Arkansas, Department of Horticulture, Aug. 2016-Present
- Tropical Forage Breeder, International Center for Tropical Agriculture (CIAT), Dec. 2013-Aug. 2016
- Graduate Research Assistant (PhD), North Carolina State University, July 2010 – Dec. 2013
- Graduate Research Assistant (MSc), University of California, Davis, Jan. 2008 – Apr. 2010
- US Student Fulbright Fellow to India, Institute of International Education, Dec. 2006 – Sept. 2007

Primary duties include direction of the peach breeding program, research in fruit genetics and molecular breeding, and teaching in the areas of plant breeding and small fruit production.

EDUCATION

• Ph.D.	Crop Science	North Carolina State University	2014
• M.S.	Horticulture and Agronomy	University of California, Davis	2010
• M.S.	International Ag. Development	University of California, Davis	2010
• B.S.	Environmental Sciences	Duke University	2005

RESEARCH INTERESTS AND SKILLS

Applied plant breeding, fruit production, marker assisted selection, quantitative genetics, polyploid genetics, QTL mapping, breeding clonally propagated crops, genetic resistance to pests and diseases

PROFESSIONAL AFFILIATIONS

- American Society for Horticultural Science
- American Pomological Society
- National Association of Plant Breeders
- Crop Science Society of America

AWARDS AND HONORS

- Winner of Milton D. and Mary M. Miller Plant Science Award. 2009-2010
- Invited to Association for International Agriculture and Rural Development (AIARD) Future Leaders Forum. 2009
- Awarded a UC Davis Plant Sciences Departmental Graduate Research Fellowship. 2008-2010
- Winner of a US Student Fulbright Fellowship to India. 2006

PROFESSIONAL/DEPARTMENTAL SERVICE

- Associate Editor, Crop Science, 2016 – Present
- University of Arkansas Horticulture Department Awards Committee, 2016-Present
- University of Arkansas Horticulture Department Undergraduate Program Committee, 2016-Present
- Student representative to the Internal and External Advisory Boards of the UC Davis Agricultural Sustainability Institute, 2008 - 2010

PEER REVIEWED JOURNAL PUBLICATIONS (13)

Jiménez, J., J.A. Cardoso, L.F. Leiva, J. Gil, M.G. Forero, **M. Worthington**, J.W. Miles, and I.M. Rao. Non-destructive phenotyping to identify *Brachiaria* hybrids tolerant to waterlogging stress under field conditions. *Under review* Frontiers of Plant Science

Hernandez, L.M., G. Sotelo, X. Bonilla, E. Alvarez, J.W. Miles, and **M. Worthington.** An experimental comparison of three inoculum types to detect Rhizoctonia resistance in *Brachiaria* hybrids. *Under review* Plant Disease

Worthington, M., C. Heffelfinger, D. Bernal, C. Quintero, Y.P. Zapata, J.G. Perez, S. Dellaporta, J. Miles, and J. Tohme. 2016. A parthenogenesis gene candidate and evidence for segmental allopolyploidy in apomictic *Brachiaria decumbens*. GENETICS. 203: 1117-1132. doi: 10.1534/genetics.116.190314

Rao, I.M., M. Peters, A. Castro, R. Schultze-Kraft, D. White, M. Fisher, J. Miles, C. Lascano, M. Blummel, D. Bungestab, J. Tapasco, G. Hyman, A. Bolliger, B. Paul, R. Van der Hoek, B. Maass, T. Tiemann, M. Cuchillo, S. Douxchamps, C. Villanueva, A. Rincon, M. Ayarza, T. Rosenstock, G. Subbarao, J. Arango, J. Cardoso, **M. Worthington**, N. Chirinda, A. Notenbaert, A. Jenet, A. Schmidt, N. Vivas, R. Lefroy, K. Fahrney, E. Guimares, J. Tohme, S. Cook, M. Herrero, M. Chocon, T. Searchinger, and T. Rudel. 2015. LivestockPlus – The sustainable intensification of forage-based systems to improve livelihoods and ecosystem services in the tropics. Tropical Grasslands. 3:59-82. doi:10.17138/TGFT(3)59-82

Subbarao G.V., T. Yoshihashi, **M. Worthington**, K. Nakahara, Y. Ando, K.L. Sahrawat, I.M. Rao, J.C. Lata, M. Kishii, and H.J. Braun. 2015. Suppression of soil nitrification by plants. Plant Science. 233:155-164. doi:10.1016/j.plantsci.2015.01.012

Petersen S., J.H. Lyerly, **M.L. Worthington**, W.R. Parks, C. Cowger, S. Leath, G. Brown-Guedira, and J.P. Murphy. 2015. Mapping of powdery mildew resistance gene *Pm53* introgressed from *Aegilops speltoides* into soft red winter wheat. Theoretical and Applied Genetics. 128:303-312. doi:10.1007/s00122-014-2430-8.

Worthington, M., S.C. Reberg-Horton, G. Brown-Guedira, D. Jordan, R. Weisz, and J.P. Murphy. 2015. Morphological traits associated with superior weed suppressive ability of winter wheat against Italian ryegrass. Crop Science. 55:50-56. doi:10.2135/cropsci2014.02.0149.

Worthington, M., S.C. Reberg-Horton, G. Brown-Guedira, D. Jordan, R. Weisz, and J.P. Murphy. 2015. Relative contributions of allelopathy and competitive traits to the weed suppressive ability of winter wheat lines against Italian ryegrass. Crop Science. 55:57-64. doi:10.2135/cropsci2014.02.0150

Worthington, M., J. Lyerly, S. Petersen, G. Brown-Guedira, D. Marshall, C. Cowger, R. Parks, and J.P. Murphy. 2014. Genetic mapping of *MlUM15*: an *Aegilops neglecta*-derived powdery mildew resistance gene in common wheat. Crop Science. 54:1397-1406. doi:10.2135/cropsci2013.09.0634.

Worthington, M. and S.C. Reberg-Horton. 2013. Breeding cereal crops for enhanced weed suppression: optimizing allelopathy and competitive ability. Journal of Chemical Ecology. 39:213-231. doi:10.1007/s10886-013-0247-6

Worthington, M., S.C. Reberg-Horton, D. Jordan, and J.P. Murphy. 2013. A comparison of methods for evaluating the suppressive ability of winter wheat cultivars against Italian ryegrass (*Lolium perenne*). Weed Science. 61:491-499. doi:10.1614/WS-D-12-00167.1

Soleri, D., **M. Worthington**, F. Aragón-Cuevas, and P. Gepts. 2013. Farmers' varietal identification in *Phaseolus* species in the Sierra Juárez, Oaxaca, Mexico: implications for *in situ* conservation of crop diversity. Economic Botany. 67:283-298. doi:10.1007/s12231-013-9248-1

Worthington, M., D. Soleri, F. Aragón-Cuevas, and P. Gepts. 2012. Genetic composition and spatial distribution of farmer-managed *Phaseolus* bean plantings: an example from a village in Oaxaca, Mexico. Crop Science. 52:1721-1735. doi:10.2135/cropsci2011.09.0518

NON-REFEREED PUBLICATIONS (2)

Worthington, M.L. and J.W. Miles. 2015. Reciprocal full-sib recurrent selection and tools for accelerating genetic gain in apomictic *Brachiaria*. In: Budak, H. and G. Spangenberg (eds) Molecular Breeding of Forage and Turf: The Proceedings of the 8th International Symposium of Molecular Breeding of Forage and Turf. Springer International Publishing. pp 19-30. doi:10.1007/978-3-319-08714-6_3

Broome, J. and **M. Worthington**. 2009. Research and extension needs assessment for organic growers in Sacramento, Solano, and Yolo Counties, University of California Cooperative Extension: 1-19.

ABSTRACTS AND PROCEEDINGS (15)

Worthington, M., C. Heffelfinger, D. Bernal, C. Quintero, S. Dellaporta, and J. Tohme. 2016. Diagnostic markers for apomixis derived from saturated genetic linkage maps of a *Brachiaria ruziziensis* x *Brachiaria decumbens* hybrid population. Abstracts: Plant & Animal Genome Conference XXIV. Jan 2016, San Diego, California p. 1259 *Poster presentation*

Worthington, M. 2015. Development of saturated linkage maps and markers for apomixis in *Brachiaria.* 5th International Symposium of Forage Breeding (ISFB). Oct, 2015. Buenos Aires, Argentina. *Invited oral presentation*

Arango, J., I.M. Rao, M. Ishitani, J. Miles, M. Peters, J. Tohme, D. Moreta, **M. Worthington**, R. van der Hoek, M. Cuchillo, G. Hyman, J. Tapasco, J. Martinez. 2015. Regulation of nitrification in soil: Advances in integration of *Brachiaria* hybrids to intensify agriculture and to mitigate climate change. Abstracts: XXIII Int. Grasslands Congress. Nov 2015. New Dehli, India. p. 432 *Poster presentation*

Jimenez, J.C., I.M. Rao, J.A. Cardoso, **M. Worthington**, J. Miles. 2015. *Brachiaria* hybrids with larger root length densities show greater shoot vigor under drought. Abstracts: XXIII Int. Grasslands Congress. Nov 2015. New Dehli, India. p. 613. *Poster presentation*

Granberry, M., J.P. Murphy, P. Maloney, S. Petersen, and **M. Worthington**. 2015. Identification of QTL for weed suppressive ability in the NC-Neuse x AGS 2000 winter wheat population. Abstracts: 2015 Int. Ann. Meet. [ASA/CSSA/SSSA] Nov 2015. Minneapolis, MN. p. 709. *Poster presentation*

Núnez, J., A. Arevalo, D. Moreta, H. Karwat, M. Ishitani, J. Miles, G. Subbarao, **M. Worthington**, G. Cadisch, I.M. Rao, and J. Arango. 2015. Evaluation of Biological Nitrification Inhibition (BNI) capacity in a biparental mapping population of *Brachiaria humidicola*. 2015 Conference on Tropical and Subtropical Agricultural and Natural Resource Management (Tropentag), Sept 2015. Berlin, Germany p. 143. *Poster presentation*

Worthington, M.L. and J.W. Miles. 2014. Reciprocal full-sib recurrent selection and tools for accelerating genetic gain in apomictic *Brachiaria*. 8th International Symposium of Molecular Breeding of Forage and Turf (MBFT). June 2014. Istanbul, Turkey. *Oral presentation*

Rao, I.M., J. Arango, M. Ishitani, **M. Worthington**, J. Miles, M. Peters, J. Tohme, M. Cuchillo Hilario, A. Castro, G. Hyman, J. Tapasco, J. Duitama, D. Moreta, J. Nuñez, M. Selvaraj, R. van der Hoek, H. Karwat, A. Rincón, R. Mendoza, M. Sotelo, D. Vergara, P. Pardo, G. Borrero, G. Subbarao, and G. Cadisch. 2014. Developing climate-smart crop-livestock systems for smallholders in the tropics through regulation of nitrification in soil. 2014 Conference on Tropical and Subtropical Agricultural and Natural Resource Management (Tropentag) Sept 2014. Prague, Czech Republic. p. 74. *Poster presentation*

Worthington, M., S. Petersen, J. Lyerly, C. Cowger, G. Brown-Guedira, D. Marshall, R. Parks, and J.P. Murphy. 2013. Genetic mapping of UM15: A *Triticum neglecta*-derived powdery mildew resistance gene on chromosome 7AL in common wheat. Abstracts: 2013 Int. Ann. Meet. [ASA/CSSA/SSSA] p. 109. *Poster presentation*

Petersen S., J.H. Lyerly, **M.L. Worthington**, J. Kolmer, W.R. Parks, C. Cowger, S. Leath, G. Brown-Guedira, D.S. Marshall, and J.P. Murphy. 2013. Mapping powdery mildew and leaf rust resistance introgressed from *Aegilops speltoides* into soft red winter wheat. Abstracts: 2013 Int. Ann. Meet. [ASA/CSSA/SSSA] 100-1. p. 100. *Poster presentation*

Worthington M., C. Reberg-Horton, G. Brown-Guedira, D. Jordan, and J.P. Murphy. 2013 Breeding winter wheat for increased weed suppressive ability against Italian ryegrass. Abstracts: 2013 Int. Ann. Meet. [ASA/CSSA/SSSA] *Oral presentation*

Worthington, M., C. Reberg-Horton, D. Jordan, and J.P. Murphy. 2012. Breeding winter wheat for increased suppressive ability against Italian ryegrass. Abstracts: 2012 Int. Ann. Meet. [ASA/CSSA/SSSA] p. 419. Oct 2012. Cincinnati, OH. *Poster presentation*

Worthington, M., C. Reberg-Horton, D. Jordan, and J.P. Murphy. 2012. Breeding winter wheat for increased suppressive ability against Italian ryegrass. Annual Meeting of the National Association of Plant Breeders. Aug 2012. Indianapolis, IN. *Poster presentation*

Worthington, M., D. Soleri, F. Aragón-Cuevas, and P. Gepts. 2010. Farmer choices and environmental adaptation of *Phaseolus* bean species in Oaxaca, Mexico. Annual Meeting of the Society for Economic Botany. June 2010. Xalapa, Mexico. *Selected oral presentation*

Worthington, M., D. Soleri, F. Aragón-Cuevas, and P. Gepts. 2009 Farmer choices and environmental adaptation of *Phaseolus* bean species in Oaxaca, Mexico. Biennial Meeting of the Bean Improvement Cooperative. Oct 2009. Fort Collins, CO. *Oral presentation*

PRESENTATIONS AT CONFERENCES AND SCIENTIFIC MEETINGS (10)

Worthington, M., C. Heffelfinger, D. Bernal, C. Quintero, S. Dellaporta, and J. Tohme. 2016. Diagnostic markers for apomixis derived from saturated genetic linkage maps of a *Brachiaria ruziziensis* x *Brachiaria decumbens* hybrid population. Abstracts: Plant & Animal Genome Conference XXIV. Jan 2016, San Diego, California p. 1259 *Poster presentation*

Worthington, M. 2015. Development of saturated linkage maps and markers for apomixis in *Brachiaria.* 5th International Symposium of Forage Breeding (ISFB). Oct, 2015. Buenos Aires, Argentina. *Invited speaker*

Worthington, M.L. and J.W. Miles. 2014. Reciprocal full-sib recurrent selection and tools for accelerating genetic gain in apomictic *Brachiaria*. 8th International Symposium of Molecular Breeding of Forage and Turf (MBFT). June 2014. Istanbul, Turkey. *Selected speaker*

Worthington, M., S. Petersen, J. Lyerly, C. Cowger, G. Brown-Guedira, D. Marshall, R. Parks, and J.P. Murphy. 2013. Genetic mapping of UM15: A *Triticum neglecta*-derived powdery mildew resistance gene on chromosome 7AL in common wheat. Abstracts: 2013 Int. Ann. Meet. [ASA/CSSA/SSSA] p. 109. *Selected speaker*

Worthington M., C. Reberg-Horton, G. Brown-Guedira, D. Jordan, and J.P. Murphy. 2013 Breeding winter wheat for increased weed suppressive ability against Italian ryegrass. Abstracts: 2013 Int. Ann. Meet. [ASA/CSSA/SSSA] *Selected speaker*

Worthington, M., C. Reberg-Horton, D. Jordan, and J.P. Murphy. 2012. Breeding winter wheat for increased suppressive ability against Italian ryegrass. Abstracts: 2012 Int. Ann. Meet. [ASA/CSSA/SSSA] p. 419. Oct 2012. Cincinnati, OH. *Poster presentation*

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Worthington, M., D. Soleri, F. Aragón-Cuevas, and P. Gepts. 2010. Farmer choices and environmental adaptation of *Phaseolus* bean species in Oaxaca, Mexico. Annual Meeting of the Society for Economic Botany. June 2010. Xalapa, Mexico. *Selected oral presentation*

Worthington, M., D. Soleri, F. Aragón-Cuevas, and P. Gepts. 2009 Farmer choices and environmental adaptation of *Phaseolus* bean species in Oaxaca, Mexico. Biennial Meeting of the Bean Improvement Cooperative. Oct 2009. Fort Collins, CO. *Oral presentation*

Worthington, M., C. Reberg-Horton, G. Brown-Guedira, D. Jordan, and J.P. Murphy. 2013. Breeding winter wheat for increased weed suppressive ability against Italian ryegrass. Joint meeting of the Eastern Wheat Workers, Southern Small Grains Workers, and Great Lakes Wheat Workers. March 2013. Wooster, OH. *Oral presentation*

RESEARCH GRANTS

BBSRC Newton Fund Postdoctoral Twinning Award. 2015. 'Identifying gene regulatory networks associated with response to water stress in *Brachiaria* and developing genotype and phenotype ontologies for forage grass species.' *Funded $380,000* (Principal Applicant: Ian Armstead, Aberystwyth University)

BBSRC Newton Fund Joint Centre Award. 2015. 'UK-Colombia Joint Centre in Forage Grasses.' *Funded $380,000* (Principal Applicant: Jon Moorby, Aberystwyth University)

CIAT Young Scientist Innovation Grant. 2014. 'Genome-Wide Association Mapping to Identify Useful Quantitative Trait Loci in *Brachiaria*.' *Funded $15,000*

Southern Region Sustainable Agriculture Research and Education (SARE) Graduate Student Grant in Sustainable Agriculture. 2012. 'Breeding Wheat for Increased Weed-Suppressive Ability against Italian Ryegrass.' *Funded $11,000*

University of California Institute for Mexico and the United States (UC MEXUS). 2008. 'Farmer choices and environmental adaptation of Phaseolus bean species in Oaxaca, Mexico.' *Funded $15,000* (Principal Applicant: Paul Gepts)

UC Davis Jastro-Shields Graduate Research Scholarship Award. 2008. *Funded $1,600*

US Student Fulbright Program. 2006. *Awarded fellowship to India*

SKILLS AND LANGUAGES

Software: ASREML, SAS, R, JoinMap, MapQTL, TetraploidMap, ImageJ

Languages: Proficient in spoken and written Spanish