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Education

B.S., Soil Science, Natural Resources, University of Wisconsin, Madison, WI, 1976.
M.S., Soil Fertility, University of Idaho, Moscow, Idaho, 1984 MS. Thesis title: The influence of N source and rate on strawberry production.
Ph.D., Soil Biogeochemistry, University of Minnesota, St. Paul, 1988. Dissertation title: Nitrogen, tillage, and residue management influence on microbial activity and corn production.
Post Doc., Water Quality Center, University of Minnesota, St. Paul, 1988-1990.,
Lead21 Leadership training, 2010

Experience, Responsibilities, and Leadership

2017-2020 Editor for Agronomy Journal, First South Dakota Editor in American Society of Agronomy premier journal. This Journal is over 100 years old.
2016-18 SDSU Faculty Senate,
2001-pres. Professor Plant Science, 90% research and 10% teaching, SDSU, Brookings, SD,

Awards and Accomplishments

- 2016, Paper of the year, Smart, A.J., L.B. Perkins, T.N. Schramm, M.J. Nelson, P.J. Bauman, S.A. Clay, and D.E. Clay. 2016. The effects of patch-burn grazing on vegetation structural heterogeneity in the northern tallgrass prairie of South Dakota. *Great Plains Research* 26:57-70.
- Co-author of one of the Top-cited (12 citations #4) and top down-loaded (1028 #7) papers from 2014-2016 for ASA publications.
- Served on over 13 federal grant review panels,
- 2016 awarded the ASA Precision Agriculture Systems Impact Award, from the American Society of Agronomy, Precision Agricultural Systems community,
- 2016 selected for SDSU Faculty Senate,
- 2016, ASA Excellence for publication > 16 pages, Midwest Cover Crop Field Guide. 2nd Edition.
- 2016, Clay, D.E., G. Reicks, J. Chang, T. Kharel, and S.A.H. Bruggeman. 2016. Assessing a fertilizer program: Short and long-term approaches. *In* A. Chatterjee and D. Clay (eds), *Soil Fertility Management in Agroecosystems*. ASA/Crop Science/SSSA digital library, Madison WI, used to develop a certified crop consultant training guide.
- 2015, *AJ* 107:2363-2372 selected to be highlighted in the tri societies *Crops and Soils Magazine*,
- Published over 250 referred papers and book chapters,
- Served as editor or author on 15 books,
- 137 funded grants providing over 30 million dollars, since 2012, 26 grants providing over 6.6 million dollars in support;
- 2015, elected to the Chairman SDSU Plant Science Promotion and Tenure Committee,
- 2014 elected Chairperson American Society of Agronomy Finance Committee,

- 2014 recipient of the SDSU College of Agriculture and Biological Sciences Outstanding Researcher Award,
- ASA selected Chang et al. (2014) for a CEU self study that was published in the Crop and Soil Magazine.
- 2013 ASA Precision Agriculture Systems Impact Award, from the American Society of Agronomy, Precision Agricultural Systems community.
- Graduate student (T.P. Kharel) 2nd place winner at the 2013 S4-S8 SSSA Graduate Student Poster Competition.
- Awarded the Weed Science Society Paper of the Year in 2012,
- Represented ASA at Climate Day (Washington SD, Feb 26-27, 2013)
- The South Dakota iGrow Wheat Best Management Practices for Wheat Production was awarded a certificate of Excellence for Extension Material >15 pages by the American Society of Agronomy, (10/20/2012). D. Clay was lead editor.
- American Society of Agronomy Division A-4, Corn Best Management Practices awarded Excellence for Extension Materials greater than 15 pages. November 2010
- CRC press, GIS Applications in Agronomy Identified as Best Seller.
- 2010 Nominated for the American Society of Agronomy Budget and Finance committee Chair.
- Awarded the 2009 PrecisionAG Award of Excellence, Education/research Award, Sponsored by the PrecisionAG Institute, The PrecisionAg™ Institute is an independent global forum dedicated to the sharing of precision agriculture practices, ideas, research, products, services and success stories.
- Fellow American Society of Agronomy, 2007.
- Awarded SD Sigma Xi Presidents Award for Service, 2006;
- Awarded USDA-ARS Collaboration Award, April 20, 2006;
- Nominated Ag/Bio Teacher of the Year, 2006
- Awarded the Deans Award for Teamwork, 2004
- Awarded SDSU F.O. Butler Award for Excellence in Research, December 2004
- Awarded the Gamma Delta Research Award, 1996;
- Awarded the Deans Award for Excellence, 1994;
- Served on over 50 graduate MS or Ph.D. student committees as major advisor or committee member,

Professional Activities and Research Interest

My research goal is to develop and test sustainable agricultural management systems that enhance environmental quality, maintain rural economies, create wealth and jobs, improve soil health, and lead to energy self-sufficiency. Specific research projects include the development of: (i) a conceptual understandings on how complex interactions among weeds, crop genetics, soils, topography, water, insects, diseases, and nutrient cycling influence crop productivity, profitability, and energy efficiency over landscapes; (ii) remote sensing techniques for assessing C storage and N and water stress in crop plants; (iii) new techniques for assessing the impact of management on system resilience; and (iv) precision farming equations for improved management. Principle obstacles to this research has been: (i) the linking of information collected at cellular or plant scales with higher organizational levels; (ii) developing analysis tools that quantitatively define the impact of stress on plant growth, (iii) mathematically defining how different limiting factors interact to influence yield, and (v) developing experimental approaches to solve multivariate problems. We have used simulation models, remote sensing, tracking stable isotopes pulses, microarray analysis, detailed soil and plant measurements, and natural abundance stable isotope approaches in our research. I am committed toward increasing the adoption of technologies that can

improve agricultural profitability and environmental sustainability. To achieve this goal I believe that we need to research the barriers to adopting technologies that clearly have economic and environmental benefits. I am committed to convert agricultural research into tools that producers can use to increase their profitability.

Books

1. Site-Specific Management Guideline. 1999. Clay, D.E. et al. (ed.). Potash and Phosphate Institute. Available at <http://www.ppi-far.org/ssmg>.
2. GIS Applications in Agriculture. 2007. Pierce F.J. and D. Clay (eds). CRC Press, Taylor and Francis, New York, New York. <http://www.crcpress.com/product/isbn/0849375266>
3. Soil Science: A Step-by-Step Field Analysis. 2008. Logsdon, S., D.E. Clay, D. Moore, and T. Tsegaye (eds). American Society of Agronomy. Madison, WI. Available at <https://portal.sciencesocieties.org/Resources/Files/downloads/pdf/B60915.pdf>
4. South Dakota Corn Best Management Practices. 2009. Clay, D.E., S.A. Clay, and K. Reistma (eds). SDSU, Brookings, SD. Available at http://pubstorage.sdstate.edu/AgBio_Publications/articles/EC929.pdf.
5. Mathematics and Calculations for Agronomists and Soil Scientists. 2011. Clay, D.E., S.A. Clay, C.G. Carlson, and S. Murrell. International Plant Nutrition Institute, available at <http://ppi-store.stores.yahoo.net/maandcaforag.html>
6. GIS Applications in Agriculture: Nutrient Management for Improved Energy Efficiency. Clay and Shanahan (eds). 2011. Available at <http://www.crcpress.com/product/isbn/0849375266>
7. IGROW Wheat: Best Management Practices for Wheat Production. 2012. Clay D.E., C.G. Carlson, and K. Dalsted (eds).
8. Mathematics and Calculations for Agronomists and Soil Scientists: Portuguese Version, 2013. Clay, D.E., S.A. Clay, C.G. Carlson, and S. Murrell. International Plant Nutrition Institute, available at <http://ppi-store.stores.yahoo.net/maandcaforag.html>.
9. Mathematics and Calculations for Agronomists and Soil Scientists: Metric Version, 2012. Clay, D.E., S.A. Clay, C.G. Carlson, and S. Murrell. International Plant Nutrition Institute, available at <http://ppi-store.stores.yahoo.net/maandcaforag.html>.
10. IGROW Soybeans: Best Management Practices for Soybean Production. 2013. Clay, D.E., S.A. Clay, C.G. Carlson, C. Hay, L. Wagner, and D. Deneke (eds.). Available at <http://www.sdsoybean.org/BMP>.
11. Midwest Cover Crop Field Guide. 2015. 2nd Edition. Fisher, B., C.K. Gerber, K.D. Johnson, E.J. Kladvik. D.E. Clay. Purdue.
12. IGROW Corn: Best Management Practices for Corn Production. 2016. Clay, D.E., S.A. Clay, C.G. Carlson, and E. Byamukama (eds.) SDSU
13. Precision Agriculture Basics, 2016, K Shannon, D.E. Clay, and N Kitchen, editors, ASA/Crop Science/SSSA digital library, expect to be completed by January 2018.
14. Practical Mathematics for Precision Farming, D.E. Clay, S.A. Clay, and S. Bruggeman Editors. ASA/Crop Science/SSSA digital library. Completed October 2017.
15. Soil Fertility Management in Agroecosystems. A. Chatterjee and D. Clay (eds), ASA/Crop Science/SSSA digital library. Madison WI.

Publications General Public

1. Back to the future, report by Susan Winson, progressive farmer. <http://dtnpf-digital.com/publication/?i=289125&p=62>, 2016
2. <http://www10.gisafe.com/nbc/articles/1/1400940/Data-driven-decisions-South-Dakota-land>, 2016
3. http://www.hpj.com/general/using-data-driven-decisions-on-south-dakota-land/article_e9fd40b0-

- [dcdd-556b-9a02-41bb203c1ea8.html](http://www.agprofessional.com/news/data-driven-decisions-south-dakota-land), 2016
4. <http://www.agprofessional.com/news/data-driven-decisions-south-dakota-land>, 2016
 5. http://www.usagnet.com/state_headlines/state_story.php?tbl=SD2016&ID=98, 2016
 6. Radio, Ag New 890, Mich Kjar, Jan 22, 2016.
 7. South Dakota Soybean Leader, September/October 2016, Soybean check off helps farmers reach for 100 bushels per acre.
 8. Growing South Dakota, SDSU College of Agriculture and Biological Sciences, 2015 Annual Report, Saving our Soil.
 9. Growing South Dakota, SDSU College of Agriculture and Biological Sciences, Summer 2016, Curricula collaboration,
 10. South Dakota Soybean Leader, March/April 2017, Real World through On-Farm Research.
 11. Radio interview, Tom Steever, On-farm Research, September 8, 2017.

Peer reviewed outreach and book chapters

1. Franzen, A., C.G. Carlson, C.L. Reese, and D.E. Clay. 2017. Chapter 2: Writing simple programs in Microsoft Excel for automating precision farming calculations. Clay, D.E., S.A. Clay, and S. Bruggeman (eds), Practical Mathematics for Precision Farming. American Society of Agronomy, Madison WI.
2. Clay, D.E., G. Hatfield, and S.A. Clay. 2017. Chapter 3: An Introduction to experimental design and models. Clay, D.E., S.A. Clay, and S. Bruggeman (eds), Practical Mathematics for Precision Farming. American Society of Agronomy, Madison WI.
3. Clay, D.E., T.A. Brase, and G. Reicks. 2017. Chapter 4: Mathematics of latitude and longitude. Clay, D.E., S.A. Clay, and S. Bruggeman (eds), Practical Mathematics for Precision Farming. American Society of Agronomy, Madison WI.
4. Clay, D.E., C. Robinson, and T. M. DeSutter. 2017. Chapter 6: Soil testing and understanding soil testing results for precision farming. Clay, D.E., S.A. Clay, and S. Bruggeman (eds), Practical Mathematics for Precision Farming. American Society of Agronomy, Madison WI.
5. Clay, D.E., N.R. Kitchen, E. Byamukama, and S. Bruggeman. 2017. Chapter 7: Calculations supporting management zones. Clay, D.E., S.A. Clay, and S. Bruggeman (eds), Practical Mathematics for Precision Farming. American Society of Agronomy, Madison WI.
6. Clay, D.E., and T.P. Trooien. 2017. Chapter 8: Understanding soil water and yield variability in precision farming. Clay, D.E., S.A. Clay, and S. Bruggeman (eds), Practical Mathematics and Precision Farming. American Society of Agronomy, Madison WI.
7. Chang, J., D.E. Clay, B. Arnall, and G. Reicks. 2017. Chapter 10: Essential plant nutrients, fertilizer sources, and application rate calculations. Clay, D.E., S.A. Clay, and S. Bruggeman, Practical Mathematics for Precision Farming. American Society of Agronomy, Madison WI.
8. Fausti, S., B.J. Erickson, D.E. Clay, and C.G. Carlson. 2017. Chapter 11: Deriving and using equations to calculate the economic optimum fertilizer and seeding rates. Clay, D.E., S.A. Clay, and S. Bruggeman, Practical Mathematics for Precision Farming. American Society of Agronomy, Madison WI.
9. Graham, C., D.E. Clay., and S. Bruggeman. 2017. Chapter 15: Developing yield response curves for fertilizer and seeding rates. Clay, D.E., S.A. Clay, and S. Bruggeman, Practical Mathematics and Agronomy for Precision Farming. American Society of Agronomy, Madison WI.
10. Clay, D.E. 2017. Chapter 16: A site-specific fertilizer program assessment using soil and nutrient removal benchmarks. Clay, D.E., S.A. Clay, and S. Bruggeman, Practical Mathematics and Agronomy for Precision Farming. American Society of Agronomy, Madison WI.
11. Sharda, A.J., A. Franzen, and D.R. Clay. 2017. Precision variable equipment, chapter 5 In Shannon, K, D.E. Clay, and N. Kitchen (eds) Precision Agriculture Basics, American Society of

- Agronomy, Madison WI.
12. Shannon, K., D.E. Clay., and K. Sudduth. 2018. An introduction to precision agriculture. Chapter 1. In Shannon, K, D.E. Clay, and N. Kitchen (eds) *Precision Agriculture Basics*, American Society of Agronomy, Madison WI.
 13. Clay, D.E., and U. Mishra. 2017. Role of crop residues in maintaining soil organic carbon in agroecosystems. *In* Qin Z, U. Mishra, A. Hastings (eds) *Bioenergy and Land Use Change*. John Wiley & Sons, Inc, Hoboken, NJ.
 14. Clay, D.E. J. Chang, G. Reicks, S.A. Clay, and C. Reese. 2017. Calculating soil organic turnover at different landscape positions in precision conservation. *In* Delgado J., S. Sassenrath, and T. Mueller (ed.). *Agronomy Monograph 59, Precision Conservation: Geospatial Techniques and Natural Resource Conservation*. American Society of Agronomy, Madison WI.
 15. Catterjee, A., and D.E. Clay. 2016. Soil fertility and cover crops. *In* A. Chatterjee and D. Clay (eds), *Soil Fertility Management in Agroecosystems*. ASA/Crop Science/SSSA digital library, Madison WI.
 16. Clay, D.E., G. Reicks, J. Chang, T. Kharel, and S.A.H. Bruggeman. 2016. Assessing a fertilizer program: Short and long-term approaches. *In* A. Chatterjee and D. Clay (eds), *Soil Fertility Management in Agroecosystems*. ASA/Crop Science/SSSA digital library, Madison WI.
 17. Carlson, C.G., D.E. Clay, and S.A. Clay. 2016. An introduction to conceptual models, calculating and using rate constants, economics, and models to solve problems. *Soil Fertility Management in Agroecosystems*. ASA/Crop Science/SSSA digital library, Madison WI.
 18. Clay, D.E., C. Reese, S.A.H. Bruggeman, and J. Moriles-Miller. 2016. The use of enriched and natural abundance nitrogen and carbon isotopes in soil fertility research. *In* A. Chatterjee and D. Clay (eds), *Soil Fertility Management in Agroecosystems*. ASA/Crop Science/SSSA digital library, Madison WI.
 19. Erickson, B., S. Fausti, D. Clay, and S. Clay. Knowledge, skills, and ability needed in the precision ag workforce: An industry survey, *Proceedings from the 13th International Precision Conference*. July 31-August 4, 2016, St. Louis Missouri.
 20. Carlson, C.G., D.E. Clay, D. Malo, C. Reese, R. Kerns, T. Kharel, G. Birru, and T. DeSutter. 2016. The management and identification of saline and sodic soils in the northern Great Plains. Chapter 32, *In* Clay, D.E., C.G. Carlson, S.A. Clay, and E. Byamukama (eds). *iGROW Corn: Best Management Practices*. South Dakota State University.
 21. Carlson, C.G., D.E. Clay, Darrin Hefty, Keith Alverson, and Kyle Gustafson. 2016. Chapter 1: Developing a strategy to achieve 300 bushel corn per acre or incrementally increasing current yields. *In* Clay, D.E., C.G. Carlson, S.A. Clay, and E. Byamukama (eds). *iGROW Corn: Best Management Practices*. South Dakota State University.
 22. Carlson, G., D.E. Clay, and K. Reitsma. 2016. Chapter 12: Land rolling corn fields. *In* Clay, D.E., C.G. Carlson, S.A. Clay, and E. Byamukama (eds). *iGROW Corn: Best Management Practices*. South Dakota State University.
 23. Clay, D.E., and C.G. Carlson. 2016. Chapter 13: Preparing a corn seed bed and managing crop residues. *In* Clay, D.E., C.G. Carlson, S.A. Clay, and E. Byamukama (eds). *iGrow Corn: Best Management Practices*. South Dakota State University, Brookings SD.
 24. Kumar, S., D.E. Clay, and C.G. Carlson. 2016. Chapter 14: Soil compaction impact on corn yield. *In* Clay, D.E., C.G. Carlson, S.A. Clay, and E. Byamukama (eds). *iGrow Corn: Best Management Practices*. South Dakota State University.
 25. Clay, S.A., C.L. Reese, and D.E. Clay. 2016. Chapter 15: Cover crops in rotations including corn. *In* D.E., C.G. Carlson, S.A. Clay, and E. Byamukama (eds). *iGROW Corn: Best Management Practices*. South Dakota State University
 26. Chang, J., C.L. Reese, T. Kharel, S.A. Clay, and D.E. Clay. 2016. Chapter 19: Precision

- farming opportunities. *In* D.E., C.G. Carlson, S.A. Clay, and E. Byamukama (eds). iGROW Corn: Best Management Practices. South Dakota State University
27. Clay, D.E., and C.G. Carlson. 2016. Chapter 21: Precision soil sampling. *In* Clay, D.E., C.G. Carlson, S.A. Clay, and E. Byamukama (eds). iGROW Corn: Best Management Practices. South Dakota State University
 28. Chang, J., and D.E. Clay. 2016. Chapter 22: Matching remote sensing tools to problems. *In* Clay, D.E., C.G. Carlson, S.A. Clay, and E. Byamukama (eds). iGROW Corn: Best Management Practices. South Dakota State University.
 29. Reitsma, K., D.E. Clay, C.G. Carlson, A. Bly, and G. Reicks. 2016. Chapter 23: Estimating yield goals and nitrogen, phosphorus, and potassium recommendations. *In* Clay, D.E., C.G. Carlson, S.A. Clay, and E. Byamukama (eds). iGROW Corn: Best Management Practices. South Dakota State University.
 30. Carlson, C.G., D.E. Clay, and C.L. Reese. 2016. Chapter 28: Common fertilizers used in corn production. *In* Clay, D.E., C.G. Carlson, S.A. Clay, and E. Byamukama (eds). iGROW Corn: Best Management Practices. South Dakota State University.
 31. Clay, D.E., and D. W. Clay. 2016. Chapter 29: Evaluating the success of N, K, and P fertilizer applications. *In* Clay, D.E., C.G. Carlson, S.A. Clay, and E. Byamukama (eds). iGROW Corn: Best Management Practices. South Dakota State University.
 32. Carlson, C.G., and D.E. Clay. 2016. Chapter 34: Estimating the corn plant population and seed emergence rate. *In* Clay, D.E., C.G. Carlson, S.A. Clay, and E. Byamukama (eds). iGROW Corn: Best Management Practices. South Dakota State University.
 33. Reitsma, K.D., D.E. Clay, C.G. Carlson, B.K. Dunn, S.J. Smart, D.L. Wright, and S.A. Clay. 2014. Estimated South Dakota land use change from 2006 to 2012. South Dakota State University, iGrow Agronomy, April 2014, <http://igrow.org/up/resources/03-2001-2014.pdf>
 34. Chang, J., D.E. Clay, S.A. Hansen, S.A. Clay, and T. Schumacher. 2014. Water stress impacts on transgenic corn in the northern Great Plains. pp 1-6 in the March – April Crops and Soils Magazine. doi:10.2134/cs2014-47-2-X
 35. Reese, C.L., S.A. Clay, D. Forgey, and D.E. Clay. 2013. Chapter 5: Cover crops in rotations including soybeans. *In* Clay, D.E., Carlson, C.G. Clay, S.A., Wagner, L., Deneke, D., Hay, C. (eds). iGrow Soybean: Best Management Practices. South Dakota State University
 36. Carlson, C.G., and D. Clay. 2013. Estimating the soybean plant population and seed emergence rate. Chapter 13 *in* Clay, D.E., C.G. Carlson, S.A. Clay, L. Wagner, D. Deneke, and C. Hay (eds). iGrow Soybean: Best Management practices. South Dakota State University.
 37. Chang, J., D.E. Clay, S.A. Clay and C. Reese. 2013. Using Remote Sensing Technique to Assess Soybean Yield Limiting Factors. Chapter 16. *In* Clay, D.E., Carlson, C.G. Clay, S.A., Wagner, L., Deneke, D., Hay, C. (eds). iGROW Soybean: Best Management Practices. South Dakota State University.
 38. Clay, D.E., D. W. Clay, and L. Sanghun. 2013. Identifying in-season nutrient deficiencies: tissue sampling and other techniques. Chapter 26 *In* Clay, D.E., C. G. Carlson, S.A. Clay, L. Wagner, D. Deneke, C. Hay (eds). iGrow Soybean: Best Management practices. South Dakota State University
 39. Clay, D.E., C.G. Carlson, J. Chang, and C. Reese. 2013. Overcoming production barriers using precision soil sampling. Chapter 20. *In* Clay, D.E., C.G. Carlson, S.A. Clay, L. Wagner, D. Deneke, and C. Hay, C. (eds). iGrow Soybean: Best Management Practices. South Dakota State University
 40. Clay, D.E., and C.G. Carlson. 2013. Chapter 20: Fertilizers used in corn and soybean production. *In* Clay, D.E., C.G. Carlson, S.A. Clay, L. Wagner, D. Deneke, and C. Hay (eds). iGROW Soybean: Best Management practices. South Dakota State University.
 41. Clay, D.E., and K. Gustafson. 2013. Chapter 23: N fixation. *In* Clay, D.E., C.G. Carlson, S.A. Clay, L. Wagner, D. Deneke, C. Hay (eds). iGrow Soybean: Best Management Practices. South Dakota State

University.

42. Clay, D.E., and K. Gustafson. 2013. Late season N applications. Chapter 24. *In* Clay, D.E., Carlson, C.G. Clay, S.A., Wagner, L., Deneke, D., Hay, C. (eds). *iGrow Soybean: Best Management Practices*. South Dakota State University.
43. Sanghun, L., and D.E. Clay. 2013. Determining your soybean phosphorus recommendation. Clay, D.E., C.G. Carlson, S.A. Clay, L. Wagner, D. Deneke, and C. Hay. (eds). *iGrow Soybean: Best Management practices*. South Dakota State University.
44. Carlson, C.G., D. Clay, K. Reitsma, and K. Gustafson. 2013. Estimating soybean yield. Chapter 43 *in* Clay, D.E., Carlson, C.G. Clay, S.A., Wagner, L, Deneke, D., and Hay C. (eds). *iGrow Soybean: Best Management practices*. South Dakota State University.
45. Carlson, C.G., D.E. Clay, K. Reistma, and R. Gelderman. 2013, Soybeans, salinity, and sodicity. Chapter 48. *In* Clay, D.E., C.G. Carlson, S.A. Clay, L. Wagner, D. Deneke, and C. Hay. (eds). *iGrow Soybean: Best Management Practices*. South Dakota State University.
46. Clay, D.E., S.A. Clay, and C.G. Carlson. 2013. Producing high corn, soybean, and wheat yields in a water stressed environment. Chapter 52 *in* Clay, D.E., C.G. Carlson, S.A. Clay, L. Wagner, D. Deneke, and C. Hay (eds). *iGrow Soybean: Best Management practices*. South Dakota State University.
47. Carlson, C.G., and D.E. Clay. 2013. Useful calculations and conversions. Chapter 58 *In* Clay, D.E., C.G. Carlson, S.A. Clay, L. Wagner, D. Deneke, and C. Hay (eds). *iGrow Soybean: Best Management Practices*. South Dakota State University.
48. Clay, D.E., C.G. Carlson. 2012, Fertilizers used in wheat production. Chapter 10. *In* Clay, D.E., C.G. Carlson, and K. Dalsted (eds). *iGrow Wheat: Best Management Practices for Wheat Production in South Dakota*. South Dakota State University, South Dakota Cooperative Extension Service, Brookings, SD. http://igrow.org/up/resources/Wheat_Prev-10.pdf
49. Clay, D.E., and C.G. Carlson. 2012, Estimating nutrient removal in wheat grain and straw. Chapter 12. *In* Clay, D.E., C.G. Carlson, and K. Dalsted (eds). *iGrow Wheat: Best Management Practices for Wheat Production in South Dakota*. South Dakota State University, South Dakota Cooperative Extension Service, Brookings, SD. http://igrow.org/up/resources/Wheat_Prev-12.pdf
50. Chang, J., K. Dalsted, D. Clay, and C.G. Carlson. 2012, Precision wheat management. Chapter 14. *In* Clay, D.E., C.G. Carlson, and K. Dalsted (eds). *iGrow Wheat: Best Management Practices for Wheat Production in South Dakota*. South Dakota State University, South Dakota Cooperative Extension Service, Brookings, SD.
51. Carlson, C.G., R. Gelderman, K. Reitsma, and D.E. Clay. 2012. Managing saline and sodic soils for wheat production, Chapter 19. *In* Clay, D.E., C.G. Carlson, and K. Dalsted (eds). *iGrow Wheat: Best Management Practices for Wheat Production in South Dakota*. South Dakota State University, South Dakota Cooperative Extension Service, Brookings, SD.
52. Clay, D.E., and G. Carlson. Estimating wheat yield potential. 2012, Chapter 29, *In* Clay, D.E., C.G. Carlson, and K. Dalsted (eds). *iGrow Wheat: Best Management Practices for Wheat Production in South Dakota*. South Dakota State University, South Dakota Cooperative Extension Service, Brookings, SD. <https://igrow.org/up/resources/05-1001-29-2012.pdf>.
53. Carlson, C.G., R. Cuirong, and D.E. Clay. 2012. Analysis of on-farm studies. Chapter 33. *In* Clay, D.E., C.G. Carlson, and K. Dalsted (eds). *iGrow Wheat: Best Management Practices for Wheat Production in South Dakota*. South Dakota State University, South Dakota Cooperative Extension Service, Brookings, SD
54. Reicks, G.W., D.E. Clay, C.G. Carlson. 2012. Effects of planting date, maturity group, population, and seed treatment on soybean yields near Beresford, SD in 2012. Southeast Research Farm Annual Progress Report.

55. Reicks, G.W., D.E. Clay, C.G. Carlson, C.G. 2012. Effects of planting date, maturity group, population, and seed treatment on soybean yields near South Shore, SD in 2012. Northeast Research Farm Annual Progress Report.
56. Stover, R.G., M. R. Parvez, L. Janssen, S. Burkhard, D. Clay, E. Mousel, K.D. Reitsma, A. Smart, and N. Troelstrup. 2012. Executive summary: Social and economic attitudes toward conservation practices in the Bad River Basin of South Dakota. Available at <http://www.sdstate.edu/soc/rlcdc/i-o/upload/Social-and-Economic-Attitudes-toward-Conservation.pdf>.
57. Reitsma, K.D., T.E. Schumacher, V.N. Owens, D.E. Clay, A. Boe, and P.J. Johnson. 2011. Switchgrass management and productivity in South Dakota. South Dakota State University Extension. Publication # 03-2006-201.
58. Clay, D.E., C.G. Carlson, and S.A. Clay. 2011. Maximizing nutrient efficiency through the adoption of management practices that maintain soil organic carbon, calculating carbon turnover kinetics. Pp 191-208. *In* D.E. Clay and J. Shanahan (ed.). GIS in Agriculture: Nutrient Management for Improved Energy Efficiency. CRC Press. Available at <http://www.crcpress.com/product/isbn/0849375266>
59. Mamani-Pati, F., D.E. Clay, and C.G. Carlson. 2011. Nutrient management for improved energy efficiency. pp. 19-30. *In* D.E. Clay and J. Shanahan (ed.). GIS in Agriculture: Nutrient Management for Improved Energy Efficiency. CRC Press.
60. Carlson, G., D.E. Clay, and J. Schefers. 2011. A case study for improving nutrient management efficiency by optimizing the plant population. pp. 157-172, *In* D.E. Clay and J. Shanahan (ed.). GIS in Agriculture: Nutrient Management for Improved Energy Efficiency. CRC Press.
61. Carlson, C.G., D.E. Clay, C. Wright, and K.D. Reitsma. 2010. Potential impacts of linking ethanol, crop production, and backgrounding calves on economics, carbon, and nutrient budgets. SDSU Extension Publication. Brookings, SD. Available at: http://pubstorage.sdstate.edu/AgBio_Publications/articles/exex8165.pdf
62. Hall, R.G., K.D. Reitsma, and D.E. Clay. 2009. Corn planting guide. pp. 13 *In* Clay, D.E. K, Reitsma, and S.A. Clay (eds), Best Management Practices for South Dakota. South Dakota State University, Brookings, SD.
63. Hall, R.G., T.P. Tooiien, D.P. Todey, and D.E. Clay. 2009. Seasonal hazards. pp. 17. *In* Clay, D.E. K, Reitsma, and S.A. Clay (eds), Best Management Practices for South Dakota. South Dakota State University, Brookings, SD.
64. Beck, D.L., D.E. Clay, and K.D. Reitsma. 2009. Tillage, crop rotations, and cover crops. pp. 19. *In* Clay, D.E. K, Reitsma, and S.A. Clay (eds), Best Management Practices for South Dakota. South Dakota State University, Brookings, SD.
65. Clay, D.E., and K. D. Reitsma. Soil fertility. 2009. pp. 40. *In* Clay, D.E. K, Reitsma, and S.A. Clay (eds), Best Management Practices for South Dakota. South Dakota State University, Brookings, SD.
66. Reitsma, K., D.E. Clay, S.A. Clay, and C.G. Carlson. 2009. Useful calculations: Yields and storage requirements. *In* Clay, D.E. K, Reitsma, and S.A. Clay (eds), Best Management Practices for South Dakota. South Dakota State University, Brookings, SD.
67. Reitsma, K.D., S.A. Clay, C.G. Carlson, and D.E. Clay. 2009. Corn Calendar and trouble shoot guide. pp. 124. *In* Clay, D.E. K, Reitsma, and S.A. Clay (eds), Best Management Practices for South Dakota. South Dakota State University, Brookings, SD
68. Clay, D.E., and K.D. Reitsma. 2009. Websites and related information. pp. 128. *In* Clay, D.E. K, Reitsma, and S.A. Clay (eds), Best Management Practices for South Dakota. South Dakota State University, Brookings, SD.
69. Manani-Pati, E.M., D. Clay, and G. Carlson. 2008. The issues of carbon sequestration. South Dakota State University. Extension, Brookings, SD. Available at

- <http://agbiopubs.sdstate.edu/articles/FS951.pdf>
70. Clay, D.E., S.A. Clay, G. Reicks, and D. Horvath. 2008. Plant and N impacts on corn growth: What controlling yield. Proceedings of 9th International Conference of Precision Farming. Denver CO. July 20-23.
 71. Clay, D.E., C.G. Carlson, C., Reese. 2008. A step-by-step guide to reduce soil sampling errors. Logsdon, S., D.E. Clay, D. Moore, and T. Tsegaye. (eds) A Sep-by-step Guide for Improved Productivity, American Society of Agronomy, Madison WI.
 72. Reicks, G.W., D.E. Clay, C.G. Carlson, and S.A. Clay. 2008. Better management practices for improved profitability and water quality. SD Cooperative Extension Service FS944. Available at <http://www.sdstate.edu/abe/wri/water-quality/upload/FS944.pdf>.
 73. Reese, C.L., D.E. Clay, D. Beck, and R. Englund. 2007. Is protein enough for assessing wheat flour quality? pp. 85-91. Western Nutrient Management Conference. Salt Lake City, Utah. March 8-9 7:85-91.
 74. Kleinjan, J.L., D. E. Clay, C. G. Carlson and S. A. Clay. 2007. Developing productivity zones from multiple years of yield data. SSMG 45. In Clay et al. (Ed) Site Specific Management Guidelines. Potash and Phosphate Institute. Norcross, GA.
 75. Kleinjan, J, D.E. Clay, C.G. Carlson, and S.A. Clay. 2007. Developing productivity zones from multiple years of yield monitor data. GIS in Agriculture, CRC Press
 76. Clay, D.E., N. Kitchen, J. Kleinjan, C.G. Carlson, and J. Chang. 2007. Using historical management areas to reduce soil nutrient sampling error. In: Pierce F.J., and D. E. Clay (ed), GIS in Agriculture, CRC Press.
 77. Clay, S.A., K.R. Banken, F. Forcella, M.M. Ellsbury, D.E. Clay, and A.E. Olness. 2007. Influence of yellow foxtail (*Setaria pumila*) on corn (*Zea mays*). Comm. Soil Sci. Plant Anal. 37:1421-1435.
 78. Reitsma, K., R. Gelderman, P.S. Skiles, K. Alverson, J. Hemenway, H. Woodard, T.E. Schumacher, D.D. Malo, and D.E. Clay. 2008. Nitrogen best management practices for corn in South Dakota. FS 941, South Dakota State University Extension, Available on-line at http://pubstorage.sdstate.edu/AgBio_Publications/articles/FS941.pdf.
 79. Clay, D.E., C.L. Reese, Ki-In Kim, C.G. Carlson, and S.A. Clay. 2006. The influence of soil yield zone on N mineralization and fertilizer response in corn. Proceedings of the 8th International Precision Farming Conference, July 23-26, Minneapolis MN.
 80. Clay, S.A., J. Chang, D.E. Clay, C. Reese, and K. Dalsted. 2004. SSMG-42. Using Remote Sensing to Develop Weed Management Zones in Soybeans. Clay et al. (Ed) Site Specific Management Guidelines. Potash and Phosphate Institute. Norcross, GA.
 81. Clay, D.E., C.G. Carlson, and J. Chang. 2004. Identifying the "Best" Approach to Identify Nutrient Management Zones: A South Dakota Example SSMG 41. Clay et al. (Ed) Site Specific Management Guidelines. Potash and Phosphate Institute. Norcross, GA.
 82. Gaspar, P., C.G. Carlson, and D.E. Clay. 2003. A "Cookbook" approach for determining the point of maximum economic return. SSMG 39. Clay et al. (Ed) Site Specific Management Guidelines. Potash and Phosphate Institute. Norcross, GA.
 83. Dalsted, D. J. Paris, D. Clay, S.A. Clay, C. Reese, and J. Chang. 2003. Selecting the appropriate satellite remote sensing product for precision farming. SSMG 40. Clay et al. (Ed) Site Specific Management Guidelines. Potash and Phosphate Institute. Norcross, GA.
 84. Jackson, J., S.A. Clay, and D.E. Clay. 2002. Influence of landscape position and weeds on water stress in soybean. In Robert et al (eds.). Proc. of 6th International Conf. of Precision Agriculture July 14-17 2002, Minneapolis MN
 85. Clay, D.E., S.A. Clay, C. Reese, and C.G. Carlson. 2002. Using remote sensing and C13 discrimination to understand yield variability. In Robert et al (eds.). Proc. of the 6th International Con.

- of Precision Agriculture July 14-17 2002, Minneapolis MN.
86. Sudduth, K.A., N.R. Kitchen, W.D. Batchelor, G.A. Bollero, D.G. Bullock, D.E. Clay, H.L. Palm, F.J. Pierce, R.T. Schuler, K. Thelen, and W.J. Wiebold. 2002. *In* Robert et al (eds.). Characterizing field-scale soil variability across the Midwest with electrical conductivity. Proc. of the 6th International Con. of Precision Agriculture July 14-17 2002, Minneapolis MN.
 87. Drummond, S.T., K.A. Sudduth, N.R. Kitchen, W.D. Batchelor, G.A. Bollero, D.G. Bullock, D.E. Clay, H.L. Palm, F.J. Pierce, R.T. Schuler, K. Thelen, and W.J. Wiebold. 2002. *In* Robert et al (eds.). Neural network analysis of site-specific soil, landscape and yield data. p. 59. Proceedings of the 6th International Conference of Precision Agriculture July 14-17 2002, Minneapolis MN.
 88. Clay, D.E., J. Chang, C. Reese, and S. Christopherson. 2002. Landscape position influence on soybean quality. 2002. *In* Robert et al (eds.). Proc. of the 6th International Con. of Precision Agriculture July 14-17 2002, Minneapolis MN.
 89. Chang, J., D.E. Clay, C.G. Carlson, S.A. Clay, and D.D. Malo. 2002. The influence of different classification approaches on N and P fertilizer recommendations. Proc. of the 6th International Con. of Precision Agriculture July 14-17 2002, Minneapolis MN.
 90. Clay, D.E., K. Dalsted, M. O'Neill, C. Reese, and P. Thanupura. 2002. Teaching farmers how to use remote sensing. 2002 *In* Robert et al (eds.). Proc. of the 6th International Con. of Precision Agriculture July 14-17 2002, Minneapolis MN.
 91. Ellsbury, S.A. Clay, D.E. Clay, D.D. Malo, and C.G. Carlson. 2002. *In* Robert et al (eds.). Increased incidence of extended diapause in northern corn rootworm and evidenced by georeferenced adult emergence. Proc. of the 6th International Con. of Precision Agriculture July 14-17 2002, Minneapolis MN.
 92. Reese, C.L., D. Clay, D. Long, C.G. Carlson, and D. Beck. 2002. *In* Robert et al (eds.). Using protein and ¹³C discrimination to determine the influence of nitrogen and water stress on wheat yields. Proc. of the 6th International Con. of Precision Agriculture July 14-17 2002, Minneapolis MN.
 93. Carlson, C.G., D.E. Clay, D.D. Malo, and T.E. Schumacher. 2001. The issues in carbon sequestration. South Dakota State University, Brookings, SD ABS 5-01
 94. Reese, C.L., S. Christopherson, C. Fossey, J. Gray, A. Hager, R. Morman, G. Schmitt, B. Showalter, C.G. Carlson, and D.E. Clay. 2001. Trouble-shooting yield monitor systems. SSMG #32. Clay et al. (Ed) Site Specific Management Guidelines. Potash and Phosphate Institute. Norcross, GA.
 95. Poppen, C., S.A. Clay, K. Dalsted, D.E. Clay, and M.M. Ellsbury. 2000. Spectral reflectance differences in crops and weeds. Proc. of the 5th International Conference on Precision Agriculture, Minneapolis Minnesota, July 16-19, 2000. ASA-CSSA-SSSA Madison WI.
 96. Chang, J., D.E. Clay, and C.G. Carlson, S.A. Clay, and C. Reese. 2000. Determining the impact of approaches to classify nutrient management zones. The influence of sampling approach on fertilizer recommendation errors. Proc. the 5th International Con. on Precision Agriculture, Minneapolis MN, July 16-19 2000. ASA-CSSA-SSSA Madison WI.
 97. Clay, D.E., S.A. Clay, Z. Liu, C. Reese, and C. Chang. 2000. Spatial variability of ¹³C isotopic discrimination in corn. Proc. the 5th International Con. on Precision Agriculture, Minneapolis MN, July 2000. ASA-CSSA-SSSA Madison WI.
 98. Nugteren, W., D.D. Malo, T.E. Schumacher, J.A. Schumacher, C.G. Carlson, D.E. Clay, S.A. Clay, M.M. Ellsbury, and K. Dalsted. 2000. Hillslope chronosequence of EM-38, soil temperature, and soil moisture readings as influenced by selected soil properties. Proc. the 5th International Conference on Precision Agriculture, Minneapolis MN, July 16-19 2000. ASA-CSSA-SSSA Madison WI.
 99. Clay, D.E., J. Chang, C. Carlson, D. Malo, S. Clay, and M. Ellsbury. 1999. Systematic evaluation of precision farming soil sampling requirements. pp 253-266. Robert, P.C., R.H. Rust, and W.E. Larson (ed). *Proc. of 4th International Con. on Precision Agriculture*. July 19-22 1998, St Paul MN. American Society of Agronomy. Madison WI

100. Ellsbury, M.M., W.D. Woodson, D.D. Malo, D.E. Clay, C.G. Carlson, and S.A. Clay. 1999. Spatial variability in corn rootworm distribution in relation to spatially variable soil factors and crop condition. pp 523-534. Robert, P.C., R.H. Rust, and W.E. Larson (ed) *In Proc. of 4th International Con. on Precision Agriculture*. July 19-22 1998, St Paul MN. American Society of Agronomy. Madison WI.
101. Clay, S.A., D.E. Clay, G.L. Lems, M.M. Ellsbury, and F. Forcella. 1999. Targeting precision agrichemicals applications to increased productivity. pp. 1699-1708. Robert, P.C., R.H. Rust, and W.E. Larson (ed) *In Proc. of 4th International Con. on Precision Agriculture*. July 19-22 1998, St Paul MN. American Society of Agronomy. Madison WI
102. Fritz, R., T.E. Schumacher, D.D. Malo, D.E. Clay, S.A. Clay, C.G. Carlson, M.M. Ellsbury, and K.J. Dalsted. 1999. Field comparisons of two soil electrical conductivity measurements systems. pp 1211-1218. Robert, P.C., R.H. Rust, and W.E. Larson (ed) *In Proc. of 4th International Con. on Precision Agriculture*. July 19-22 1998, St Paul MN. American Society of Agronomy. Madison WI
103. Johansen, D.P., Clay, D.E., C.G. Carlson, K.W. Stange, S.A. Clay, J.A. Schuchacher, and M.M. Ellsbury. 1999. On-Farm-Research protocols: Determining vertical accuracy of differentially corrected carrier and code phase global positioning satellite systems (GPS). pp 1197-1206. Robert, P.C., R.H. Rust, and W.E. Larson (ed). *In Proc. of 4th International Con. on Precision Agriculture*. July 19-22 1998, St Paul MN. American Society of Agronomy. Madison WI
104. Zhuojing, L., S.A. Clay, and D.E. Clay. 1999. Spatial variation in atrazine field dissipation and laboratory mineralization and their relationship to weed control. pp 879-884. Robert, P.C., R.H. Rust, and W.E. Larson (ed). *In Proc. of 4th International Con. on Precision Agriculture*. July 19-22.1998, St Paul MN. American Society of Agronomy. Madison WI.
105. Carlson, C.G. and D.E. Clay. 1999. The earth model- calculating field size and distance between points using GPS coordinates #11. Clay et al. (Ed) *Site Specific Management Guidelines*. Potash and Phosphate Institute. Norcross, GA
106. Clay, D.E., D.D. Malo, C.L. Reese, and C.G. Carlson. 1999. Identifying good candidates for precision phosphorus management. #13. Clay et al. (Ed) *Site Specific Management Guidelines*. Potash and Phosphate Institute. Norcross, GA
107. Johansen, D.P., D.E. Clay, C.G. Carlson. K.W. Stange, S.A. Clay, and K.Dalsted. 1999. Selecting a DGPS for making topography maps #14. Clay et al. (Ed) *Site Specific Management Guidelines*. Potash and Phosphate Institute. Norcross, GA.
108. Ellsbury, M.M. W.D. Woodson, L.D. Chandler, S.A. Clay, D.E. Clay, and D.D. Malo. 1997. Spatial characteristics of adult emergence patterns and oviposition for corn rootworm populations in continuous corn rotated corn. pp 227-234. *In proc. of the 1st European Con. Precision Agriculture* Sept 8-10, 1997. Warwick, UK.
109. Lowery, B., D.E. Clay, and J.L. Baker. 1995. Nitrogen placement in ridge tillage to minimize leaching and maximize use efficiency. p. 123-126 Vol. 2 *In Proc. ASAE Clean Water Clean Environment 21st Century*. March 5-8 1995, Kansas City Mo.
110. Clay, S.A., D.E. Clay, K.A. Brix-Davis, and K.A. Scholes. 1995. Alachlor and atrazine fate in the soil profile. p. 37-40 Vol 1 *In Proc. ASAE, Clean Water Clean Environment 21st Century*. March 5-8 1995, Kansas City Mo.
111. Clay, S.A., Z. Liu, D.E. Clay, and S.S. Harper. 1995. Atrazine binding and movement in soil as influenced by ammonia fertilizer. p 41-44. Vol. 1 *In Proc. ASAE Clean Water Clean Environment 21st Century*. ASAE, March 5-8 1995, Kansas City Mo.
112. Clay, D.E., C.G. Carlson, T.E. Schumacher, and S.A. Clay. 1995. Banding N fertilizer influence on inorganic N distribution. p 31- 34 Vol 2. *In Proc. ASAE Clean Water Clean Environment 21st Century*. March 5-8, Kansas City Missouri.
113. Dowdy, R.H., J.A. Lamb, W.L. Albus, D.E. Clay, B. Lowery, G.N. Delin, J.L. Anderson. 1995.

Water quality under a ridge-tilled corn/soybean farming system. P. 85-88 Vol. 3 *In Proc. ASAE Clean Water Clean Environment 21st Century*. March 5-8, Kansas City Missouri.

114. Schumacker, T.E., M.J. Lindstrom, M.L. Blecha, N.P. Congo, D.E. Clay, and B.H. Bleakley. 1995. Soil management after CRP contracts expire. p. 239-242 Vol.3 *In Proc. ASAE Clean Water Clean Environment 21st Century*. March 5-8, Kansas City Missouri.
115. Clapp, C.E., S.A. Stark, D.E. Clay, and W.E. Larson. 1986. Sewage sludge organic matter and soil properties. *In* Y. Chen and A. Avnimelech (ed). *The Role of Organic Matter in Modern Agriculture*. Martinus Nijhoff Publishers. Boston, US.

Referred Journal Papers

116. Birru, G.A., D.E. Clay*, T.M. DeSutter, C.L. Reese, A.C. Kennedy, S.A. Clay, S.A. Bruggeman, and D.D. Malo. 2018. Will precision management of saline-sodic soils enhance productivity. *Agron J.* In review.
117. Kharel, K., D.E. Clay, S.A. Clay, and T. DeSutter. 2018. Water movement and chemical remediation in non-irrigated semi-arid saline/sodic soils. Submitted to *Agron, J.*
118. Dose, H.L., Y. He, R.K. Owens, D. Hopkins, B. Deutsch, J. Lee, D.E. Clay, C. Reese, D.D. Malo, and T.M. DeSutter. 2017. Predicting electrical conductivity of the saturation extract from a 1:1 solution to water ration. *Comm. Soil Sci Plant Anal.* 48:2148-2154.
119. Fausti, S., B. Erickson, S.A. Clay, L. Schumacher, D.E. Clay, and D. Scouby. 2017. Educator survey: Do institutions provide the precision agriculture education needed by agribusiness. *Environ. Ed. Res.* (In review)
120. Erickson, B., S. Fausti, D.E. Clay, and S.A. Clay. 2017. Knowledge skills, and ability of precision agriculture. *J. Ag. Education* (In review).
121. Chang, J., D.E. Clay, S.A. Clay, A. Smart, and M. Ohrtman. 2017. A rapid method for measuring feces ammonia-nitrogen and carbon dioxide-carbon emissions and decomposition rate constants. *Agron J.* 109:1-9.
122. Clay, D.E., T. M. DeSutter, S.A. Clay, and C. Reese. 2017. From plows, horses, and harnesses to precision technologies in the north American Great Plains, *Oxford Research Encyclopedia of Environmental Science*. DOI: 10.1093/acrefore/9780199389414.013.196.
123. Wamono, A., D. Steele, Z. Lin, T. DeSutter, X. Jia, and D. Clay. 2016. Effects of calcium based surface amendments on the penetration resistance of subsurface drained sodic soils. *Trans. ASABE* 59(4):869-877. DOI 10.13031/trans.59.11516.
124. Dose, H.L., T.M. DeSutter, F.X.M. Casey, and D.E. Clay. 2017. Naturally occurring soil salinity does not reduce N-transforming enzymes or organisms. *Can. J. Soil Sci.* (with drawn).
125. Sieverding, H., D.E. Clay, E. Khan, J. Sivaguru, M. Pattabiraman, R.T. Koodali, M. Ndiva-Mongoh, J.J. Stone. 2016. A sustainable rural food-energy-water nexus framework for the northern Great Plains. *Ag and Environmental Letters*. 1:160008, doi:10.2134/ael2016.02.0008
126. Lai, L., S. Kumar, R. Chintala, V.N. Owens, D.E. Clay, J. Schumacher, A.S. Nazami, S.S. Lee, and R. Rafique. 2016. Modeling the impact of temperature and precipitation changes on soil CO₂ fluxes from switchgrass stand recently converted from cropland. *J. Environ. Sci.* <http://dx.doi.org/10.1016/j.jes.2015.08.019>.
127. Chang, L., D. E. Clay, A. Smart, and S. Clay. 2016. Estimating annual root decomposition in grassland systems. *Rangeland Ecology & Management* 69:288-291.
128. Chang, J. D.E. Clay, S.A. Clay, R. Chintala, J. Miller, and T. Schumacher. 2016. Corn stover biochar reduced N₂O and CO₂ emissions in soil with different water filled pore spaces and diurnal temperature cycles. *Agron J.* 108:2214-2221.

129. Smart, A.J., L.B. Perkins, T.N. Schramm, M.J. Nelson, P.J. Bauman, S.A. Clay, and D.E. Clay. 2016. The effects of patch-burn grazing on vegetation structural heterogeneity in the northern tallgrass prairie of South Dakota. *Great Plains Research* 26:57-70. Paper of the year.
130. Reitsma, K.D., D.E. Clay, S.A. Clay, B.H. Dunn, and C.L. Reese. 2016. Does the U.S. cropland data layer provide an accurate benchmark for land-use change estimates? *Agron. J.* 108:266-272.
131. Reitsma, K.D., B.H. Dunn, U. Mishra, S.A. Clay, T. DeSutter, and D.E. Clay. 2015. Land-use change impacts on soil sustainability in a climate and vegetation transition zone. *Agron. Journal.* 107:2362-2372.
132. Ferouz A., E. Cortus, D.E. Clay, and S. Hansen. 2015. Isotope ratio mass spectrometry monitoring of nitrogen volatilization from beef cattle feces and ¹⁵N-labeled synthetic urine. *Atmosphere* 6:641-649.
133. Sieverding, H.L. L.M. Bailey, T.J. Hengen, D.E. Clay, and J.J. Stone. 2015. Meta-analysis of soybean biodiesel for the northern Great Plains. *J. Environ. Qual.* Doi10.2134/jeq2014.07.0320.
134. Horvath, D.P., S. Hansen, J. Moriles-Miller, R. Pierik, C. Yan, D. Clay, B. Scheffler, and S.A. Clay. 2015. RNAseq reveals weed-induced PIF3-like as a candidate target to manipulate weed stress response in soybean *New Phytologist.* 207:196-210.
135. Clay, D.E., G. Reicks, C.G. Carlson, J. Moriles-Miller, J.J. Stone, and S.A. Clay. 2015. Tillage and corn residue harvesting impacts surface and subsurface carbon sequestration. *J. Environ. Qual.* 44:803-809 Doi:102134/jeq2014.070322
136. He, Y., T.M. DeSutter, and D.E. Clay. 2015. The relationship between SAR1:5 and SARE of three extraction methods. *Soil. Soc. Soc. Am. J.* 79:681-687.
137. He, Y., T.M. DeSutter, F. Casey, D.E. Clay D. Franzen, and D. Steele. 2015a. Field capacity water as influenced by Na and EC: Implications for subsurface drainage. *Geoderma.* 245-246:83-88.
138. Smart, A.J., D.E. Clay, R.G. Stover, M.R. Parvez, K.D. Reitsma, L.L. Janssen, N.H. Troelstrup, S.R. Burkhard, and E.M. Mousel. 2015. Persistence wins: long-term agricultural conservation outreach pays off. *J. Extension.* 53:2
139. DeSutter, T., D. Franzen, Y. He, A. Wick, J. Lee, B. Deutsch, and D.E. Clay. 2015. Relating sodium adsorption ratio to its utility in the Northern Great Plains. *Soil Sci. Soc. Am J.* 79:1261-1264.
140. Dose, H., A.M. Fortunia, L. Cihacek, J. Bell, T. DeSutter, J. Norland, and D.E. Clay. 2015. Biological indicators provide short term soil health assessment during sodic soil reclamation. *Ecol. Indicators* 58:244-253.
141. Chintala, R., R.K. Owens, T.E. Schumacher, K.A. Spokas, L.M. McDonald, S. Kumar, D.E. Clay, D.D. Malo, and B. Bleakly. 2014. Denitrification kinetics in biomass-and biochar-amended soils of different landscape position. *Environ Sci. Pollut Res.* DOI10.1007/s11356-014-3762-2
142. Chintala, R., T. Schumacher, D. Malo, S. Kumar, J. Rice, D. Clay, J. Julson, S. Papiernik, G. Chilom, B. Bleakly, and Z. Gu. 2014. Molecular characterization of biochars and their influence on microbial properties of soil. *J. Haz. Mat.* 279:244-256.
143. Lee, S., D.E. Clay, and S.A. Clay. 2014. Chapter 10. Impact of herbicide tolerant crops on soil health and sustainable agriculture crop production. Pg 211 – 238. In: D.D. Songstad, J.L. Hatfield, and D.T. Tomes (eds.). *Convergence of Food Security, Energy Security, and Sustainable Agriculture.* Springer. 389 pg. ISBN 978-3-642-55261-8.
144. Park, H., D.E. Clay, R.G. Hall, J.S. Rohila, T.P. Kharel, S.A. Clay, and S. Lee. 2014. Winter wheat quality responses to water, environment, and nitrogen fertilization. *Communications in Soil Sci. Plant Analysis.* 45:1894-1905.
145. Bich, A.D., C.L. Reese, A.C. Kennedy, D.E. Clay, and S.A. Clay. 2014. Corn yield is not reduced by in-season cover crop seeded after the weed free period. *Crop Management.* doi:10.2134/CM-2014-0009-RS

146. Nemali, K.S., C. Bonin, F.G. Dohleman, M. Stephens, W. R. Reeves, J. E. Whitsel, B. Sammons, R. A. Silady, D. E. Nelson, D. Anstrom, R. Sharp, O. R. Patharkar, D. Clay, M. Coffin, M. A. Nemeth, M. E. Leibman, M. Luethy and M. Lawson. 2014. Physiological Responses Related to Reduced Yield Loss under Drought Conditions in the 1 First Biotechnology-Derived Drought Tolerant Maize Event, MON 87460. *Plant Cell and Environment*. DOI 10.1111/pce.12446.
147. Mbonimpa, E.G., C.O. Hong, V. Owens, R.M. Lehman, S.L. Osborne, T. Schumacher, D. Clay, and S. Kumar. 2014. Nitrogen fertilizer and landscape position impacts on CO₂ and CH₄ fluxes from a landscape seeded to switchgrass. *GCG Bioenergy*. DOI: 10.1111/gcbb.12187.
148. Reese, C., D.E. Clay, S.A. Clay, A. Bich, A. Kennedy, S. Hansen, and J. Miller. 2014. Wintercover crops impact on corn production in semi-arid regions. *Agron. J.* 106:1479-1488.
149. Mamani-Pati, F., D.E. Clay, and H. Smeltekop. 2014. Modern landscape management in the Andean Highlands using technology developed by the Inca Empire. G.J. Churcham and E.R. Landa (ed.) *In The Soil Underfoot: Infinite Possibilities for a Finite Resource*. CRC Press.
150. Clay, D.E., S.A. Clay, K.D. Reitsma, B.H. Dunn, A.J. Smart, C.G. Carlson, D. Horvath, and J.L. Stone. 2014. Does the conversion of grasslands to row crop production in semi-arid areas threaten global food security? *Global Food Security*. 3:22-30
151. Chang, J., D.E. Clay, S.A. Hansen, S.A. Clay, and T. Schumacher. 2014. Water stress impacts on transgenic corn in the northern Great Plains. *Agron. J.* 106:125-130.
152. Smart, A. J., T.K. Scott, S.A. Clay, D.E., M. Ohrtman, and E.M. Mousel. 2013. Spring clipping, fire, and simulated increased atmospheric nitrogen deposition effects on Tallgrass Prairie vegetation. *Rangeland Ecology & Management*. 66:680-687.
153. He, Y., T.M. DeSutter, and D.E. Clay. 2013. Dispersion of pure clay minerals as influenced by calcium/magnesium ratios, sodium adsorption ratios, and electrical conductivity. *Soc. Soc. Soc. Am. J.* 77:2014–2019 doi:10.2136/sssaj2013.05.0206n
154. Kim Ki-In, D. Clay, S. Clay, G.C. Carlson, and T. Trooien. 2013. Testing corn (*Zea Mays* L.) pre-season regional nitrogen recommendation models in South Dakota. *Agron. J.* 105:1619-1625.
155. Chintala, R., J. Mollinedo, T.E. Schumacher, D.D. Malo, S. Papiernik, D.E. Clay, S. Kumar, D. W. Gulbrandson. 2013. Nitrate sorption and desorption by biochars produced from microwave pyrolysis. *Microporous Mesoporous Mater* 179: 250-257.
156. Lupo, C., D.E. Clay, J. Benning, and J. Stone. 2013. Life Cycle Assessment of the Beef Cattle Production System for the Northern Great Plains, US. *J. E. Q.* 42:1386-1394
157. Chintala, R., T. Schumacher, D. Clay, and D. Malo. 2013. Phosphorus sorption and availability from biochars and soil-biochar mixtures. *CLEAN - Soil, Air, Water*. 41:1-9. DOI: 10.1002/clen.201300089
158. Hansen S., S.A. Clay, D.E. Clay, C.G. Carlson, G. Reicks, J. Jarachi, and D. Horvath. 2013. Landscape features impacts on soil available water, corn biomass, and gene expression during the late vegetative growth stage. *The Plant Genome* 6:1-9. doi: 10.3835/plantgenome2012.11.0029
159. Chintala, R., D. E. Clay, T. E. Schumacher, D. D. Malo and J.L. Julson. 2013. Optimization of oxygen parameters for determination of carbon and nitrogen in biochar materials, *Analytical Letters*, 46:3, 532-538 available at <http://dx.doi.org/10.1080/00032719.2012.721103>
160. Clay, D.E., T.P. Kharel, C. Reese, D. Beck, C.G. Carlson, S.A. Clay, and G. Reicks. 2012. Winter wheat crop reflectance and N sufficiency index values are influenced by N and water stress. *Agron. J.* 104:1612-1617.
161. Moriles, J., Hansen, S., Horvath, D.P., Reicks, G., Clay, D.E., Clay, S.A. 2012. Microarray and growth analyses identify differences and similarities of early corn response to weeds, shade, and nitrogen stress. *Weed Science*. 60(2):158-166. (paper of the year Weed Sci.)
162. Clay, D.E., C.G. Carlson, S.A. Clay, J. Stone, K.D. Reitsma, and R.H. Gelderman. 2012. Great Plains soils may be C sinks. *Better Crops* 99:20-22.

163. Mamani-Pati, F., D.E. Clay, S.A. Clay, H. Smeltekop, and M.A. Yujra-Callata. 2012. The influence of strata on the nutrient recycling within a tropical certified coffee production system. ISRN Agronomy# 89290, doi:10.5402/2012/389290. Available at <http://www.isrn.com/journals/agronomy/contents/>.
164. Clay, D.E., J. Chang, S.A. Clay, J.J. Stone, R.H. Gelderman, C.G. Carlson, K. Reitsma, M. Jones, L. Janssen, and T. Schumacher. 2012. Corn yields and no-tillage affects carbon sequestration and carbon footprint. *Agron. J.* 104:763-77
165. Stone, J.J., C.R. Dollarhide, J.L. Benning, C.G. Carlson, and D.E. Clay. 2012. The life cycle impacts of feed for modern northern Great Plains U.S. swine production. *Agricultural Systems* 166:1-10.
166. Ohrtman, M.K., S.A. Clay, D.E. Clay, and A.J. Smart. 2012. Fire as a tool for controlling *Tamarix* spp. seedlings. *Inv. Plant Sci. Manage.* 5:139-147.
167. Butte, K.J., S.M. Brouder, D. Clay, P. Gepts, J.L. Hatfield, D. Hillel, R.C. Izaurralde, A.R. Moiser, J.R. Porter, C.E. Rosenzweig, and C.W. Rice. 2011. ASA, CSSA, ad SSSA Climate Change Working Group. Available at <https://www.agronomy.org/files/science-policy/asa-cssa-sssa-climate-change-policy-statement.pdf>.
168. Obade, V.P., D.E. Clay, C.G. Carlson, K. Dalsted, B. Wylie, C. Ren, and S.A. Clay. 2011. Estimating non-harvested crop residue cover dynamics using remote sensing. *In Biomass and Energy Production*. InTech ISBN 978-953-307-491-7.
169. Kharel, T.P., D.E. Clay, S.A. Clay, D. Beck, C. Reese, G. Reicks, G. Carlson, and H. park. 2011. Nitrogen and water stress affect winter wheat yield and dough quality. *Agron. J.* 103:1389-1396.
170. Setiyono, T.D., H. Yang, D.T. Walters, A. Dobermann, R.B. Ferguson, D.F. Roberts, D.J. Lyon, D.E. Clay, and K.G. Cassman. 2011. Maize-N: A decision tool for nitrogen management in maize. *Agron J.*, 103:1276-1283.
171. Mamani-Pati, F., D.E. Clay, and H. Smeltekop. 2011. Geospatial management of Andean technologies by the Inca Empire. Pp255-276. *In D.E. Clay and J. Shanahan (ed.). GIS in Agriculture: Nutrient Management for Improved Energy Efficiency*. CRC Press. Available at <http://www.crcpress.com/product/isbn/0849375266>
172. Mamani Pati, F, D.E. Clay, C.G. Carlson, and S.A. Clay. 2011. Production, profitability, and energy audits can produce contrary results for corn (*Zea mays*) used in ethanol production. *J. Plant Nutrition.* 34:1-12.
173. Mamani-Pati, F., D.E. Clay, C.G. Carlson, S.A. Clay, G. Reicks, and K. Kim. 2010. Nitrogen rate, landscape position, and harvest corn stover impacts on energy gains and carbon budgets of corn grown in South Dakota. *Agron. J.* 102:1535-1541.
174. Mamani-Pati, E.M., D.E. Clay, C.G. Carlson, and S.A. Clay. 2010. Calculating soil organic carbon maintenance using stable and isotopic approaches: A review. pp. 189-216. *In E. Lichtfouse (ed.). Sustainable Agricultural Reviews: Sociology, Organic Farming, Climate Change and Soil Science*, Springer Netherlands, DOI 10.1007/978-90-481-3333-8
175. Stone, J.J., C. Dollarhide, R. Jinka, R. Thaler, C.E. Hostetler, and D. Clay. 2010. Life-cycle assessment model for a modern upper Great Plains U.S. confined swine animal feeding facility. *Envir. Engineer. Sci.* 27:1009-1018.
176. Stone, J.J., K.R. Aurand, C.R. Dollarhide, R. Jinka, R.C. Thaller, D.E. Clay, and S.A. Clay. 2010. Determination of environmental impact of antimicrobial use for a US northern Great Plains Production facility: A life cycle assessment approach. *J. Life Cycle Assess.* 16:27-39.
177. Clay, D.E., C.G. Carlson, T.E. Schumacher, V. Owens, and F. Mamani Pati. 2010. Biomass estimation approach impacts on calculated SOC maintenance requirements and associated mineralization rate constants. *J. Environ. Qual.*39:783-790.
178. Reese, C., D. Long, D. Clay, S. Clay, and D. Beck. 2010. Nitrogen and water stress impact hard

red spring wheat. J. Terrestrial Observations Vol. 2: Iss. 1, Article 7.
Available at: <http://docs.lib.purdue.edu/jto/vol2/iss1/art7>

179. Seiststad, G.A., D.E. Clay, K. Dalsted, R.L. Lawrence, D.R. Olsen, and X. Zhang. 2010. Providing precision crop and range protection in the Northern Great Plains. Oerke, E.C., R. Gerhards, G. Menz, G., and R.A. Sikora, (Eds.) In Precision Crop Protection - the Challenge and Use of Heterogeneity. Springer, available at ISBN: 978-90-481-9276-2.
180. Clay, S.A., D.E. Clay, D. Horvath, J. Pullis, C.G. Carlson, S. Hansen, and G. Reicks. 2009. Corn (*Zea mays*) responses to competition: growth alteration vs limiting factor. Agron.J. 101:1522-1529.
181. Hoese, A., S.A. Clay, D.E. Clay, J. Oswald, T. Trooien, R. Thaler, and C.G. Carlson. 2009. Chlortetracycline and tylosin runoff from soils treated with antimicrobial containing manure. J. Environ. Sci. Health Part B. 44:1-8.
182. Reiman, M., D.E. Clay, C.G. Carlson, D.E. Humburg, G. Reicks, D.W. Clay, and S.A. Clay. 2009. Deep manure placement Impact on soil N and P concentrations, Corn (*Zea mays*) and Soybean (*Glycine max*) Yields, and Water Infiltration. Environmental Sci. Part B. 44:1-10.
183. Mishra, U., D.E. Clay, T. Trooien. K. Dalsted, D.D. Malo, and C.G. Carlson. 2008. Assessing the value of using a remote sensing based evapotranspiration map in site-specific management. J. Plant Nutrition 31:1188-1202.
184. Chang, J., D.E. Clay, L. Leish, D. Aaron, K. Dalsted, and M. Volz. 2008. Evaluating modified atmospheric correction methods for Landsat imagery: Image-Based and Model-Based Calibration Methods. Comm. Plant and Soil Anal. 49:1532-1545.
185. Clay, D.E., C.G. Carlson, and S.A. Clay. 2008. Calculating site-specific carbon budgets: Carbon footprints and Implications of different assumptions. Plant and N impacts on corn growth: What controlling yield. Proceedings of 9th International Conference of Precision Farming. Denver CO. July 20-23.
186. Kim, Ki-In, D. E. Clay, C. G. Carlson, S. A. Clay, and T. Trooien. 2008. Do synergistic relationships between nitrogen and water influence the ability of corn to use nitrogen derived from fertilizer and soil? Agron. J. 100: 551-556.
187. Clay, D., C. Ren, C. Reese, R. Waskom, J. Bauder, N. Mesner, B. Seelig, G. Paige, K. Reddy, M. Neibauer, and R. Mahler. 2007. Peoples perceptions, impacts, and willingness to utilize different learning opportunities designed to improve water quality. J. Natural Res. Life Sci. Ed. 363:36-44.
188. Clay, D.E., C.E. Clapp, C. Reese, Z. Liu, C. G. Carlson, H. Woodard, and A. Bly. 2007. ¹³C fractionation of relic soil organic C during mineralization effects calculated half-lives. Soil Sci. Soc. Am. J. 71:1003-1009.
189. Humburg, D. S., P. Thanapura, C. Ren, and D. E. Clay. 2006. Sugarbeet quality correlation to Landsat canopy data from a large GIS database. *Trans ASAE*, 49:775-782.
190. Clay, D.E., N.R. Kitchen, C.G. Carlson, and J.L. Kleinjan. 2006. The First Step in Precision Agriculture: Sampling Old Farmsteads Separately from the Rest of the Field. SSMG 43. In Clay et al. (Ed) *Site Specific Management Guidelines*. Potash and Phosphate Institute. Norcross, GA.
191. Chang, J., and D.E. Clay. 2006. Identifying factors for yield prediction models and evaluating model selection methods. Korean Crop Sci. Soc. J. 50:268-275.
192. Clay, D.E., C.G. Carlson, S.A. Clay, C. Reese, Z. Liu, and M.M. Ellsbury. 2006. Theoretical derivation of new stable and non-isotopic approaches for assessing soil organic C turnover. Agron. J. 98:443-450.
193. Clay, S.A., B. Kreutner, D.E. Clay, and C. Reese. 2006. Spatial distribution, temporal stability, and yield loss estimates for annual grasses and common ragweed in corn/soybean production field over nine years. Weed Sci. 54:380-390.
194. Clay, D.E., Ki-In Kim, J. Chang, S.A. Clay, and K. Dalsted. 2006. Characterizing water and N stress in corn using remote sensing. Agron. Journal. 98:579-587.

195. Clay, D.E., C.G. Carlson, S.A. Clay, J. Chang, and D.D. Malo. 2005. Soil organic C maintenance in a corn (*Zea mays* L.) and soybean (*Glycine max* L.) as influenced by elevation zone. *J. Soil Water and Conservation*. 60:342-348.
196. Clay, S.A., J. Kleinjan, D.E. Clay, F. Forcella, and W. Batchelor. 2005. Growth and fecundity of weed in species in corn and soybean. *Agron. Journal*. 97:294-302.
197. Chang, J. S.A. Clay, D.E. Clay, D.Aaron, D. Helder, and K Dalsted. 2005. Clouds influence precision and accuracy of ground-based spectroradiometers. *Com. Soil and Plant Anal*. 36:1799-1807.
198. Clay, D.E., S.A. Clay, D.J. Lyon, and J.M. Blumenthal. 2005. ¹³C discrimination in corn grain can be used to separate and quantify yield losses due to water and nitrogen stress. *Weed Sci*. 53:23-29.
199. Ellsbury, M.M., S.A. Clay, D.E. Clay, and D.D. Malo. 2005. Within-field spatial variation of northern corn rootworm distributions. P 145-154, S. Videl et al. (ed.). *Western Corn Rootworm: Ecology and Management*. CAB International. Oxfordshire UK.
200. Sudduth, K.A., N.R. Kitchen, W.J. Wiebold, W.D. Batchelor, G.A. Bollero, D.G. Bullock, D.E. Clay, H.L. Palm, F.J. Pierce, R.T. Schuler, K.D. Thelen. 2005. Relating apparent electrical conductivity to soil properties across the north-central USA. *Computers and Electronics in Agriculture* 46:263-283.
201. Clay, D.E., Z. Zhen, Z. Liu, S.A. Clay, and T.P. Trooien. 2004. Bromide and nitrate leaching in undisturbed soil columns collected from three landscape positions. *J. Environ. Qual*. 33:338-342.
202. Clay, S.A., D.E. Clay, and T.B. Moorman. 2004. Comparison of atrazine and alachlor sorption, mineralization and degradation potential in surface and aquifer sediments. p. 199-212, In Gan et al. (ed.) *ACS Symposium Series, Pesticide 863 Pesticide Decontamination and Detoxification*, American Chemical Society.
203. Chang, J. D. E. Clay, C. G. Carlson, C. L. Reese, S. A. Clay, and M.M. Ellsbury. 2004. The Influence of different approaches to define yield goals and management zones on N and P fertilizer recommendations errors. *Agron. J*. 96:825-831.
204. Chang, J., S.A. Clay, and D.E. Clay. 2004. Detecting weed free and weed infested areas of a soybean (*Glycine max*) field using NIR reflectance data. *Weed Sci*. 52:642-648.
205. Heiniger, R.W., R.G. McBride, and D.E. Clay. 2003. Using soil electrical conductivity to improve nutrient management. *Agron. J*. 95:508-519.
206. Paz, J.O., W.D. Batchelor, D.E. Clay, S.A. Clay, and C. Reese. 2003. Characterization of Soybean Yield Variability Using Crop Growth Models and ¹³C Discrimination. *ASAE meeting presentation # 033044*.
207. Chang, J., D. E. Clay, K. Dalsted, S.A. Clay, M. O'Neill. 2003. Yield predictions using multispectral and multivariate reflectance. *Agron. J*. 95:1447-1453.
208. Clay, D.E., S.A. Clay, J. Jackson, K. Dalsted, C. Reese, Z. Liu, D.D. Malo, and C.G. Carlson. 2003. C13 discrimination can be used to evaluate soybean yield variability. *Agron. J*. 95:430-435.
209. DeSutter, T., S.A. Clay, D.E. Clay. 2003. Sorption and desorption of atrazine from six aggregate particle size fractions of two soils. *Weed Sci*. (51:456-462).
210. Chang, J., D.E. Clay, C.G. Carson, S.A. Clay, D.D. Malo, R. Berg, J. Kleinjan, and W. Wiebold. 2003. Different techniques to identify management zone influences nitrogen and phosphorus sampling variability. *Agron. J*. 95:1550-1559.
211. Carlson, C.G., T. Doerge, and D.E. Clay. 2002. Estimating corn yield losses from unevenly spaced corn. *SSMG 37*. Clay et al. (Ed) *Site Specific Management Guidelines*. Potash and Phosphate Institute. Norcross, GA.
212. Liu, Z., S.A. Clay, and D.E. Clay. 2002. Spatial variability of atrazine and alachlor efficacy and mineralization in an eastern South Dakota field. *Weed Sci*. 50:662-671.
213. Clay, D. E., Kitchen, N., Carlson, C. G., Kleinjan, J. L., and Tjentland, W. A. 2002. Collecting representative soil samples for N and P fertilizer recommendations. Online. *Crop Management*

doi:10.1094/CM-2002-12XX-01-MA.

214. Clay, D. E., Kitchen, N., Carlson, C. G., Kleinjan, J. L., and Tjentland, W. A. 2002. Collecting representative soil samples for N and P fertilizer recommendations. SSMG 38. Clay et al. (Ed) *Site Specific Management Guidelines*. Potash and Phosphate Institute. Norcross, GA.
215. Smeltekop, H. D.E. Clay, and S.A. Clay. 2002. The impact of sava snail medic cover crop on corn production, stable isotope discrimination, and soil quality. *Agron J.* 94:917-924.
216. Clay, D.E., S.A. Clay and C.G. Carlson. 2002. Site specific management from a cropping system perspective. Srinivasan, A. (ed) *In Precision Farming- A Global Perspective*
217. Clay, S.A., T.M. DeSutter, and D.E. Clay. 2001. Herbicide concentration and dissipation from surface wind-erodible soil. *Weed Sci.* 49:431-436.
218. Clay, D.E., J. Chang, D.D. Malo, C.G. Carlson, C. Reese, S.A. Clay, M. Ellsbury, and B. Berg. 2001. Factors influencing spatial variability of apparent electrical conductivity. *Comm. Plant and Soil Analysis.* 32:2993-3008.
219. Johansen, D.P., D.E. Clay, C.G. Carlson, K.W. Stange, S.A. Clay, D.D. Malo, and J.A. Schumacher. 2001. Vertical accuracy of two differential corrected global positioning systems. *J. Soil Water Conservation* 56:198-201.
220. Clay, D.E., R. Engel, D. Long, and Z. Lui. 2001. Nitrogen and water stress interact to influence carbon-13 discrimination in wheat. *Soil Sci. Soc. Amer. J.* 65:1823-1828.
221. Clay, D.E., S.A. Clay, Z. Lui, and C. Reese. 2001. Spatial variability of C-13 isotopic discrimination in corn (*Zea mays*). *Comm. Soil Sci. Plant Anal.* 32:1813-1828.
222. Lems, J., D.E. Clay, D. Humberg, T.A. Doerge, S. Christopherson, and C.L. Reese. 2001. Yield monitors-basic steps to ensure system accuracy and performance. SSMG #31. Clay et al. (Ed) *Site Specific Management Guidelines*. Potash and Phosphate Institute. Norcross, GA.
223. Clay, S.A., R.H. Dowdy, J.A. Lamb, J.L. Anderson, B. Lowery, R.E. Knighton, and D.E. Clay. 2000. Herbicide movement and dissipation in four Midwestern sites. *J. Environ. Sci. Health Part B.* 35:259-278.
224. Clay, D.E., J. Chang, C.G. Carlson, D. Malo, S.A. Clay, and M. Ellsbury. 2000. Precision Farming Protocols: Part 2. A comparison of sampling approaches for precision P management. *Comm. Plant and Soil Anal.* 31: 2969-2985.
225. Clay, S.A., G.J. Lems, D.E. Clay, F. Forcella, M.M. Ellsbury, and C.G. Carlson. 1999. Sampling weed spatial variability on a field-wide scale. *Weed Sci.* 47:674-681.
226. DeSutter, T., S.A. Clay, and D.E. Clay. 1999. Agrochemical concentration on wind blown sediments. *J. Environ. Sci. Health Part B.* 33: 683-691.
227. Chang, J. D.E. Clay, C.G. Carlson, J. Lee, D.D. Malo, S.A. Clay, and M. Ellsbury. 1999. Selecting precision farming soil sampling protocols: part 1. Grid distance impact on semivariograms and estimation variances. *Prec. Agric.* 1: 277-289.
228. Clay, S.A., D.E. Clay, W.C. Koskinin, and R.K. Berg, Jr. 1998. Agrichemical management, movement, and maize yield: Ridge till vs chisel plow. *Soil Tillage Research* 48:215-244.
229. Ellsbury, M.M. W.D. Woodson, S.A. Clay, D.D. Malo, J. Schumacher, D.E. Clay, and C.G. Carlson. 1998. Geostatistical characterization of the spatial distribution of adult corn rootworms (*Coleoptera Chrysomelidea*) emergence. *Pop. Ecol.* 27:910-917.
230. Clay, S.A., T.B. Moorman, D.E. Clay, and K.A. Scholes. 1997. Sorption and degradation of alachlor in soil and aquifer material. *J. Environ. Qual.* 1335-1353.
231. Clay, D.E., 1997. Comparison of the difference and delta 15-Nitrogen approaches for evaluating liquid urea ammonium nitrate utilization by maize. *Comm. Soil Sci. Plant Anal* 28:1151-1161.
232. Clay, D.E., C.G. Carlson, K. Brix-Davis, J. Oolman, and B. Berg. 1997. Soil sampling strategies for estimating residual nitrogen. *J. Production Agriculture.* 10: 446-451.
233. Clay, D.E., J. Chang, S.A. Clay, M. Ellsbury, C.G. Carson, D.D. Malo, D. Woodson, and T.

- DeSutter. 1997. Field scale variability of nitrogen and delta 15-N in soil and plants. *Comm. Soil and Plant Analysis*. 28:1513-1527.
234. Clay, S.A., D.E. Clay, Z. Liu, and S.S. Harper. 1996. The effect of ammonia on atrazine sorption and transport. In Meyer M.T. and E.M. Thurman (eds) *Herbicide Metabolites in Surface Water and Groundwater*. ACS Symposium Series. Washington, D.C. 630:117-124.
235. Clay, D.E., S.A. Clay, T. Moorman, K. Brix-Davis, K.A. Scholes, and A.R. Bender. 1996. Temporal variability of organic C and nitrate in a shallow aquifer. *Water Research* 30:559-568
236. Lui, Z., S.A. Clay, D.E. Clay, and S.S. Harper. 1995. Ammonia impacts on atrazine leaching through undisturbed soil columns. *J. Environ. Qual.* 24:1170-1173.
237. Clay, D.E. T.E. Schumacher, and K.A. Brix-Davis. 1995. Carbon and nitrogen mineralization in row and interrow areas of chisel and ridge tillage systems. *Soil Till. Res.* 35:167-174.
238. Clay, D.E., S.A. Clay, Z. Liu, and S.S. Harper. 1995. Leaching of dissolved organic C in soil following anhydrous ammonia application. *Biol. Fert. Soil.* 19:10-14.
239. Clay, D.E., C.G. Carlson, P.W. Holman, T.E. Schumacher, and S.A. Clay. 1995. Banding nitrogen fertilizer influence on inorganic nitrogen distribution. *J. Plant Nutrition.* 18:331- 341.
240. Liu, Z., S.A. Clay, D.E. Clay, and S.S. Harper. 1995. The influence of N fertilizer on atrazine adsorption to soil. *J. Ag. Food Chem.* 43:815-819.
241. Clay, D.E., P.W. Holman, S.A. Clay, T.E. Schumacher, K.A. Scholes and A.R. Bender. 1994. Agrichemical contamination detection in a shallow unconfined aquifer as influenced by groundwater sampling system. *Soil Sci. Soc. Amer. J.* 58:102-104.
242. Clay, D.E., S.A. Clay, K. Brix-Davis, and K.A. Scholes. 1994 Fertilizer placement impact on nitrate movement in a ridge tillage system. *J. Environ. Qual.* 23: 9-12.
243. Holman, P.W., D.E. Clay, C.G. Carlson, T.E. Schumacher, and S.A. Clay. 1994. Band fertilizer impact on sampling requirement to estimate inorganic N. pp 79-86. J.L. Havlin (ed.) *In* 1994: Great Plains Soil Fertility Conference Proceedings. Denver Colorado.
244. Clay, S.A., K.A. Scholes, and D.E. Clay. 1994. Fertilizer shank placement impact on atrazine movement in a ridge tillage system. *Weed Sci.* 42: 86-91.
245. Clay, D.E., C.E. Clapp, R.H. Dowdy, and J.A.E. Molina. 1993. Mineralization of nitrogen in fertilizer-acidified lime-amended soil. *Biol. and Fert. of Soil.* 15: 249-252.
246. Clay, D.E. and G.L. Malzer. 1993. Comparison of two chemical methods for extracting residual N fertilizer. *Biol and Fert. Soil.* 15: 179-184.
247. Clay, S.A., D.E. Clay, G.L. Malzer, and W. Koskinen. 1992. Surface microrelief impact on agrichemical movement. *J., Environ Sci. Health Part B;* 27: 125-138
248. Clay, D.E., C.E. Clapp, and D.R. Linden. 1991. Redox potential structure as influenced by tillage following rainfall. *Soil Tillage Research.* 22: 211-219
249. Clay, D.E., G.L. Malzer, and J.L. Anderson. 1990. Ammonia volatilization from urea as influenced by soil temperature, soil water content, and nitrification and hydrolysis inhibitors. *Soil Sci. Soc. Am. J.* 54:263-266.
250. Clay, D.E., G.L. Malzer, and J.L. Anderson. 1990. Tillage and dicyandiamide influence on nitrogen fertilizer immobilization, remineralization, and utilization by maize. *Biol and Fert Soil* 9: 220-225.
251. Clay, D.E., C.E. Clapp, J.A.E. Molina, and D.R. Linden. 1990. Soil tillage impact on the diurnal redox potential cycle. *Soil Sci. Soc. Am. J.* 54:516-521.
252. Clay, D.E., and C.E. Clapp. 1990. Mineralization of low C:N ratio corn residue in soil fertilized with ammonia fertilizer. *Soil Bio. Biochemistry.* 22:355-360.
253. Clay, D.E. C.E. Clapp, J.A. Molina, and R.H. Dowdy. 1990. Influence of nitrogen fertilization, tillage, and residue management on a N mineralization index. *Comm. Soil Sci. Plant Analysis.* 21:323-335.

254. Clay, D.E., C.E. Clapp, D.R. Linden, and J.A.E. Molina. 1989. Nitrogen-tillage-residue management: 3: The interrelationship between soil depth, N mineralization, and maize production. *Soil Sci.* 147:319-325.
255. Clay, D.E., C.E. Clapp, J.A.E. Molina, and D.R. Linden. 1985. Nitrogen-tillage-residue management: 1: Simulating soil and plant behavior with the model NCSWAP. *Plant and Soil.* 84:67-77.
256. Clay, D.E., J.A.E. Molina, C.E. Clapp, and D.R. Linden. 1985. Nitrogen-tillage-residue management: 2: Calibration of maximum nitrification and denitrification by model simulation. *Soil Sci. Soc. Am. J.* 49:322-325.
257. Clay, D.E., R.L. Mahler, and H.A. Mensor. 1984. The influence of N sources and rates on soil N parameters related to strawberry production in northern Idaho. *Comm. Soil Sci. and Plant Anal.* 15: 819-832.