

12/26/19

VITA

NAME: David J. Mulla

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EDUCATION:

B.S.	Earth Sci. (Geophys.)	1979	Univ. California, Riverside
M.S.	Agronomy (Soil Chemistry)	1981	Purdue University
Ph.D.	Agronomy (Soil Physics)	1983	Purdue University

EXPERIENCE

Mar. 1995 - present	W.E. Larson Chair and Professor for Soil & Water Resources; Univ. MN
Jan. 2007 – 2009	Founding Fellow, Institute on the Environment, Univ. MN
Jan. 2004- present	Director Precision Agriculture Center, Univ. MN
Oct. 1995	Elected to Graduate faculty status; UM Water Resource Sci., Soil Sci.
July 1993 - Mar. 1995	Professor/Soil Scientist; Washington State Univ.
July 1988 - July 1993	Associate Professor/Associate Soil Scientist; WSU
Nov. 1984	Elected to Graduate faculty status; WSU
Aug. 1983 - Jun. 1988	Assistant Professor/Assistant Soil Scientist; WSU
1980 - 1983	NSF Predoctoral Fellow; Purdue University; West Lafayette, Indiana.

RESEARCH EMPHASIS

My research emphasizes (1) the measurement, modeling, and management of uncertainty and risk for non-point source pollution of surface and groundwater; (2) the characterization and estimation of field-scale variability for precision farming; (3) the evaluation of alternative farm management strategies for improved soil quality and sustainability; and (4) evaluation of policies for soil and water resources.

AWARDS and HONORS

Best Research Paper Award for Impact and Quality (Honorable Mention), J. Soil Water Conserv. 2016
Soil Science Applied Research Award, Soil Science Society of America, 2013
International Soc. Prec. Ag. Pierre C. Robert Precision Agriculture Research Award, 2012
Featured Water Quality Research Project, USDA-CSREES, Washington, DC. Aug. 2005
Visiting Distinguished Faculty Award, Univ. Kentucky, Dec. 2002
Best Research Paper in 2001, J. Soil Water Conservation, July, 2002
Minnesota Governor's Commendation for Lake Pepin Phosphorus Study, 2000
Fellow American Society of Agronomy, 1999.
Fellow Soil Science Society of America, 1997.
Junior Faculty Research Award, W.S.U. College of Agriculture, 1991.
Sigma Xi Student Research Award. April, 1982.
Scarseth Research Award. September, 1981.
Alumni Award of the University of California, June, 1979.
Myron Wilson Scholarship in Agriculture, November, 1978.
Dana King Undergraduate Research Scholarship, May, 1978.
Regents Scholarship of the University of California, September, 1974.

GRANT FUNDING

Career research grant funding levels exceed \$27 million.

Grants were funded by a variety of sources, including USDA, USEPA, NSF, USAID, Minnesota Department of Agriculture, Minnesota Pollution Control Agency, Legislative Citizen Committee on Minnesota Resources, and the Minnesota Environmental Quality Board.

PROFESSIONAL SERVICE

USDA Water Quality Proposal Review Panels 88, 92, 93 (panel chair)
SBIR Proposal Panel '91
Panel Manager USDA-CSRS-NRI Competitive Grants Program in Water Resources, 1994
EPA/NSF Water and Watersheds Proposal Review Panel '98
SSSAJ Assoc. Ed. Soil Physics Division S-1 ('92-'96), Tech. Ed. ('97-99)
Program Chair Div. S-1 SSSA '96-'97
Board of Directors Div. S-1 Rep. SSSA '97-'98
SSSA Fellows Committee Member (S495) '99-'01
Assoc. Editor J. Precision Agric. '97-present
Team Leader, Comprehensive Review, Dept. Soil Science, North Carolina State Univ. April, 2004
Team Leader, USDA-ARS Water Management Unit Review, Ft. Collins, CO. March, 2005
Selected as US delegate for Water Management Workshop, New Delhi, India. Sept., 2006
Proposal reviewer for Legislative Citizen Commission on Minnesota Resources. Mar. 2007
National Academy of Sciences Member Comm. Water Quality Standards for Nutrients in Lakes and Flowing Waters of Florida. 2011
National Academy of Sciences Member Comm. Mississippi River Water Quality Monitoring and Evaluation. 2013.
SSSA Ahuja Ag Systems Modeling Award Committee member. 2015-2016
USDA NIFA AFRI Engineering Panel Manager 2016, 2017
NSF Chemical Bioengineering Environmental and Transport (CBET) Career Panel in Environmental Sustainability (Water and Agriculture) focus area 2018

PROFESSIONAL AFFILIATIONS

Soil Science Soc. America
International Society for Precision Agriculture
Sigma Xi
Gamma Sigma Delta
Phi Beta Kappa

REFEREED JOURNAL PUBLICATIONS AND BOOK CHAPTERS (out of 203): h-index 46 q-index 123

- 1 Mulla, D. J., Page, A. L., and Ganje, T. J. Cadmium accumulations and bioavailability in soils from long-term phosphorus fertilization. *J. Environ. Qual.* 9(3), 408-412, 1980.
- 2 Mulla, D. J., and Low, P. F. The molar absorptivity of interparticle water in clay-water systems. *J. Colloid Interface Sci.*, 95(1), 51-60, 1983.
- 3 Mulla, D. J., Cushman, J. H., and Low, P. F. Molecular dynamics and statistical mechanics of water near an uncharged silicate surface. *Water Resources Research* 20(5):, 619-628, 1984.
- 4 Mulla, D. J., Cushman, J. H., Low, P. R., and Diestler, D. J. A molecular dynamics study of water near silicate surfaces. *J. Colloid Interface Sci.* 100(2), 576-580, 1984.
- 5 Mulla, D. J., Low, P. F., and Roth, C. B. Measurement of the specific surface area of clay minerals by internal reflectance spectroscopy. *Clays Clay Minerals* 33(5), 391-396, 1985.
- 6 Mulla, D. J. Distribution of slope steepness in the Palouse region of Washington. *Soil Sci. Soc. Amer. J.* 50(6): 1401-1405, 1986.
- 7 Papendick, R. I. and Mulla, D. J. Basic principles of cell and tissue water relations. In: Water, Fungi and Plants, P. Ayres and L. Boddy, eds. Bath Press, London, 1986. Chapter 1.
- 8 Mulla, D. J. Simulating liquid water near mineral surfaces: Current methods and limitations. In: Geochemical Processes at Mineral Surfaces, J. A. Davis and K. F. Hayes, eds., Am. Chem. Soc.

Symposium Series #323, American Chemical Society, Washington, D.C., 1986. Chapter 2.

- 9 Mulla, D. J. Using geostatistics and spectral analysis to study spatial patterns in the topography of southeastern Washington State, U.S.A. *Earth Surface Processes and Landforms* 13: 389-405, 1988.
- 10 Mulla, D. J. Estimating spatial patterns in water content, matric suction, and hydraulic conductivity. *Soil Sci. Soc. Am. J.* 52(6):1547-1553, 1988.
- 11 Pierson, F. B. and Mulla, D. J. An improved method for measuring aggregate stability of a weakly aggregated loessial soil. *Soil Sci. Soc. Amer. J.* 53(6):1825-1831, 1989.
- 12 Mulla, D. J. 1989. Measurement and characterization of soil-water potential. In: C. E. Whitman, J. F. Parr, R. I. Papendick, and R. E. Meyer, (eds.), Rainfed Agriculture in the Near East Region: Soil, Water and Crop/Livestock Management Systems. USDA/USAID. Washington, D.C. pp. 147-161.
- 13 Mulla, D. J. 1989. Soil spatial variability and methods of analysis: I. Kriging soil fertility patterns. In: C. E. Whitman, J. F. Parr, R. I. Papendick, and R. E. Meyer, (eds.), Rainfed Agriculture in the Near East Region: Soil, Water and Crop/Livestock Management Systems. USDA/USAID. Washington, D.C. pp. 185-204.
- 14 Mulla, D. J. 1989. Measurement and characterization of soil-water relationships. In: C. M. Renard, R. J. Van Den Beldt, and J. F. Parr, (eds.), Soil, Crop and Water Management Systems in the Sudano-Sahelian Zone. ICRISAT. Patancheru, India. pp. 75-84.
- 15 Mulla, D. J. 1989. Soil spatial variability and methods of analysis: II. Cokriging soil fertility patterns. In: C. M. Renard, R. J. Van Den Beldt, and J. F. Parr, (eds.), Soil, Crop and Water Management Systems in the Sudano-Sahelian Zone. ICRISAT. Patancheru, India. pp. 241-254.
- 16 Campbell, G. S. and Mulla, D. J. Measurement of soil water content and potential. In: Irrigation of Agricultural Crops, B. A. Stewart and D. R. Nielson, eds. A.S.A. Monograph #30, Am. Soc. Agronomy, Madison, Wisconsin. 1990. Chapter 6.
- 17 Mulla, D. J., Bhatti, A. U., and Kunkel, R. Methods for removing spatial variability from field research trials. In: Advances in Soil Science, Dryland Agriculture: Strategies for Sustainability, R. P. Singh, B. A. Stewart, and J. F. Parr, eds. Vol. 13, pp. 201-213, Springer-Verlag New York, NY. 1990.
- 18 Cheng, H. H. and Mulla, D. J. Sample analyses for groundwater studies. In: D. W. Nelson and R. H. Dowdy (eds.), Methods for Ground Water Quality Studies. pp. 90-96. USDA-ARS, University of Nebraska, Lincoln, Nebraska. 1990.
- 19 Mulla, D. J. and Annandale, J. G. Assessment of field-scale leaching patterns for management of nitrogen fertilizer application. In: K. Roth, H. Fluhler, W. A. Jury, and J. C. Parker (eds.), Field-Scale Water and Solute Flux in Soils. pp. 55-63. Birkhauser Verlag, Basel, Sz. 1990.
- 20 Pierson, F. B. and Mulla, D. J. Aggregate stability in the Palouse region of Washington: Effect of landscape position. *Soil Sci. Soc. Am. J.* 54:1407-1412, 1990.
- 21 Bhatti, A. U. and Mulla D. J. Using semivariograms to identify yield trends caused by spatial variability in field experiments. *Pakistan J. Soil Sci.* 5:31-36, 1990.
- 22 Bhatti, A. U., Mulla, D. J., and Frazier, B. E. Estimation of soil properties and wheat yields on complex eroded hills using geostatistics and Thematic Mapper images. *Remote Sensing Environ.* 37:181-191, 1991.
- 23 Bhatti, A. U., Mulla, D. J., Koehler, F. E., and Gurmani, A. H. Identifying and removing spatial correlation from yield experiments. *Soil Sci. Soc. Am. J.* 55:1523-1528, 1991.

- 24 Mulla, D. J. Using geostatistics and GIS to manage spatial patterns in soil fertility. In: G. Kranzler (ed.), Automated Agriculture for the 21st Century. pp. 336-345. Am. Soc. Agric. Eng., St. Joseph, MI. 1991.
- 25 Bhatti, A. U. and D. J. Mulla. Interpretation of field experiments using different statistical procedures. *Sarhad J. Agric.* 7(4):549-560, 1991.
- 26 Mulla, D. J., Bhatti, A. U., Hammond, M. W., and Benson, J. A. A comparison of winter wheat yield and quality under uniform versus spatially variable fertilizer management. *Agric. Ecosys. Env.* 38:301-311, 1992.
- 27 Rossi, R. E., Mulla, D. J., Journel, A. G., and Franz, E. H. Geostatistical interpretation of ecological phenomena: Tools for modeling spatial dependence. *Ecological Monographs* 62:277-314, 1992.
- 28 Mulla, D. J., Huyck, L. M., and Reganold, J. P. Temporal variation in aggregate stability on conventional and alternative farms. *Soil Sci. Soc. Am. J.* 56:1620-1624, 1992.
- 29 Mallawatantri, A. P., and Mulla, D. J. Herbicide adsorption and organic carbon contents on adjacent low-input versus conventional farms. *J. Environ. Qual.* 21:546-551, 1992.
- 30 Mulla, D. J. Mapping and managing spatial patterns in soil fertility and crop yield. In: P. Robert, W. Larson, and R. Rust (eds.), Soil Specific Crop Management. Am. Soc. Agronomy, Madison, WI. pp. 15-26, 1993.
- 31 Busacca, A. J., Cook, C. A., and Mulla, D. J. Comparing landscape-scale estimation of soil erosion in the Palouse using Cs-137 and RUSLE. *J. Soil Wat. Conserv.* 48:361-367, 1993.
- 32 Ball, S. T., Mulla, D. J., and Konzak, C. F. Spatial heterogeneity affects variety trial interpretation. *Crop Sci.* 33(5):931-935, 1993.
- 33 Tahir, A. R., D. J. Mulla and J. I. Finnie. 1993. Potential pathways of pesticides transport. *Pak J. Agri. Sci.* 30(2):124-128
- 34 Tahir, A. R., D. J. Mulla and L. G. King. 1993. Modeling transport of metribuzin in sloping lands. *Pak. J. Agri. Sci.* 30(3):236-241
- 35 Tahir, A. R. M. Younis and D. J. Mulla. 1994. Effect of conservation tillage on transport of pesticides. *J. Eng. and Applied Sci.* 13(2):79-84
- 36 Borgelt, S. C., Searcy, S. W., Stout, B. A., and Mulla, D. J. 1994. Spatially variable liming rates: A method for determination. *Trans. ASAE* 37(5):1499-1507.
- 37 Painter, K., Young, D. L., Granatstein, D., and Mulla, D. J. 1995. Combining alternative and conventional systems for environmental gains. *Am. J. Alternative Agric.* 10:88-96.
- 38 Bhatti, A. U. and D. J. Mulla. 1995. Spatial variability of soil properties and wheat yield on complex hills and their fertility management. *J. Ind. Soc. Soil. Sci.* 43:53-58.
- 39 Mallawatantri, A. P., McConkey, B. G., and Mulla, D. J. 1996. Characterization of pesticide sorption and degradation in macropore linings and soil horizons of Thatuna silt loam. *J. Environ. Qual.* 25:227-235.
- 40 Mallawatantri, A.P. and Mulla, D. J. 1996. Uncertainties in leaching risk assessments due to field averaged transfer function parameters. *Soil Sci. Soc. Am. J.* 60:722-726.

- 41 Mulla, D. J., Perillo, C. A., and C. G. Cogger. 1996. A site-specific farm-scale GIS approach for reducing groundwater contamination by pesticides. *J. Environ. Qual.* 25:419-425.
- 42 Harris, R. F., D. L. Karlen, and D. J. Mulla. 1996. An integrated framework for assessment and management of soil quality and health. p. 61-82. In: (J. W. Doran and A. J. Jones, eds.), *Methods for Assessing Soil Quality*. SSSA Spec. Publ. No. 49. SSSA, Madison, WI.
- 43 Khakural, B. R., P. C. Robert, and D. J. Mulla. 1996. Relating corn/soybean yield to variability in soil and landscape characteristics. p. 117-128. In: (P. C. Robert, R. H. Rust, and W. E. Larson, Eds.), *Precision Agriculture: Proc. Third Intl. Conf., ASA/CSSA/SSSA*, Madison, WI.
- 44 Bhatti, A. U. and D. J. Mulla. 1996. A comparison of criteria for dividing eroded wheat fields into different management zones. *J. Ind. Soil Sci. Soc.* 44:488-495.
- 45 Mulla, D. J., and J. S. Schepers. 1997. Key processes and properties for site-specific soil and crop management. p. 1-18. In: (F. J. Pierce and E. J. Sadler, eds.), *The State of Site Specific Management for Agriculture*. ASA/CSSA/SSSA, Madison, WI.
- 46 Wollenhaupt, N. C., D. J. Mulla, and C. A. Gotway. 1997. Soil sampling and interpolation techniques for mapping spatial variability of soil properties. p. 19-54. In: (F. J. Pierce and E. J. Sadler, eds.), *The State of Site Specific Management for Agriculture*. ASA/CSSA/SSSA, Madison, WI.
- 47 Baca, R. G., Chung, J. N., and Mulla, D. J. 1997. Mixed transform finite element method for solving the non-linear equation for flow in variably saturated porous media. *Int. J. Numerical Methods in Fluids* 24:441-455.
- 48 Mulla, D. J. Geostatistics, remote sensing and precision farming. 1997. pp 100-119. In: A. Stein and J. Bouma (eds.), *Precision Agriculture: Spatial and Temporal Variability of Environmental Quality*. Ciba Foundation Symposium 210. Wiley, Chichester.
- 49 Mulla, D. J. and A. U. Bhatti. 1997. An evaluation of indicator properties affecting spatial patterns in N and P requirements for winter wheat yield. p. 145-154. In: J. V. Stafford (ed.), *Precision Agriculture '97: Spatial Variability in Soil and Crop*. Vol. 1. BIOS Sci. Publ., Oxford, UK.
- 50 Allmaras, R. R., D. E. Wilkins, O. C. Burnside, and D. J. Mulla. 1998. Agricultural technology and adoption of conservation practices. P. 99-158. In: F. J. Pierce and W. W. Frye (eds.), *Advances in Soil and Water Conservation*. Ann Arbor press, Chelsea, MI.
- 51 Mulla, D. J. and T. M. Addiscott. 1999. Validation approaches for field-, basin-, and regional-scale water quality models. Pp 63-78. In: D. Corwin, K. Loague, and T. Ellsworth (eds.), *Assessment of Nonpoint Source Pollution in the Vadose Zone*. AGU, San Francisco, CA.
- 52 Tahir, A. R. F. H. Khan and D. J. Mulla. 1998. Computer simulation of intrinsic impact of deep tillage on the soil and water environment. *Pak. J. Agri. Sci.* 35(1-4):24-27
- 53 Brezonik, P. L., V. J. Bierman, R. Alexander, J. Anderson, J. Barko, M. Dortch, L. Hatch, G. L. Hitchcock, D. Keeney, D. Mulla, V. Smith, C. Walker, T. Whittedge, and W. J. Wiseman. 1999. Effects of reducing nutrient loads to surface waters within the Mississippi River Basin and the Gulf of Mexico. Topic 4 Report for the Integrated Assessment on Hypoxia in the Gulf of Mexico. NOAA Coastal Ocean Program Decision Analysis Series No. 18. NOAA, Silver Spring, MD.
- 54 Oliveira, Jr., R. S., W. C. Koskinen, F. A. Ferreira, B. R. Khakural, D. J. Mulla, and P. C. Robert. 1999. Spatial variability of imazethapyr sorption in soil. *Weed Sci.* 47:243-248.
- 55 Braum, S. M., P. Hinds, G. L. Malzer, J. Bell, D. Mulla, and P. C. Robert. 1999. Terrain attributes and soil nitrogen: Spatial effects on corn yield response to nitrogen fertilization for a northern, glaciated

landscape. pp. 195-202. In: (P.C. Robert, R. H. Rust, and W.E. Larson, eds.), Precision Agriculture, Proc. 4th Intl. Conf. ASA-CSSA-SSSA. Madison, WI.

- 56 Khakural, B.R., G.A. Johnson, P.C. Robert, D. J. Mulla, R. Oliveira, and W.C. Koskinen. 1999. Site-specific herbicide management for preserving water quality. pp. 1719-1732. In: (P.C. Robert, R. H. Rust, and W.E. Larson, eds.), Precision Agriculture, Proc. 4th Intl. Conf. ASA-CSSA-SSSA. Madison, WI.
- 57 Mulla, D. J., Mallawatantri, A. P., Wendroth, O., Joschko, M., Rogasik, H., and Koszinski, S. 1999. Site-specific management of flow and transport in heterogeneous and structured soils. p. 396-417. In: M. B. Parlange and J. W. Hopmans (eds.), Vadose Zone Hydrology: Cutting Across Disciplines. Oxford University Press, New York, NY.
- 58 Cheng, H. H. and Mulla, D. J. 1999. The soil environment. pp. 1-14. In: D.C. Adriano, J. M. Bollag, W. T. Frankenberger, and R. C. Sims (eds.), Bioremediation of Contaminated Soils. Agronomy Monograph #37.
- 59 Brezonik, P., K. W. Easter, L. Hatch, D. Mulla, and J. Perry. 1999. Management of diffuse pollution in agricultural watersheds: Lessons from the Minnesota River basin. *Wat. Sci. Tech.* 39:323-330.
- 60 Davis, D. M., P. H. Gowda, D. J. Mulla, and G. W. Randall. 2000. Modeling nitrate nitrogen leaching in response to nitrogen fertilizer rate and tile drain depth or spacing for southern Minnesota, USA. *J. Environ. Qual.* 29:1568-1581.
- 61 Mulla, D. J. and A. B. McBratney. 2000. Soil spatial variability. Ch. 9. In: (M. E. Sumner, ed.), *Handbook of Soil Science*. Pp A321-A352. CRC Press, Boca Raton, FL.
- 62 Randall, G. W. and D. J. Mulla. 2001. Nitrate-N in surface waters as influenced by climatic conditions and agricultural practices. *J. Environ. Qual.* 30:337-344.
- 63 Gowda, P. H., B. J. Dalzell, D. J. Mulla, and F. Kollman. 2001. Mapping tillage practices with Landsat Thematic Mapper based logistic regression models. *J. Soil Water Conservation* 56:14-19.
- 64 Hatch, L. K., A. P. Mallawatantri, D. Wheeler, A. Gleason, D. J. Mulla, J. A. Perry, K. W. Easter, P. Brezonik, R. Smith, and L. Gerlach. 2001. Land management at the major watershed - agroecoregion intersection. *J. Soil Water Conservation* 56:44-51.
- 65 Mulla, D. J., M. Beatty, and A. C. Sekely. 2001. Evaluation of remote sensing and targeted soil sampling for variable rate application of lime. In: (P.C. Robert, R. H. Rust, and W.E. Larsen, eds.), Precision Agriculture, Proc. 5th Intl. Conf. ASA-CSSA-SSSA. Madison, WI.
- 66 Mulla, D. J., M. Beatty, and A. C. Sekely. 2001. Evaluation of remote sensing and targeted soil sampling for variable rate application of nitrogen. In: (P.C. Robert, R. H. Rust, and W.E. Larsen, eds.), Precision Agriculture, Proc. 5th Intl. Conf. ASA-CSSA-SSSA. Madison, WI.
- 67 Birr, A. S. and D. J. Mulla. 2001. Evaluation of phosphorus site index in watersheds at the regional scale. *J. Environ. Quality.* 30:2018-2025.
- 68 Dalzell, B. J., D. J. Mulla, and P. H. Gowda. 2001. Modeling and evaluation of alternative agricultural management practices in Sand Creek watershed. pp. 637-640. In: J. C. Ascough II and D. C. Flanagan (eds.), *Soil Erosion Research for the 21st Century*. Am. Soc. Ag. Eng., St. Joseph, MI.
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- 70 Mulla, D. J. and A. B. McBratney. 2002. Soil Spatial Variability. Ch. 9. In: A. W. Warrick (ed.), *Soil*

Physics Companion. Pp 343-373. CRC Press, Boca Raton, FL. 389 pp.

- 71 Sekely, A. C., D. J. Mulla, and D. W. Bauer. 2002. Streambank slumping and its contribution to the phosphorus and suspended sediment loads of the Blue Earth River, Minnesota. *J. Soil Water Conservation*. 57(5):243-250.
- 72 Birr, A. S. and D. J. Mulla. 2002. Relationship between lake and ground water quality patterns and Minnesota agroecoregions. *Hydrological Sci. Tech*. 18(1-4):31-41.
- 73 Fang, F., P. L. Brezonik, D. J. Mulla, and L. K. Hatch. 2002. Estimating runoff phosphorus losses from calcareous soils in the Minnesota River Basin. *J. Environ. Quality* 31(6):1918-1929.
- 74 Mulla, D. J., P. Gowda, W. C. Koskinen, B. R. Khakural, G. Johnson, and P. C. Robert. 2002. Ch. 20. Pp. 304-317. Modeling the effect of precision agriculture: Pesticide losses to surface waters. In: (E. Arthur, A. Barefoot, and V. Clay, eds.), *Terrestrial Field Dissipation Studies*. ACS Symp. Ser. No. 842, ACS, Washington, DC..
- 75 Koskinen, W. C., D. J. Mulla, R. Oliveira, B. R. Khakural, and P. Robert. 2002. Ch. 7. Pp 88-101. Spatial variability of herbicide sorption on soil. In: (E. Arthur, A. Barefoot, and V. Clay, eds.), *Terrestrial Field Dissipation Studies*. ACS Symp. Ser. No. 842, ACS, Washington, DC.
- 76 Gowda, P. H., D. J. Mulla, and B. J. Dalzell. 2003. Examining the targeting of conservation tillage to steep vs. flat landscapes in the Minnesota River Basin. *J. Soil Water Conservation* 58:53-57.
- 77 Mulla, D. J., P. H. Gowda, A. S. Birr, and B. J. Dalzell. 2003. Estimating nitrate-N losses at different scales in agricultural watersheds. Ch. 17, In: Y. Pachepsky, D. Radcliffe, and M. Selim, eds., *Scaling Methods in Soil Physics*. CRC Press. Boca Raton, FL.
- 78 Hernandez, J. A. and D. J. Mulla. 2003. Comparing classical and spatial statistical analysis methods for landscape scale experiments. Pp. 763-773. In: (P.C. Robert, ed.), *Precision Agriculture, Proc. 6th Intl. Conf. ASA-CSSA-SSSA*. Madison, WI.
- 79 Miao, Y., P. C. Robert, and D. J. Mulla. 2003. Geostatistical analysis of soil properties and grain quality. Pp. 417-423. In: (J. Stafford and A. Werner, eds.), *Precision Agriculture*. Wageningen Academic Publ. Wageningen, The Netherlands.
- 80 Mamo, M., G. L. Malzer, D. J. Mulla, D. J. Huggins, and J. Strock. 2003. Spatial and temporal variation in economically optimum N rate for corn. *Agronomy J.* 95:958-964.
- 81 Johansson, R. C., P. H. Gowda, D. J. Mulla, and B. J. Dalzell. 2004. Metamodeling phosphorus best management practices for policy use: A frontier approach. *Am. J. Agricultural Economics* 30(1):63-74.
- 82 Updegraff, K., P. Gowda, and D. J. Mulla. 2004. Watershed scale modeling of the water quality effects of cropland conversion to short rotation woody crops. *Renewable Agric. Food Systems* 19(2):1-11.
- 83 Dalzell, B. J., P. H. Gowda, and D. J. Mulla. 2004. Modeling sediment and phosphorus losses in an agricultural watershed to meet TMDLs. *J. Am. Water Resources Assoc.* 40(2):533-543.
- 84 Cheng, H.H. and D. J. Mulla. 2004. Sustainable Water and Soil Management: From Problem Solving to a Holistic Appreciation. Ch. 25. In: (T. C. Tso and H. Kang, eds.), *Dare to Dream: Vision of 2050 Agriculture in China*. China Agricultural Univ. Press, Beijing, China.
- 85 Miao, Y., D. J. Mulla and P. C. Robert. 2005. Combining soil-landscape and spatial-temporal variability of yield information to delineate site-specific management zones. In: (J. V. Stafford,

ed.), Proc. 5th European Conf. Precision Ag. P. 811-818. Wageningen Academic Publ. Wageningen, The Netherlands.

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- 87 Strock, J. S., D. Bruening, J.D. Apland, and D.J. Mulla, 2005. Farm nutrient management practices in two geographically diverse watersheds in the Cottonwood River Watershed of Minnesota. *J. Water Air Soil Pollution* 165:211-231.
- 88 Roggenbuck, R., P. C. Robert, D. J. Mulla and G. L. Malzer. 2005. Spatial variation in Economic Optimum Nitrogen Rate for corn in south central Minnesota. pp. 945-960. In: (D. J. Mulla, ed.), Proc. 7th International Conf. Prec. Agriculture. Univ. Minnesota. St. Paul, MN.
- 89 Miao, Y., P. C. Robert and D. J. Mulla. 2005. Spatial and temporal variability in corn yield and quality responses to N fertilization within an eastern Illinois no-till field. pp 961- 976. In: (D. J. Mulla, ed.), Proc. 7th International Conf. Prec. Agriculture. Univ. Minnesota. St. Paul, MN.
- 90 Balasundram, S. K., P. C. Robert, D. J. Mulla and D. L. Allan. 2006. Relationship between oil palm yield and soil fertility as affected by topography in an Indonesian plantation. *Communications in Soil and Plant Analysis.* 37(9-10):1321-1337.
- 91 Balasundram, S. K., P. C. Robert, D. J. Mulla and D. L. Allan. 2006. Spatial variability of soil fertility variables influencing yield in oil palm (*Elaeis guineensis* Jacq.). *Asian Journal of Plant Sciences.* 5(2):389-400.
- 92 Oquist, K., J. Strock and D. Mulla. 2006. Influence of alternative and conventional management practices on soil physical and hydraulic properties. *Vadose Zone J.* 5:356-364.
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