

CURRICULUM VITAE

Antonio P. Mallarino

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Education

- Ph.D. Crop Production and Physiology, Iowa State University, 1988.
- M.S. Soil Fertility, and Crop Production and Physiology; Iowa State University, 1981.
- B.S. Agronomy and Animal Science, University of Uruguay, 1975.

Employment

- 2003-present. Professor, Soil Fertility. Agronomy Dep., Iowa State University.
- 1998-2002. Associate Professor, Soil Fertility. Agronomy Dep., Iowa State University.
- 1993-1997. Assistant Professor, Soil Fertility. Agronomy Dep., Iowa State University.
- 1989-1990. Postdoctoral Research Associate, Soil Fertility. Agronomy Dep., Iowa State Univ.
- 1991-1992. Assistant Scientist II (1992), Soil Fertility. Agronomy Dep., Iowa State University.
- 1981-1988. Associate Professor, Soil Fertility. Dep. of Soils, University of Uruguay.
- 1976-1980. Assistant Professor, Soil Fertility. Dep. of Soils, University of Uruguay.
- 1974-1975. Instructor (½ time). Dep. of Soils, Univ. of Uruguay.

Summary of Responsibilities at Iowa State University

1. Research: The research program focuses on developing more cost-effective and environmentally sound nutrient management practices for cropping systems, better diagnostic tools to assess the nutrient (mainly P and K) status in soils managed with conservation tillage and soils receiving animal manures, and to adapt precision agriculture technologies for soil fertility and crop management. Projects have focused on soil testing and plant analysis for P and K; P testing and management in relation to P loss to water resources (including developing environmental P assessment tools such as the P index); utilization of manure P and soil testing for manured fields; starter, P, and K fertilization of corn and soybean managed with various tillage systems; and N fixation and transfer by forages legumes. The field research program emphasizes on-farm research in cooperation with producers, agribusiness, and extension agronomists.
2. Extension: The extension activities involve training of field crops extension specialists, supporting state-wide extension programs related to crop production and environmental nutrient management issues (including several projects of the agribusiness education program and continuing education programs), co-responsibility in developing P and K fertilizer recommendations, and co-responsibility for teaching Continuing Education Soil Fertility courses. The areas of contribution mainly are related to soil testing and plant analysis, P, K, and starters management, precision agriculture technologies for soil fertility management, and P environmental issues. The activities include presentations to agronomists, producers,

agribusiness, and the general public; preparation of extension bulletins and brochures; teaching continuing education short-courses; and conducting on-farm demonstrations.

3. Teaching: The position has no formal teaching assignment other than graduate student training, but a significant effort is being developed. The effort involves contributing to the Master of Science in Agronomy Long Distance Program, resident teaching in areas of expertise described above, and continuing education short courses. Contributions to campus-based courses have included regular or occasional lectures at the courses Precision Farming Systems (Agricultural Systems Technologies 333), Soil Fertility (Agronomy 354), Agronomic Applications of Precision Agriculture (Agronomy 493A), Systems Analysis in Crop and Soil Management (Agronomy 392), and Soil-Plant Relationships (Agronomy 553). Contributions to the Master of Science in Agronomy Long Distance Program include responsibility for various lessons of the course Soil-Plant Environment (Agronomy 512) and Soil Management (Agronomy 532). The major contribution to continuing education has involved a Soil Fertility short course.

4. International: International activities have involved two areas: (a) Outreach projects with various organizations in South America (mainly in Argentina and Uruguay) which include invited presentations and tours related to improving soil fertility management for sustainable agriculture or precision agriculture. (b) Presentations to visitors (producers, scientists, or administrators mainly from Spanish-speaking countries) on areas related to Iowa agriculture and soil fertility research programs.

5. Service to the University or the State of Iowa: Service responsibilities have involved four major areas. (a) Supervision of the Iowa State University Soil Testing and Plant Analysis Laboratory from September 1993 to 1996, and Chair of its Advisory Committee since 1997. (b) Representing Iowa State University at two CSREES committees. One is the NCR-13 (North-Central Committee for Soil Testing and Plant Analysis) committee, in which served as Chair during the 1997-1998 period. The other is the SERA-17/IEG (Minimizing Phosphorus Losses from Agriculture / Information Exchange group) committee. (c) Member of four issue committees at departmental and College of Agriculture levels. (d) Served as advisor scientist of the Iowa State Technical Committee, the Iowa Natural resources Conservation Service, and the Iowa Department of Natural Resources in relation to agronomic and environmental manure and P management guidelines and regulations

Professional Activities and Memberships

- International Scholar Fellow (1986), World Food Institute, Iowa State University.
- C.R. Weber Award for Excellence in Plant Science (1987), Iowa State University.
- Award for Excellence in Graduate Research (1988), Iowa State University.
- Iowa State University Representative, North-Central Region Committee for Soil Testing and Plant Analysis (NCR-13) since 1994. Chair for the period 1997-1998.
- Iowa State University Representative, SERA-17/IEG Minimizing Phosphorus Losses from Agriculture Committee since 2000.
- Extension Award, Iowa State University - Cooperative Extension Service, 1999.
- Associate Editor, Soil Science Society of America Journal, since 1999.

- Associate Editor, Agronomy Journal, since 2000.
- Participant, Agrilience - Farmland nutrient management advisory board, since 1999.
- Participant, Growmark's Nutrient Management Marcell Conference Group, since 2001.
- Member, American Society of Agronomy, Soil Science Society of America.
- Member, Gamma Sigma Delta (Honor Society for Agriculture), Phi Kappa Phi (Honor Society for Science), and Sigma Xi (Honor Society for Scientific Research).

Awards and Recognitions

- C.R. Weber Award for Excellence in Plant Science, Iowa State University, 1987.
- Award for Excellence in Graduate Research, Iowa State University, 1988.
- Extension Award, Iowa State University - Cooperative Extension Service, 1999.
- American Soc. of Agron. W.L. Nelson Award for Diagnosis of Yield-Limiting Factors, 2003.
- USDA/ARS Secretary Group Award (for contributions to P index development), 2003.
- Certificate of Appreciation, Iowa State University Extension, 2003.
- USDA/ARS Secretary Group Award (for contributions to technology transfer), 2004.
- Raymond Baker Award (for contributions to study of P environmental issues), 2004.

Graduate Students and Postdoctoral Research Associates

- In 2003, seven graduate students (three M.S. and four Ph.D.) and one Postdoctoral Research Associate are developing programs.
- Twelve students have graduated since 1995.
- Three postdoctoral research associates have developed research projects since 1998.

Invited presentations at regional, national, and international conferences

1. Regional or national research or extension symposia or conferences.

- 2003. ASA Annual Meetings. Management Zones Sampling Symposium. Comparing zone sampling approaches with crop response to phosphorus and potassium fertilization.
- 2003. Four-State Soil Testing Workshop. Soil test interpretations for ammonium acetate and Mehlich-3 extractable potassium and Mehlich-3 ICP phosphorus. Dubuque, IA. North-Central Regional Soil and Plant Analysis Committee (NCR-13).
- 2002. ASA Annual Meetings. Policy and Nutrient Management Symposium. Using variable-rate technology and the p index for agronomic and environmental phosphorus management at a field level.
- 2002. National No-Till Conference. Starter Fertilization for No-Till Corn. Indianapolis, IN.
- 2001. ASA Annual Meetings. Facilitated Training on Nutrient Management Symposium. Phosphorus Indexing for Cropland: The Iowa phosphorus index (with Barbara Stewart, NRCS).
- 2001. ASA Annual Meetings. Soil Potassium Symposium. Placement and soil testing options to address emerging potassium deficiencies.
- 2001. Four-State Soil Testing Workshop. Cost-effective use of intensive soil sampling and variable-rate fertilization. Dubuque, IA. North-Central Regional Soil and Plant Analysis Committee (NCR-13).
- 2001. Indiana CCA Convention. Review of Potassium Nutrition and Revision of Potassium

- Recommendations. Indiana Certified Crop Advisor Program. November 27. Indianapolis.
- 2001. Phosphorus, Manure, and Water Quality Conference. Understanding the Iowa phosphorus index. Sioux Falls, SD.
 - 2001. North Central Extension-Industry Soil Fertility Conference. Corn and Soybean responses to potassium fertilization and placement. Des Moines, IA.
 - 2001. North-Central Region Soil and Plant Analyst Workshop. Using Precision Ag Technologies for Soil Test Calibration Research. Des Moines, IA. North-Central Regional Soil and Plant Analysis Committee (NCR-13).
 - 2001. Soil and Water Conservation Society annual meetings. Facilitated Training on Nutrient Management Symposium. Phosphorus indexing for cropland: The Iowa phosphorus index (with Barbara Stewart, NRCS). Myrtle Beach, SC.
 - 2000. ASA Annual Meetings symposium. Success in Soil Testing. Successful use of correlation and calibration research produces improved P and K recommendations for conservation tillage systems (with G.W. Rehm, University of Minnesota).
 - 2000. ASA Annual Meetings. The State of Soil Sampling Systems in Precision Farming Symposium. The evolution of precision soil sampling systems in the Upper Midwest (with Dr. John Lamb, University of Minnesota).
 - 2000. ASA North Central Branch meetings. Agronomic and Environmental Phosphorus Management Symposium. Soil phosphorus chemistry and interpreting soil test phosphorus for agronomic and environmental purposes.
 - 2000. Four-State Soil Testing Workshop. Economics of variable rate fertilization and liming. Dubuque, IA. North-Central Regional Soil and Plant Analysis Committee (NCR-13).
 - 2000. Four-State Soil Testing Workshop. Comparisons of soil test recommendations for the north central region. With Drs. Keith Kelling (Wisconsin), Robert Hoeft, Illinois, and George Rehm (Minnesota). Dubuque, IA. North-Central Regional Soil and Plant Analysis Committee (NCR-13).
 - 2000. Minnesota Extension Annual Crop-Pest Management Short Course. The Iowa phosphorus index: Concepts and implications. St. Paul, MN.
 - 2000. National No-Till Conference. Fertilizer placement for no-till corn and soybeans. Des Moines, IA
 - 1999. ASA Annual Meetings. Testing for Phosphorus: Agronomic and Environmental Considerations Symposium. Routine and bioavailable soil phosphorus testing for agronomic recommendations.
 - 1999. Four-State Soil Testing Workshop. Cost-effective use of intensive soil sampling and variable-rate fertilization. Dubuque, IA. North-Central Regional Soil and Plant Analysis Committee (NCR-13).
 - 1998. North Central Extension-Industry Soil Fertility Conference. Foliar fertilization of soybeans. St. Louis, MO.
 - 1998. North Central Region Soil and Plant Analyst Workshop. Soil test interpretations of Mehlich-3 P and K for corn. St. Louis, MO.
 - 1998. ASA Annual Meetings Special Workshop. Mallarino, A.P. The Olsen, Bray-1, and Mehlich-3 P tests: Correlations and field calibration for corn in Iowa soils.
 - 1998. Midwest Soybean Conference. What is new in phosphorus and potassium management for soybeans and its impact on water quality. Davenport, IA.

- 1998. Minnesota Extension Annual Crop-Pest Management Short Course. Manure phosphorus in soils: how should we approach upper limits? St. Paul, MN.
- 1996. Midwest Soybean Conference. Phosphorus and potassium fertilization of corn and soybean. Des Moines, IA.

2. International conferences.

- 2003. National No-Till Congress (Argentina). Phosphorus and potassium management for no-till corn and soybean production. August 27-29. Rosario, Argentina.
- 2003. Soil Fertility Conference (Argentina). Phosphorus, potassium, and starter fertilization management for crop production. August 25. Bahia Blanca, Argentina.
- 2001. Special Seminar and Conference on Soil Fertility Management (Argentina). Phosphorus and potassium management for corn and soybean. Conferences and field tours organized by the South American branch of the Potash and Phosphate Institute and the Regional Consortiums for Agricultural Research. July 2-4. Balcarce and America, Argentina.
- 2001. InfoAg Conference (Argentina). Phosphorus and potassium management: recent advances in the Corn Belt. Potash and Phosphate Institute (South America). July 6, 2001. Rosario, Argentina.
- 2001. InfoAg Conference (Argentina). Soil Fertility site-specific management. Potash and Phosphate Institute (South America). July 6, 2001. Rosario, Argentina.
- 2001. Soil Fertility Management Conference and Tours. Phosphorus and potassium management for corn and soybean. Pioneer Hi-Bred International (Argentina). April 1-8. Tres Arroyos, Argentina.
- 2001. Soil Fertility Management Conference and Tours. Soil Fertility management with precision agriculture technologies. Pioneer Hi-Bred International (Argentina). April 1-8. Tres Arroyos, Argentina.
- 2000. Agoinformatica conference on Precision Agriculture. Nutrient management with precision agriculture technologies. La Dulce, Argentina.
- 2000. Special Seminar. Nutrient management with precision agriculture technologies. University of Uruguay, Montevideo.
- 1999. World Soybean Research Conference VI. Phosphorus and potassium management for cost-effective soybean production. Chicago, IL.
- 1998. 6th National No-Till Conference. Phosphorus, potassium and starters for no-till corn and soybean. Mar del Plata, Argentina.
- 1998. Special Seminars Series. Nitrogen and phosphorus management for corn and soybeans and use of precision agriculture technologies for nutrient management. , Pioneer Hi-Bred International (Argentina). Alberdi, Parana, Salta, and Tandil; Argentina.
- 1997. 5th National No-Till Conference. Methods of phosphorus and potassium placement for no-till corn and soybean: Recent advances in the U.S. Corn Belt. Mar del Plata, Argentina.

Publications. (Note: asterisks identify Mallarino graduate students and research associates).

1. Refereed journal articles.

- Bermudez, M.*, and A.P. Mallarino. In press. Corn response to starter fertilizer and tillage across and within fields having no-till management histories. *Agron. J.*
- Mallarino, A.P., and D.J. Wittry*. In press. Efficacy of grid and zone soil sampling approaches for site-specific assessment of phosphorus, potassium, pH, and organic matter. *Precision Agric.*
- Hansen, D.J., A.M. Blackmer, A.P. Mallarino, and M.A. Wuebker. 2004. Performance-based evaluations of guidelines for nitrogen fertilizer application after animal manure. *Agron. J.* 2004 96:34-41.
- Wittry, D.J.*, and A.P. Mallarino. 2004. Comparison of uniform- and variable-rate phosphorus fertilization for corn-soybean rotations. *Agron. J.* 96:26-33.
- Borges, R.*, and A.P. Mallarino. Broadcast and deep-band placement of phosphorus and potassium for soybean managed with ridge tillage. *Soil Sci. Soc. Am. J.* 67:1920-1927.
- Klatt, J.G.*, A.P. Mallarino, J.A. Downing, J.A. Kopaska, and D.J. Wittry*. 2003. Soil phosphorus, management practices, and their relationship to phosphorus delivery in the Iowa Clear Lake agricultural watershed. *J. Env. Qual.* 32: 2140-2149.
- Mallarino, A.P. 2003. Field calibration for corn of the Mehlich-3 soil phosphorus test with colorimetric and inductively-coupled plasma emission spectroscopy determination methods. *Soil Sci. Soc. Am. J.* 67:1928-1934.
- Balkcom, K.S., A.M. Blackmer, D.J. Hansen, T.F. Morris, and A.P. Mallarino. 2003. Evaluating nitrogen management practices in Corn Belt watersheds. *J. Env. Qual.* 32:1015-1024.
- Atia, A.M.*, and A.P. Mallarino. 2002. Agronomic and environmental phosphorus testing for soils receiving swine manure. *Soil Sci. Soc. Am. J.* 66:1696-1705.
- Bermudez, M.*, and A.P. Mallarino. 2002. Yield and early growth responses to starter fertilizer in no-till corn. *Agron. J.* 94:1024-1033.
- Bianchini, A.A.*, and A.P. Mallarino. 2002. Soil sampling alternatives and variable-rate liming for a soybean-corn rotation. *Agron. J.* 94:1355-1366.
- Mallarino, A.P., B.M. Stewart, J.L. Baker, J.A. Downing, and J.E. Sawyer. 2002. Phosphorus indexing for cropland: Overview and basic concepts of the Iowa phosphorus index. *J. Soil Water Conserv.* 57:440-447.
- Borges, R.*, and A.P. Mallarino. 2001. Deep banding phosphorus and potassium fertilizers for corn produced under ridge tillage. *Soil Sci. Soc. Am. J.* 65:376-384.
- Mallarino, A.P., M. U. Haq*, D.J. Wittry*, and M. Bermudez*. 2001. Variation in soybean response to early-season foliar fertilization among and within fields. *Agron. J.* 93:1220-1226.
- Borges, R.*, and A.P. Mallarino. 2000. Grain yield, early growth, and nutrient uptake of no-till soybean as affected by the phosphorus and potassium placement. *Agron. J.* 92:380-388.
- Haq, M.U.*, and A.P. Mallarino. 2000. Soybean yield and nutrient composition as affected by early season foliar fertilization. *Agron. J.* 92:16-24.
- Mallarino, A.P., J.M. Bordoli*, and R. Borges*. 1999. Phosphorus and potassium placement effects on early growth and nutrient uptake of no-till corn and relationships with grain

- yield. *Agron. J.* 91:37-45.
- Mallarino, A.P., E.S. Oyarzabal, and P.N. Hinz. 1999. Interpreting within-field relationships between crop yields and soil and plant variables using factor analysis. *Precision Agric.* 1:15-26.
- Bordoli, J.M.*, and A.P. Mallarino. 1998. Deep and shallow banding of phosphorus and potassium as alternatives to broadcast fertilization for no-till corn. *Agron. J.* 90:27-33.
- Borges, R.*, and A.P. Mallarino. 1998. Significance of spatially variable soil phosphorus and potassium for early growth and nutrient content of no-till corn and soybean. *Commun. Soil Sci. Plant Anal.* 29:2589-2605.
- Haq, M.U.*, and A.P. Mallarino. 1998. Foliar fertilization of soybean at early vegetative stages. *Agron. J.* 90:763-769.
- Borges, R.*, and A.P. Mallarino. 1997. Field-scale variability of phosphorus and potassium uptake by corn and soybean. *Soil Sci. Soc. Am. J.* 61:846-853.
- Mallarino, A.P. 1997. Interpretation of soil phosphorus tests for corn in soils with varying pH and calcium carbonate content. *J. Prod. Agric.* 10:163-167.
- Mallarino, A.P. and M.U. Haq*. 1997. Topsoil and subsoil potassium as affected by long-term potassium fertilization of corn-soybean rotations. *Commun. Soil Sci. Plant Anal.* 28:1537-1547.
- Mallarino, A.P. 1996. Evaluation of optimum and above-optimum phosphorus supply for corn by analysis of young plants, leaves, stalks, and grain. *Agron. J.* 88:376-380.
- Mallarino, A.P. 1996. Spatial variability patterns of phosphorus and potassium in no-tilled soils for two sampling scales. *Soil Sci. Soc. Am. J.* 60:1473-1481.
- Mallarino, A.P. 1995. Evaluation of excess soil phosphorus supply for corn by the ear-leaf test. *Agron. J.* 87:687-691.
- Mallarino, A.P., and J.R. Webb. 1995. Long-term evaluation of phosphorus and zinc interactions in corn. *J. Prod. Agric.* 8:52-55.
- Mallarino, A.P., and A.M. Blackmer. 1994. Profit-maximizing critical values of soil-test potassium for corn. *J. Prod. Agric.* 7:261-268.
- Mallarino, A.P., and A.M. Blackmer. 1992. Comparison of methods for determining critical concentrations of soil test phosphorus for corn. *Agron. J.* 84:850-856.
- Webb, J.R., A.P. Mallarino, and A.M. Blackmer. 1992. Effects of residual and annually applied phosphorus on soil test values and yields of corn and soybean. *J. Prod. Agric.* 5:148-152.
- Farnham, D.E., A.P. Mallarino, W.F. Wedin, and I.T. Carlson. 1991. Comparison of dinitrogen fixation and nitrogen transfer potentials of four red clover cultivars. *J. Iowa Academ. Sci.* 98:162-166.
- Mallarino, A.P., J.R. Webb, and A.M. Blackmer. 1991. Corn and soybean yields during 11 years of phosphorus and potassium fertilization on a high-testing soil. *J. Prod. Agric.* 4:312-317.
- Mallarino, A.P., J.R. Webb, and A.M. Blackmer. 1991. Soil test values and grain yields during 14 years of potassium fertilization of corn and soybean. *J. Prod. Agric.* 4:560-566.
- Mallarino, A.P., and W.F. Wedin. 1990. Effects of species and proportion of legume on herbage yield and nitrogen concentration of legume-grass mixtures. *Grass Forage Sci.* 45:393-402.
- Mallarino, A.P., and W.F. Wedin. 1990. Nitrogen fertilization effects on dinitrogen fixation as

- influenced by legume species and proportion in legume-grass mixtures in Uruguay. *Plant Soil* 124:127-135.
- Mallarino, A.P., and W.F. Wedin. 1990. Seasonal distribution of topsoil ammonium and nitrate under legume-grass and grass swards. *Plant Soil* 124:137-140.
- Mallarino, A.P., W.F. Wedin, R.S. Goyenola, C.H. Perdomo, and C.P. West. 1990. Legume species and proportion effects on dinitrogen fixation of legume-grass mixtures. *Agron. J.* 82:785-789.
- Mallarino, A.P., W.F. Wedin, C.H. Perdomo, R.S. Goyenola, and C.P. West. 1990. Nitrogen transfer from white clover, red clover, and birdsfoot trefoil to associated grass. *Agron. J.* 82:790-795.
- West, C.P., A.P. Mallarino, W.F. Wedin, and D.B. Marx. 1989. Spatial variability of soil chemical properties in grazed pastures. *Soil Sci. Soc. Am. J.* 53:784-789.
- Mallarino, A.P., W.F. Wedin, R.D. Voss, and C.P. West. 1983. Phosphorus requirements of alfalfa-smooth bromegrass-orchardgrass and reed canarygrass pastures under two grazing intensities. *Agron. J.* 75:291-294.

2. Book chapters and issue papers.

- Mallarino, A.P., and J.S. Schepers. In press. Role of precision farming in phosphorus management practices. *In Phosphorus: Agriculture and the Environment*. ASA, CSSA, SSSAJ, Madison, WI.
- Kamprath, E.G., D.B. Beegle, P.E. Fixen, S.C. Hodges, B.C. Joern, A.P. Mallarino, R.O. Miller, J.T. Simms, R. Ward, and A.M. Wolf. 2000. Relevance of soil testing to agriculture and the environment. CAST Issue Paper 15. Council Agric. Sci. Tech. Ames, IA.
- Gelderman, R.H., and A.P. Mallarino. 1998. Soil sample preparation. *In J. Brown (ed.) Recommended chemical soil test procedures for the North-Central Region*. North-Central Regional Publ. No. 221 (Rev.). Missouri Agric. Exp. Station. Columbia. MO.
- Karlen, D.L., J.R. Russell, and A.P. Mallarino. 1997. A systems engineering approach for utilizing animal manure. *In J.L. Hatfield and B.A. Stewart (ed.) Animal waste utilization*. Ann Arbor Press. Chelsea. MI.

3. Non-refereed research articles and technical reports.

- Mallarino, A.P. 2004. Mehlich-3 Phosphorus Analysis: Colorimetric and ICP. *In Proceedings. 17th Soil/Plant Analyst Workshop*. NCR-13 CSREES Regional Committee. 24-25 Feb. 2004. West Des Moines, Iowa.
- Baker, J.L., A.P. Mallarino, and B.M. Stewart. 2003. The Iowa phosphorus index: major concepts and implications for phosphorus management. *In Proceedings. AWRA 2003 Spring Specialty Conf.* May 12-14. Kansas City, MO.
- Kaiser, D.E.*, A.P. Mallarino, and M. Bermudez*. 2003. In-furrow starter and broadcast phosphorus and potassium fertilization for corn. p. 186-189. *In North-Central Extension-Industry Soil Fertility Conf. Proceedings*. Vol. 19. Des Moines, IA.
- Lore, J.F., J.L. Baker, A.P. Mallarino, and S.W. Melvin. 2003. Phosphorus leaching and potential loss with artificial subsurface drainage. *In Proceedings. AWRA 2003 Spring Specialty Conf.* May 12-14. Kansas City, MO.
- Lore, J.F., J.L. Baker, A.P. Mallarino, and S.W. Melvin. 2003. Phosphorus movement through

- subsoils to tile drains. Paper no. 032317. ASAE Annual Intl. Meeting. July 27-30, 2003. Las Vegas, NV.
- Mallarino, A.P., D.J. Wittry, and P.A. Barbagelata. 2003. New soil test interpretation classes for potassium. *Better Crops Plant Food* 87:12-14.
- Pederson, C.H., R.S. Kanwar, J.E. Sawyer, A.P. Mallarino, and J.L. Baker. 2003. Impact of swine manure applications on phosphorus, NO₃-N, bacteria concentrations in surface runoff and subsurface drainage water. *In Proceedings. AWRA 2003 Spring Specialty Conf.* May 12-14. Kansas City, MO.
- Klatt, J.G.*, A.P. Mallarino, and B.L. Allen*. 2002. Relationships between soil phosphorus and phosphorus in surface runoff and subsurface drainage. An overview of ongoing research. p. 183-189. *In North-Central Extension-Industry Soil Fertility Conf. Proceedings.* Vol. 18. Des Moines, IA.
- Kanwar, R., C. Pederson, J. Baker, A.P. Mallarino, J. Sawyer, and K. Pecinovsky. 2002. Fertilizer and swine manure management systems: Impacts on crop production and nitrate-nitrogen leaching with subsurface drainage. Annual Report. Northeast Research and Demonstration farm. ISRF02-13. <http://www.ag.iastate.edu/farms/reports.html>. Iowa State Univ., Ames, IA.
- Mallarino, A.P., and D. Rueber. 2002. Long-term evaluation of nitrogen, phosphorus, potassium, and lime requirements of continuous corn. Annual Report. Northern Research and Demonstration farm. ISRF02-22. Iowa State Univ., Ames, IA.
- Mallarino, A.P., J. Sawyer, J. Klatt, R. Kanwar, C. Pederson, J. Baker, and K. Pecinovsky. 2002. Fertilizer and swine manure management systems: impacts on agronomic and environmental soil phosphorus tests and on phosphorus loss with subsurface drainage. Annual Report. Northeast Research and Demonstration farm. ISRF02-13. <http://www.ag.iastate.edu/farms/reports.html>. Iowa State Univ., Ames, IA.
- Mallarino, A.P., and K. Van Dee. 2002. Phosphorus and potassium placement for corn and soybeans managed with no-till and chisel-plow tillage. Annual Report. Northwest Research and Demonstration farm. ISRF02-34. <http://www.ag.iastate.edu/farms/reports.html>. Iowa State Univ., Ames, IA.
- Mallarino, A.P., D.J. Wittry*, and P.A. Barbagelata*. 2002. Iowa soil-test field calibration research update: Potassium and the Mehlich-3 ICP phosphorus test. p. 29-39. *In North-Central Extension-Industry Soil Fertility Conf. Proceedings.* Vol. 17. Des Moines, IA.
- Wittry, D.J.*, and A.P. Mallarino. 2002. Use of variable-rate technology for agronomic and environmental phosphorus-based liquid swine manure management. *In P.C. Robert et al. (ed.). Sixth Intl. Conf. on Site-Specific Management for Agricultural Systems. Proceedings.* CD-ROM. July 14-17. Minneapolis, MN. ASA, CSSA, SSSA, Madison, WI.
- Baker, J.L., J.M. Laflen, A.P. Mallarino, and B.M. Stewart. 2001. Developing a phosphorus index using WEPP. p. 79-82. *In Proc. Intl. Symposium on Soil Erosion Research for the 21st Century.* Honolulu, HI. Jan. 3-5, 2001. ASAE, St. Joseph, MI.
- Mallarino, A.P. 2001. Fertilizer management for corn and soybeans in the United States Midwest. p. 1-5. *In Proceedings, Fertility 2001. Technical Update for Professionals.* INPOFOS Cono Sur. Potash and Phosphate Institute, Norcross, GA.
- Mallarino, A.P. 2001. Phosphorus management for the corn-soybean rotation. p. 20-21. *In Iowa Soybean Review.* Summer 2001. Iowa Soybean Association, Urbandale, IA.

- Mallarino, A.P. 2001. Site-specific nutrient management. p. 6-9. *In* Proceedings, Fertility 2001. Technical Update for Professionals. INPOFOS Cono Sur. Potash and Phosphate Institute, Norcross, GA.
- Mallarino, A.P., and K. Pecinovsky. 2001. Effects of crop rotation and nitrogen fertilization on crop production. Annual report. Northeast research and demonstration farm. ISRF01-13. Iowa State Univ., Ames, IA.
- Mallarino, A.P., and D. Rueber. 2001. Impacts of crop rotation and nitrogen fertilization on crop production. Annual report. Northeast Research and Demonstration farm. ISRF01-22. Iowa State Univ., Ames, IA.
- Mallarino, A.P., R. Borges*, and D. Wittry*. 2001. Corn and soybean response to potassium fertilization and placement. p. 5-11. *In* North-Central Extension-Industry Soil Fertility Conf. Proceedings. Vol. 16. Des Moines, IA.
- Mallarino, A.P., B.M. Stewart, J.L. Baker, J.A. Downing, and J.E. Sawyer. 2001. Background and basic concepts of the Iowa phosphorus index. A support document to the NRCS Field Office Tech. Note 25. p. 63-71. *In* Agriculture and the Environment: State and Federal Water Initiatives. Proceedings. March 5-7, 2001. Iowa State Univ. Ames, IA.
- Rehm, G.W., A. Mallarino, K. Reid, D. Franzen, and J. Lamb. 2001. Soil sampling for variable-rate fertilizer and lime application. North-Central Multistate Report 348 - NCR-13 Committee. Minnesota Agricultural Experiment Station Bull. 608-2001. University of Minnesota, St. Paul, MN.
- Mallarino, A.P., and M.U. Haq*. 2000. What about foliar fertilization of soybeans? Fluid J. 8:8-11.
- Mallarino, A.P., and K. Pecinovsky. 2000. Phosphorus and potassium fertilization of corn and soybeans managed with no-till and chisel-plow tillage. p. 7-8. *In* Annual report. Northeast research and demonstration farm. ISRF00-13. Iowa State Univ., Ames, IA.
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