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Education

- Ph.D., Agriculture (Agronomy option), 1988, Texas Tech University, Lubbock, Texas. Dissertation: Performance of wheatgrasses and wheatgrass-sainfoin mixtures under three schedules of sheep defoliation.
- M.S., Agronomy, 1983, The Pennsylvania State University, University Park, Pennsylvania. Thesis: Growth of alfalfa cultivars: Harvest schedules, yield estimation techniques, and seasonal growth patterns.
- B.A., Plant Science, 1976, Hampshire College, Amherst, Massachusetts.
Advanced Independent Study Paper: Plant nutrient conservation through soil management.

Research and Extension Experience

- Associate Professor**, Div. of Plant and Soil Sciences, West Virginia University, May 2015-present. Teaching, research, and mentoring students in crop science, grassland agronomy, herbage and bioenergy feedstock compositional analysis, and pasture canopy management impacts on ecosystem services.
- Assistant Professor**, Div. of Plant and Soil Sciences, West Virginia University, August 2009-May 2015.
Teaching, research, and mentoring students in crop science, grassland agronomy, and analysis of herbage nutritional value.
- Visiting Assistant Professor**, Division of Plant and Soil Sciences, West Virginia University, August 2008-August 2009. Taught forage crop and grassland management course and planned and initiated research to evaluate beef heifer and grassland responses to winter grazing management.
- Consultant**, Logan, UT, July 2007-August 2008. Forage quality assessment including near-infrared reflectance spectroscopy, analysis of alfalfa and birdsfoot trefoil performance, presentations on extended-season grazing, and evaluation of alfalfa weevil impacts on forage productivity.
- Assistant Professor and Extension Agronomy Specialist**, Dept. of Plants, Soils, and Climate, Utah State University, August 2000-June 2007. State-wide extension agronomy programs including crop performance trials; crop and pasture management educational materials and workshops; field and laboratory research in forage and pasture management, quality, and utilization; and mentoring of student research assistants.
- Area Extension Educator**, Washington State University Cooperative Extension (Grant-Adams counties), January 1999-August 2000. Forage and pasture extension and applied research programs in the northern Columbia Basin in conjunction with growers, crop advisors, and other extension educators.
- Assistant Professor**, Dept. of Plant, Soil and Entomological Sciences, University of Idaho, August 1991-December 1998. Field and laboratory investigations of the physiological and morphological bases of herbage plant quality, utilization by herbivores, and management; taught undergraduate crop and grassland science courses; and mentored undergraduate and graduate research assistants.
- Postgraduate Researcher**, Dept. of Plant Sciences, University of California-Davis, October 1989-July 1991. Investigated sward structure and hunger as determinants of cattle ingestive behavior, and lamb responses to stocking densities and grazing systems on subclover-interseeded annual grassland.
- Postdoctoral Research Associate**, Dept. of Agronomy, Purdue University, September 1988-September 1989. Investigated inhibition of forage fiber digestion by soluble cell wall phenolic-carbohydrate complexes.
- Graduate Research Assistant**, Dept. of Agronomy, Horticulture, and Entomology, Texas Tech University, September 1983-August 1988. Greenhouse, small-plot, and pasture research involving physiology, quality, and management of herbage grasses and legumes and grazing livestock.

Graduate Research Assistant, Agronomy Dept., Penn State University, December 1980-January 1983.
Determined alfalfa nonstructural carbohydrate reserve levels and freezing tolerance in response to fall harvest management, and assisted with forage small plot and grazing management research projects.

Teaching Experience

West Virginia University, 2008-present. Designed and teach AGRN 452 Grain and Special Crops (3 cr.) and AGRN 454 Forage Crops (3 cr.). Guest presentations in AGRN 120 Principles of Agroecology, ANPR 343 Beef Production, ANPR 350 Milk Production, WDSC 444 Bio-based Energy Systems, RESM 330 Equine Facility Design and Management, and AGRN 593 SPTP Analytical Chemical Methods.

Graduate committee membership:

Jordan Koos, M.S. candidate Plant and Soil Sciences, 2016-2018.
Yadav Sapkota, M.S. Plant and Soil Sciences, 2015-2018.
Steffany Scagline, M.S. Plant and Soil Sciences, 2014-2017.
Rebecca Uphold, M.S. candidate Plant and Soil Sciences, 2013-16 (co-advisor).
Carol Brown, M.S. Plant and Soil Sciences, 2013-14.
Daniel Collucci, Ph.D. candidate Plant and Soil Sciences, 2012-15 (major professor).
Saraswati Poudel Acharya, M.S. Plant and Soil Sciences, 2012-14.
Inocencio Rodriquez, Ph.D. Natural Resource Economics, 2011-13.
Bobbi Lynn Bailey, Ph.D. Animal and Nutritional Sciences, 2009-13.
Michael Marra, M.S. Plant and Soil Sciences, 2011-12.
Joshua Peplowski, M.Ag. Agriculture, Forestry and Consumer Science, 2010.
Gatha Clevenger, M.S. Animal and Nutritional Sciences, 2009.

Utah State University, 2000-2007.

Graduate committee membership:

Sallee Reynolds, M.S. Plant Science, 2004-2007.
Carmen Yupanqui, M.S. Irrigation Engineering, 2004-2005.

University of Idaho, 1991-1998. Taught:

PISc 102 (3 cr.), The Science of Plants in Agriculture (1992-1993).
PISc 308 (3 cr., w/ lab), Forage and Grassland Management (1992-1998).
PISc 400 (1 cr.), Plant Science Seminar (1995-1998).
PISc 406 (1 cr.), Crop Production Practices and Big Game Depredation (co-instructor, 1991).
PISc 480 (1 cr.), Field Trip; co-leader to Hood River and Willamette Valley, OR (1995).
PISc 499 (1 cr.), Directed Study: Agricultural Enterprise Development (1997).
PISc 499 (2 cr.), Directed Study: Grass Developmental Morphology (1995).
PISc 499 (3 cr.), Directed Study: NIR Spectroscopy (1994).

Graduate committee membership:

Major Professor: Stephen Schrader (M.S. Plant Science, 1997). Thesis: Pasture-legume competition: The performance of *Medicago sativa* and *Trifolium repens* inter-seeded into a grass pasture.

Other committee membership:

10 M.S., Agric. Economics, Anim. Sci., Plant Sci., and Range Resources; 1 Ph.D., Chemistry.

Other Teaching

Associate Instructor, University of California-Davis. Lecturer in Range Sci. 135, Ecology and Community Structure of Grassland and Savanna Herbivores (graduate course), Fall 1990.

Supervisor, National Science Foundation-University of California Young Scholar, June-July 1990.

Supervisor, Purdue University Agricultural Research Apprentice, June-August 1989.

Teaching Assistant, The Pennsylvania State University. Agro. 28, Principles of Crop Management, Spring, 1982.

Instructor, School of Natural Science, Hampshire College. Shared planning and teaching A Plan for Hampshire's Wastes (with lab), Spring 1972; and Composting: An Introduction to the Biological Process as a Tool for Waste Management and Soil Improvement (with lab), Spring, 1975.

Other Experience

Dairy Farm Worker, Harkdale Farms, Inc., Newbury, VT, October 1978-April 1979.
 Herd Manager, Muskox Farm, University of Alaska, Fairbanks, September 1976-October 1977.
 Assistant Instructor, Dartmouth Outward Bound Center, Hanover, NH, January and August 1971, and
 January 1972.

Professional Affiliations

American Association for the Advancement of Science	American Society of Agronomy
American Forage and Grassland Council	British Grassland Society
Crop Science Society of America	New Zealand Grassland Association
NCCC31 Ecophysiological Aspects of Forage Management	NIRS Forage and Feed Testing Consortium

Awards and Honors

Certificate of Excellence, American Society of Agronomy 2010 Extension Educational Materials Program, for publication Pasture and Grazing Management in the Northwest (principal participant and co-author).
 Excellence in Extension Award 2010, Univ. of Idaho Extension, for publication Pasture and Grazing Management in the Northwest (principal participant and co-author).
 Excellence in Extension Award 2008 (team member, Lost Rivers Grazing Academy), Univ. of Idaho Extension.
 National winner (team member), Search for Excellence - Livestock Production: Univ. of Idaho Cooperative Extension Lost Rivers Grazing Academy, National Assoc. of County Agricultural Agents Annual Meeting, Cincinnati, OH, July 23-27, 2006.
 Certificate of excellence in recognition of development of agronomic educational materials (publications category), November 1, 1999, American Society of Agronomy.
 Outstanding Young Scientist Award, American Forage and Grassland Council, 1983.

Refereed Journal Publications and Research Proceedings

Scagline-Mellor, S., T. Griggs, J. Skousen, E. Wolfrum, and I. Holásková. 2018. Switchgrass and giant miscanthus biomass and theoretical ethanol production from reclaimed mine lands. *BioEnergy Res.* 11:562-573.

Brown, C., T. Griggs, T. Keene, M. Marra, and J. Skousen. 2016. Switchgrass biofuel production on reclaimed surface mines: I. Soil quality and dry matter yield. *BioEnergy Res.* 9:31-39.

Brown, C., T. Griggs, I. Holaskova, and J. Skousen. 2016. Switchgrass biofuel production on reclaimed surface mines: II. Feedstock quality and theoretical ethanol production. *BioEnergy Res.* 9:40-49.

Chail, A., J. Legako, L. Pitcher, T. Griggs, R. Ward, S. Martini, and J. MacAdam. 2016. Legume finishing provides beef with positive human dietary fatty acid ratios and comparable consumer preference with grain-finished beef. *J. Anim. Sci.* 94:2184-2197.

Hunt, S.R., J.W. MacAdam, and T.C. Griggs. 2016. Seeding rate, oat companion crop, and planting season effects on irrigated organic birdsfoot trefoil stands in the Mountain West United States. *Crop Sci.* 56:463-473.

Olsoy, P., T.C. Griggs, A.C. Ulappa, K. Gehlken, L.A. Shipley, G.E. Shewmaker, and J.S. Forbey. 2016. Nutritional analysis of sagebrush by near-infrared reflectance spectroscopy. *J. Arid Environments* 134:125-131.

Villalba, J.J., C. Spackman, B.M. Goff, J.L. Klotz, T. Griggs, and J.W. MacAdam. 2016. Interaction between a tannin-containing legume and endophyte-infected tall fescue seed on lambs' feeding behavior and physiology. *J. Anim. Sci.* 94:845-857.

Grabber, J.H., W.K. Coblenz, H. Riday, T.C. Griggs, D.H. Min, J.W. MacAdam, and K.A. Cassida. 2015. Protein and dry-matter degradability of European- and Mediterranean-derived birdsfoot trefoil cultivars grown in the colder continental USA. *Crop Sci.* 55:1-9.

MacAdam, J.W., S.R. Hunt, T.C. Griggs, R. Christensen, J.-S. Eun, R.E. Ward, and D.J. McMahon. 2015. Enhanced forage intake and milk production on birdsfoot trefoil pastures in the western US. 4 pp. *Proc. Organic Agriculture Research Symp. 2015*, La Crosse, WI, February 25-26, 2015.

Scagline, S., J. Skousen, and T. Griggs. 2015. Switchgrass and Miscanthus yield on reclaimed surface mines for bioenergy production. *J. Amer. Soc. Mining and Reclamation* 4(2):80-90.

Bailey, B.L., T.C. Griggs, E.B. Rayburn, and K.M. Krause. 2014. Beef heifer growth and reproductive performance following two levels of pasture allowance during the fall grazing period. *J. Anim. Sci.* 92:3659-3669.

- Grabber, J.H., H. Riday, K.A. Cassida, T.C. Griggs, D.H. Min, and J.W. MacAdam. 2014. Yield, morphological characteristics, and chemical composition of European- and Mediterranean-derived birdsfoot trefoil cultivars grown in the colder continental United States. *Crop Sci.* 54:1893-1901.
- Hunt, S.R., T.C. Griggs, and J.W. MacAdam. 2014. Change in birdsfoot trefoil (*Lotus corniculatus*) nutritive value with stem elongation, flowering and pod formation. In A. Hopkins et al. (ed.) *Proc. 25th European Grassland Federation General Meeting*, Aberystwyth, Wales, September 7-11. *Grassl. Sci. in Europe* 19:884-886.
- Hunt, S.R., J.W. MacAdam, and T.C. Griggs. 2014. Lignification and tannin localization during the development of birdsfoot trefoil stems. *Crop Sci.* 54:1876-1886.
- Skousen, J., C. Brown, T. Griggs, and S. Byrd. 2014. Establishment and growth of switchgrass and other biomass crops on surface mines. *J. Amer. Soc. Mining and Reclamation* 3(1):136-156.
- Brown, C., J. Skousen, and T. Griggs. 2013. Yield of switchgrass on reclaimed surface mines in West Virginia. *J. Amer. Soc. Mining and Reclamation* 2:38-48.
- MacAdam, J.W., S. Martini, and T.C. Griggs. 2013. The potential for reducing the carbon dioxide equivalent of beef production by finishing cattle on pure *Lotus corniculatus* pastures compared with grain-based feedlot finishing. R. Dewhurst et al. (ed.) *Proc. 5th Greenhouse Gases and Animal Agriculture Conference*, Dublin, Ireland, June 23-26, 2013. *Advances in Anim. Biosciences* 4, Special Issue 2:323.
- Marra, M., T. Keene, J. Skousen, and T. Griggs. 2013. Switchgrass yield on reclaimed surface mines for bioenergy production. *J. Environ. Qual.* 42:696-703.
- Rodriguez, I., G. D'Souza, and T.C. Griggs. 2013. Can spatial dependence enhance industry sustainability? The case of pasture-based beef. *Environ. Econ.* 4:93-103.
- MacAdam, J.W., R.E. Ward, T.C. Griggs, B.R. Min, and G.E. Aiken. 2011. Case study: average daily gain and blood fatty acid composition of cattle grazing the non-bloating legumes birdsfoot trefoil and cicer milkvetch in the mountain west. *The Prof. Animal Scientist* 27:574-583.
- Jensen, K.S., C. Cheyney, J. Hawkins, C.W. Gray, G. Shewmaker, S. Williams, T. Griggs, and J.R. Gerrish. 2009. Lost Rivers Grazing Academy: Building sustainability in livestock production. 5 pp. [Online] *J. of Extension* 47 (1), Article Number 11AW4.
- Griggs, T.C. 2007. Introduction to the CSSA symposium - Beyond the plant: Biodiversity impacts on the grazing animal. *Crop Sci.* 47:380-381.
- Griggs, T.C., J.W. MacAdam, H.F. Mayland, and J.C. Burns. 2007. Temporal and vertical distribution of non-structural carbohydrate, fiber, protein, and digestibility levels in orchardgrass swards. *Agron. J.* 99:755-763.
- Provenza, F.D., J.J. Villalba, J. Haskell, J.W. MacAdam, T.C. Griggs, and R.D. Wiedmeier. 2007. The value to herbivores of plant physical and chemical diversity in time and space. *Crop Sci.* 47:382-398.
- Griggs, T.C. 2006. Fall and spring forage production and quality of winter cereals seeded at three fall dates. [Online] *Forage and Grazinglands* doi:10.1094/FG-2006-0711-01-RS.
- MacAdam, J.W., and T.C. Griggs. 2006. Performance of birdsfoot trefoil, white clover, and other legume-grass mixtures under irrigation in the Intermountain West USA. *Proc. New Zealand Grassland Association* 68:355-359.
- MacAdam, J.W., T.C. Griggs, P.R. Beuselinck, and J.H. Grabber. 2006. Birdsfoot trefoil, a valuable tannin-containing legume for mixed pastures. [Online] *Forage and Grazinglands* doi:10.1094/FG-2006-0912-01-RV.
- Griggs, T.C., J.W. MacAdam, H.F. Mayland, and J.C. Burns. 2005. Nonstructural carbohydrate and digestibility patterns in orchardgrass swards during daily defoliation sequences initiated in evening and morning. *Crop Sci.* 45:1295-1304.
- MacAdam, J. W., T. C. Griggs and G. J. Mileski. 2005. The interaction of management with botanical composition of irrigated grass-legume pasture mixtures in the Intermountain West USA. p. 357. In F.P. O'Mara et al. (ed.) *Proc. XX Internat. Grassland Congress* (main session), Dublin, Ireland, June 26-July 2, 2005.
- Griggs, T.C., K.B. Lobos, and P.E. Kingery. 1999. Digestibility analysis of undried, unground, and dry ground herbage by near-infrared reflectance spectroscopy. *Crop Sci.* 39:1164-1170.
- Distel, R.A., E.A. Laca, T.C. Griggs, and M.W. Demment. 1995. Patch selection by cattle: maximization of intake rate in horizontally heterogeneous pastures. *Appl. Anim. Beh. Sci.* 45:11-21.
- Laca, E.A., R.A. Distel, T.C. Griggs, and M.W. Demment. 1994. Effects of canopy structure on patch depression by grazers. *Ecol.* 75:706-716.
- Demment, M.W., R.A. Distel, T.C. Griggs, E.A. Laca, and G.P. Deo. 1993. Selective behaviour of cattle grazing ryegrass swards with horizontal heterogeneity in patch height and bulk density. p. 712-714. In M.J. Baker et al. (ed.) *Proc. XVII Internat. Grassland Congress*, Palmerston North, New Zealand, February 8- 21, 1993.

- Flores, E.R., E.A. Laca, T.C. Griggs, and M.W. Demment. 1993. Sward height and vertical morphological differentiation determine cattle bite dimensions. *Agron. J.* 85:527-532.
- Griggs, T.C., M.B. Jones, and M.W. Demment. 1993. Grazing system and grazing pressure effects on herbage and lamb production from subclover-interseeded annual grassland. p. 1307-1308. *In* M.J. Baker et al. (ed.) *Proc. XVII Internat. Grassland Congress*, Palmerston North, New Zealand, February 8-21, 1993.
- Laca, E.A., M.W. Demment, R.A. Distel, and T.C. Griggs. 1993. A conceptual model to explain variation in ingestive behaviour within a feeding patch. p. 710-712. *In* M.J. Baker et al. (ed.) *Proc. XVII Internat. Grassland Congress*, Palmerston North, New Zealand, February 8-21, 1993.
- Laca, E.A., R.A. Distel, T.C. Griggs, G. Deo, and M.W. Demment. 1993. Field test of optimal foraging with cattle: the marginal value theorem successfully predicts patch selection and utilisation. p. 709-710. *In* M.J. Baker et al. (ed.) *Proc. XVII Internat. Grassland Congress*, Palmerston North, New Zealand, February 8-21, 1993.
- Griggs, T.C., and A.G. Matches. 1991. Productivity and consumption of wheatgrasses and wheatgrass-sainfoin mixtures grazed by sheep. *Crop Sci.* 31:1267-1273.
- Kidambi, S.P., A.G. Matches, and T.C. Griggs. 1989. Variability for Ca, Mg, K, Cu, Zn, and K/(Ca+Mg) ratio among three wheatgrasses and sainfoin on the Southern High Plains. *J. Range Manage.* 42:316-322.
- Griggs, T.C., and W.C. Stringer. 1988. Prediction of alfalfa herbage mass using sward height, ground cover, and disk technique. *Agron. J.* 80:204-208.

Refereed Journal or Proceedings Publications Submitted or in Preparation

- Sapkota, Y., L.M. McDonald, T.C. Griggs, T. Basden, and B.L. Drake. Portable X-ray fluorescence spectroscopy for rapid and cost-effective determination of elemental composition of forage. *Submitted to Frontiers in Plant Sci.*
- Bailey, B.L., T.C. Griggs, E.B. Rayburn, and K.M. Krause. Herbage mass, forage quality, and botanical composition of mixed cool season naturalized pastures in response to two fall stocking rates. *In preparation for submission to Crop, Forage & Turfgrass Management.*
- Griggs, T.C. Cool-season pasture growth responses to winter stocking density and timing of initiation of spring grazing. *In preparation for submission to Agron. J.*
- Griggs, T.C. Assessment of botanical composition of mixed pasture vegetation via near-infrared reflectance spectroscopy. *In preparation for submission to Crop Sci.*
- Griggs, T.C., K. Nkansah, and C.D. Griffin. Spectral assessment of pasture root density in soil samples. *In preparation for submission to Plant and Soil.*

Peer Editor-Approved Publications

- Griggs, T.C. 2011. Nonstructural carbohydrate and digestibility patterns in temperate pastures and canopy management implications. 7 pp. *Proc. American Forage and Grassland Council Annual Conference*, French Lick, IN, June 13-15, 2011 [CD, American Forage and Grassland Council].
- Griggs, T.C., C.E. Israelsen, and R.D. Clawson. 2006. 2005 Utah Corn Silage Variety Trial Results - Benson. [Online] *Crop Management*.
- Griggs, T.C., C.E. Israelsen, K. Pack, D.R. Fillmore, and D.D. Knudsen. 2006. 2004 Utah Corn Silage Variety Trial Results - Wellsville. [Online] *Crop Management*.
- Griggs, T.C., K. Pack, D.R. Fillmore, R.F. Sessions, and R.D. Clawson. 2006. Utah 2004 Irrigated Alfalfa Variety Trial Results - Logan. [Online] *Crop Management*.
- Griggs, T.C., C.S. Poulson, M.G. Pace, and K. Pack. 2006. Utah 2004-2005 Irrigated Alfalfa Variety Trial Results - Delta. [Online] *Crop Management*.
- Pace, M.G., L. Rasmussen, T. Tuttle, and T.C. Griggs. 2006. Utah 2003 Leafy Corn Silage Variety Trial Results - Flowell. [Online] *Crop Management*.
- Griggs, T.C., J.V. Barnhill, C.E. Israelsen, K. Pack, D.R. Fillmore, and D.D. Knudsen. 2004. Utah 2003 corn silage variety trial results (Benson and Hooper). [Online] *Crop Management*.
- Griggs, T.C., J.V. Barnhill, M.G. Pace, R.F. Sessions, R.L. Cartee, and D.D. Knudsen. 2004. Utah 2001 corn silage variety trial results (Delta, Hooper, and Wellsville). [Online] *Crop Management*.
- Griggs, T.C. and M.M. Guenter. 2004. Utah 2002 corn grain variety trial results (Elwood). [Online] *Crop Management*.
- Griggs, T.C., M.G. Pace, T.A. Reeve, and R.F. Sessions. 2004. Utah 2001 corn grain variety trial results (Elwood and Holden). [Online] *Crop Management*.
- Griggs, T.C., M.G. Pace, K. Pack, and D.R. Fillmore. 2004. Utah 2003 irrigated alfalfa variety trial results (Delta and N. Logan). [Online] *Crop Management*.

- Griggs, T.C., J.V. Barnhill, C.E. Israelsen, F.D. Miner, and M.M. Guenter. 2003. Utah 2002 corn silage variety trial results (Benson, Hooper, and Lake Shore). [Online] *Crop Management*.
- Griggs, T.C., R.F. Sessions, M.J. Bouck, J.S. Murdock, D.A. Chandler, and R.E. Whitesides. 2003. Utah 1999-2002 irrigated alfalfa variety trial results (Kaysville). [Online] *Crop Management*.

Non-Refereed Journal, Experiment Station, and Proceedings Publications

- Novotny, L., T. Griggs, J. Karlen, P. Laskowski-Morren, and L. Bauman. 2013. Guidelines for optimizing accuracy and consistency in the NIRSC laboratory. Ver. 2 (35 pp). NIRS Forage and Feed Testing Consortium, Hillsboro, WI, <http://nirsconsortium.org/>.
- Rodriguez, I., G. D'Souza, E. Rayburn, and T. Griggs. 2012. BEFERGYONET model (of potential economic and environmental impacts of pasture-based beef production in the Appalachian region), <http://ccl.northwestern.edu/netlogo/models/community/BEFERGYONET%20MODEL>. Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL.
- Griggs, T.C., B.L. Bailey, and K.M. Krause. 2011. Beef heifer and pasture responses to winter grazing and hay feeding management. 6 pp. *Proc. 2011 Appalachian Grazing Conf.*, Morgantown, WV, March 4-5, 2011.
- Shewmaker, G.E., L. K. Hooper, and T.C. Griggs. 2010. Predicting herbage mass in irrigated orchardgrass (*Dactylis glomerata* L.) pastures. p. 225-230. *Proc. 4th National Conference on Grazing Lands*, Sparks, NV, December 13-16, 2009 [CD, Grazing lands Conservation Initiative].
- Griggs, T.C., D.R. Drake, and S.C. Parkinson. 2008. Production and quality of warm-season annual forage grasses. p. 42-45. *Proc. 2008 Idaho Alfalfa and Forage Conference*, Burley, ID, February 26-27, 2008.
- Griggs, T.C. 2006. Performance of warm-season annual forage grasses. p. 133-136. *Proc. 2006 Western Alfalfa and Forage Conference*, Reno, NV, December 11-13, 2006.
- Putnam, D., M. Ottman, T. Griggs, D. Drake, D. McWilliams, J. Brummer, and W. Riggs. 2006. Emerging issues with forages in the Southwest. p. 9-20. *Proc. 2006 Western Alfalfa and Forage Conference*, Reno, NV, December 11-13, 2006.
- Mayland, H., D. Mertens, B. Taylor, J. Burns, D. Fisher, P. Gregorini, T. Ciavarella, K. Smith, G. Shewmaker, and T. Griggs. 2005. Diurnal changes in forage quality and their effects on animal preference, intake, and performance. p. 223-230. *Proc. 2005 California Alfalfa Symposium*, Visalia, CA, December 12-14, 2005.
- Fransen, S.C., and T.C. Griggs. 2002. Management of cool-season grasses for hay production and quality. p. 95-100. *Proc. 2002 Western Alfalfa and Forage Conference*, Reno, NV, December 11-13, 2002.
- Griggs, T.C. 2002. Interpretation and use of university forage variety trial results. p. 191-193. *Proc. 2002 Western Alfalfa and Forage Conference*, Reno, NV, December 11-13, 2002.
- Griggs, T.C., and W.W. Riggs. 2002. Emerging issues for alfalfa and other forages in the Great Basin. p. 9-12. *Proc. 2002 Western Alfalfa and Forage Conference*, Reno, NV, December 11-13, 2002.
- Putnam, D., J. Brummer, D. Cash, A. Gray, T. Griggs, M. Ottman, I. Ray, W. Riggs, M. Smith, G. Shewmaker, and R. Todd. 2000. The importance of western alfalfa production. p. 1-9. *Proc. 29th National Alfalfa Symposium*, Las Vegas, NV, December 11-12, 2000.
- Griggs, T.C. 1999. Pasture and range management basics. p. 78-81. *Washington Beef Information Day Proc.* Pullman, WA, April 15-16. Washington State Univ. Cooperative Extension.
- Griggs, T.C., and P.E. Kingery. 1998. Performance of forage and conservation grasses in northern Idaho. *Idaho Agricultural Experiment Station Bull.* 798.
- Kingery, P.E., and T.C. Griggs. 1998. Performance of perennial forage legumes in northern Idaho. *Idaho Agricultural Experiment Station Bull.* 802.
- Fransen, S., and T. Griggs. 1993. Adaptation of New Zealand-Australian grazing management techniques to the Palouse region. p. 1-4. *Proc. WSU Beef Information Day '93*. Pullman, WA, June 2. Washington State Univ. Dept. of Animal Sci. and Cooperative Extension.
- Griggs, T.C. 1993. Diagnosis of nutrient deficiencies in alfalfa and wheat. *J. Nat. Resources and Life Sciences Educ.* 22:183-184 (review of a slide and audiotape set).
- Distel, R.A., T.C. Griggs, E.A. Laca, and M.W. Demment. 1991. Cattle prefer patches that yield greater instantaneous intake rate in patchy ryegrass swards. p. 171. *Proc. 2nd Grazing Livestock Nutrition Conference*, Steamboat Springs, CO, August 2-3. Oklahoma Agric. Exp. Stn. MP-133.
- Griggs, T.C., R.A. Distel, and M.W. Demment. 1991. Bite dimensions of cattle as determined by sward height, bulk density, and grazing time. p. 172. *Proc. 2nd Grazing Livestock Nutrition Conference*, Steamboat Springs, CO, August 2-3. Oklahoma Agric. Exp. Stn. MP-133.
- Griggs, T.C., E.A. Laca, and M.W. Demment. 1991. Bite dimensions and intake of cattle within feeding stations as affected by horizontal sward heterogeneity and hunger level. p. 173. *Proc. 2nd Grazing Livestock Nutrition Conference*, Steamboat Springs, CO, August 2-3. Oklahoma Agric. Exp. Stn. MP-133.

- Laca, E.A., T.C. Griggs, R.A. Distel, and M.W. Demment. 1991. Concepts of grazing - factors and mechanisms that determine bite weight and grazing behavior of cattle within a feeding station. p. 174. *Proc. 2nd Grazing Livestock Nutrition Conference*, Steamboat Springs, CO, August 2-3. Oklahoma Agric. Exp. Stn. MP-133.
- Griggs, T.C., and W.C. Stringer. 1983. The relation of alfalfa summer growth rate to yield at maturity for six cultivars. p. 42-44. *Proc. Forage and Grassland Conference*, Eau Claire, WI, January 23-26. American Forage and Grassland Council, Georgetown, TX.

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Grants, Funding, and Collaboration

- 2018 USDA NIFA Organic Transitions Program, Overcoming barriers to transitioning small ruminants to organic production: Effects of feeding birdsfoot trefoil on parasite control, nutritional status and profitability. \$499,817 for multi-institutional award 2018-2021.
USDA NIFA Alfalfa and Forage Research Program, Proximal and remote sensing of alfalfa canopies for early detection of insect pest stress and rapid integrated pest management decision-making. \$289,993 multi-institutional award (WVU portion \$84,872 for Y.-L. Park (PI) and self (co-PI) for 2018-2019).
- 2017 WV NRCS, Prescribed grazing management training program and AFGC Professional planning to individual WV livestock farmers, \$123,432 (co-PI portion \$3,999 for 2017-2020).
- 2015 WVU Davis College-WV NRCS Cooperative Agreement, Prescribed grazing impacts on grassland rooting and soil microbial population dynamics: Implications for soil organic matter development and nitrous oxide emissions, \$123,539 for 2016-2019 (PI).
WVU Teaching and Learning Commons Academic Innovation Technology Integration Grant, Environmental instrumentation of crop science teaching small plots on WVU Evansdale campus, \$2000 for 2015-2016 (PI).
- 2014 USDA NRCS Contribution Agreement, Nutrient management planning leading to the development of CNMP development in West Virginia, \$260,000 for 2014-2016 (co-PI portion \$8472).
Michigan State University AgBioResearch Project GREEN, Birdsfoot trefoil: an alternative forage legume with bioactive potential, \$54,145, no direct funding (collaborator).
- 2013 USDA NIFA AFRI Competitive Grants Program, Increasing legume grazing for higher beef gain on pastures: An improved high-tannin birdsfoot trefoil cultivar with trans-regional potential, \$402,500 multi-institutional award (co-PI portion \$59,650 for 2013-2017).
- 2012 Western Region SARE Professional Development Program, Forage and pasture educational program for professionals in the Northwest, \$71,058 for group for 2012-2014, travel funding (cooperator).
USDA-ARS and West Virginia Agricultural and Forestry Experiment Station Project, Economic pasture-based beef systems for Appalachia, co-PI portion \$41,657.
- 2011 USDA-ARS and West Virginia Agricultural and Forestry Experiment Station Project, Economic pasture-based beef systems for Appalachia, co-PI portion \$41,524.
- 2010 West Virginia University Faculty Development Grant, \$500.
USDA-ARS and West Virginia Agricultural and Forestry Experiment Station Project, Economic pasture-based beef systems for Appalachia, co-PI portion \$23,304.
- 2006 Utah Agricultural Experiment Station Special Research Grant, Pasture and Forage Research: Creating mixtures that sustain irrigated pastures and enhance livestock health and production, \$28,850.
USU corn silage hybrid performance trial 2006, \$2800 from commercial corn breeding programs and seed companies.
Western Region SARE Professional + Producer Competitive Grant: Integrating annual crops and residues, perennial pastures, and livestock management to extend the grazing season and minimize nitrogen losses, \$10,000 (PI).
- 2005 Western Region SARE Professional Development Program competitive grant: Forage and Pasture Educational Program for Extension, FSA, and NRCS in the Pacific Northwest, \$90,000 (co-PI portion \$5786).
Utah Agricultural Experiment Station Special Research Grant, Pasture and Forage Research: Creating Mixtures That Sustain Irrigated Pastures and Enhance Livestock Health and Production, \$8200 (co-PI portion \$2050).
Pasture Management – Plants, Soil, and Water Quality. USU Pasture Research Initiative Committee, \$5000.
USU alfalfa cultivar performance trial 2005-2008, Cedar City, \$11,250 from commercial alfalfa breeding programs and seed companies.
USU corn silage hybrid performance trial 2005, \$3380 from commercial corn breeding programs and seed companies.
USU spring cereal forage performance trial 2005, \$1300 from ProGene Plant Research.

- 2004 USU corn silage hybrid performance trial 2004, \$3220 from commercial corn breeding programs and seed companies.
Grants from USU Pasture Research Initiative (\$1003), USU Extension Agriculture and Natural Resources Program Leader (\$1000), and Western Region SARE Professional Development Program (\$1000) to support USU Extension Irrigated Pasture and Grazing Management Professional Development Workshop, Payson and Elberta, UT.
Pasture Management – Plants, Soil, and Water Quality. USU Pasture Research Initiative Committee, \$21,000 awarded; reduced to \$3370 after redirection of Initiative.
- 2003 Assessment and prediction of pasture growth rates for improved budgeting of herbage to grazing livestock. USU Pasture Research Initiative Committee, \$5000.
USU multi-location corn silage hybrid performance trials 2003, \$5500 from commercial corn breeding programs and seed companies.
USDA CSREES, Extending BEHAVE in Utah, \$10,000 (*co-PI*).
- 2002 Assessment and prediction of pasture growth rates for improved budgeting of herbage to grazing livestock. USU Pasture Research Initiative Committee, \$5,000.
USU Pasture Research Initiative Committee equipment cost-sharing grant, \$3200.
USU multi-location alfalfa cultivar performance trials 2002-2005, \$6750 from commercial alfalfa breeding programs and seed companies.
USU multi-location corn silage and grain hybrid performance trials 2002, \$4060 from commercial corn breeding programs and seed companies.
USU spring cereal forage performance trials 2002, Delta and Logan, \$2300 from seed companies and Utah Crop Improvement Association.
- 2001 USU multi-location corn silage and grain hybrid performance trials 2001, \$4200 from commercial corn breeding programs and seed companies.
USU multi-location alfalfa cultivar performance trials 2001-2004, \$24,750 from commercial alfalfa breeding programs and seed companies.
USU Research Office New Faculty Grant, Improving the accuracy of forage quality evaluation through rapid assessment of fiber digestibility. July, 2001-June, 2002, \$15,000.
- 2000 Travel support grant for Washington Grazier's Conference presenters, Washington State University Center for Sustaining Agriculture and Natural Resources, \$500.
- 1997 Instructional development grant, USDA Western Region Sustainable Agriculture Research and Education Professional Development Program, Teaching scientific concepts of grass regrowth for improved grazing management, \$600 (with D. Hannaway, Oregon State Univ.).
Research grant, USDA Small Business Innovation Research Program, Forage-based agriculture on sloping, erodible terrain in northern Idaho, \$20,800.
- 1996 Research grant, Idaho Barley Commission, Use of near-infrared reflectance spectroscopy and *in vivo* digestibility to predict energy value of feed barley, \$3,000 (with C. Hunt).
Research grant, USDA Small Business Innovation Research Program, Forage-based agriculture on sloping, erodible terrain in northern Idaho, \$16,700.
- 1995 Equipment grant, USDA National Research Initiative Competitive Grants Program, Near-infrared reflectance spectrophotometer for analysis of feed, food, and beverage quality, \$27,121.
Research grant, USDA Small Business Innovation Research Program, Forage-based agriculture on sloping, erodible terrain in northern Idaho, \$3,000.
Research grant, USDA STEEP II Program, Sustainability of uses of land released from the CRP: hay, cattle pasture, and cereal cropping systems, \$21,726.
Research grant, Idaho Barley Commission, Evaluation of environmental effects on ruminant nutritional value of spring barleys, \$3,000.
- 1994 Research grant, Idaho Barley Commission, Evaluation of environmental effects on ruminant nutritional value of spring barleys, \$6,000.
Research grant, USDA STEEP II Program, Sustainability of uses of land released from the CRP: hay, cattle pasture, and cereal cropping systems, \$25,815.
Teaching grant, Univ. of Idaho Teaching/Learning Mini-Grants Program, Implementation of modelling software to improve student understanding of complex biological systems, \$1,000 (with J. Marshall).
- 1993 Research grant, Idaho Barley Commission, Evaluation of environmental effects on ruminant nutritional value of spring barleys, \$7,000.
Research grant, Univ. of Idaho Seed Grant Program, Plant population dynamics and herbivore diet selection in legume-interseeded pastures, \$6,000.
Research grant, USDA Small Business Innovation Research Program, Technical and economic

feasibility of mechanized gathering of hay from northern Idaho hillsides, \$34,921 (with G. Morris).

- Research grant, USDA STEEP II Program, Forage legumes for soil conservation and improvement in annual cropping systems of northern Idaho, \$7,471.
- 1992 Research grant, USDA STEEP II Program, Forage legumes for soil conservation and improvement in annual cropping systems of northern Idaho, \$7,471.
- Travel grant, American Forage and Grassland Council, International Grassland Congress, \$860.
- Travel grant, Univ. of Idaho Research Office, International Grassland Congress, \$900.

Grant proposals not funded (note short timeline for some proposals)

- 2017 Northeast SARE Program pre-proposal, Prescribed grazing impacts on forage and microbial dynamics: soil organic matter development and nitrous oxide emissions (with Z. Freedman and C. Kelly, no amount specified).
- 2016 USDA Northeast Sun Grant Initiative, Rapid field and laboratory assessment of perennial grass and willow feedstock composition for decision support by biorefineries, \$300,000 for 2016-2018 (*PI*).
- 2015 WVU Davis College-WV NRCS Cooperative Agreement, Grassland management as a strategy to maintain and increase soil health in West Virginia marginal landscapes: Soil-forage-animal interactions, \$132,560 for 2016-2017 (*co-PI*).
- USDA NIFA Alfalfa and Forage Research Program, Field spectral assessment of alfalfa canopy composition to support harvest timing decisions, \$209,969 (*PI*). Multi-regional and -institutional proposal prepared during 30-day timeline.
- WVU Davis College Faculty Development Fund, Participation in Unity Scientific NIR spectroscopy calibration training workshop, \$2,000.
- US Department of Energy Office of Energy Efficiency and Renewable Energy, Landscape Design for Sustainable Bioenergy Systems Program, Preston County WV: A future biomass mosaic, \$3,000,000 (*co-PI*).
- 2014 Mississippi State University Sustainable Vision Program, Application of nanometer technology to transform teaching of botanical determinations with a Sustainable Vision faculty grant, \$50,000 (*collaborator*).
- Preliminary proposal to The Virginia Hemp Company, Establishment and growth of industrial hemp on reclaimed lands in West Virginia, \$336,483 (*co-PI*).
- USDA NIFA AFRI Competitive Grants Program, Facilitation of dung beetle-mediated ecosystem services through integrated cattle and pasture management in the Appalachian uplands, \$500,000 (*PI*).
- USDA NRCS Conservation Innovation Grants Program, Using strategic beef cattle dewormer programs to enhance scarab dung beetle populations on pastures resulting in improved manure nutrient cycling and soil health, \$241,113 (*co-PI*).
- USDA NIFA Alfalfa and Forage Research Program, Field spectral assessment of alfalfa canopy composition to support harvest timing decisions, \$165,000 (*PI*). Multi-regional and -institutional proposal prepared during 30-day timeline.
- 2013 NIFA AFRI Sustainable Bioenergy Competitive Grants Program, Equation development for rapid spectral assessment of switchgrass composition for decision support and feedstock management by biorefineries (*PI*). Letter of Intent approved but proposal not submitted because availability of necessary infrastructure would be unlikely.
- Northeast SARE Program, Canopy management to promote herbage production, root contributions to soil organic matter, and grass-legume balance in climate-resilient cool-season pastures, \$199,027 (*PI*).
- 2012 USDA NIFA AFRI, Agriculture and Natural Resources Science for Climate Variability and Change, Climate-resilient pastures in the carbon economy (Integrated Coordinated Agricultural Project), \$10,000,000 (one of 31 *co-PIs*).
- USDA NIFA Regional Integrated Pest Management Competitive Grants Program, Livestock diet training for biological control of horsenettle, ironweed, and biennial thistle in northeastern pastures (*PI*). Letter of Intent approved but full proposal not submitted by due date of <30 days.
- WV Dept. of Environmental Protection, Growth of switchgrass on reclaimed lands in West Virginia 2012-2014, \$41,490 (*co-PI*).
- 2011 USDA NIFA AFRI, Sustainable Bioenergy, Root turnover and soil carbon and nitrogen dynamics in perennial grassland under contrasting intensities of bioenergy feedstock and forage utilization

- (PI). Full proposal encouraged following Letter of Intent but not submitted by due date of 30 days. USDA NIFA AFRI, Agriculture and Natural Resources Science for Climate Variability and Change, Canopy management for soil carbon and nitrogen storage in perennial grassland under contrasting intensities of utilization (PI). Amount not specified in Letter of Intent.
- USDA NIFA AFRI Foundational Program, Soil carbon dynamics and storage in perennial grassland under biomass, hay, and pasture management, \$150,000 (PI).
- WVU Research Corp. Program to Stimulate Competitive Research (PSCoR), Assessment of grassland botanical composition with near-infrared reflectance spectroscopy, \$19,862 (PI).
- Northeast Sun Grant Initiative, Integrated grassland management for sustainable production of bioenergy feedstock and forage with soil carbon storage, \$145,500 (PI).
- 2010 USDA-NRCS Conservation Innovation Grants Program, Preproposal: On farm demonstrations transitioning to legume-grass production systems to replace poultry litter-derived nitrogen on grassland, \$59,700 (co-PI).
- Cornell Univ. AFRI Northeast Coordinated Agricultural Program on Sustainable Agriculturally-Based Industrial Ecologies, Preproposal: Integrated management of grassland resources for sustainable forage, bioenergy feedstock, and livestock production and soil carbon storage, \$223,002 (PI).
- Northeast SARE Program, Integrated management of grassland resources for sustainable forage, bioenergy feedstock, and livestock production and soil carbon storage, \$200,000 (PI).

Invited Presentations at Professional Meetings

- Two presentations: Defoliation responses of grasses; and Forage species use, adaptation, and yield. *Cool-Season Grass Professional Development Workshop*, Noble Foundation, Ardmore, OK, May 28, 2015.
- Two presentations: NIRS for pasture monitoring; and Highlighting the value of advanced forage quality constituents. *Joint annual conferences of American Forage and Grassland Council and NIRS Forage and Feed Testing Consortium*, St. Louis, MO, January 12-14, 2015.
- Biofuels committee update. *NIRS Forage and Feed Testing Consortium Annual Conference*, Knoxville, TN, February 12-13, 2014.
- Two presentations: Cool-season grass growth and development; and Cool-season grass physiology and management implications. *Cool-Season Grass Initiative Professional Development Workshop*, Syria, VA, May 21-22, 2013.
- Two presentations: Cool-season grass growth and development; and Cool-season grass physiology and management implications. *Cool-Season Grass Initiative Professional Development Workshop*, French Lick, IN, June 16, 2011.
- Nonstructural carbohydrate and digestibility patterns in temperate pastures and canopy management implications [in Symposium on Canopy Management for Pasture Production and Quality]. *American Forage and Grassland Council Annual Conference*, French Lick, IN, June 13-15, 2011.
- Laskowski, P.M., D. Osmanski, and T.C. Griggs. Demonstration of Methods Outlined in NIRS Consortium Guidelines Document. *NIRS Forage and Feed Testing Consortium Annual Conference*, Omaha, NE, February 15-17, 2011.
- NIRS analysis of forage quality: current status. *Pacific Northwest Forage Workers Annual Workshop*, Prosser, WA, October 31-November 3, 2005.
- Participant (dairy group), *Workshop on Private Grazing Lands*, Utah State Univ., Logan, UT, July 8-10, 1997.
- Vegetation and cattle responses to grazing management on perennial grassland. *Dept. of Plant, Soil and Entomological Sci. Seminar Series*, Univ. of Idaho, December 7, 1995.
- Improved understanding of pasture-livestock system dynamics through simple models. *Forage-Livestock Systems Seminar Series*, Univ. of Missouri, Columbia, MO, May 1, 1995.
- Sustainability of alternative forage and crop enterprises following CRP. *STEEP II Annual Review Meeting*, Richland, WA, January 4-5, 1995.
- Forage cropping systems for water-conservative agriculture in the western U.S. *Western Society of Crop Science Annual Meeting*, Tucson, AZ, June 21-23, 1994.

Volunteered Presentations at Professional Meetings and Academic Seminars

- Griggs, T.C., M.L. Satterfield, J.M. Koos, Z.L. Freedman, and C.L. Kelly. Is pasture productivity determined by LAI? *Crop Science Society of America Annual Meeting*, Baltimore, MD, November 4-7, 2018.
- Asking and answering insightful scientific questions. Division of Plant and Soil Sciences Agronomy Graduate Seminar, West Virginia University, September 11, 2018.

- Pasture growth responses to timing of initial spring grazing. Division of Plant and Soil Sciences Agronomy Graduate Seminar, West Virginia University, November 14, 2017.
- Scagline, S., J. Skousen, and T. Griggs. 2017. Yields and ethanol production potential of switchgrass and miscanthus on reclaimed mine lands. *2017 National Meeting of the American Society of Mining and Reclamation, What's Next for Reclamation?*, Morgantown, WV, April 9-13.
- Koos, J., Z. Freedman, T. Griggs, and C. Kelly. 2017. Prescribed defoliation strategies may influence grassland rooting and soil microbial dynamics in West Virginia. [Poster] *21st Annual Davis College Graduate Research and Creative Scholarship Day*, West Virginia University, Morgantown, WV, April 4.
- Kreykes, M., K. Cassida, E. van Santen, J.W. MacAdam, and T. Griggs. Forage yield, quality, and root characteristics of birdsfoot trefoil-tall fescue pastures. [Poster] *Crop Science Society of America Annual Meeting*, Phoenix, AZ, November 6-9, 2016.
- MacAdam, J.W., and T. Griggs. Source and implications of elevated non-fibrous carbohydrates in the perennial legume birdsfoot trefoil (*Lotus corniculatus* L.). *Crop Science Society of America Annual Meeting*, Phoenix, AZ, November 6-9, 2016.
- Griggs, T.C., C.D. Griffin, K. Nkansah, and M.L. Satterfield. Cool-season mixed pasture growth and root density under differing defoliation regimes and leaf area indices. [Poster] *Crop Science Society of America Annual Meeting*, Minneapolis, MN, November 15-18, 2015.
- Scagline, S., T. Griggs, and J. Skousen. Switchgrass and Miscanthus yields on reclaimed surface mines for bioenergy production. [Poster] *2015 NEWBio Annual Meeting*, Morgantown, WV, August 3-5, 2015.
- Scagline, S., J. Skousen, and T. Griggs. Switchgrass and Miscanthus yields on reclaimed surface mines for bioenergy production capabilities, *2015 Joint Conference of the American Society of Mining and Reclamation and the Appalachian Regional Reforestation Initiative*, Lexington, KY, June 6-11, 2015.
- Collucci, D., E. Rayburn, I. Holásková, and T. Griggs. Grassland defoliation strategies to minimize nitrogen losses from Appalachian beef stocker grazing systems. [Poster] *Crop Science Society of America Annual Meeting*, Long Beach, CA, November 2-5, 2014.
- Grabber, J.H., W.K. Coblenz, H. Riday, K.A. Cassida, T.C. Griggs, D.-H. Min, and J.W. MacAdam. Yield, morphological development, and forage quality characteristics of European- and Mediterranean-derived birdsfoot trefoil cultivars grown in the colder continental United States. [Poster] *Crop Science Society of America Annual Meeting*, Long Beach, CA, November 2-5, 2014.
- Hunt, S.R., T.C. Griggs, and J.W. MacAdam. Change in birdsfoot trefoil (*Lotus corniculatus*) nutritive value with stem elongation, flowering and pod formation. [Poster] *25th European Grassland Federation General Meeting*, Aberystwyth, Wales, September 7-11, 2014.
- MacAdam, J.W., L.R. Pitcher, and T. Griggs. 2014. Reducing carbon dioxide equivalent emissions by finishing beef yearlings on birdsfoot trefoil perennial legume pastures. [Poster] *Crop Science Society of America Annual Meeting*, Long Beach, CA, November 2-5, 2014.
- Olsoy, P.J., J.S. Forbey, J.L. Rachlow, J.D. Nobler, M.A. Burgess, T.C. Griggs, N.F. Glenn, and L.A. Shipley. Mapping fearsomes and foodscapes for grouse: High-resolution habitat assessment using remote sensing. *29th Western Agencies Sage and Columbian Sharp-tailed Grouse Workshop*, Elko, NV, June 17-19, 2014.
- Uphold, R., J. Kotcun, T. Griggs, and E. Rayburn. Tannin content in birdsfoot trefoil in response to herbivory and season. *Crop Science Society of America Annual Meeting*, Long Beach, CA, November 2-5, 2014.
- van Santen, E., K. Cassida, B. Goff, T. Griggs, J. Johnson, R. Kallenbach, J. MacAdam, and G. Shewmaker. Increasing legume grazing for higher beef gain on pastures: An improved high-tannin birdsfoot trefoil cultivar with trans-regional potential. [Poster] *68th Southern Pasture and Forage Crop Improvement Conference*, Biloxi, MS, April 21-23, 2014.
- van Santen, E., K.A. Cassida, B. Goff, T. Griggs, J.M. Johnson, R.L. Kallenbach, J.W. MacAdam, and G.E. Shewmaker. Increasing legume grazing for higher beef gain on pastures: An improved high-tannin birdsfoot trefoil cultivar with trans-regional potential. [Poster] *Crop Science Society of America Annual Meeting*, Long Beach, CA, November 2-5, 2014.
- West Virginia Univ. annual report to multi-state research Coordinating Committee NCCC-31, *Ecophysiological Aspects of Forage Management*, Hickory Corners, MI, June 17-19 2014.
- Bailey, B.L., T.C. Griggs, and K.M. Krause. Heifer growth and reproductive performance following two levels of fall pasture allocation. [Poster] *American Dairy Science Association and American Society of Animal Science Joint Annual Meeting*, Indianapolis, IN, July 8-12, 2013.
- Brown, C., J. Skousen, and T. Griggs. Yield of switchgrass on reclaimed surface mines in West Virginia. [Poster] *National Meeting of the American Society of Mining and Reclamation*, Laramie, WY, June 1-6, 2013.
- Griggs, T.C., K. Nkansah, and C.D. Griffin. Spectral assessment of pasture root density in soil samples. [Poster] *Crop Science Society of America Annual Meeting*, Tampa, FL, November 3-6, 2013.
- Hunt, S.R., J.W. MacAdam, and T.C. Griggs. Fluctuation in growing-season tannin concentrations of three

- birdsfoot trefoil varieties. [Poster] *Crop Science Society of America Annual Meeting*, Tampa, FL, November 3-6, 2013.
- MacAdam, J.W., S. Martini, and T.C. Griggs. The potential for reducing the carbon dioxide equivalent of beef production by finishing cattle on pure *Lotus corniculatus* pastures compared with grain-based feedlot finishing. [Poster] *5th Greenhouse Gases and Animal Agriculture Conference*, Dublin, Ireland, June 23-26, 2013.
- Poudel Acharya, S., L.M. McDonald, T. C. Griggs, and J.B. Koteun. Phosphorus forms and availability in organically managed grassland soils. [Poster] *American Society of Agronomy Annual Meeting*, Tampa, FL, November 3-6, 2013.
- West Virginia Univ. annual report to multi-state research Coordinating Committee NCCC-31, *Ecophysiological Aspects of Forage Management Annual Meeting*, Lexington, KY, June 3-5, 2013.
- Poudel Acharya, S., L.M. McDonald, W.B. Bryan, and T. C. Griggs. Grazing effects on phosphorus form and availability in organically managed grassland. [Poster] *American Society of Agronomy Annual Meeting*, Cincinnati, OH, October 21-24, 2012.
- Assessment of botanical composition of cool-season pastures via near-infrared reflectance spectroscopy. [Poster] *Crop Science Society of America Annual Meeting*, Cincinnati, OH, October 21-24, 2012.
- Bailey, B.L., K.M. Krause, and T.C. Griggs. Beef heifer growth and reproductive performance responses to stockpiled fall forage allowances. [Poster] *American Society of Animal Science Annual Meeting*, Phoenix, AZ, July 15-19, 2012.
- West Virginia Univ. annual report to multi-state research Coordinating Committee NCCC-31, *Ecophysiological Aspects of Forage Management Annual Meeting*, Bloomington, MN, June 19-21, 2012.
- Bailey, B.L., K.M. Krause, and T.C. Griggs. Beef heifer growth and reproductive performance responses to stockpiled fall forage allowances. [Poster] *16th Annual West Virginia Univ. Davis College of Agriculture, Natural Resources and Design Graduate Research Day*, Morgantown, WV, April 4, 2012.
- Griggs, T.C., B.L. Bailey, and K.M. Krause. Cool-season mixed pasture growth responses to winter grazing severity and timing of initial spring grazing. *Crop Science Society of America Annual Meeting*, San Antonio, TX, October 16-19, 2011.
- Bailey, B.L., K.M. Krause, and T.C. Griggs. Influence of winter and spring pasture allowance on growth and reproductive performance of beef replacement heifers. [Poster] *American Society of Animal Science Annual Meeting*, New Orleans, LA, July 10-14, 2011.
- Bailey, B.L., K.M. Krause, and T.C. Griggs. Influence of winter and spring pasture allowance on growth and reproductive performance of beef replacement heifers. [Poster] *15th Annual West Virginia Univ. Davis College of Agriculture, Natural Resources and Design Graduate Research Day*, Morgantown, WV, April 6, 2011.
- West Virginia Univ. annual report to multi-state research Coordinating Committee NCCC-31, *Ecophysiological Aspects of Forage Management Annual Meeting*, W. Lafayette, IN, March 30, 2011.
- Griggs, T.C., B.L. Bailey, and K.M. Krause. Productivity of cool-season perennial pastures under cattle grazing initiated at three dates in spring following moderate and heavy fall defoliation. [Poster] *Crop Science Society of America Annual Meeting*, Long Beach, CA, October 31-November 4, 2010.
- Griggs, T.C., W.B. Bryan, and E.E.D. Felton. Legume proportions in pasture and hay swards following overseeding of cool-season perennial grass with red and white clover. [Poster] *Crop Science Society of America Annual Meeting*, Pittsburgh, PA, November 2-5, 2009.
- MacAdam, J.W., and T.C. Griggs. Forage nutritive value of grazed irrigated pasture mixtures for the Intermountain West. [Poster] *Crop Science Society of America Annual Meeting*, Pittsburgh, PA, November 2-5, 2009.
- Shewmaker, G.E., L.K. Hooper, and T.C. Griggs. Predicting herbage mass in irrigated orchardgrass pastures. *4th National Conference on Grazing Lands*. Sparks, NV, Dec. 13-16, 2009.
- Shewmaker, G.E., L.K. Hooper, and T. Griggs. Predicting herbage mass in irrigated orchardgrass (*Dactylis glomerata* L.) pastures. *Annual Meeting of the Society for Range Management*, Albuquerque, NM, February 8-12, 2009.
- Cheyney, C., J. Gerrish, C. Gray, T. Griggs, J. Hawkins, S. Jensen, S. Williams, and G. Shewmaker. Lost Rivers Grazing Academy: Building sustainability in livestock production. *7th Annual Western Region Extension Professional Development Conference*, Prineville, OR, October 15-16, 2008.
- Hooper, L.K., G.E. Shewmaker, and T.C. Griggs. Relationship of sward height and herbage mass for orchardgrass (*Dactylis glomerata* L.), smooth bromegrass (*Bromus inermis* Leyss.), and perennial ryegrass (*Lolium perenne* L.) in a pasture system. *Annual Meeting of the American Forage and Grassland Council and the Society for Range Management*, Louisville, KY, January 26-31, 2008.
- Shewmaker, G.E., and T.C. Griggs. Nonstructural carbohydrate cycles and accumulation rates in perennial forages. *Annual Meeting of the American Forage and Grassland Council and the Society for Range*

- Management*, Louisville, KY, January 26-31, 2008.
- Gray, C.W., C.C. Cheyney, J.R. Gerrish, J.N. Hawkins, K.S. Jensen, G.E. Shewmaker, S. Williams, and T.C. Griggs. Lost Rivers Grazing Academy: Management-intensive grazing for sustainable livestock production. [Poster] *International Farm Management Association Congress 16*, Cork, Ireland, July 15-20, 2007.
- MacAdam, J.W., and T.C. Griggs. Performance of birdsfoot trefoil, white clover, and other legume-grass mixtures under irrigation in the Intermountain West USA. [Poster] *New Zealand Grassland Association Annual Conference*, Dunedin, New Zealand, November 14-16, 2006.
- Drake, D.R., G.E. Cardon, and T.C. Griggs. Non-traditional soil amendments in western US alfalfa production. [Poster] *American Society of Agronomy Annual Meeting*, Indianapolis, IN, November 13-16, 2006.
- Drake, D.R., T.C. Griggs, and G.E. Cardon. Non-traditional soil amendments in western US alfalfa production. [Poster] *American Society of Agronomy Annual Meeting*, Salt Lake City, UT, November 6-10, 2005.
- Forage productivity and nutritional value of winter cereals planted at three fall dates. [Poster] *Crop Science Society of America Annual Meeting*, Salt Lake City, UT, November 6-10, 2005.
- MacAdam, J.W., and T.C. Griggs. Forage nutritive value of irrigated pasture species for the Intermountain West. [Poster] *Crop Science Society of America Annual Meeting*, Salt Lake City, UT, November 6-10, 2005.
- MacAdam, J. W., T. C. Griggs and G. J. Mileski. The interaction of management with botanical composition of irrigated grass-legume pasture mixtures in the Intermountain West USA. [Poster] *XX Internat. Grassland Congress (Main Session)*, Dublin, Ireland, June 26-July 2, 2005.
- Daily carbohydrate and digestibility patterns in orchardgrass sward horizons. *Crop Science Society of America Annual Meeting*, Seattle, WA, November 1-4, 2004.
- MacAdam, J.W., T.C. Griggs, G. Mileski, and S. Buffler. Long-term changes in botanical composition of rotationally stocked irrigated grass-legume mixtures. [Poster] *Crop Science Society of America Annual Meeting*, Seattle, WA, November 1-4, 2004.
- Integrating daily patterns of pasture soluble carbohydrate level and grazing behavior. *Annual Meeting of the AAAS, Pacific Division, and Western Society of Crop Science*, Logan, UT, June 13-17, 2004.
- Energy levels in orchardgrass sward horizons during defoliation sequences initiated in morning and evening. [Poster] *Crop Science Society of America Annual Meeting*, Denver, CO, November 2-6, 2003.
- Orchardgrass soluble carbohydrate and digestibility levels in sward horizons under sequences of successive defoliation initiated in morning and evening. [Poster] *American Dairy Science Association and American Society of Animal Science Annual Meeting*, Phoenix, AZ, June 22-26, 2003.
- Mayland, H.F., J.W. MacAdam, T.C. Griggs, and J.C. Burns. Soluble sugar, fiber, and energy density in orchardgrass horizons during sward defoliation sequences initiated in morning and evening. [Poster] *National Conference on Grazing Lands*, Nashville, TN, December 7-10, 2003.
- Seasonal distribution of tiller developmental stages in cool-season grass canopies. *Crop Science Society of America Annual Meeting*, Charlotte, NC, October 21-25, 2001.
- Timothy production and quality responses to N and harvest management in the Pacific Northwest. [Poster] *Crop Science Society of America Annual Meeting*, Salt Lake City, UT, October 31-November 4, 1999.
- Smith, E., K. Launchbaugh, and T. Griggs. How energy sources in plants may affect dietary preferences in grazing animals. [Student poster] *Joint Society for Range Management/American Forage and Grassland Council Annual Meeting*, Omaha, NE, February 21-26, 1999.
- Grass developmental morphology patterns under simulated grazing. *Crop Science Society of America Annual Meeting*, Baltimore, MD, October 18-22, 1998.
- Perennial grass growth and quality responses to N and harvest management. *Crop Science Society of America Annual Meeting*, Anaheim, CA, October 26-31, 1997.
- Evaluation of environmental effects on ruminant nutritional value of spring barleys. *Tri-State Barley Research Review*, Moscow, ID, February 12-13, 1996.
- Livestock pasture, hay, and cereal cropping options for CRP grassland. *Crop Science Society of America Annual Meeting*, St. Louis, MO, October 29-November 3, 1995.
- Evaluation of environmental effects on ruminant nutritional value of spring barleys. *Tri-State Barley Research Review*, Moscow, ID, February 21-22, 1995.
- Behavior of pasture-livestock systems under fluctuating environmental conditions. *Crop Science Society of America Annual Meeting*, Seattle, WA, November 14-17, 1994.
- Lobos, K.B., T.C. Griggs, and P.E. Kingery. Quality analysis of wet and dry forms of forage by NIRS. [Student poster] *Crop Science Society of America Annual Meeting*, Seattle, WA, November 14-17, 1994.
- Evaluation of environmental effects on ruminant nutritional value of spring barleys. *Tri-State Barley Research Review*, Moscow, ID, January 25-26, 1994.
- Grazing system and grazing pressure effects on herbage and lamb production from subclover-interseeded annual grassland. [Poster] *XVII Internat. Grassland Congress*, Palmerston North, New Zealand,

- February 8-21, 1993.
- Laca, E.A., R.A. Distel, T.C. Griggs, G. Deo, and M.W. Demment. Field test of optimal foraging with cattle: the marginal value theorem successfully predicts patch selection and utilisation. [Poster] *XVII Internat. Grassland Congress*, Palmerston North, New Zealand, February 8-21, 1993.
- Productivity of lamb grazing systems on subclover-seeded annual grassland. *Crop Science Society of America Annual Meeting*, Denver, CO, October 28-31, 1991.
- Ingestive behavior of cattle grazing alfalfa is determined by sward structure. *Crop Science Society of America Annual Meeting*, San Antonio, TX, October 22-25, 1990.
- Phenolic-carbohydrate complexes in maize cell walls and influences on rumen microbes. [Poster] *Crop Science Society of America Annual Meeting*, Las Vegas, NV, October 16-19, 1989.
- Digestible organic matter intake of wheatgrasses and wheatgrass-sainfoin mixtures by sheep. [Poster] *Crop Science Society of America Annual Meeting*, Anaheim, CA, November 28-December 1, 1988.
- Wheatgrass and wheatgrass-sainfoin production and quality under different sheep-grazing schedules. *Crop Science Society of America Annual Meeting*, Atlanta, GA, November 30-December 3, 1987.
- Prediction of alfalfa herbage mass using nondestructive techniques. *Crop Science Society of America Annual Meeting*, New Orleans, LA, December 1-4, 1986.
- The relation of alfalfa summer growth rate to yield at maturity for six cultivars. *American Forage and Grassland Council Annual Conference*, Eau Claire, WI, January 23-26, 1983.

Extension Presentations (and participant number) Since 2005; others to 1991 in Appendix A

- Two presentations: Grassland management contributions to soil health and sustainability; and Cow efficiency and pasture. *2017 Appalachian Grazing Conference*, Morgantown, WV, March 10-11 (60).
- Dairy pasture agronomic background and management principles. *WVU Dairy Grazing Field Day*, Morgantown, WV, September 28, 2017 (22).
- Grassland defoliation impacts on roots, soil microbial communities, and soil health. *2016 West Virginia University Organic Farm Field Day*, Morgantown, WV, August 27, 2016 (12).
- Defoliation management impacts on pasture and root growth. *2015 Appalachian Grazing Conference*, Morgantown, WV, March 13-14 (60).
- Forage budgeting: Optimal forage management for stocker operators. *Virginia Cooperative Extension 2015 Virginia Stocker Cattle Summit*, Weyers Cave, VA, February 25, 2015 (70).
- Griggs, T.C., and E.E. Felton. Forage sampling, analysis, interpretation, and end-use applications. *2013 Appalachian Grazing Conference*, Morgantown, WV, March 8-9 (250).
- Grazing management strategies with cattle. *2013 Appalachian Grazing Conference*, Morgantown, WV, March 8-9 (80).
- Practical review of fertilizer management problems. *West Virginia University Extension Service Fundamentals of Nutrient Management Training Course*, Morgantown, WV, December 12, 2012 (30).
- Growth, development, and defoliation responses of legumes. *Western SARE PDP Pasture Management Professional Development Workshop*, Salmon, ID, August 21-23, 2012 (28).
- Griggs, T.C., R. Frost, and C. Cheyney. Grazing systems. *Western SARE PDP Pasture Management Professional Development Workshop*, Salmon, ID, August 21-23, 2012 (28).
- Griggs, T.C., and J.B. Hall. Nutritional needs of grazing animals and forage nutritive value. *Western SARE PDP Pasture Management Professional Development Workshop*, Salmon, ID, August 21-23, 2012 (28).
- Pasture growth responses to winter and early spring grazing. *WVU Reedsville Farm Research Field Days*, Reedsville, WV, July 6-7, 2012 (25).
- Pasture canopy management impacts on species composition and root production. *WVU Reedsville Farm Research Field Days*, Reedsville, WV, July 6, 2012 (15).
- Griggs, T.C., and E.B. Rayburn. Pasture and hay management and quality. *WVU Reedsville Farm Research Field Days*, Reedsville, WV, July 7, 2012 (20).
- Keys to excellence in hay production and quality. *2012 Wood Co. Farmers' Short Course*, Parkersburg, WV, February 9, 2012 (60).
- Griggs, T.C., and B.L. Bailey. Beef heifer and pasture responses to winter grazing and hay feeding management. *2011 Appalachian Grazing Conf.*, Morgantown, WV, March 4-5 (150).
- Principles and practices of forage budgeting in pastures. *West Virginia Conservation Agency Tygarts Valley District Pasture Walk*, Barbour Co., WV, June 19, 2010 (19).
- Practical review of fertilizer management problems. *West Virginia University Extension Service Fundamentals of Nutrient Management Training Course*, Morgantown, WV, December 16-17, 2009 (30).
- Two presentations: Pasture plant structure, physiology, and defoliation response; and Hands-on herbage mass assessment. *Univ. of Idaho Cooperative Extension Lost Rivers Grazing Academy X*, Salmon, ID, June 10-

- 13, 2008 (19).
- Production and quality of warm-season annual forage grasses. *Univ. of Idaho Cooperative Extension 2008 Idaho Alfalfa and Forage Conference*, Burley, ID, February 26-27, 2008 (145).
- Extending the fall and winter grazing season. *Univ. of Idaho Cooperative Extension Regional Beef Schools*, Pocatello, ID, January 9; Montpelier, ID, January 10; and Rexburg, ID, January 11, 2008 (66 total).
- Judged entries at *2007 Oregon Hay King Contest*, Lakeview, OR, December 1, 2007 (30).
- Four presentations: Legume growth and development; Forage quality assessment; Grazing systems; and Hands-on pasture assessment. *Western SARE Pasture Management Professional Development Workshops*, Salmon, ID, September 18-20, 2007 (23); Prineville, OR, May 15-17, 2007 (24); Logan, UT, September 19-21, 2006 (44); and Prosser, WA, May 23-25, 2006 (24).
- Two presentations: Pasture plant structure, physiology, and defoliation response; and Hands-on pasture assessment. *Univ. of Idaho Cooperative Extension Lost Rivers Grazing Academy IX*, Salmon, ID, June 11-14, 2007 (18).
- Barney, B.J., D.R. Drake, T.C. Griggs, and G.E. Cardon. Effect of non-traditional soil amendments on alfalfa forage quality. [Student poster] *2007 Utah State Univ. Extension Annual Planning and Professional Development Conference*, Logan, UT, March 6-8, 2007 (30).
- Extended-season grazing. *Univ. of Idaho Cooperative Extension 2007 Southeast Idaho Forage School*, Preston, ID, March 13, 2007 (45).
- Drake, D.R., D.G. Eddington, and T.C. Griggs. Comparative forage yield and quality of Goldeneye 6-row spring barley. [Poster] *2007 Annual Seed School and Seed Industry Meetings*, Utah Crop Improvement Association, Brigham City, UT, February 28, 2007 (30).
- Cache County silage corn performance trial – 2006. *USU Extension Cache Co. Crops School*, Logan, UT, February 20, 2007 (60).
- Jensen, K.B., and T.C. Griggs. Species and management for grass hay production. *2007 Utah Hay & Forage Symposium*, St. George, UT, February 7-8, 2007 (60).
- Drake, D.R., T.C. Griggs, and G.E. Cardon. Alfalfa yield and quality response to foliar applied non-traditional fertilizers. [Poster] *2006 Western Alfalfa and Forage Conference*, Reno, NV, December 11-13, 2006.
- Drake, D.R., D.G. Eddington, and T.C. Griggs. Comparative forage yield and quality of Goldeneye 6-row spring barley. [Poster] *2006 Western Alfalfa and Forage Conference*, Reno, NV, December 11-13, 2006.
- Performance of warm-season annual forage grasses. *2006 Western Alfalfa and Forage Conference*, Reno, NV, December 11-13, 2006 (100).
- Two presentations: Hands-on pasture assessment; and Pasture weed management. *USU Extension Beaver River Watershed Tour and Pesticide Training*, Beaver, UT, November 14, 2006 (30).
- Judged entries at *Cache County Fair Hay Contests*, Logan, UT, August 6, 2008; August 8, 2007; August 9, 2006; August 10, 2005; August 11, 2004; and August 6, 2003 (200).
- Judged entries at *Eureka County Fair Hay Contest*, Eureka, NV, August 12, 2006 (35).
- Field presentation: Birdsfoot trefoil tannins study 2006. *USU Extension and Utah Agricultural Experiment Station Greenville Irrigated Farm Field Day*, N. Logan, UT, July 12, 2006 (20).
- Managing irrigated pastures for profit. *Univ. of Idaho Cooperative Extension Oneida Co. Livestock School*, Malad, ID, March 1, 2006 (15).
- Management-intensive grazing to maximize pasture returns. *Harward Irrigation Systems Irrigation Expo 2006*, Springville, UT, March 1, 2006 (25).
- Pest management and production practices for spring cereal forages. *USU Extension Cache Co. Crops School*, Logan, UT, March 1, 2006 (45).
- Two presentations (co-presenter with D.R. Drake): Small grain forage trial results; and Economic comparisons of barley and corn production in Utah. *Annual Seed School and Seed Industry Meetings*, Utah Crop Improvement Association, Brigham City, UT, February 17, 2006 (80).
- Alfalfa and small grain forage crop update. *USU Extension Summit Co. Weed and Crop Management Workshop*, Oakley, UT, February 1, 2006 (12).
- Pasture plant selection and grazing management. *USU Extension Pasture Management Workshop*, Beaver, UT, January 25, 2006 (25).
- Two presentations: Alfalfa weed management; and Alfalfa variety testing and performance. *USU Extension Crop and Water School*, Cedar City, UT, January 10, 2006 (87).
- Two presentations: Microwave oven determination of forage dry matter concentration; and Forage production vs. nutritional value and associated tests: fiber digestibility, RFQ, TDN, and MILK2000. *USU Extension Cache Co. Fall Forage Field Day*, Benson, UT, September 7, 2005 (20).
- Field presentation: Birdsfoot trefoil tannins study. *USU Extension Greenville Farm Crops Tour*, N. Logan, UT, July 15, 2005 (35).
- Pasture plant structure, physiology, and defoliation response. *Univ. of Idaho Cooperative Extension Lost Rivers*

- Grazing Academy VII*, Salmon, ID, June 13-16, 2005 (20).
- Role of pastures in the Northwestern USA. *Ecology of Grazing Lands Systems graduate field course* (Texas Tech Univ., Univ. of Missouri, Univ. of Tennessee, and Virginia Tech), Logan, UT, May 31, 2005 (25).
- Two presentations: Small grain, harvested forage, and pasture plant selection and management; and Information resources for Utah crop production, management, and quality. *USU Extension Agriculture Agent Professional Development Workshop on Crop Production*, Provo, UT, May 24-26, 2005 (18).
- Flooding impacts on Utah crops. *Midday Edition broadcast, KCPW Public Radio*, Salt Lake City, May 23, 2005.
- Pasture plant selection and grazing management. *USU Extension Small Acreage Management Workshop*, Roosevelt, UT, April 16, 2005 (30).
- Determining hay quality with systematic sensory evaluation and laboratory analysis (co-presenter with C.E. Israelsen). *2005 Utah State Univ. Extension Annual Planning and Professional Development Conference*, Logan, UT, March 8-10, 2005 (28).
- Small grain, corn, warm-season annual grass, and alfalfa: performance and selection. *USU Extension Utah Co. Crop and Forage Seminar*, Provo, UT, March 2, 2005 (17).
- Hay preservatives: which and when to use. *USU Extension Weber Co. Crops School*, Ogden, UT, March 2, 2005 (40).
- Warm-season annual forage grasses: fit and performance. *USU Extension Cache Co. Crops School*, Logan, UT, March 1, 2005 (65).
- Drought impacts on corn, small grains, and alfalfa production. *USU Extension Box Elder Co. Crop Management School*, Garland, UT, February 17, 2005 (58).
- Two presentations: New forage quality tests: fiber digestibility, RFQ, and TDN; and USU alfalfa variety trial results and selection guidelines (co-presenter with C. Poulson). *2005 Utah Hay and Forage Symposium*, St. George, UT, January 31-February 1 (50).
- Pasture fertilization management. *Far West Agribusiness Association Annual Fertilizer and Chemical Conference*, Jackpot, NV, January 10-12, 2005 (50).

Extension Consultations and Technical Assistance

Planning and technical assistance in response to approximately 100-120 requests annually during 2000-2007, and 60 requests annually during 1991-1998, from Extension agricultural agents, producers, seed companies, natural resource management agencies, and other Extension clientele. Continue to respond to occasional questions from editors of popular press forage management publications and Extension agricultural agents within and beyond West Virginia.

Event Planning and Implementation (and participant number)

- Presided over annual Board of Directors summer meeting of NIRS Forage and Feed Testing Consortium, Ardmore, OK, July 24-26, 2017 (12).
- Planned and organized 1-day field tour of Oregon forage seed industry for participants in annual meeting of NCCC-31, *Ecophysiological Aspects of Forage Management*, Willamette Valley, OR, June 15, 2016 (15).
- Organized and invited presenters for pasture dung beetle ecology session at *2015 Northeast Pasture Consortium Annual Meeting*, Morgantown, WV, March, 2015 (35).
- Planned and ran hay and haylage sample exhibit with nutritional value analyses at *2013 Appalachian Grazing Conference*, Morgantown, WV, March 8-9, 2013 (300).
- Co-planned and convened *Western SARE Pasture Management Professional Development Workshops*, Salmon, ID, August 21-23, 2012 (12 presenters, 28 participants) and September 18-20, 2007 (8 presenters, 23 participants); and Prosser, WA, May 23-25, 2006 (6 presenters, 24 participants).
- Co-planned and convened *WVU Reedsville Farm Research Field Days*, Reedsville, WV, July 6-7, 2012 (40).
- Planned Biofuels and Portable instruments sessions at *NIRS Forage and Feed Testing Consortium Annual Conference*, Phoenix, AZ, February 14-16, 2012 (50).
- Planned and conducted educational program at *2007 Utah Hay & Forage Symposium*, St. George, UT, February 7-8, 2007 (20 presenters, 165 participants).
- Organized *Western SARE Pasture Management Professional Development Workshop*, Logan, UT, September 19-21, 2006 (10 presenters, 44 participants).
- Co-organized hay judging and forage quality analysis at *2005 Utah Hay & Forage Symposium*, St. George, UT, January 31-February 1; 2005, and *Cache County Fair Hay Contests*, Logan, UT, August 8, 2007; August 9, 2006; August 10, 2005; August 11, 2004; and August 6, 2003 (230 total).
- Utah State Univ. Extension Annual Planning and Development Conference Planning Committee* member, 2006.

- Assisted with planning and conduct of annual *Oregon Hay and Forage Association Hay and Straw King Contests*, October-November, 2001-2005 and December, 2007, Fort Rock, Lakeview, Merrill, and Madras, OR (190 total).
- Planned and conducted educational program at *2005 Utah Hay & Forage Symposium*, St. George, UT, January 31-February 1, 2005 (28 presenters, 160 participants).
- Planned and conducted *USU Extension Irrigated Pasture and Grazing Management Professional Development Workshop*, Payson and Elberta, UT, June 8-10, 2004 (27).
- Planned and conducted Educational program at *2003 Utah Hay & Forage Symposium*, St. George, UT, January 27-28, 2003 (28 presenters, 150 participants).
- Co-organized *USU Extension Cache Co. Fall Forage Field Day*, Lewiston, UT, September 12, 2003 and Benson, UT, September 4, 2002 (57 total).
- Planned and conducted *USU Extension and Utah Agricultural Experiment Station Greenville Irrigated Farm Field Days*, N. Logan, UT, July 13, 2004; July 8, 2003; July 9, 2002; and July 11, 2001 (180 total).
- Planned and conducted *Utah Wool Growers Association Forage and Pasture Management Tour*, Utah State University, Logan, UT, August 8, 2002 (35).
- Planned and conducted *USU Extension Professional Development Workshop on Pasture Assessment*, Utah State University, N. Logan, UT, June 14, 2002 (6).
- Planned and conducted *USU Pasture Research Initiative Committee Pasture Research Workshop: Management and Output of Irrigated Pasture-Livestock Systems*, USU Caine Dairy Center, Wellsville, UT, June 12-13, 2002 (28).
- Organized cultivar verification grow-out sample sets for *USU Extension Spring and Winter Cereal Drillbox Surveys*, 2002.
- Co-planned and conducted *USU Extension Professional Development Workshop: Planning and management of integrated pasture-livestock systems*, Provo, UT, February 5, 2002 (20).
- Coordinated *USU and Commercial Pasture Research and Management Tour*, USU Caine Dairy, Wellsville, UT, August 24, 2001 (25).
- Co-organized *State FFA Crops Contest*, Snow College, Ephraim, UT, October 17, 2000 (60).
- Organized *Washington State Hay Growers Association Hay King Contests*, Moses Lake, WA, August 17-21, 1999 and August 14-18, 2000.
- Co-organized Washington State Univ. *Washington Grazier's Conference*, Mount Vernon, WA, July 7-8, 2000. Eighteen presenters, 60 participants, and three locations throughout two days, with field exercises.
- Co-organized Washington State Univ. *Washington Grazier's Conference*, Moses Lake, WA, June 26, 1999. Fifteen presenters, 120 participants, and three locations throughout the day, with field exercises.

National Service

- President, 2017; President-elect, 2016; Vice-president, 2015; and Board of Directors member, 2011-2015, NIRS Forage and Feed Testing Consortium.
- Associate editor, *Crop Science*, 2017-2018. Processed 5 assigned manuscripts.
- Oversaw submission of successful 5-year renewal proposal for NCCC-31, Ecophysiological Aspects of Forage Management.
- Biofuels Committee chair, NIRS Forage and Feed Testing Consortium, 2012-2014.
- Accuracy and Quality, Switchgrass, and Annual Conference Planning Committees member, NIRS Forage and Feed Testing Consortium, 2010-2013.
- Judged Forage and Grazinglands R.F. Barnes Graduate Student Paper Competition, Crop Science Society of America Annual Meeting, Cincinnati, OH, October 22, 2012 and Tampa, FL, November 4, 2013.
- Chaired annual meetings of NCCC-31, Ecophysiological Aspects of Forage Management, June 17-19, 2014 and June 4-6, 2013.
- Secretary/Chair-elect for NCCC-31, Ecophysiological Aspects of Forage Management, 2012.
- Intellectual Property Committee member, NIRS Forage and Feed Testing Consortium, 2007.
- Co-organizer and Presiding Officer of C-6 symposium: Beyond the Plant: Biodiversity Impacts on the Grazing Animal (4 presenters, 45 participants). Annual Meetings of the Crop Science Society of America, Salt Lake City, UT, November 6-10, 2005.
- Associate Editor, *Agronomy Journal*, 2001-2004. Processed 12 manuscripts through review and revision.
- Manuscript reviewer for USDA NRCS conservation practice assessment book chapter, USDA Northeast Climate Hub factsheet, *Agronomy*; *Agronomy J.*; *Canadian J. of Plant Science*; *Crop Science*; *Crop, Forage & Turfgrass Management*; *Forage and Grazinglands*; *Grass and Forage Science*; *J. of Environmental Quality*; *J. of Natural Resources and Life Sciences Education*; *J. of Near Infrared Reflectance Spectroscopy*; *J. of Production Agriculture*; *J. of Range Management*; *J. of the Science of Food*

and Agriculture; Renewable Agriculture and Food Systems; Scientia Agricola (Brazil); and *Zoo Biology* since 1989.

- Program Planning Committee member and Session Co-chair (Other Forage Crops), National Alfalfa Symposium, San Diego, CA, December 13-15, 2004.
- Extension Forage Specialist Seminar recorder. Annual Meeting of the American Society of Agronomy, Seattle, WA, November 1-4, 2004.
- Presiding Officer at C-6 session: Grazing and Livestock Performance. Annual Meetings of the Crop Science Society of America, Denver, CO, November 2-6, 2003.
- Presiding Officer at C-6 session: Pasture Production and Soil Nutrient Management. Annual Meetings of the Crop Science Society of America, Indianapolis, IN, November 10-14, 2002.
- Main session moderator, 29th National Alfalfa Symposium, Las Vegas, NV, December 11-12, 2000.
- Forage, Grassland and Range Resource Committee (ACS 824) member, American Society of Agronomy, 1996-1998.

Regional Service

- Session moderator: Dung beetles in the pasture ecosystem; and discussion session leader: Promoting dung beetle activity in pastures, *2015 Northeast Pasture Consortium Annual Meeting*, Morgantown, WV, March, 11-12, 2015.
- West Virginia Associated Crop Growers Advisory and Certification Committees member, 2011-2012.
- Utah Farm Bureau Federation Hay Growers Advisory Committee member, 2000-2007.
- Utah State University and Utah Department of Agriculture and Food NIRS Feed Analysis Committee member, 2001-2007.
- Utah Crop Improvement Association Board of Directors member (ex officio), 2001-2007.
- Program planning representative for 2006 Western Alfalfa and Forage Conference, Reno, NV, December 11-13, 2006.
- Utah Farm Bureau Federation Grain Crops Advisory Committee member, 2000-2004.
- Chair and annual meeting organizer, Western Coordinating Committee (WCC)-091, Improving stress resistance of forages in the western United States, Salt Lake City, January 9-10, 2003.
- Vice-Chair and annual meeting organizer, Western Coordinating Committee (WCC)-091, Improving stress resistance of forages in the western United States, Las Vegas, NV, January 2-3, 2002.
- Planning Committee member and main session moderator for 2002 Western Alfalfa and Forage Conference, Reno, NV, December 11-13, 2002.
- Secretary, Western Coordinating Committee (WCC)-091, Improving stress resistance of forages in the western United States, Salt Lake City, January 3, 2001.
- Reviewed project proposals, research manuscripts, and extension publications from California Dept. of Food and Agriculture, University of California, Oregon State University, University of Idaho, University of Nevada, USDA-ARS, Utah State University, and Washington State University since 2000.
- University advisor to Washington State Hay Growers Association, 1999-2000.
- Technical advisor to two applicants for USDA Western Region Sustainable Agriculture Research and Education Program Farmer/Rancher Research Grants, 1994 and 1997 (one successful recipient).
- Technical advisor to Palouse-Clearwater Environmental Institute Farm Improvement Club Annual Legumes/Summer Fallow Replacement Project, Reardan, WA, 1994.
- Clearwater Resource Conservation and Development Council North Idaho Hay and Forage Marketing Feasibility Study Group member, Moscow, ID, 1992.
- Western Research Coordinating Committee member, WRCC-88, Evaluation of Alfalfa Hay Quality in the Western Region, 1992.

University and Community Service

- Member, WVU Davis College Committee for 2016 and 2017 Annual Student Research and Creative Scholarship Days, 2015-2017.
- Member, WVU Davis College Farm Council, 2015-2016.
- Member, WVU Davis College committee to assess feasibility of future robotic pasture-based dairy farm, 2015-2016.
- Judged MS oral papers at WVU Davis College Student Research and Creative Scholarship Day, April 7, 2015.
- Member, WVU Davis College Master of Agriculture Program Committee, 2015-2016.
- Planner, new WVU Agricultural Sciences Building plant drying, grinding, refrigeration, and freezer facilities and crop science research lab suite, 2014-2015.

Organized and conducted West Virginia State Agriculture Career Development Agronomy contest for FFA teams, Morgantown, WV, June 3, 2015 and assisted organizer in June, 2016.

Helped WVU EnvironMentor student with NIR spectroscopic compositional analysis of birdsfoot trefoil herbage, April, 2015.

Drafted syllabi for proposed new WVU Div. of Plant and Soil Sciences Agroecology curriculum: AGRE 480 - Field Methods and Case Studies in Agroecology; and AGRE 120 - Principles of Agroecology, 2015.

Developed crop science small-plot teaching area on WVU Evansdale campus. 2015.

Member, Horticulture Candidate Search Committee, Div. of Plant & Soil Sciences, West Virginia Univ., 2013-2014.

Member, WVU Davis College Planning Committee for 2013 Appalachian Grazing Conference.

Member, Beef and Sheep Committees, WVU Davis College, 2013-14.

Chair, Special Events Committee, Davis College of Agriculture, Natural Resources and Design, WVU, 2010-2013.

Special Events Committee member, Davis College of Agriculture, Natural Resources and Design, WVU, 2009.

President, Utah State Univ. Extension Specialists' Association, 2005-2006 (President-elect in 2004-2005).

Presenter, Management of Alfalfa and Birdsfoot Trefoil Production and Quality, to delegation from Shaanxi Province, People's Republic of China, at Utah State University, September 26, 2005.

Presenter, Departmental Capabilities in Crop Production and Diversification Under Semi-Arid and Arid Conditions, to Governor of Babylon Province and Chairman of Babylon Provincial Council, Iraq at Utah State University, July 21, 2005.

Utah State Univ. Pasture Research Center Development Committee member, 2005. Responsible for pasture and laneway design and integration with irrigation, fencing plan, and selection of fencing contractor for 120-ac research unit.

Utah State University IFAFS BEHAVE (Behavioral Education for Human, Animal, Vegetation, and Ecosystems Management) Project Advisory Board member, 2002-2005.

Utah State Univ. Plants, Soils, and Biometeorology departmental committees member: FFA/4-H, Field Days, and Crops Curriculum, 2002-2005.

Reviewer, Dept. of Plants, Soils, and Biometeorology graduate student applications, 2001-2005.

Utah State Univ. Extension Small-Acreage Workshops Planning Committee member, 2003-2004.

Co-organized Hillcrest Elementary School Science Fair, Logan, UT, February 1, 2001.

Judge, ENVIROTHON soils contest sponsored by Conservation Districts Water Quality Partnership, Ephrata, WA, April 27, 2000.

Washington State University Cooperative Extension Central Washington Animal Agriculture Team member, 1999-2000.

Moscow Elementary Schools Science Fair evaluator, Moscow, ID, 1994 and 1997.

University of Idaho:

- University Safety Committee member, 1995-1996.
- Plant Science Farm Field Day Committee member, 1993-1997.
- Dept. of Animal and Veterinary Sci. Forage/Facility Use/Animal Management Committee member, 1993.
- Plant Science Graduate Student Progress Committee member, 1995-1998.

Professional Improvement

West Virginia University Academic advising workshop, Teaching and Learning Commons, August 31, 2016.

West Virginia University Introduction to Course Design, Davis College of Agriculture, Natural Resources and Design and Teaching and Learning Commons, October 17, 2016.

West Virginia University Assessment for learning: Everyday strategies to help determine how you and your students are doing, Teaching and Learning Commons, February 5, 2016.

COMET-Farm: Agricultural and Forestry Carbon and Greenhouse Gas Accounting at Your Fingertips workshop, American Society of Agronomy Annual Meeting, Minneapolis, MN, November 15, 2015.

Unity UCal spectroscopy and chemometrics software workshop, Morgantown, WV, June 24-26, 2015.

Write Winning Grant Proposals workshop (presented by Grant Writers' Seminars and Workshops), Morgantown, WV, June 18, 2015.

Computer technology and teaching and learning improvement seminars and workshops offered by the WVU Offices of Information Technology Services and Teaching and Learning Commons, 2009-2014.

WVU Human Resources Employee Relations Performance Management and Supervisor Training workshops series, 2011-2012.

Measurement and Use of Spectral Data for Vegetation Applications workshop, American Society of Agronomy Annual Meeting, Tampa, FL, November 4, 2013.

Be a Science Communicator: Tips From TED on Giving Engaging Presentations webinar (AAAS MemberCentral), July 24, 2013.

NDVI & PRI: Measurement Theory, Methods, and Applications webinar (Decagon Devices), March 28, 2013.

R for Recovering SAS Users workshop, American Society of Agronomy Annual Meeting, Cincinnati, OH, October 21, 2012.

Walk, Crawl, Run! Hands-On Training in Modern Data Analysis with SAS for Researchers workshop, American Society of Agronomy Annual Meeting, San Antonio, TX, October 16, 2011.

Plant Measurements from Leaf to Canopy: Light and Temperature Interaction workshop, American Society of Agronomy Annual Meeting, San Antonio, TX, October 15, 2011.

Applications of Generalized Linear Mixed Models in Agricultural and Natural Resource Sciences Workshop, American Society of Agronomy Annual Meeting, Long Beach, CA, October 31, 2010.

Introduction to NIR short course, International Diffuse Reflectance Conference, Chambersburg, PA, August 1, 2010.

West Virginia University Write Winning Grants Seminars, June 18 and September 17, 2009.

West Virginia University short course: FOR/RESM 493, GPS Use and Applications, June 18-19, 2009.

Participation in annual meetings of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America since 1986, and NIRS Forage and Feed Testing Consortium since 2004.

Minirhizotron Techniques Workshop, Soil Science Society of America Annual Meeting, Seattle, WA, October 31, 2004.

Workshops for editors of Agronomy Journal, American Society of Agronomy Annual Meetings, Charlotte, NC, October 23, 2001 and Denver, CO, November 5, 2003.

Advanced WinISI NIRS Software Training Workshop, State College, PA, August 29-30, 2001.

Univ. of Idaho Office of Teaching Enhancement Workshops, Moscow, ID, March 3-4, 1993.

ACOP Western Region Teaching Symposium, Logan, UT, September 24-25, 1993.

Ohio State Univ. satellite course: Agr. Educ. 631, Methods in Teaching Agriculture, Spring, 1992.

Appendix A. Extension Presentations (and participant number) Prior to 2005

Judged entries and led mini-seminars on management impacts on forage quality at annual *Oregon Hay and Forage Association Hay and Straw King Contests*, Merrill, October 16, 2004 and October 18, 2003; Lakeview, October 19, 2002; Fort Rock, October 20, 2001; and Redmond, November 30, 2000 (160 total).

Field presentation: Pasture species selection, quality, and management. *USU Extension Field Day: High Elevation Pasture Response to Water and Nitrogen*, Randolph, UT, September 2, 2004 (25).

Field presentation: Keys to successful pasture management. *Utah Wool Growers Summer Annual Meeting and Range Tour*, Park City, UT, August 6-7, 2004 (15).

Two presentations: Soil, forage, and livestock resources in an example grazing system; and Pasture plant structure, physiology, and defoliation responses. *USU Extension Irrigated Pasture and Grazing Management Professional Development Workshop*, Payson and Elberta, UT, June 8-10, 2004 (27).

Perspectives on scholarly endeavors and partnerships in extension. *USU Extension Early Career Training Conference*, Utah State University, Logan, UT, May 17-18, 2004 (15).

Keys to successful pasture management. *USU Extension Small Acreage Management Workshops*, Cedar City, UT, February 28, and Sandy, UT, March 27, 2004 (105 total).

Annual forage grasses: performance and quality. *Univ. of Idaho Cooperative Extension 2004 Southeast Idaho Forage School*, Preston, ID, March 9, 2004 (50).

Three presentations: Alfalfa growth and development; Value of alfalfa in rotations; and Alfalfa economics. *National Alfalfa Alliance Alfalfa Intensive Training Seminar*, Salt Lake City, UT, March 2-4, 2004 (30).

Alfalfa and cereal forage selection and management. *USU Extension Crops School*, Beaver, UT, February 27, 2004 (20).

Small grain, alfalfa, and pasture selection and performance. *USU Extension 2004 Crop Variety Workshop*, Kamas, UT, February 5, 2004 (10).

Behavior and management of cool-season pasture grasses. *Far West Agribusiness Association Annual Fertilizer and Chemical Conference*, Jackpot, NV, January 12-14, 2004 (45).

Warm-season annual forage grasses: role and productivity (co-presenter with S.C. Parkinson). *Univ. of Idaho Cooperative Extension Regional Beef Schools*, Pocatello, ID, January 7, and Montpelier, ID, January 8, 2004 (50 total).

Interpreting fiber digestibility and use of summative equations in forage quality evaluation. *Oregon Hay and Forage Association Board of Directors meeting*, Klamath Falls, OR, October 17, 2003 (12).

Pasture plant morphology and responses to grazing management. *Univ. of Idaho Cooperative Extension Lost Rivers Grazing Academy V*, Soda Springs, ID, September 15-18, 2003 (25).

- Forage quality testing and management. *USU Extension Cache Co. Fall Forage Field Day*, Lewiston, UT, September 12, 2003 (22).
- Field presentation: Role and performance of spring cereal forages and warm-season annual forage grasses in livestock systems. *Univ. of Idaho Cooperative Extension Franklin County Crop and Weed Tour*, Whitney, ID, July 2, 2003 (35).
- Two presentations: Characteristics and selection of pasture grasses and legumes; and Plant regrowth responses in grazing systems. *Duchesne County Soil Conservation District Pasture Management Workshop*, Roosevelt, UT, June 5-6, 2003 (30).
- Seasonal patterns of pasture root growth and forage production. Teleconference with members of the *Umpqua Valley Forage Study Group*, Roseburg, OR, May 16, 2003 (10).
- Pasture management impacts on plant and animal performance. *Cache County Cattlemen's Workshop*, Wellsville, UT, April 9, 2003 (15).
- Alfalfa variety selection and management. *USU Extension Carbon Co. Crop Seminar*, Price, UT, March 14, 2003 (8).
- Use of fiber digestibility in improved estimates of forage feeding value. *2003 Utah State Univ. Extension Annual Planning and Professional Development Conference*, Logan, UT, March 4-7, 2003 (20).
- Grass physiology and management. *Workshop for public officials from Bulgan, Mongolia*, Preston, ID, February 28, 2003 (14).
- Two presentations: Cache County 2002 silage corn trial results; and Spring cereals as forage alternatives to alfalfa. *USU Extension Cache Co. Crops School*, Logan, UT, February 25, 2003 (65).
- Two presentations: Forage crop management, quality, and utilization. *USU Extension Winter Crops Seminars*, Richfield and Manti, UT, February 19, 2003 (50 total).
- Cereal seedings for forage production. *Utah Crop Improvement Association and Utah Seed Council Seed School and Annual Meetings*, Provo, UT, February 12, 2003 (40).
- Alfalfa, cereal forage, and silage corn performance. *USU Extension Crop Management Seminar*, Tremonton, UT, February 11, 2003 (40).
- Overview of the Utah State University alfalfa testing program. *2003 Utah Hay and Forage Symposium*, St. George, UT, January 27, 2003 (120).
- Perennial and cereal grasses for rotation with alfalfa (co-presenter with M.G. Pace). *2003 Utah Hay and Forage Symposium*, St. George, UT, January 27, 2003 (60).
- Interpretation and use of university forage variety trial results. *2002 Western Alfalfa and Forage Conference*, Reno, NV, December 11-13, 2002 (300).
- Management of cool-season grasses for hay production and quality (co-presenter with S.C. Fransen). *2002 Western Alfalfa and Forage Conference*, Reno, NV, December 11-13, 2002 (60).
- Emerging issues for alfalfa and other forages in the Great Basin (co-presenter with W.W. Riggs). *2002 Western Alfalfa and Forage Conference*, Reno, NV, December 11-13, 2002 (300).
- Emerging forage quality testing issues. *Utah State Univ. and Utah Department of Agriculture and Food NIRS Hay/Feed Analysis Committee meeting*, Ogden, UT, December 10, 2002 (12).
- Two presentations: Introduction to integrated forage-livestock systems; and field session on herbage mass assessment. *USU Extension Range and Pasture Workshops*, Panguitch, UT, October 29, and Richfield, UT, October 30, 2002 (45 total).
- Four presentations: Plant function and behavior in pastures; Plant succession and pasture management; Forage budgeting on pasture; and field session on herbage mass assessment. *Univ. of Idaho Cooperative Extension Lost Rivers Grazing Academy IV*, Salmon, ID, September 25-28, 2002 (25).
- Two presentations: Corn silage dry matter level, milk line, and harvest timing; and Determining silage particle size distribution with the Penn State Forage Particle Separator. *USU Extension Cache Co. Fall Forage Field Day*, Benson, UT, September 4, 2002 (35).
- Two presentations: Whole plant growth and development of corn and alfalfa; and Alfalfa and silage corn management, quality, and utilization. *Intermountain Farmers Association In-Service Professional Development Workshop*, Sherwood Hills Resort, Wellsville, UT, August 20-21, 2002 (32).
- Two field presentations: Spring cereal and annual/Italian ryegrass forage evaluation trial; and Alfalfa cultivar performance trial. *USU Extension and Utah Agricultural Experiment Station Greenville Irrigated Farm Field Day*, N. Logan, UT, July 9, 2002 (45).
- Field presentation: Roles of annual and Italian ryegrasses and warm-season grasses in double-cropping annual forage programs. *Univ. of Idaho Cooperative Extension Franklin Co. Crop and Weed Tour*, Whitney, ID, June 26, 2002 (25).
- Field presentation: Pasture assessment techniques. *USU Extension Professional Development Workshop on Pasture Assessment*, Utah State University, N. Logan, UT, June 14, 2002 (6).
- Alfalfa selection and management. *USU Extension Cache Co. Crops School*, Logan, UT, March 7, 2002 (65).

- Small grain and alfalfa management and quality. *Land View Fertilizer Inc. Annual Crop Production Seminar*, Tremonton, UT, March 6, 2002 (40).
- Production and nutritional value of annual forage crops. *2002 Univ. of Idaho Cooperative Extension Southeast Idaho Forage School*, Preston, ID, February 26, 2002 (45).
- Alfalfa and corn silage planning and management. *USU Extension Sevier and Sanpete Co's. Crop Management Seminars*, Richfield and Manti, UT, February 22, 2002 (45 total).
- Alfalfa and cereal forage planning and management. *USU Extension Wayne and Piute Co's. Forage Management Seminars*, Junction and Loa, UT, February 21, 2002 (21 total).
- Alfalfa, cereal forage, and pasture planning and management. *USU Extension Summit Co. Crop, Weed, and Pasture Management Workshop*, Coalville, UT, February 20, 2002 (8).
- USU Extension agronomy report. *Utah Crop Improvement Association and Utah Seed Council Seed School and Annual Meetings*, Brigham City, UT February 15, 2002 (60).
- Three presentations: Planning and management of integrated pasture-livestock systems; Pasture plant selection in relation to environment, end-use, and defoliation management; and Plant-animal relationships in pastures. *USU Extension Professional Development Workshop: Planning and Management of Integrated Pasture-Livestock Systems*, Provo, UT, February 5, 2002 (20).
- Two presentations: Annual forage alternatives; and Forage quality evaluation: limitations, potentials, and new directions. *Beehive Seeds and Morrison Fertilizers Seed and Fertilizer Information Meeting*, Delta, UT, December 7, 2001 (20).
- Alfalfa variety selection, establishment, and harvest management. *USU Extension Tooele Co. Alfalfa Workshop*, Tooele, UT, November 29, 2001 (22).
- Alfalfa variety selection and harvest management. *USU Panguitch Experimental Farm Forage and Livestock Nutrition Field Day*, Panguitch, UT, September 19, 2001 (25).
- Forage testing and strategies for economic valuation of harvested forage. *Millard County Dairy Committee monthly meeting*, Delta, UT, March 15, 2001 (15).
- Forage variety selection and management for improved performance. *USU Extension Cache Co. Crops School*, Logan, UT, March 1, 2001 (55).
- Forage variety update 2001. *Univ. of Idaho Cooperative Extension Southeast Idaho Forage School*, Preston, ID, February 27, 2001 (45).
- Cost-effectiveness of modern crop varieties. *USU Extension Weber Co. Crops School*, Ogden, UT, February 27, 2001 (30).
- Performance of high-oil grain corn in Utah. *Circle Four Farms Grain Grower Appreciation Luncheon*, Milford, UT, February 22, 2001 (6).
- Alfalfa variety selection, performance, and management. *USU Extension Sevier Co. Crops School*, Richfield, UT, February 20, 2001 (20).
- Alfalfa varieties and management issues. *USU Extension Wasatch Co. Crops Seminar*, Heber City, UT, February 15, 2001 (15).
- Variety performance: corn, alfalfa, and small grains. *USU Extension Utah Co. Crops School*, Provo, UT, February 15, 2001 (25).
- Pastures and grazing: planning and managing forage-livestock systems. *Colorado State Univ. and Utah State Univ. Dryland Farming Workshop*, Dove Creek, CO, February 8, 2001 (35).
- Limitations, potentials, and directions in forage quality evaluation. *Wheatland Seed Dealer Meeting*, Midway, UT, February 2, 2001 (20).
- Quality considerations for future forage exports. *Northwest Alfalfa Cube and Export Conference*, Pasco, WA, January 25, 2001 (60).
- Future trends in quantifying forage quality. *Washington State Hay Growers Association Hay Conference and Trade Show*, Pasco, WA, January 23-24, 2001 (120).
- Forage grasses and timothy hay production. *Columbia Basin Crop Consultants Shortcourse*, Moses Lake, WA, January 18-19, 2001 (45).
- Forage analysis: the past, present, and future. *Oregon Hay and Forage Association Forage Conference and Trade Show*, Redmond, OR, November 30-December 2, 2000 (25).
- Pasture growth rate and responses to defoliation. *USU Extension Management-intensive Grazing Workshop*, Price, UT, November 8-9, 2000 (25).
- Grazing with triticale. *Connell Grain Growers Triticale Workshop*, Connell, WA, August 7, 2000.
- Field presentation: Improved pasture management. *Washington State Univ. Cooperative Extension Grazing Management Alternatives Field Tour*, Spokane Co., WA, June 24, 2000.
- Two presentations: Plant growth and development, and Biological basis for grazing management. *Washington State Univ. Cooperative Extension Pasture Management Workshops*, Prosser, April 29; Moses Lake, May

- 6; Selah, May 13; and Goldendale, WA, June 3, 2000.
- Curly dock identification, biology, and control in alfalfa. *Washington State Univ. Cooperative Extension Weed Workshop*, Palisades, WA, April 22, 2000.
- Perennial forage management. *Conservation Districts Water Quality Partnership Dairy Field Day*, Royal City, WA, April 4, 2000.
- Timothy production and management in the Columbia Basin. *Lower Columbia Basin Fieldmen Dealers Association meeting*, Pasco, WA, March 30, 2000.
- Two presentations: Start your pasture right, and Small pasture management. *Country Life and Farm Expo*, Spokane, WA, March 25, 2000.
- Two presentations: Hay quality standards, and Hay production: techniques for better stand establishment. *Idaho State Hay Growers Association and Univ. of Idaho Cooperative Extension Producing Hay to Diversify your Farm Workshop*, Moscow, ID, March 23, 2000.
- Overview of winter cover crop grazing systems in the Columbia Basin (co-presenter with A.M. McGuire). *Washington State Univ. Cooperative Extension Profits and Conservation with Winter Cover Crops Workshop*, George, WA, March 16, 2000.
- Perennial grass selection and management for hay, haylage, and pasture. *Washington State Univ. Cooperative Extension Dairy Forage Management Workshop*, Connell, WA, February 14, 2000.
- Timothy production and management. *Western Farm Service Annual Grower Meeting*, Pasco, WA, January 21, 2000.
- Two presentations: Green manure and cover crop use in the Columbia Basin, and Perennial forage grasses for marginal conditions. *Cenex Harvest States Annual Grower Meeting*, Moses Lake, WA, January 18, 2000.
- Timothy production and management. *Columbia Basin Hay Growers Annual Meeting*. Basin City, WA, December 16, 1999 (100).
- Understanding plants: growth and development, defoliation response, and seasonal distribution of forage supply. *Washington State Univ. Washington Grazier's Conference*, Moses Lake, WA, June 26, 1999 (120).
- Pasture and range management basics. *Washington State Univ. Beef Information Day '99*, Pullman, WA, April 15-16, 1999 (60).
- Two presentations: The physiological basis of defoliation management, and Timothy and other forage grass variety trial results. *Oregon State Univ. Annual Central Oregon Forage Conference*, Redmond, OR, January 29-30, 1999 (70).
- Two presentations: Nitrate testing and toxicity in forage grasses, and Timothy and other forage grass variety and management trial results. *Washington State Hay Growers Association Annual Hay Conference*, Pasco, WA, January 27, 1999 (100).
- The physiological and structural basis of grazing management. *Oregon State Univ. Management-intensive Grazing Workshops*, Baker City, Klamath Falls, and Coos Bay, OR, October 26-30, 1998.
- Three presentations: Plant growth, development, and defoliation response; Balancing forage supply and demand in pastures; and Plant materials characteristics and pasture mass assessment. *Univ. of Idaho Intensive Management of Irrigated Pastures Workshop*, Arco, ID, July 21-23, 1998.
- Timothy hay production in northern Idaho: principles, practices, and research results. *Northern Idaho Hay Growers meeting*, Lewiston, ID, February 24, 1998.
- Two presentations: Timothy production under dryland conditions, and Nitrate content of hay: management principles and what the numbers mean. *Kittitas County Timothy Hay Growers and Suppliers Conference and Annual Meeting*, Ellensburg, WA, February 19, 1998.
- Alfalfa establishment and fertilization basics. *Idaho Hay Association Annual Conference*, Twin Falls, ID, January 29-30, 1998.
- Pasture grass growth and development patterns under simulated grazing. *Dept. of Plant, Soil and Entomological Sci. 1997 Research Farm Field Day*, Univ. of Idaho, Moscow, ID, July 1, 1997.
- Two presentations: Physiological basis of grazing management, and Grass varieties for pasture and hay. *Oregon State Univ. Management-intensive Grazing Workshops*, Redmond and Eugene, OR, May 13-16, 1997.
- Two presentations: Forage grass and legume growth, development, and morphology, and Procedures for assessing herbage mass. *Pacific Northwest Forage Workers Professional Development Workshop*, Waitts Lake, WA, July 15-19, 1996.
- Balancing plant and animal requirements in pastures. *Washington State Univ. Cooperative Extension and Holistic Resource Management Support Group meeting*, Albion, WA, March 24, 1996.
- Two presentations: Forage variety selection and establishment, and Hay and pasture fertility management. *Univ. of Idaho Cooperative Extension 1996 Panhandle Area Beef School*, Sandpoint, ID, February 3, 1996.
- Grass developmental morphology. *Pacific Northwest Forage Workers Annual Conference*, Twin Falls, ID, November 7, 1995.
- Pasture and grazing management research update. *Univ. of Idaho and Washington State Univ. Cooperative*

- Extension Beef Producer's Intensive Grazing Tour*, Moscow, ID and Pullman, WA, June 29, 1995.
- Performance of pasture and hay legumes in northern Idaho. *Dept. of Plant, Soil and Entomological Sci. 1995 Research Farm Field Day*, Univ. of Idaho, Moscow, ID, June 28, 1995.
- Grass growth, development, and grazing management. *Univ. of Idaho Cooperative Extension Bear Lake Co. Weed and Range Tour*, Montpelier, ID, June 15, 1995.
- Crop management influences on feed quality. *Univ. of Idaho Cooperative Extension In-Service Small Grain Issues Workshop*, Moscow, ID, April 25, 1995.
- Planning and management of grazing systems. *Kootenai Stockmen's Association and Univ. of Idaho Cooperative Extension Seminar*, Coeur d'Alene, ID, March 28, 1995.
- Management of improved pastures in the Palouse region. *Whitman Co. Cattlemen's Association and Washington State Univ. Cooperative Extension Seminar*, Colfax, WA, March 1, 1995.
- Selection of pasture grasses and legumes: domestic and imported. *Univ. of Idaho/Washington State Univ. Sheep Symposium*, Moscow, ID, February 4, 1995.
- Two presentations: Pasture plant physiology, and Forage-livestock system management. *Univ. of Idaho Cooperative Extension Intensive Irrigated Pasture Management Workshop*, Arco, ID, August 30-31, 1994.
- Role of Mediterranean annual clovers and medics in summer fallow replacement. *Washington State Univ. Cooperative Extension Lincoln Co. Twilight Tour*, July 14, 1994.
- Pasture grass and legume species selection. *Whitman Co. Cattleman's Summer Ranch Tour*, Endicott, WA, June 8, 1994.
- Pasture management techniques. *Univ. of Idaho Cooperative Extension Livestock Master Workshop*, Coeur d'Alene, ID, April 25, 1994.
- Two presentations: Goal-setting and evaluating grassland system potential, and Plant-animal interactions and grazing management. *Washington State Univ. Cooperative Extension Grazing Management Short Course*, Yakima, WA, March 8, 1994.
- Technical and economic feasibility of mechanized gathering of baled hay from northern Idaho hillsides. *Palouse-Clearwater Environmental Institute Agricultural/Consumer/Environmental Alliance Conference*, Moscow, ID, January 8, 1994.
- Current directions in forage and grassland management research. *Dept. of Plant, Soil and Entomological Sci. 1993 Research Farm Field Day*, Univ. of Idaho, Moscow, ID, June 29, 1993.
- Adaptation of New Zealand-Australian grazing management techniques to the Palouse region. *WSU Beef Information Day '93*, Pullman, WA, June 2, 1993.
- Pasture management research. *Univ. of Idaho Cooperative Extension 1993 Panhandle Livestock Master Program*, Univ. of Idaho, Moscow, ID, April 23, 1993.
- Pasture ecology and grazing management. *Latah Soil and Water Conservation District Small Ranch Management Workshop*, Moscow, ID, April 14, 1993.
- Two presentations: Forage fertility management, and Species selection and defoliation management. *Univ. of Idaho Cooperative Extension Bonner and Kootenai County Forage and Pasture Management Workshops*, Sandpoint and Coeur d'Alene, ID, December 7, 1992.
- Two presentations: Interspecific relations of pasture plants and formulation of species mixtures, and Plant-animal relations in pastures - concepts and management. *Pacific Northwest Forage Workers Professional Development Workshop*, Ketchum, ID, July 20-24, 1992.
- Palouse-region forage systems. *Clearwater Resource Conservation and Development Council North Idaho Hay and Forage Marketing Feasibility Study Group meeting*, Moscow, ID, July 14, 1992.
- Harvest management of grass-legume forage mixtures, *North Idaho Alternative Agriculture Enterprise Development Tour*, Univ. of Idaho Research and Extension Center, Sandpoint, ID, June 18, 1992.
- Forage species selection and management. *Latah Soil and Water Conservation District Pasture and Hayland Management Workshop*, Moscow, ID, May 21, 1992.
- Forage crops research. *Dept. of Plant, Soil and Entomological Sci. 1991 Research Farm Field Day*, Univ. of Idaho, Moscow, ID, July 2, 1991.
- Grazing behavior and forage intake. *Univ. of California Depts. of Animal Sci. and Agronomy and Range Sci. Beef and Range Field Day*, Sierra Foothill Range Field Station, Browns Valley, CA, April 17, 1991.