

Curriculum Vitae

T. Scott Murrell, Director, U.S. Northcentral Region
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1. Education

Doctor of Philosophy, Soil Science, Texas A&M University 1996
Master of Science, Soil Fertility and Plant Nutrition, Purdue University, 1991
Doctor of Philosophy Student, Near Eastern Languages and Literature, Yale University, 1986-1987.
Bachelor of Arts, General History Major, Religious Studies Minor, Purdue University, 1986

2. Professional Experience

2007 –pres. Northcentral Director, International Plant Nutrition Institute, Norcross, Georgia
1996-2006 Northcentral Director, Potash & Phosphate Institute, Norcross, Georgia
1990-1991 SAS® Software Consultant, Purdue University, West Lafayette, Indiana

3. Awards and Honors

2009 SSSA Soil Science Industry Award
2006 American Society of Agronomy Educational Materials Award
1995-pres. Gamma Sigma Delta Honor Society of Agriculture
1992-1995 International Minerals Corporation Fellowship
1994 Gary Fitzgerald Scholarship, Texas Plant Food Institute
1992 J. Fielding Reed Potash and Phosphate Institute Fellowship
1986-pres. The Honor Society of Phi Kappa Phi
1986 Graduated With Distinction from Purdue University
1984-1986 Golden Key International Honour Society
1982 Bausch and Lomb Honorary Science Award
1982 Valedictorian, Twin Lakes High School

4. Service to Professional Organizations

2009-2010 Member, ASA Division Realignment Task Force
2009-2010 ASA Northcentral Branch, President
2008-2009 ASA Northcentral Branch, President-Elect
2007-2008 ASA Northcentral Branch, Secretary-Treasurer
2006-2009 ASA Division A9 Board Representative
2003-2006 Program Committee Member, Northcentral Extension Industry Conference

2005	Minnesota Agricultural Nutrient Task Force
2004	Scientist, Nitrogen Fertilizer Rapid Assessment Program, Scientific Committee on Problems of the Environment
2003-2009	ICCA – Minnesota: Board Member, 2003-Present
2003-2004	Committee Member, Minnesota Crop Production Research Foundation
2003	CSSA Editorial Affairs, Policies, & Practices Committee 2003
2003	CSSA Crop Management Editorial Board, 2003
2002	ASA Division A9 Annual Meeting Program Committee
2001/2/4/6	Scientific Reviewer, Wisconsin Fertilizer Research Program
2000-2003	Member, Soil and Plant Analysis Council
2000/2/4	Program Committee Member, International Precision Agriculture Conference
1999,2001/3	Program Committee Member, InfoAg Conference
1998-pres.	Member, CSSA
1997-2000	ICCA – South Dakota: Board Member
1996-pres.	Sigma Xi Scientific Research Society
1994-1996	American Chemical Society
1994-1996	Member, Texas Society for Electron Microscopy
1993-pres.	Member, ASA
1992-pres.	Member, SSSA

5. **Synergistic Activities**

Chair, IPNI Working Group: Nutrient Decision Support Systems for Maize. Dr. Murrell is currently chair of an international working group within the International Plant Nutrition Institute that is focused on improving maize nutrition to narrow the gap in yield between that currently achieved by farmers and that which is ecologically attainable. This effort involves scientists in the U.S., Mexico, Argentina, Brazil, India, and China and is focused on improving food security and meeting future demands for maize.

On-Farm Research and Evaluation. Murrell has created several tools and has trained numerous production agronomists on using the scientific method to evaluate nutrient management practices on the farm. His focus has been on design, analysis, and simple modeling, particularly using Microsoft Excel because of its popularity among crop consultants. Tools include a step-by-step guide for using Excel to conduct an analysis of variance and separate means; a step-by-step guide for examining temporal trends in soil test levels; a spreadsheet for evaluating nutrient budgets over many years; an online database of published crop removal coefficients; step-by-step methodology for using a GIS to identify areas of yield consistency in the field and to calculate nutrient budgets; and a spreadsheet for estimating yield loss with nutrient rate reductions. For additional information, see www.ipni.net/toolbox.

6. List of Publications – T.S. Murrell

Refereed journal papers

1. Chusuei, C.C., T.S. Murrell, J.S. Corneille, M.G. Nooney, S.M. Vesecky, L.R. Hossner, and D.W. Goodman. 1999. Liquid reaction apparatus for surface analysis. *Rev. Sci. Instrum.* 70(5):2462-2464.
2. Nooney, M.G., A. Campbell, T.S. Murrell, X.-F. Lin, L.R. Hossner, C.C. Chusuei, and D.W. Goodman. 1998. Nucleation and growth of phosphate on metal oxide thin films. *Langmuir* 14(10):2750-2755.
3. Nooney, M.G., T.S. Murrell, J.S. Corneille, E.I. Rusert, L.R. Hossner, and D.W. Goodman. 1996. A spectroscopic investigation of phosphate adsorption onto iron oxides. *J. Vac. Sci. Tech. A* 14(3):1357-1361.

Refereed book chapters

1. Murrell, T.S. 2008. Measuring nutrient removal, calculating nutrient budgets. p. 159-182. *In* S. Logsdon et al. (ed.) *Soil science: Step-by-step field analysis*. ASA, Madison, WI.
2. Murrell, T.S. 2004. Using advanced technologies to refine nitrogen management at the farm scale: A case study from the U.S. Midwest. p. 155-165. *In* A.R. Mosier, K. Syers, and J.R. Freney (eds.) *Agriculture and the nitrogen cycle: Assessing the impacts of fertilizer use on food production and the environment*. SCOPE 65. Island Press, Washington, D.C.
3. Murrell, T.S., M.G. Nooney, L.R. Hossner, D.W. Goodman. 1996. Growth kinetics of phosphate films on metal oxide surfaces. p. 71-86. *In* G. Jerkiewicz, M. P. Soriaga, K. Uosaki, and A. Wieckowski (ed.) *Solid-liquid electrochemical interfaces*. ACS Symp. Ser. 656. American Chemical Society, Washington, DC.
4. Murrell, T.S., Q.B. Rund, and H.F. Reetz, Jr. 2007. Gleaning more information from yield data. p. 121-140. *In* Pierce, F.J. (ed.) *GIS applications in agriculture*. CRC Press, Boca Raton, FL.
5. Palm, C., P. Machado, T. Mahmood, J. Melillo, T.S. Murrell, J. Nymangara, M. Scholes, E. Sisworo, J. Olesen, J. Pender, J. Stewart, and J. Galloway. 2004. Societal responses to meeting nitrogen input needs. p. 71-89. *In* A.R. Mosier, K. Syers, and J.R. Freney (eds.) *Agriculture and the nitrogen cycle: Assessing the impacts of fertilizer use on food production and the environment*. SCOPE 65. Island Press, Washington, D.C.

Conference Proceedings

1. Fixen, P.E. and T.S. Murrell. 2002. Soil test summary and nutrient trends. *In* R. Minks (ed.) *Proc. Annual Soils, Fertilizer and Agricultural Pesticides Short Course and Equipment Exposition, 52nd, Minneapolis, MN. 10-12 Dec. 2002*. Minnesota Crop Production Retailers, St. Paul, MN.
2. Murrell, T.S. 2009. Principos basicos de la eficiencia de fosforo y potasio. p. 20-25. *In* J. Espinosa and F. García (eds.) *Uso eficiente de nutrientes simposio*,

- Congreso Latinoamericano de la Ciencia del Suelo, 18th. 16-20 Nov. 2009. San José, Costa Rica. International Plant Nutrition Inst., Norcross, GA.
3. Murrell, T.S. 2007. The importance of phosphorus placement. Proc. Crop Production Conf., Columbus, OH. 4 Jan. 2007. Ohio Agribusiness Association.
 4. Murrell, T.S. 2005. High-precision guidance systems: Will they change nutrient management practices? *In* R. Minks (ed.) Proc. Annual Soils, Fertilizer and Agricultural Pesticides Short Course and Equipment Exposition, 55th. Minneapolis, MN. 7-8 Dec. 2005.
 5. Murrell, T.S. 2005. Phosphorus and potassium placement in the Midwest: Possibilities with automatic guidance technology. *In* Proc. North Central Ext. Industry Conf., Des Moines, IA. 16-17 Nov. 2005. Potash & Phosphate Institute, Brookings, SD.
 6. Murrell, T.S. 2005. Placement and timing issues for P & K in the eastern Corn Belt. *In* Proc. Indiana CCA Conf., Indianapolis, IN. 13-14 Dec. 2005.
 7. Murrell, T.S. 2003. Analyzing site-specific soil test data to help farmers make management decisions [Online]. Proc. 2003 Wisconsin Fert., Aglime, & Pest Management Conf., Madison, WI. Available at <http://www.soils.wisc.edu/extension/publications/wfapm.htm> (verified 10 Jan. 2004).
 8. Murrell, T.S. 2001. Returns from P and K inputs [Online]. Proc. 2001 Wisconsin Fert., Aglime, & Pest Management Conf., Madison, WI. Available at <http://www.soils.wisc.edu/extension/publications/wfapm.htm> (verified 10 Jan. 2004).
 9. Murrell, T.S. 2000. Precision agriculture: What have we learned so far? *In* R. Minks (ed.) Proc. Annual Soils, Fertilizer and Agricultural Pesticides Short Course and Equipment Exposition, 50th, Minneapolis, MN. 12-14 Dec. 2000. Minnesota Crop Production Retailers, St. Paul, MN.
 10. Murrell, T.S. 2000. Selling nutrient inputs in today's market [Online]. Proc. 2000 Wisconsin Fert., Aglime, & Pest Management Conf., Madison, WI. Available at <http://www.soils.wisc.edu/extension/publications/wfapm.htm> (verified 10 Jan. 2004).
 11. Murrell, T.S. 1999. Managing Nutrients for Optimum Crop Yield. Eastern Canada Nutrient Management Workshop, Guelph, Ontario, Canada. 14 July. 1999. Canadian Fertilizer Institute, Ottawa, Ontario, Canada.
 12. Murrell, T.S. 1999. Selling nutrient inputs in today's market. Proc. Soils, Fert., and Agric. Pesticides Short Course and Equip. Expo., 49th, Minneapolis, MN. 7-9 Dec. 1999. Potash & Phosphate Institute, Norcross, GA.
 13. Murrell, T.S. 1998. P and K fertilizer economics. Soils, Fertilizer, and Agricultural Pesticides Short Course and Exposition, Minneapolis, MN, 1998, 14 Dec.-15 Dec. 1998.
 14. Murrell, T.S. 1998. Understanding Fertilizer Economics. *In* Proceedings of the 1999 Wisconsin Fertilizer, Aglime & Pest Management Conference, Madison, WI, January 19-21. University of Wisconsin, Madison, WI.
 15. Murrell, T.S. and P.E. Fixen. 2004. Why more Midwest K problems in 2003? [Online]. Proc. 2004 Wisconsin Fert., Aglime, & Pest Management Conf., Madison, WI. Available at

- <http://www.soils.wisc.edu/extension/publications/wfapm.htm> (verified 20 Jan. 2004).
16. Murrell, T.S. and D. Frieberg. 1998. Major program profitability trends and findings, 1997. Proc. Iowa Soybean Association's Producer Profitability Conference, Ames, Iowa, 1998.
 17. Murrell, T.S. and L.J. Murrell. 2004. Nitrogen recommendations based on local databases. Proc. Indiana CCA Conf., Indianapolis, IN. 14-15 Dec. 2004.
 18. Murrell, T.S., H.F. Reetz, Jr., and Q.B. Rund. 2004. Mapping nutrient budgets within fields [Online]. Proc. ESRI Int. User Conf., 24th, San Diego, CA. 9-13 Aug. 2004. Available at <http://gis.esri.com/library/userconf/proc04/docs/pap1368.pdf> (verified 22 Jul. 2008).
 19. Murrell, T.S., H.F. Reetz, Jr., and Q.B. Rund. 2003. Using the internet as a dealer information source [Online]. Proc. 2003 Wisconsin Fert., Aglime, & Pest Management Conf., Madison, WI. Available at <http://www.soils.wisc.edu/extension/publications/wfapm.htm> (verified 10 Jan. 2004).
 20. Murrell, T.S., H.F. Reetz, Jr., Q.B. Rund, and L.J. Murrell. 2003. Using site-specific soil test results to check management practices. Proc. 2003 Southern Plant. Nutr. Conf., Olive Branch, MS. 7-8 Oct. 2003. Univ. of Kentucky, Lexington.
 21. Murrell, T.S. and Q.B. Rund. Using ArcGIS for yield data analysis [Online]. Proc. ESRI Int. User Conf., 23rd, San Diego, CA. 7-11 Jul. 2003. Available at <http://gis.esri.com/library/userconf/proc03/p0897.pdf> (verified 22 Jul. 2008).
 22. Murrell, T.S. and R. Vanden Heuvel. 2000. Principles of fertilizer economics: Small grain example. Proc. Great Plains Soil Fertility Conf., Denver, CO. 7-8 March 2000. Potash & Phosphate Institute, Norcross, GA.
 23. Reetz, H., Q. Rund, and S. Murrell. 2004. GIS in nutrient management: A 21st century paradigm shift. Proc. ESRI Int. User Conf., 24th, San Diego, CA. 9-13 Aug. 2004. Available at www.esri.com (verified 31 May 2005).
 24. Rund, Q., H. Reetz, and S. Murrell. 2004. ArcGIS for certified crop advisers (CCAs): A training program. Proc. ESRI Int. User Conf., 24th, San Diego, CA. 9-13 Aug. 2004. Available at www.esri.com (verified 31 May 2005).

Decision Support Tools

1. Murrell, T.S. 2009. Excel calculator: Estimating yield loss from nutrient rate reductions [online]. Available at <http://www.ipni.net/toolbox> (verified 11 Mar. 2009).
2. Murrell, T.S., N. Baxley, and Q.B. Rund. 2009. Nutrient uptake and removal database (NURD) [online]. Available at <http://ipni.net/toolbox> (verified 11 Mar. 2009).
3. Murrell, T.S. and K.J. Moore. 2001. Planning and analyzing on-farm experiments with Microsoft Excel 2000: single year, single location [online]. Available at <http://www.ipni.net/toolbox> (verified 11 Mar. 2009).

4. Murrell, T.S., H.F. Reetz Jr., L.J. Murrell, and Q.B. Rund. Finding trends in soil test data [online]. Available at <http://www.ipni.net/toolbox> (verified 11 Mar. 2009).
5. Murrell, T.S. and Q.B. Rund. 2003. PKalc: Nutrient budget estimator [online]. Available at <http://www.ipni.net/toolbox> (verified 11 Mar. 2009).

Industry Extension Publications

1. Bly, A., R.H. Gelderman, J. Gerwing, and T.S. Murrell. 2002. Symptoms associated with potassium deficiency in corn. *Better Crops* 86(3):12-15. Available at <http://www.ppi-ppic.org/bettercrops> (verified 4 Dec. 2006).
2. Bruulsema, T.W. and T.S. Murrell. 2008. Corn fertilizer decisions in a high-priced market. *Better Crops* 92(3):16-18. Available online at <http://www.ipni.net/bettercrops> (verified 12 Mar. 2009).
3. Bruulsema, T.W. and T.S. Murrell. 2006. Nutrient placement in reduced tillage systems: Considerations [Online]. Available at [http://www.ppi-far.org/ppiweb/ppibase.nsf/\\$webindex/article=F7CCCBEBF852571B2004328E08C54B69E](http://www.ppi-far.org/ppiweb/ppibase.nsf/$webindex/article=F7CCCBEBF852571B2004328E08C54B69E) (verified 9 Mar. 2007).
4. Johnson, J.W., T.S. Murrell, and H.F. Reetz, Jr. 1997. Balanced fertility management: A key to nutrient use efficiency. *Better Crops* 81(2):3-5. Available at <http://www.ppi-ppic.org/bettercrops> (verified 4 Dec. 2006).
5. Kastens, T.L., H. Nivens, W.M. Stewart, and T.S. Murrell. 1998. Profitability surveys: Evaluating management factors. *Better Crops* 82:8-10. Available at <http://www.ppi-ppic.org/bettercrops> (verified 4 Dec. 2006).
6. Mallarino, A.P., M.U. Haq, and T.S. Murrell. 2005. Early season foliar fertilization of soybeans. *Better Crops* 89(3):11-13. Available at <http://www.ppi-ppic.org/bettercrops> (verified 4 Dec. 2006).
7. Mallarino, A.P. and T.S. Murrell. 2004. Detecting phosphorus with plasma emission spectroscopy may require unique field calibration data. *Better Crops* 88(2):12-15. Available at <http://www.ppi-ppic.org/bettercrops> (verified 4 Dec. 2006).
8. Mallarino, A.P. and T.S. Murrell. 1998. No-till corn grain yield responses to band applications of potassium. *Better Crops* 82:4-6. Available at <http://www.ppi-ppic.org/bettercrops> (verified 4 Dec. 2006).
9. Malzer, G.L., D.J. Mulla, and T.S. Murrell. 1999. Getting specific with site-specific nutrient management. *Site Specific Management Guidelines SSMG-23*. Available at <http://www.ppi-ppic.org/ssmg> (verified 4 Dec. 2006).
10. Murrell, T.S. 2010. A distant early warning line for potassium. *Plant Nutr. Today*. Spring 2010, No. 4. Available at <http://www.ipni.net/pnt> (verified 8 Feb. 2010).
11. Murrell, T.S. 2010. New 4R article appears in *Crops & Soils* magazine. *Plant Nutr. Today*. Winter 2009-1010, No. 4. Available at <http://www.ipni.net/pnt> (verified 10 May 2010).
12. Murrell, T.S. 2010. Northcentral regional update. 8 Feb. 2010 [online]. Available online with updates at <http://www.back-to-basics.net> (verified 8 Feb. 2010).

13. Murrell, T.S. 2010. Visual indicators of potassium deficiency in corn. *Better Crops* 94(1):14-15. Available at <http://ipni.net/bettercrops> (verified 5 May 2010).
14. Murrell, T.S. 2009. Chances of losing yield from fertilizer rate reductions. International Plant Nutrition Institute, Norcross, GA. Available at <http://www.ipni.net/fertilizer2009> (verified 20 Nov. 2009).
15. Murrell, T.S. 2009. Considerations for maintenance applications of phosphorus and potassium. *Plant Nutr. Today*. Fall 2009, No. 4. Available at <http://www.ipni.net/pnt> (verified 20 Nov. 2009).
16. Murrell, T.S. 2009. Estimating yield loss for fertilizer rate reductions. *Plant Nutr. Today*. Spring 2009, No. 4. Available at <http://www.ipni.net/pnt> (verified 20 Nov. 2009).
17. Murrell, T.S. 2009. Keep an eye on potassium this season. *Insights*. Apr. 2009. International Plant Nutrition Institute, Norcross, GA. Available online at [http://www.ipni.net/ipniweb/insights.nsf/\\$webcontents/5C036E047EF4E651856518CB004CF909/\\$file/Potassium+IPNI+Insights+-+Murrell+May+09.pdf](http://www.ipni.net/ipniweb/insights.nsf/$webcontents/5C036E047EF4E651856518CB004CF909/$file/Potassium+IPNI+Insights+-+Murrell+May+09.pdf) (verified 18 Dec. 2009).
18. Murrell, T.S. 2009. Measuring nutrient removal, calculating nutrient budgets. ICCA Self-Study CEU SS03899. Available at <https://www.certifiedcropadviser.org/certified/education/self-study/> (verified 20 Nov. 2009).
19. Murrell, T.S. 2009. Northcentral research report. *Insights*. Jul. 2009. International Plant Nutrition Institute, Norcross, GA. Available online at [http://www.ipni.net/ipniweb/insights.nsf/\\$webcontents/46F6D9C459A7D13A885257607005EEC1/\\$file/Murrell09_Research.pdf](http://www.ipni.net/ipniweb/insights.nsf/$webcontents/46F6D9C459A7D13A885257607005EEC1/$file/Murrell09_Research.pdf) (verified 18 Dec. 2009).
20. Murrell, T.S. 2009. Skipping a phosphorus or potassium application. *Plant Nutr. Today*. Summer 2009, No. 4. Available at <http://www.ipni.net/pnt> (verified 20 Nov. 2009).
21. Murrell, T.S. 2009. Why are soil test potassium levels so variable over time? [online]. ICCA Self-Study CEU SS03872. Available at <https://www.certifiedcropadviser.org/certified/education/self-study/> (verified 20 Nov. 2009).
22. Murrell, T.S. 2008. 2007 corn and soybean harvest in the Northcentral region. *Plant Nutr. Today*. Spring 2008, No. 4. Available at <http://www.ipni.net/pnt> (verified 11 Mar. 2009).
23. Murrell, T.S. 2008. A soil fertility assessment checklist for Winter. *Plant Nutr. Today*. Winter 2008, No. 4. International Plant Nutrition Institute, Norcross, GA. Available at <http://www.ipni.net/pnt> (verified 11 Mar. 2009).
24. Murrell, T.S. 2008. Average nutrient removal rates for crops in the Northcentral region. *Plant Nutr. Today*. Fall 2008, No. 4. Available at <http://www.ipni.net/pnt> (verified 11 Mar. 2009).
25. Murrell, T.S. 2008. Keep a log of soil acidity. *Plant Nutr. Today*. Summer 2008, No. 4. Available at <http://www.ipni.net/pnt> (verified 11 Mar. 2009).
26. Murrell, T.S. 2006. 2005 corn and soybean nutrient harvest in the Northcentral region. *Agri-Briefs*, Summer 2006, No. 4. Available at [http://www.ppi-far.org/ppiweb/agbrief.nsf/\\$webcontents](http://www.ppi-far.org/ppiweb/agbrief.nsf/$webcontents) (verified 4 Dec. 2006).

27. Murrell, T.S. 2007. Biofuels' potential impact on nutrient use in the U.S. *Plant Nutr. Today*. Summer 2007, No. 4. Available at <http://www.ipni.net/pnt> (verified 11 Mar. 2009).
28. Murrell, T.S. 2007. Starter fertilizer: Considerations for corn following corn. *Plant Nutr. Today*. Winter 2007, No. 4. Available at <http://www.ipni.net/pnt> (verified 11 Mar. 2009).
29. Murrell, T.S. 2007. The 2006 corn and soybean harvest in the Northcentral region. *Plant Nutr. Today*. Spring 2007. International Plant Nutrition Institute, Norcross, GA.
30. Murrell, T.S. 2007. The delta yield concept: An update. *Better Crops* 91(3):20-21. Available online at <http://www.ipni.net/bettercrops> (verified 13 Mar. 2009).
31. Murrell, T.S. 2006. Coordinate for success. *Agri-Briefs*, Fall 2006, No. 4. Available at [http://www.ppi-far.org/ppiweb/agbrief.nsf/\\$webcontents](http://www.ppi-far.org/ppiweb/agbrief.nsf/$webcontents) (verified 4 Dec. 2006).
32. Murrell, T.S. 2006. Fertilizer nitrogen BMPs for corn in the Northcentral region. *Better Crops* 90(2):16-18. Available at <http://www.ppi-ppic.org/bettercrops> (verified 4 Dec. 2006).
33. Murrell, T.S. 2006. Northcentral soil test summary: Changes in phosphorus and potassium. *Better Crops* 90(1):14-15.
34. Murrell, T.S. 2006. Rooting for starter fertilizer. *Agri-Briefs*, Spring 2006, No. 4. Available at [http://www.ppi-far.org/ppiweb/agbrief.nsf/\\$webcontents](http://www.ppi-far.org/ppiweb/agbrief.nsf/$webcontents) (verified 4 Dec. 2006).
35. Murrell, T.S. 2006. The highs and lows of soil test potassium variability. *Agri-Briefs*, Winter 2006-7, No. 4. Available at [http://www.ppi-far.org/ppiweb/agbrief.nsf/\\$webcontents](http://www.ppi-far.org/ppiweb/agbrief.nsf/$webcontents) (verified 4 Dec. 2006).
36. Murrell, T.S. 2005. Average nutrient removal rates for crops in the Northcentral region. International Plant Nutrition Institute. Available online at <http://www.ipni.net/northcentral/nutrientremoval> (verified 12 Mar. 2009).
37. Murrell, T.S. 2005. High fertilizer prices: What do I do? *Agri-Briefs*, Winter 2005-6, No. 4. Available at [http://www.ppi-far.org/ppiweb/agbrief.nsf/\\$webcontents](http://www.ppi-far.org/ppiweb/agbrief.nsf/$webcontents) (verified 4 Dec. 2006).
38. Murrell, T.S. 2005. High fertilizer prices: What do I do? *News & Views* Sep. 2005. Available at <http://www.ppi-ppic.org/news> (verified 4 Dec. 2006).
39. Murrell, T.S. 2005. Northcentral phosphorus and potassium research funded by the foundation for agronomic research (FAR). *News & Views* Jul. 2005. Available at <http://www.ppi-ppic.org/news> (verified 4 Dec. 2006).
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41. Murrell, T.S. 2005. Record yields mean record nutrient removal in corn-soybean rotations. *Agri-Briefs*, Spring 2005, No. 4. Available at [http://www.ppi-far.org/ppiweb/agbrief.nsf/\\$webcontents](http://www.ppi-far.org/ppiweb/agbrief.nsf/$webcontents) (verified 4 Dec. 2006).
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43. Murrell, T.S. 2005. When scouting for rust, keep an eye on nutrients, too. Agri-Briefs, Summer 2005, No. 4. Available at [http://www.ppi-far.org/ppiweb/agbrief.nsf/\\$webcontents](http://www.ppi-far.org/ppiweb/agbrief.nsf/$webcontents) (verified 4 Dec. 2006).
44. Murrell, T.S. 2004. Early growth of corn – is it important? Agri-Briefs, Summer 2004, No. 4. Available at [http://www.ppi-far.org/ppiweb/agbrief.nsf/\\$webcontents](http://www.ppi-far.org/ppiweb/agbrief.nsf/$webcontents) (verified 4 Dec. 2006).
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46. Murrell, T.S. 2004. How important is fertilization when soils test “medium”? [Online]. Available at <http://www.ppi-ppic.org/fallfertilization> (verified 4 Dec. 2006).
47. Murrell, T.S. 2004. Northcentral phosphorus and potassium research funded by the foundation for agronomic research (FAR). News & Views Oct. 2004. Available at <http://www.ppi-ppic.org/news> (verified 4 Dec. 2006).
48. Murrell, T.S. 2004. Potassium deficiency: Listening to your ears of corn. Agri-Briefs, Fall 2004, No. 4. Available at [http://www.ppi-far.org/ppiweb/agbrief.nsf/\\$webcontents](http://www.ppi-far.org/ppiweb/agbrief.nsf/$webcontents) (verified 4 Dec. 2006).
49. Murrell, T.S. 2004. The growing potassium problem. Agri-Briefs, Spring 2004, No. 4. Available at [http://www.ppi-far.org/ppiweb/agbrief.nsf/\\$webcontents](http://www.ppi-far.org/ppiweb/agbrief.nsf/$webcontents) (verified 4 Dec. 2006).
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51. Murrell, T.S. 2003. Can your local fertilization programs be improved? Agri-Briefs, Fall 2003, No. 4. Available at [http://www.ppi-far.org/ppiweb/agbrief.nsf/\\$webcontents](http://www.ppi-far.org/ppiweb/agbrief.nsf/$webcontents) (verified 4 Dec. 2006).
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