

Marty B. Rhoades, Ph.D.
Research Fellow
Department of Agricultural Sciences
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Personal

Born May 3, 1968, Ft. Worth, TX
Married to Amy Rhoades (1989), two sons: Casey & Riley

Education

- 2009 - PhD, Agriculture, West Texas A&M University, Canyon, TX.
Ph.D Dissertation Title: "Gaseous Emissions from Ground Level Area Sources"
- 2001 - M.S., Plant, Soil, Environmental Science, West Texas A&M Univ., Canyon, TX
M.S. Thesis Title: "Land Application of Beef Feedyard Effluent to Forage Sorghum and Winter Wheat in Field Plots"
- 1992 - B.S., Animal Science, West Texas A&M University, Canyon, TX (cum laude)
- 1986 - Pampa High School, Pampa, TX

Work Experience

October 2009 to present: Research Fellow, Department of Agricultural Sciences – Feedlot Research Group, West Texas A&M University, Canyon TX

Supervisor of agricultural air quality and waste management research. Conduct research on abatement of ammonia emissions from beef cattle feedlot pen surfaces, as well as determine the methane producing potential from beef cattle manure. Member of the Feedlot Research Group at West Texas A&M University. Collaborate with scientists and engineers located at the Texas A&M University Research and Extension Center in Amarillo, TX, the USDA-ARS Conservation and Production Research Laboratory in Bushland, TX, Texas A&M University in College Station, TX, and various other universities across the United States. Manager of the Agriculture Environmental Laboratory, which employs three student workers. Teach both Graduate and Undergraduate classes, as well as conduct guest lectures. Named Supervisor of Air Quality and Waste Management Research in March, 2010. Responsibilities include managing Air Quality and Waste Management Research Labs, supervising 1 graduate and 3 undergraduate students.

October 2001 to August 2009: Research Associate, Feedlot Research Group, West Texas A&M University, Canyon TX

Member of the Feedlot Research Group at West Texas A&M University. Responsible for environmental and waste management research related to concentrated animal feeding operations in the Texas Panhandle. Perform applied research and work directly with producers to solve complex environmental issues. Collaborate with scientists and engineers located at the Texas A&M University Research and Extension Center in Amarillo, TX, the USDA-ARS Conservation and Production Research Laboratory in Bushland, TX, Texas A&M University in College Station, TX, and various other universities across the United States. Hazard Analysis and Critical Control Points (HACCP) co-ordinator for the WT Meats Lab (2003-2004).

January, 1999 to August 2001: Graduate Assistant/Masters Student, Division of Agriculture, West Texas A&M University, Canyon, TX

Assist with ongoing research in the Feedlot Research Group at West Texas A&M University, Canyon.

November, 1994 to January, 1999: Driver/Salesman, Saia Motor Freight Lines, Lubbock/Amarillo, TX

Responsible for the safe operation of Class 8 (tractor-trailer) vehicle as well as customer relations and some sales. Also responsible for loading outbound trucks and closing the office and each evening. Named hazardous material safety supervisor for the Amarillo office in 1998. Received safe driver awards for 1996, 1997, and 1998.

November, 1993 to November, 1994: Driver, Borden Dairy, Lubbock, TX

Responsible for the safe operation of Class 8 vehicle involving timely deliveries and some customer service.

January, 1993 to September, 1993: Equipment Operator/Supervisor, H.D. Weaver Ditching Co, Amarillo, TX

Responsible for the safe operation of heavy equipment and job site safety and maintenance. Heavy equipment operation included backhoe, excavator, front-end loader, packer, and forklift. Also supervised work crew of five people, which included work assignments and on-site supervision. Required to read and follow blueprints and interact with regulatory personnel from outside the company.

May, 1992 to November, 1992: Research Assistant, USDA-ARS, Bushland, TX

Aided in collecting and processing data for use in agricultural research. Most work was done with the Water Conservation group headed by Dr. Terry Howell. Responsibilities included safe operation of farm and scientific equipment.

Publications

Peer Reviewed

6. Todd, R.D., N.A. Cole, **M.B. Rhoades**, D.B. Parker, K.D. Casey. 2011. Daily, monthly, seasonal and annual ammonia emissions from southern high plains cattle feedyards. *Journal of Environmental Quality*. (In Press)
5. **Rhoades, M.B.**, D.B. Parker, N.A. Cole, R.W. Todd, B.W. Auvermann, E.A. Caraway, D. Topliff, G. L. Schuster. 2010. Continuous ammonia emission measurements from a commercial beef feedyard in Texas. *Transactions of the ASABE* 53(6):1823-1831.
4. Parker, D. B., E. A. Caraway, **M. B. Rhoades**, N. A. Cole, R. W. Todd, K. D. Casey. 2010 Effect of wind tunnel air velocity on VOC flux from CAFO manure and wastewater. *Transactions of the ASABE* 53(3):831-845.
3. Cole, N. A., A. M. Mason, R. W. Todd, **M. B. Rhoades**, D.B. Parker. 2009 Chemical composition of pen surface layers of beef cattle feedyards. *The Professional Animal Scientist* 25:541-552.
2. Parker, D.B., **M. B. Rhoades**, G. L. Schuster, J. A. Koziel, Z. L. Perschbacher. 2005. Odor characterization at open-lot beef cattle feedyards using triangular forced-choice olfactometry. *Transactions of the ASABE* 48(4):1527-1535.
1. Parker, D.B., S. Pandrangi, L. W. Greene, L. K. Almas, N. A. Cole, **M. B. Rhoades**, J. A. Koziel. 2005. Rate and frequency of urease inhibitor application for minimizing ammonia emissions from beef cattle feedyards. *Transactions of the ASABE* 48(2):787-793.

Peer Reviewed (In process or submitted)

5. **Rhoades, M.B.**, B.W. Auvermann, D.B. Parker. Effects of isolation chamber geometry on evaporation in a laboratory setting. In Progress.
4. Caraway, E.A., D.B. Parker, **M.B. Rhoades**, K.D. Casey. VOC emissions from a beef cattle feedyard following a rainfall event. In Progress.
3. **Rhoades, M.B.**, D.B. Parker, N.A. Cole, J.M. Sweeten, M.S. Brown. Land application of beef feedyard effluent. In Progress.
2. Parker, D.B., **M.B. Rhoades**, N.A. Cole, V.P. Sambana. Effect of inhibitor rate and rainfall on ammonia emissions from beef manure. Submitted for Review.
1. Parker, D.B., L. Cai, N. Akdeniz, **M.B. Rhoades**, L.D. Jacobsen, J.A. Koziel. Predicting swine building odor concentrations from chemical concentrations using multivariate regression models. In Progress.

Book Chapter

1. Parker, D.B. and **M.B. Rhoades**. 2003. Oxygen Measurement: Biological-Chemical Oxygen Demand. In *Encyclopedia of Water Science*, 642-644. B.A Stewart and T.A. Howell, eds. New York, NY:Marcel Dekker, Inc.

Conference and Professional Meeting Proceedings

39. Paris, C.S., D.B. Parker, N.A. Cole, R.W. Todd, E. A. Caraway, **M.B. Rhoades**, B.Baniya, and T. B. Brown. 2009. Comparison of ammonia emissions determined with different sampling methods. Proceedings 2009 Texas Animal Manure Management Issues Conference, Austin, Texas.
38. Todd, R.W., N.A Cole, D.B. Parker, **M. Rhoades**, and K. Casey. 2009. Effect of feeding distillers grains on dietary crude protein and ammonia emissions from beef cattle feedyards. Proceedings 2009 Texas Animal Manure Management Issues Conference, Austin, Texas.
37. Cooper, B. D., E. A. Caraway, **M. B. Rhoades**, and D. B. Parker. 2009. Odor control in waste management lagoons using bioengineered yeast. Proceedings 2009 Texas Animal Manure Management Issues Conference, Austin, Texas.
36. Brown, T. B., E. A. Caraway, **M. B. Rhoades**, B. Baniya, and D. B. Parker. 2009. VOC and odor quantification downwind of a beef cattle feedyard using GC/MS and GC/MS-Olfactometry. Proceedings 2009 Texas Animal Manure Management Issues Conference, Austin, Texas.
35. Baniya, B., E. A. Caraway, **M. B. Rhoades**, K. D. Casey, T. B. Brown, and D. B. Parker. 2009. Additive and synergistic odor effects of volatile organic compounds at animal feeding operations. Proceedings 2009 Texas Animal Manure Management Issues Conference, Austin, Texas.
34. Caraway, E.A., **M.B. Rhoades**, K. Casey, D. B. Parker, B. Baniya, and T. B. Brown. 2009. VOC emissions from a beef cattle feedyard following a rainfall event. Proceedings 2009 Texas Animal Manure Management Issues Conference, Austin, Texas.
33. Parker, D.B., N.A. Cole, K.D. Casey, G. Galvin, R. Ormerod, C.S. Paris, E.A. Caraway, **M.B. Rhoades**. 2009. Wind tunnels vs. flux chambers: Area source emission measurements and the necessity for VOC and odour correction factors. Proceedings 19th International Clean Air and Environment Conference, Perth, Australia, September 6-9, 2009.
32. Casey, K.D., D.B. Parker, **M.B. Rhoades**, and L. A. McDonald. 2009. Hydrogen sulphide emissions from beef cattle feedlots in Texas. Proceedings 19th International Clean Air and Environment Conference, Perth, Australia, September 6-9, 2009.
31. **Rhoades, M.B.**, B.W. Auvermann, N.A. Cole, R.W. Todd, D.B. Parker, E.A. Caraway, G. Schuster and J. Spears. 2008. Ammonia concentration and modeled

emission rates from a beef cattle feedyard ASABE Paper No. 08-4445. In Proceedings 2008 American Society of Agricultural and Biological Engineers, Providence, Rhode Island.

30. Caraway, E.A., D. B. Parker, K.D. Casey, M.J. Olsen, C. Donnell, **M.B. Rhoades**, J. Spears. Diel VOC emissions from a beef cattle feedyard. 2008. ASABE Paper No. 08-4136. In Proceedings 2008 American Society of Agricultural and Biological Engineers, Providence, Rhode Island.
29. Donnell, C., D.B. Parker, E.A. Caraway, J. Spears, **M.B. Rhoades**. Zeolite amendment to minimize ammonia, hydrogen sulfide, and VOC emissions. 2008. ASABE Paper No. 08-4133. In Proceedings 2008 American Society of Agricultural and Biological Engineers, Providence, Rhode Island.
28. Parker, D.B., E.A. Caraway, **M.B. Rhoades**, N.A. Cole, R.W. Todd, K.D. Casey, C.D. Donnell, J.P. Spears. 2008. Effect of wind tunnel air velocity on VOC flux rates from CAFO manure and wastewater. ASABE Paper No. 08-3897. In Proceedings 2008 American Society of Agricultural and Biological Engineers, Providence, Rhode Island.
27. Casey, K.D., L. A. McDonald, **M.B. Rhoades** and D.B. Parker. 2008. Hydrogen sulfide emission from and concentrations at a Texas beef cattle feedyard. AWMA Paper No. 549. In Proceedings Air and Waste Management Association Annual Conference, Portland, OR.
26. Cole, N.A., R.W. Todd, D.B. Parker and **M.B. Rhoades**. 2007. Challenges in using flux chambers to measure ammonia emissions from simulated feedlot pen surfaces and retention ponds. Proc. International Symposium on Air Quality and Waste Management for Agriculture. September 15-19, 2007, Broomfield, Colorado.
25. Caraway, E., D.B. Parker, M. Ruby, R.G. Green, J.P. Spears, Z. Perschbacher-Buser, and **M. Rhoades**. 2007. Identification of malodorous compounds from a fish meal plant. Proc. International Symposium on Air Quality and Waste Management for Agriculture. September 15-19, 2007, Broomfield, Colorado.
24. Perschbacher-Buser, Z. L., D.B. Parker, K. Casey, G. Green, E. Caraway, and **M. B. Rhoades**. 2007. Quantification of ambient p-cresol concentrations downwind of beef cattle feedyards. Proc. International Symposium on Air Quality and Waste Management for Agriculture. September 15-19, 2007, Broomfield, Colorado.
23. D.B. Parker, Z. Buser, E. Caraway, **Marty Rhoades**, M. Olsen, K. Casey, J. Spears, G. Green. 2007. VOC concentrations downwind of beef feedlots during intense odour events. Proc. of the 14th IUAPPA World Congress, Brisbane, Australia. September 9-13, 2007.
22. Z. L. Perschbacher-Buser, D. B. Parker, G. Green, and **M. B. Rhoades**. 2006. Recovery of malodorous livestock odors and gases from Tedlar® sampling bags using olfactometry and thermal desorption tubes. In Proceedings of the Workshop on Agricultural Air Quality: State of the Science, Potomac, Maryland.

21. Galvin, G., C. Henry, D. Parker, R. Ormerod, P. D'Abreton and **M. Rhoades**. 2006. Efficacy of a Lagrangian and a Gaussian model for back calculating emission rates from feedyard area sources. In Proceedings of the Workshop on Agricultural Air Quality: State of the Science, Potomac, Maryland.
20. Koziel, J. A., D. B. Parker, B.-H. Baek, K. J. Bush, **M. Rhoades**, Z. Perschbacher-Buser. 2005. Ammonia and hydrogen sulfide flux from beef cattle pens: Implications for air quality measurement methodologies and evaluation of emission controls. In Seventh International Livestock Environment Symposium (18-20 May 2005, Beijing, China), ed. Tami Brown-Brandl and Ronaldo Maghirang, pp . 402-410. American Society of Agricultural Engineers, St. Joseph, Michigan.
19. Parker, D. B., N. A. Cole, B. H. Baek, J. A. Koziel, **M. B. Rhoades**, Z. Perschbacher-Buser, L. W. Greene, P. Sambana and J. M. Sweeten. 2005. Abatement measures to reduce ammonia emissions from open-lot feedyards and dairies. In Symposium of the State of the Science on Animal Manure and Waste Management, San Antonio, TX, January 5-7, 2005.
18. **Rhoades, M. B.**, D. B. Parker and Z. L. Perschbacher-Buser. 2005. Installation of a HDPE liner in a Beef Cattle Feedyard. ASAE Paper No. 05-4075. In Proceedings 2005 American Society of Agricultural and Biological Engineers, Tampa, FL.
17. Perschbacher-Buser, Z. L., D.B. Parker, and **M.B. Rhoades**. 2005. Moisture content and commercial additive effects on odor emissions from simulated feedlot pen surfaces and lagoons. ASAE Paper No. 05-4072. In Proceedings 2005 American Society of Agricultural and Biological Engineers, Tampa, FL.
16. **Rhoades, M. B.**, D. B. Parker, B. H. Baek, and Z. L. Perschbacher-Buser. 2005. Development and use of a mega chamber for ammonia flux measurements. ASAE Paper No. 05-4071. In Proceedings 2005 American Society of Agricultural and Biological Engineers, Tampa, FL.
15. **Rhoades, M. B.**, D. B. Parker, N. A. Cole, R. DeOtte, B. W. Auvermann and Z. L. Perschbacher-Buser. 2005. Factors affecting ammonia emission measurements with surface isolation flux chambers. ASAE Paper No. 05-4026. In Proceedings 2005 American Society of Agricultural and Biological Engineers, Tampa, FL.
14. Parker, D. B., **M. B. Rhoades**, Z. L. Perschbacher-Buser, P. Sambana, J. Koziel, and B. H. Baek. 2005. Field evaluation of urease inhibitors for reduction of ammonia emissions from open-lot feedyards. Paper #1114, In proceedings of the Air and Waste Management Association Symposium, Minneapolis, MN.
13. Koziel, J. A., D. B. Parker, B.-H. Baek, K. J. Bush, **M. Rhoades**, and Z. Perschbacher-Buser. 2005. Ammonia and hydrogen sulfide flux from beef cattle pens: Implications for air quality measurement methodologies and evaluation of emission controls. In Seventh International Livestock Environment Symposium (18-20 May 2005, Beijing, China), ed. Tami Brown-Brandl and Ronaldo

Maghirang, pp . 402-410. American Society of Agricultural Engineers, St. Joseph, Michigan.

12. Parker, D. B., N. A. Cole, B. H. Baek, J. A. Koziel, **M. B. Rhoades**, Z. Perschbacher-Buser, L. W. Greene, P. Sambana and J. M. Sweeten. 2005. Abatement measures to reduce ammonia emissions from open-lot feedyards and dairies. In Symposium of the State of the Science on Animal Manure and Waste Management, San Antonio, TX, January 5-7, 2005.
11. Parker, D.B., S. Pandrangi, L.W. Greene, L.K. Almas, N.A. Cole, **M.B. Rhoades** and J. Koziel. 2004. Application rate and timing effects on urease inhibitor performance for minimizing ammonia emissions from beef cattle feedyards. ASAE Paper No. 04-4080.
10. **Rhoades, M. B.**, D. B. Parker, J. M. Sweeten, N. A. Cole and M. S. Brown. 2003. Land application of beef feedyard effluent to forage sorghum and winter wheat. In the proceedings of the 9th International Animal, Agricultural and Food Processing Wastes Symposium, Research Triangle Park, NC.
9. Parker, D.B., **M.B. Rhoades**, J. Koziel and J. Spinhirne. 2003. Background odors in Tedlar® bags used for CAFO odor sampling. ASAE Paper No. 03-4144.
8. Pandrangi, S., D.B. Parker, L.W. Greene, L.K. Almas, **M.B. Rhoades** and N.A. Cole. 2003. Effect of dietary crude protein on ammonia emissions from open-lot beef cattle feedyards. ASAE Paper No. 03-4143.
7. Buchanan, J.D., D.B. Parker, **M.B. Rhoades**, J. Koziel and W.J. Rogers. 2003. Assessment of moisture control and additives for odor reduction from open-lot feedyard surfaces. ASAE Paper No. 03-4140.
6. **Rhoades, M.B.**, D.B. Parker and B. Dye. 2003. Measurement of hydrogen sulfide in beef cattle feedlots on the Texas High Plains. ASAE Paper No. 03-4108.
5. Parker, D.B., **M.B. Rhoades**, B. W. Auvermann, and J. Koziel. 2003. Odor characterization at open-lot beef cattle feedyards using triangular forced choice olfactometry. ASAE Paper No. 03-4105.
4. **Rhoades, M.B.**, D.B. Parker, J.M. Sweeten, N.A. Cole and M.S. Brown. 2002. Beef feedyard effluent application effects on nutrient mas balances for three cropping rotations of sorghum and wheat. ASAE Paper No. 02-4147.
3. **Rhoades, M.B.**, D.B. Parker, J.M. Sweeten, N.A. Cole, and M. Brown. 2001. Application of beef cattle feedyard effluent to wheat in field plots. ASAE Paper No. 01-2199.
2. Parker, D. B., Joel E. Cahoon, William J. Rogers, **Marty B. Rhoades**, Mary C. McCullough and Clay Robinson . 2001. Infiltration characteristics of cracked clay soils in bottoms of feedyard playa catchments. ASAE Paper No. 01-2281.

1. **Rhoades, M.B.**, D.B. Parker, J.M. Sweeten, L. Perino, N.A. Cole, and M. Brown. 2000. Application of beef cattle feedyard effluent to forage sorghum in field plots. ASAE Paper No. 00-2052.

Abstracts

4. Cole, N.A., R.W. Todd, D.B. Parker, and **M.B. Rhoades**. 2011. Ammonia emission measured from a commercial feedyard using passive samplers and a box model. *J. Anim. Sci. (In Press)*
3. Cole, N.A., R.W. Todd, D.B. Parker, **M.B. Rhoades**, E. Caraway. 2008. Challenges in using flux chambers to measure ammonia and VOC emissions from open feedlot pen surfaces and retention ponds [abstract]. Abstracts of the American Dairy Science Association and American Society of Animal Science Joint Meeting, July 7 – 11, 2008, Indianapolis, IN. No. 310.
2. **Rhoades, M.B.**, D.B. Parker, J.M. Sweeten, N.A. Cole and M.S. Brown. 2001. Application of beef cattle feedyard effluent to forage sorghum in field plots. Presented at the Texas A&M University System 2001 Agriculture Program Conference, January 8-10, 2001, College Station, TX (Poster presentation).
1. **Rhoades, M.B.**, D.B. Parker, J.M. Sweeten, L.J. Perino, and N.A. Cole. 1999. A Study of Varying Rates of Liquid Feedlot Effluent on Winter Wheat and Forage Sorghum. Presented at the 1999 Bushland Summer Crops Field Day, September 1, 1999, USDA-ARS Conservation and Production Research Laboratory, Bushland, TX.

Honors

- 2010 Federal Laboratory Consortium USDA-ARS Technology Transfer Award
September 2, 2010
- 2006 ASABE Honorable Mention Paper Award, awarded to top 5% of papers, "Odor Characterization at Open-Lot Beef Cattle Feedyards Using Triangular Forced-Choice Olfactometry" July 12, 2006

Teaching Responsibilities

ENVR 6344/PSES 7344 "Agricultural Waste Management" Graduate level environmental science course

AGRI 3318 "Agricultural Statistics" Undergraduate statistics course (team taught).

Numerous guest lectures in Feedlot Management, Ag and the Environment, Environmental Sampling, and Research Methods in Environmental Science

Workshops/Seminars/Training Sessions

- 2010 Feedyard Air Quality Workshop Series: Phase I. Participated as a presenter in a three day workshop series conducted for interested parties as part of the USDA

Special Research Grant, “Reducing Emissions from Cattle Feedlots and Dairies: A Texas-Kansas Partnership”. The workshop was designed to answer cattle feeders and dairy producers questions concerning emissions of PM, NH₃, H₂S, rVOCs, nuisance VOCs, and odors as such. In total, approximately 30 persons representing 4.4 million head of cattle marketed per year attended.

Grants

Funded

- 2010 Air Quality: Reducing Emissions from Cattle Feedlots and Dairies in Texas and Kansas \$130,133 (WTAMU portion of \$1,014,428)
- 2010 Development and Implementation of an Environmental Training Program for Manure and Compost Haulers/Applicators in the Texas High Plains \$5,603 (subaward)

Not Funded

- 2010 Use of a Global Positioning System and Real-Time weight verification for precision application of Beef Cattle feedlot manure. Texas Cattle Feeders Association \$9,364

Professional Memberships

- 1999 American Society of Agricultural and Biological Engineers (ASABE)
- 1992 Alpha Zeta Agriculture Honors Fraternity
Treasurer – 1992

Special Training

- 2009 AERMOD Modeling for Permits
- 2003 Hazard Analysis and Critical Control Points (HACCP) certification and manager training
- 2000 40 Hour HAZWOPR certification
- Class A CDL – NPT endorsements

Community Activities

- 2010 Canyon High School Future Farmers of America Agricultural Farm Clean-up Day
- 2010 Sponsor – The Bridge Children’s Advocacy Center Murder Mystery Fund Raiser
- 2008 Canyon High School Future Farmers of America Agricultural Farm Clean-up Day
- 2008 Air Quality/Waste Management Presenter for Leadership Amarillo/Canyon Member – Toastmasters International

Consulting Activities

- 2008 Microgy, Inc. – Huckaby, TX

- Monitor H₂S concentrations and develop emissions estimates using dispersion modeling from open-top processing tanks
- 2002 Xcel Energy – Amarillo, TX (2002 – 2009)
Weekly monitoring and maintenance of wells for water quality assurance

Litigation Support

- 2010 Hanes et al v. Premium Standard Farms – Kansas City, MO
Supplied expert and technical expertise for odorous emission from swine waste from a farrowing facility.
- 2009 Avila et al v. Olivera Egg Ranch, LLC – Lathrop, CA
Supplied expert and technical expertise for sampling of ammonia and volatile organic compound concentrations and emissions estimations from a ½ flush: ½ belt layer facility.
- 2007 AIR v. Schakel Dairy – Bakersfield, CA
Supplied on-the-ground support and technical expertise in sampling of methanol from an open lot dairy.
- 2006 Montalvo v. Te Velde. et al. - San Bernardino, CA
Supplied expert testimony concerning technical aspects of manure harvesting and removal from an open lot dairy.