**Colorado Presentations**

Brummer, J.E. Colorado Forage Research Overview: From Dryland Cover Crops to Irrigated Pastures. Field Research Center Seminar, Lincoln University, Lincoln, NZ, March 21, 2018.

Brummer, J.E. Cover Crops for Forage: Importance, Establishment, Management, and Utilization. Wyoming Forage Field Day, Lingle, WY, June 12, 2018.

Brummer, J.E. Alfalfa: Importance and Uses. Colorado Ag. Water Alliance Summer Tour, Sterling, CO, July 12, 2018.

Brummer, J.E. Management-intensive Grazing: Grazier’s Math. CSU Beef Cattle Field Day & Pasture School, Fort Collins, CO, October 4-5, 2018.

Brummer, J.E., L. Jones, P. Cabot, C. Pearson, and A. Berrada. Agronomic Responses of Grass and Alfalfa Hayfields to No or Partial-Season Irrigation as Part of a Potential Colorado Western Slope Water Bank. CSU Ag. Exp. Station Water Research Update, Steamboat Springs, CO, October 16, 2018.

**Idaho Presentations**

Sagers, J.; Findlay, J.R.; Shewmaker, G.E.; Roemer, R.; and Jensen, K. Idaho grass trials—Tetonia, Proceedings Idaho Hay and Forage Conference — March/2018

Shewmaker, G.E. Hay Quality Loss during Storage, American Forage & Grassland Council Annual Meeting, 16 January 2018, Louisville, KY

Shewmaker, G.E. Balancing Rations on Pasture using NIRS, NIRS Consortium Workshop, 16 January 2018, Louisville, KY

Shewmaker, G.E. Hay Quality: Sampling, Analyzing, and Interpretation, Wyoming Forage Field Day, 12 June 2018, Lingle, WY

Shewmaker, G.E. The Hay Quality-Yield Tradeoff, Arizona Alfalfa & Forage Workshop, 28 March 2018, Maricopa, AZ

Shewmaker, G.E. Idaho Forage Report, Northwest Forage Workers Conference, 30 November 2017, Reno, NV

Shewmaker, G.E. Definitions and Range of Variability for Hay Test Parameters, Western Alfalfa & Forage Symposium, 28 November 2017, Reno, NV

Shewmaker, G.E. Agronomic Influences on Forage Quality, Western Alfalfa & Forage Symposium, 28 November 2017, Reno, NV

Shewmaker, G.E. Interpreting Hay Test Results, Western Alfalfa & Forage Symposium, 28 November 2017, Reno, NV

Shewmaker, G.E. Forage Pesticide Management during Drought, North Idaho Forage & Grazing School, 30 Oct. 2018, Naples, ID

Shewmaker, G.E. Alfalfa Variety Trials, NMCREEC Twilight Open House, 6 September 2018, Carmen, ID

Shewmaker, G.E. Forages of Southern Idaho, Ecology of Grazing Lands Class, 23 July 2018, Jerome Co., ID

Shewmaker, G.E. Forage Industry and Research, Ag in the Classroom, Kimberly R&E 2017

Shewmaker, G.E. Forages, Twilight Tour, 18 July 2018, Kimberly R&E Center

Shewmaker, G.E. Idaho Forage Trends and Survey, Idaho Hay & Forage Conference, 2 March 2018, Burley, ID

Shewmaker, G.E. Hay Storage Losses and Costs, Idaho Hay & Forage Conference, 1 March 2018, Burley, ID

Shewmaker, G.E. Idaho forage Outlook, Cooper-Norman Ag Outlook Seminar, Twin Falls

Shewmaker, G.E. IPM for Controlling Rodents in Hay and Pasture, N ID Forage School, 6 November 2017, Bonners Ferry

Shewmaker, G.E. Hay Sampling & Testing, N ID Forage School, 6 November 2017, Bonners Ferry

**Montana Presentations**

Meccage, E. June 21, 2018. **Hay Field Evaluation.** Musselshell County**.** Methods of assessing hay fields, and how to determine productivity or need to renovate.50 attendees.

Meccage, E. June 21, 2018. **Annual forages for drought.** Hill County**.** Options for annual forage production in drought situations, including what species to use and when, and what are some anti-quality factors to consider.100 attendees.

Meccage, E. June 19, 2018. **Hay Storage and Forage Options.** Deer Lodge County**.** Dealer Awards Event for CHS dealers across the Western part of the state.46 attendees.

Meccage, E. May 17, 2018. **Forage Management: Nitrates and Hay Storage.** Blackfeet Reservation**.** Importance of hay storage and nitrates in animal performance and forage management. 28 attendees.

Meccage, E. October 4, 2018. **Annual forages for MT.** Yellowstone County**.**100 attendees.

Meccage, E. September 26, 2018. **Forage quality interpretation and analysis.** Gallatin County**.**10 attendees.

Meccage, E. August 23, 2018. **Optimizing alfalfa production.** Yellowstone County**.** Methods of optimizing alfalfa production, from fertilization through harvesting and fall management: How can you optimize your forage production?74 attendees.

Meccage, E. July 24, 2018. **Pasture Management Workshop Series.** Wibaux County**.** Different methods of pasture management, as well as hands-on assessment of stand health, how to make management decisions, etc. Hands-on activity in producer's pasture.15 attendees.

Meccage, E. July 17, 2018. **Pasture Management Workshop Series.** Ravalli County**.** Different methods of pasture management, as well as hands-on assessment of stand health, how to make management decisions, etc. Hands-on activity in producer's pasture.30 attendees.

Meccage, E. July 13, 2018. **Annual forages for drought.** Gallatin County**.** Annual forage options in drought situations**.**120 attendees.

Meccage, E. June 28, 2018. **Reduced-lignin technology: Where is it taking us?** Yellowstone County**.** Recent research into the new-reduced lignin alfalfa technology and how it can work for MT producers.16 attendees.

Meccage, E. April 17, 2018. **Alternative Forages: Quality and Management.** 130 attendees.

Meccage, E. April 12, 2018. **Equine Nutrition II.** 6 attendees.

Meccage, E. April 10, 2018. **Equine Nutrition I.** 6 attendees.

Meccage, E. April 5, 2018. **Forage Testing and Interpretation.** Cascade County**.** 6 attendees.

Meccage, E. April 5, 2018. **Forage Testing and Interpretation.** Judith Basin County**.** 40 attendees.

Meccage, E. April 5, 2018. **Hay Storage Techniques.** Cascade County**.** 6 attendees.

Meccage, E. April 5, 2018. **Hay Storage Techniques.** Judith Basin County**.** 40 attendees.

Meccage, E. March 28, 2018. **Nitrate Toxicity and Forage Quality Analysis.** Gallatin County**. N**itrate toxicity and testing your forages for quality analysis with students of the beef practicum course.35 attendees.

Meccage, E. March 15, 2018. **Optimizing Hay Quality.** Rocky Boy Reservation**.**12 attendees.

Meccage, E. March 6, 2018. **Interseeding legumes into irrigated pastures.** Ravalli County**.** Ways to interseed and incorporate legumes into an existing grass stand**.** 28 attendees.

Meccage, E. February 27, 2018. **Equine Nutrition Basics II.** 30 attendees.

Meccage, E. February 26, 2018. **Equine Nutrition Basics.** 30 attendees.

Meccage, E. February 21, 2018. **Making the right decisions for your forage seeding mix.** Gallatin County**.** 110 attendees.

Meccage, E. February 16, 2018. **Alfalfa Weevil Control in MT.** Stillwater County**.** 30 attendees.

Meccage, E. February 6, 2018. **Optimizing Hay Quality.** Stillwater County**.** Discussed methods of improving overall forage quality for livestock. 23 attendees.

Meccage, E. January 25, 2018. **Cover crops for forage: quality and management.** Cascade County**. H**ow cover crops/ annual forages can be used in an integrated livestock cropping system**.** 45 attendees.

Meccage, E. January 24, 2018. **Cover crops for forage: an option for drought.** Phillips County**.** Presented at the annual Jim Schumacher Memorial Day**.** 27 attendees.

Meccage, E. January 18, 2018. **Feeding Alfalfa to Horses.** 80 attendees.

Meccage, E. January 17, 2018. **Boron fertilization under irrigation.** Invited speaker to discuss research evaluating boron impacts on alfalfa production**.** 35 attendees.

Meccage, E. January 10, 2018. **Maximizing herd nutrition: forages first.** Deer Lodge County**.** 16 attendees.

Meccage, E. January 9, 2018. **Factors affecting alfalfa forage quality.** Flathead County**.** 100 attendees.

Meccage, E. January 4, 2018. **Alfalfa as a Rotation Crop. How** alfalfa can be used in cropping system rotations- benefits, disadvantages, and things to look out for.115 attendees.

**Oregon Presentations**

Ates, S., Cicek, H., Ozcan G., and M. Tezel (2018) Effect of nurse crop and seeding rate on the productivity and persistence of sainfoin in Central Anatolia ASA and CSSA Meeting, Nov. 4-7, Baltimore, MD

Ates, S., Louhaichi, M., Hassan, H., Cicek, H., Kassam, S., Qudratullah, S., Farhang, A.H. and Esmati, H. (2018) Effect of seeding rate on the yield of legume-cereal bi-crops in rainfed production systems of Afghanistan 5th International Conference on Sustainable Agriculture and Environment October 08-10, Hammamet, Tunisia.

Ates, S., Keles, G., Demirci, U., Dogan, S., Ozcan, G. and Filley, S. (2018) The effects of forage-based and a concentrate feeding system on lamb production 12th World Conference on Animal Production July 5-8, Vancouver, Canada.

Blair, S., Pirelli, G., Filley, S., Bohle, M., Davis, Z., Hall, J. and Wang G. (2018) Selenium and NPKS fertilization effects on alfalfa and grass production and quality in eastern Oregon. ASA and CSSA Meeting, Nov. 4-7, Baltimore, MD

Fan, Q., Blair, S., Hannaway, D. and Wang, G. (2018) Spring seeded annual forages differ in response to partial-season irrigation. ASA and CSSA Meeting, Nov. 4-7, Baltimore, MD

Fan, Q., Blair, S., Hannaway, D. and Wang, G. (2018) Summer seeded annual forages differ in response to partial-season irrigation. ASA and CSSA Meeting, Nov. 4-7, Baltimore, MD

Filley, S.J., Wang, G., Hall, J., Pirelli, G., Bohle, M., Ates, S. and Davis, T.Z. (2018) Selenium and fertiliser application schemes in hay fields, 27th European Grassland Federation General Meeting, 17th - 21st June Cork, Ireland

Hannaway, D.B., Brewer, L.J., Ates, S., Anderson, N.P., Wang, G. Filley, S. Daly, C. Halbleib, M.D., Ringo, C., Monk, S., Moot, D.J., Yang, X., Chapman, D.F., and Sohn, P. (2018) MatchClover: web-based tool for matching clovers to climates, soils, and intended Uses, 27th European Grassland Federation General Meeting, 17th - 21st June Cork, Ireland

Hannaway, David B. 2018. Forage Production & Management lectures. Sichuan Agricultural University. “Foreign Expert” Program. Oct 7–30. Chengdu, Sichuan Province, China.

Hannaway, David B. 2018. Forage Production & Management lectures. Northwest Agriculture & Forestry University. “Foreign Expert” Program. Aug. 28–Sep. 6 and Nov. 4-9. Yangling, Shaanxi Province, China.

Hannaway, David. 2018. MatchClover – Web Based Tools for Matching Clovers to Climates, Soils and Intended Uses. Invited Presentation to Tasmanian Institute of Agriculture, Launceston, Tasmania, Australia. May 9.

Hannaway, David. 2018. MatchClover – Web Based Tools for Matching Clovers to Climates, Soils and Intended Uses. Plenary paper presented to Dairy NZ Workshop, Christchurch, New Zealand. Feb. 28.

Slim, S., Harbeg, L., Hassan, S., Moyo, H.P., Ates, S. and Louhaichi, M. (2018) Yield and nutritive quality of *Hedysarum coronarium* across three different agro-climatic zones of northern Tunisia, 71st Annual Meeting of The Society for Range Management, Jan. 28 to Feb. 2, Reno, Nevada, US.

**Utah Presentations**

Lagrange, S., K.A. Beauchemin, J.W. MacAdam, and J.J. Villalba. 2017. Effects of grazing diverse combinations of sainfoin, birdsfoot trefoil and alfalfa on beef cow performance and environmental impacts Journal of Animal Science 95:143-144.

MacAdam, J.W., K.A. Cassida and E. van Santen. 2017. Location of growth influenced birdsfoot trefoil tannin accumulation, but few accessions differed in tannin concentration. *In* Annual Meetings Abstracts. ASA, CSSA, and SSSA, Madison, WI.

Roca-Fernández, A.I., S.L. Dillard, C.J. Dell, J. MacAdam, and K.J. Soder. 2017. Effect of oilseed source on ruminal fermentation and methane production of a grass-legume diet in continuous culture. Journal of Animal Science 95: 133-134.

Roca-Fernández, A.I., S.L. Dillard, M.D. Rubano, M. Baldin, C.J. Dell, J. MacAdam. and K.J. Soder. 2017. Modification of ruminal fermentation and methane production by adding legumes containing condensed tannins to an orchardgrass diet in continuous culture. American Dairy Science Association Annual Meeting, June 25-28, 2017, Pittsburgh, PA.

Stewart, E.K., K.A. Beauchemin, J.W. MacAdam, and J.J. Villalba. 2017. Environmental impacts from cattle consuming tannin-containing hays. Journal of Animal Science 95:133-134.

**Washington Presentations**

Norberg, O.S., L. Yu, D.K. Combs, G.E. Shewmaker, G.J. Wang, D. A. Llewellyn, S.C. Fransen and E. van Santen. 2018. Determining Genetic Factors That Influence Forage Quality In Alfalfa. International Invited Abstract. North American Alfalfa Improvement Conference. June 4-6, 2018 Logan, Utah.

Norberg, O.S., Valuing Alfalfa for Dairy Cattle from a Nutrient Perspective. 2018. North American Alfalfa Improvement Conference. Poster, 2018 North American Alfalfa Improvement Conference. June 4-6, 2018 Logan, Utah.

Norberg, S. 2018. *Alfalfa Quality Results from Washington State Alfalfa Variety Trials at WERA-1014*. Bozeman, MT.

Norberg, S. 2018. *Developing Calibration for SPAD Meter and Tissue Test for In-Season Nitrogen Assessment in Timothy Hay.* NC 1182 Annual Meeting - Management and Environmental Factors Affecting Nitrogen Cycling and Use Efficiency in Forage-Based Livestock Production Systems. Pasco, WA.

Norberg, S. 2018. *In-Season Timothy Nitrogen Management Using the SPAD Meter.* 2018 FWAA December Winter Conference. Far West Agribusiness Association. Kennewick, WA Invited Presentation.

Norberg, S. 2018. *Diagnosing Pest Problems in Alfalfa and Timothy*. 2018 FWAA December Winter Conference. Far West Agribusiness Association. Kennewick, WA Invited Presentation.

Norberg, S. 2018. Comparing Hi-Gest Alfalfa to other Alfalfa. NW Hay Expo. Kennewick, WA

Norberg, S. 2018. 2017 Results from WSHGA and WSU Variety Trials NW Hay Expo. Kennewick, WA

Norberg, O.S. 2018. Valuing Alfalfa from a Nutrient Perspective. 2018. Fall Forage Conference Oregon American Forage and Grasslands Assoc. Nov. 16, 2018 Corvallis, OR. Invited Presentation.

Norberg, O.S. 2018. Valuing Alfalfa from a Nutrient Perspective. 2018. 2018 Washington dairy Conference. Grand Mound, WA Invited Presentation.

Norberg, S. 2018. Valuing Alfalfa from a Nutrient Perspective. Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA.

Norberg, S. 2018. 2018. WSU/WSHGA Variety Testing Results. Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA.

**Wyoming Presentations**

Khatiwada1, B., Acharya, S.N., Larney, F., Lupwayi, N.Z., Smith, E., and Islam, M.A. 2018. Ability of sainfoin and cicer milkvetch populations to rejuvenate existing pastures in western Canada. The Western Society of Crop Science Annual Meetings June 20, 2018. Laramie, WY. Attendance: 35

Islam, M.A. 2018. The silent decline in soil potassium levels and its effect on alfalfa productivity in the Central and Western U.S. The North American Alfalfa Improvement Conference Annual Meetings June 6, 2018. Logan, UT. Attendance: 95.

Islam, M.A. 2018. Organic Forage Production: Options and Considerations. The 5th Annual High Plains Organic Farming Conference, February 28, 2018. Laramie County Community College, Cheyenne, WY. Attendance: 35.

Islam, MA. 2018. Agronomy in Alfalfa. Alfalfa U – Loveland CO High Plains Journal, February 6, 2018. Loveland, CO. (*Two breakout presentations*) Attendance: 68.

Islam, MA. 2017. Alternative Forage Crop Options (forage sorghums, sainfoin, nitrate (prussic acid) poising of hybrid forage sorghum). High Plains Crop Convention, November 21, 2017. UWE Goshen County, Torrington, WY. Attendance: 21

Islam, M.A. 2017. Organic Forage Production: Can Alfalfa be Grazed Without Fear of Bloat? The 3rd Annual High Plains Organic Farming Conference, February 22, 2017. Laramie County Community College, Cheyenne, WY. Attendance: 45.

Islam, M.A. 2017. Plant Diversity and Physiology for Efficient and Sustainable Agricultural Production: USA, Japan, and Global Perspectives. The 2nd Japan-US Science Forum International Conference November 18, 2017. Harvard University, Boston, MA. (*Invited presentation*) Attendance: 75.

Ashilenje, D.S. and Islam, M.A. 2017. Profiling canopy light interception and growth forms to predict forage yield and nutritive value for meadow bromegrass-alfalfa mixtures. ASA-CSSA-SSSA International Meetings. October 23, Tampa, FL. (*Oral PhD Student Competition*) Attendance: 53.

Islam, M.A. 2017. Evaluation of birdsfoot trefoil: Planting method, harvesting frequency, and cultivar. W2012 - Enhancing management, production, and sustainability of grazing ruminants in extensive landscapes Meetings, August 7-10, 2017. Eastern Oregon Agricultural Research Center, Oregon State University, Burns, OR. Attendance: 22.

Islam, M.A. 2017. Forage Research at UW, USA: Germplasm Search, Evaluation, and Cultivar Development. Department Seminar, The University of Sydney, Sydney Institute of Agriculture, Australia. July 28, 2017 Australian Technology Park, Sydney, Australia. (*Invited presentation*) Attendance: 35.

Islam, M.A. 2017. Legume adoption practices in the central great plains of USA for sustainable agricultural production in the face of climate change. The 2nd International Conference on Plant Science and Physiology June 27, 2017 Bangkok, Thailand (Conference Series Limited, UK). (*Invited presentation*) Attendance: 45.

Islam, M.A. 2017. Understanding Plant Diversity and Physiology for Resilient Production Systems and Environmental Benefits. The 2nd International Conference on Plant Science and Physiology June 26, 2017 Bangkok, Thailand (Conference Series Limited, UK). (*Invited Keynote Speaker*) Attendance: 45.

Islam, M.A. 2017. Wyoming NCCC-31 Report-Ecophysiological Aspects of Forage Management. University of Lincoln, Nebraska, June 20-22 2017. Lincoln, NE. Attendance: 27.

Islam, MA. 2017. Alternative Forage Crop Options (forage sorghums, sainfoin, nitrate (prussic acid) poising of hybrid forage sorghum). High Plains Crop Convention, November 21, 2017. UWE Goshen County, Torrington, WY. Attendance: 21

Islam, M.A. 2017. Organic Forage Production: Can Alfalfa be Grazed Without Fear of Bloat? The 3rd Annual High Plains Organic Farming Conference, February 22, 2017. Laramie County Community College, Cheyenne, WY. Attendance: 45.

**PUBLICATIONS**

**Idaho Publications**

Cherney, J.H., K.A. Albrecht, M.T. Berti, M. Bohle, S.C. Bosworth, K.A. Cassida, W.J. Cox, E. Creech, S.C. Fransen, M.H. Hall, D.B. Hannaway, M.A. Islam, K.D. Johnson, J.W. MacAdam, E.C. Meccage, D.H. Putnam, E.B. Rayburn, C.C. Sheaffer, G. Shewmaker, J. Solomon, and R.M. Sulc. 2018. Forage crops don’t get no respect! *Progressive Forage*  1 September 2018. (8):14-16.

Hannaway, D., L. Brewer, S. Fransen, G. Shewmaker, S. Williams, and S. Baker. 2018. CH 10: Planning and sowing grasslands. pp. 1-46. In Marshall, A. and Collins, R. (ed.), Improving grassland and pasture management in temperate agriculture, Burleigh Dodds Science Publishing, Cambridge, UK, 2018, (ISBN: 978 1 78676 200 9; www.bdspublishing.com)

Sagers, J., J.R. Findlay, G.E. Shewmaker, R. Roemer, and K. Jensen. 2018. Idaho grass trials—Tetonia 2017. P. 33-37 In Proceedings Idaho Hay and Forage Conference, 1-2 March 2018, Burley, ID, University of Idaho Extension.

Shewmaker, G.E. 2018. The quest for nutritive value. *Progressive Forage* 1 February 2018. (2):36-38.

Shewmaker, G.E. 2018. Hay storage losses. P. 1-11 In Proceedings Idaho Hay and Forage Conference, 1-2 March 2018, Burley, ID, University of Idaho Extension.

**Montana Publications**

Meccage, E.C.G., D.M. Peterson. 2018. Seeding Date Impact on Production of Four Perennial Cool- Season Forage Species. NRCS Tech Note MT-15-008.

Meccage, E.C., P. Carr, M. Bourgault, K. McVay, D. Boss. “Potential of Annual Forages in the Northern Great Plains”. Submitted. *Crops and Soils Magazine.* Accepted, pending publication.

Meccage, E.C. “Alfalfa fields: be prepared for 2018”. AgWeek. February, 2018.

Meccage, E.C. “Seeding decisions- the importance of variety trials”. AgWeek. February, 2018.

Meccage, E.C. “Know your forage quality to be better prepared for winter”. AgWeek. November 22, 2017.

Meccage, E.C. April 18, 2018. “Drought still a possibility in 2018”. Lane Nordlund for Northern Ag Network.

Meccage, E.C. December 8, 2017. “Alfalfa leaf retention during harvest”. Jeff Caldwell for FarmLife Magazine.

Meccage, E.C. April 19, 2018. “MT Forage Production Update”. Interview with Lane Nordlund. Northern Ag Network.

Miller, P.R., E.C. Glunk, J.A. Holmes, and R.E. Engel. Pea and barley hay as fallow replacement for dryland wheat. *J Agronomy.* Accepted December 22, 2017.

Peterson, D.M., J.G.P. Bowman, R.L. Endecott, A.L. Mack, E.C.G. Meccage\*. The effects of feeding reduced-lignin alfalfa on growing beef cattle performance: a preliminary study. *J. Ag. Studies.*

Sapkota, A., E.C. Meccage*†,* R.N. Stougaard, J.P. Tanner, D.M. Peterson, J.A. Torrion. 2018. Boron Fertilization of Alfalfa in Montana. *Crop, Forage, and Turfgrass Mgmgt. Accepted pending revision.*

Staudenmeyer, D.M., D. Fuga, E.C. Glunk\*. 2016. Preference and forage quality of 13 cultivars of forage barley and 2 cultivars of oats when grazed by sheep. *Am. J. Exp. Agric.*15:2.1-7.

**Oregon Publications**

Ates, S., Cicek, H., Gultekin, I., Yigezu, Y. A., Keser M., & Filley, S. (2018) Bio-economic analysis of dual-purpose management of winter cereals in high and low input production systems. Field Crops Research, 227: 56-66.

Daly, C., Halbleib, M., Hannaway, D.B., Eaton, L.M. 2018. Environmental Limitation Mapping of Potential Biomass Resources across the Conterminous United States. Global Change Biology: Bioenergy DOI: 10.1111/gcbb.12496.

Fery, Melissa, Maud Powell, and David B. Hannaway. 201X. Pasture and Grazing Management. Professional and Continuing Education Course. Oregon State Univ.

Hannaway, David B., Linda Brewer, Steve Fransen, Glenn Shewmaker, Shannon Williams, and Sarah Baker. 2018. Planning and Sowing Grasslands. Chapter 5, pp. 125-170. In: Improving Grassland and Pasture Management in Agriculture. Athole Marshall and Rosemary Collins, Eds. http://dx.doi.org/10.19103/AS.2017.0024.10

Hannaway, D.B.\*, L.J. Brewer, S. Ates, N.P. Anderson, G. Wang, S. Filley, C. Daly, M.D. Halbleib, C. Ringo, S. Monk, D.J. Moot, X. Yang, D.F. Chapman, and P. Sohn. 2018. Match Clover: Optimal selection of clover species. European Grassland Federation Conf., Cork, Ireland. 18-21 June.

Hannaway, D., He, F., Moot, D., Yang, X., Mills, A., Smith, R., Teixeira, E., Shewmaker, G., Islam, A., Wang, G. *2018*. Improving Alfalfa (*Medicago* *sativa* L.) Cultivar Selection by GIS Mapping of Fall Dormancy and Winter Survival Index Classes and Modeling Seasonal and Annual Yield. 2nd World Alfalfa Congress, Cordoba, Argentina. 11-14 Nov. Abstract.

He, Feng, Kun Wang, Xianglin Li, and David B. Hannaway. 2018. Effects of precipitation and clipping intensity on net primary productivity and composition of *Leymus chinensis* in temperate grasslands. PLoSONE PONE-D-17-14028R3.

Misra, A. K. Kumar, S., Kumar, T.K., Ahmed, S., Palsaniya, D. R., Ghosh, P. K., Louhaichi, M., Sarker, A., Hassan, S. & Ates, S (2018). Nutrient intake and utilization in sheep fed opuntia [Opuntia ficus-indica (L.) Mill.] in combination with conventional green and dry fodders. Range Management and Agroforestry, 39: 97-102

Roseberg, R.J., S. Norberg, and B.A. Charlton. 2018. Teff grass for forage: Nitrogen and irrigation requirements. PNW 709, Oregon State Univ. Extension Service.

Revised Pasture Fertilizer Guide (FG63; submitted to OSU Extension and Experiment Station Communications, EESC). Grass Tetany article is on the OSU website (<https://extension.oregonstate.edu/crop-production/pastures-forages/grass-tetany-fast-growing-grass-can-mean-problems>). Will submit for publication through EESC.

Yang, X., Moot, D., Brown, H., Teixeira, E., Hung, T. Hannaway, D. 2018. Modelling Alfalfa (Medicago sativa L.) Phenological Development. 2nd World Alfalfa Congress, Cordoba, Argentina. 11-14 Nov. Abstract.

**Utah Publications**

Chail, A., J.F. Legako, S. Martini, and J.W. MacAdam. 2017. Consumer sensory evaluation and chemical composition of forage and conventional feedlot finished beef *Gluteus medius* and *Triceps brachii* steaks. Journal of Animal Science 95: 1553–1564.

Christensen, R., J.-S. Eun, S.-Y. Yang, B.-R. Min, and J.W. MacAdam. 2017. In vitro effects of birdsfoot trefoil (*Lotus corniculatus* L.) pasture on ruminal fermentation, microbial population, and methane production. Professional Animal Scientist 33: 451-460.

Cox, S., M.D. Peel, J.E. Creech, B.L. Waldron, J.-S. Eun, D. Zobell, R.L. Miller, D.L. Snyder. 2017. Forage production of grass-legume binary mixtures on Intermountain Western USA irrigated pastures. Crop Science 57: 1742-1753.

Creech, J. E., B.L. Waldron, M.D. Peel, S.R. Larson, I.W. Mott. 2017. Tall fescue forage mass in a grass-legume mixture: Predicted efficiency of indirect selection. Euphytica 213: 67.

MacAdam, J.W. and C.J. Nelson. 2017. Physiology of forage plants. pp. 51-70 *In* M. Collins, C.J. Nelson, K.J. Moore, and R.F. Barnes (ed.) Forages, Vol. 1: An Introduction to Grassland Agriculture, 7th Ed., Wiley Blackwell, Hoboken, NJ.

Sagers, J. K., B.L. Waldron, J.E. Creech, I.W. Mott, B.G. Bugbee. (2017). Salinity tolerance of three competing rangeland pant species: Studies in hydroponic culture. Ecology and Evolution 7: 10916-10929.

Stettler, J.M., D.A. Johnson, B.S. Bushman, K.J. Connors, T.A. Jones, J.W. MacAdam, and D.J. Hole. 2017. Utah *Lotus*: North American legume for rangeland revegetation in the southern Great Basin and Colorado Plateau. Rangeland Ecology and Management 70: 691-699.

**Washington Publications**

Roseberg, R., S. Norberg, and Brian Charlton. 2018. Teff Grass for Forage. Pacific Northwest Extension Publication PNW709, June 2018.

Norberg, S. 2018. 2017 Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials. *Northwest Hay Expo.* Kennewick, WA. Jan. 17-18, 2017.

**Wyoming Publications**

*Peer-Reviewed Journal Articles*

Islam, M.A. and Ashilenje, D. 2018. Diversified forage cropping systems and their implications on resilience and productivity. *Sustainability*. 10, 3920; doi:10.3390/su10113920.

Nilahyane, A., Islam, M.A., Mesbah, A.O., and Garcia y Garcia, A. 2018. Effect of irrigation and nitrogen fertilization strategies on silage corn grown in semi-arid conditions. *Agronomy*. 8, 208; doi:10.3390/agronomy8100208.

Dhakal, D. and Islam, M.A. 2018. Grass-legume mixtures for improved soil health in cultivated agroecosystem. *Sustainability*. 10, 2718; doi:10.3390/su10082718.

Nilahyane, A., Islam, M.A., Mesbah, A.O., and Garcia y Garcia, A. 2018. Evaluation of silage corn yield gap: An approach for sustainable production in the semi-arid region of USA. *Sustainability*. 10, 2523; doi:10.3390/su10072523.

Tracy, B.F., Foster, J.L., Butler, T.J., Islam, M.A., Toledo, D., and Vendramini, J.M.B. 2018. Resilience in Forage and Grazinglands. *Crop Science (in press)*.

Adjesiwor, A.T., Islam, M.A., Zheljazkov, V.D., Ritten, J.P., and Garcia y Garcia, A. 2017. Grass-legume seed mass ratios and nitrogen rates affect forage accumulation, nutritive value, and profitability. *Crop Science*. 57:1-13. doi: 10.2135/cropsci2016.09.0776.

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Islam, M.A. and Ashilenje, D. 2018. Understanding species traits and biodiversity indices to solve problems associated with legume persistence in cropping systems. In: Plant Competition in Cropping Systems, (D. Dunea, Ed.). InTechOpen, Rijeka, Croatia (*in press*).

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*Reviewed Proceedings*

Islam, M.A. 2018. Effects of potassium, cultivar, and harvest time on sustainable alfalfa production. Proceedings of the 2nd World Alfalfa Congress, November 11‐14, 2018, Cordoba, Argentina.

*Abstracts*

Baidoo, M. and Islam, M.A. 2018. Effect of Potassium and Harvest Time on Forage Accumulation and Potassium Uptake of Alfalfa. Proceedings of the Western Society of Crop Science Annual Meetings June 19-20, 2018. Laramie, WY (Western Society of Crop Science).

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Khatiwada1, B., Acharya, S.N., Larney, F., Lupwayi, N.Z., Smith, E., and Islam, M.A. 2018. Ability of sainfoin and cicer milkvetch populations to rejuvenate existing pastures in western Canada. Proceedings of the Western Society of Crop Science Annual Meetings June 19-20, 2018. Laramie, WY (Western Society of Crop Science).

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*Extension publications*

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Horn, B.E., Islam, M.A., Smith, D., Jeliazkov, V., and Garcia y Garcia, A. 2017. Perennial cool-season grasses for hay production and fall grazing under full and limited irrigation. 2016 Field Days Bulletin, University of Wyoming Agricultural Experiment Station, pp. 124-125. Available at <http://www.uwyo.edu/uwexpstn/_files/docs/2017-field-days-bulletin.pdf> (verified October 26, 2017).

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Baskota, S. and Islam, M.A. 2017. Evaluation of forage nutritive value of different fenugreek entries in Wyoming. 2017 Field Days Bulletin, University of Wyoming Agricultural Experiment Station, pp. 102-103. Available at <http://www.uwyo.edu/uwexpstn/_files/docs/2017-field-days-bulletin.pdf> (verified October 26, 2017).

Nilahyane, A. and Islam, M.A. 2017. Evaluation of irrigation water and nitrogen management for silage corn production in Wyoming. 2017 Field Days Bulletin, University of Wyoming Agricultural Experiment Station, pp. 58-59. Available at <http://www.uwyo.edu/uwexpstn/_files/docs/2017-field-days-bulletin.pdf> (verified October 26, 2017).

Nilahyane, A. and Islam, M.A. 2017. Effect of water stress on yield and water use of corn for silage grown in a semiarid environment of Wyoming. 2017 Field Days Bulletin, University of Wyoming Agricultural Experiment Station, pp. 56-57. Available at <http://www.uwyo.edu/uwexpstn/_files/docs/2017-field-days-bulletin.pdf> (verified October 26, 2017).

Nilahyane, A. and Islam, M.A. 2017. Response of silage corn to irrigation water and nitrogen under on-surface and sub-surface drip irrigation. 2017 Field Days Bulletin, University of Wyoming Agricultural Experiment Station, pp. 54-55. Available at <http://www.uwyo.edu/uwexpstn/_files/docs/2017-field-days-bulletin.pdf> (verified October 26, 2017).

Ashilenje, D. and Islam, M.A. 2017. Meadow bromegrass in mixture with alfalfa affects light and nitrogen acquisition, forage yield, and nutritive value. 2017 Field Days Bulletin, University of Wyoming Agricultural Experiment Station, pp. 20-21. Available at <http://www.uwyo.edu/uwexpstn/_files/docs/2017-field-days-bulletin.pdf> (verified October 26, 2017).

Baskota, S. and Islam, M.A. 2017. Evaluation of forage nutritive value of quinoa cultivars. 2017 Field Days Bulletin, University of Wyoming Agricultural Experiment Station, pp. 18-19. Available at <http://www.uwyo.edu/uwexpstn/_files/docs/2017-field-days-bulletin.pdf> (verified October 26, 2017).

Baskota, S. and Islam, M.A. 2017. Effect of planting time on dry matter and seed yield of fenugreek. 2017 Field Days Bulletin, University of Wyoming Agricultural Experiment Station, pp. 16-17. Available at <http://www.uwyo.edu/uwexpstn/_files/docs/2017-field-days-bulletin.pdf> (verified October 26, 2017).

Islam, M.A. 2017. Grass-legume Mixtures Have Benefits Over Monoculture Systems. Wyoming Livestock Roundup, the Weekly News Source for Wyoming’s Ranchers, Farmers, and Agribusiness Community, August 26, 2017.

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Islam, M.A. 2017. Inoculation of Legumes. Wyoming Livestock Roundup, the Weekly News Source for Wyoming’s Ranchers, Farmers, and Agribusiness Community, April 8, 2017.

Islam, M.A. 2017. Silage: Production and Feeding – Part VI. Wyoming Livestock Roundup, the Weekly News Source for Wyoming’s Ranchers, Farmers, and Agribusiness Community, February 11, 2017.

**GRANTS**

**Colorado Grants**

Brummer, J.E. The Silent Decline in Soil Potassium Levels and its Effect on Alfalfa Productivity in the Central and Western US. USDA-NIFA Alfalfa and Forage Research Program, 9/1/2016 to 8/31/2019, $63,928.

Rhoades, R., J. Brummer, J. Ippolito, and J. Ahola. A Long-term Integrated Evaluation of the ARDEC Irrigated Forage System. CSU Ag. Exp. Station, 1/1/2017 to 12/31/2018, $89,933.

Schipanski, M.E. et al. Demonstrating the Potential of Cover Crop and Forage Mixtures to Improve Soil Health, Productivity, and Profitability in Water-Limited Regions. USDA-NRCS Conservation Innovation Grant, 11/12/2015 to 9/29/2019, $995,451.

**Montana Grants**

Wanner, K., S. Schell, R. Ramirez, J. Vardijman, E. Meccage. Protecting alfalfa yield from weevil damage in the Intermountain West Region. USDA NIFA. 09/01/18-09/31/2021

Carr, P., A. Bekkerman, J. Eberly, K. Fuller, B. Menalled, E. Meccage, F. Menalled, P. Miller, Z. Miller, T. Murphy, T. Seipel.Creep Stop: Integrating biological, cultural, and mechanical/ physical tools for long-term suppression of creeping perennial weeds in Northern Great Plains and Pacific Northwest Cropping Systems. USDA NIFA.

Meccage, E. Impact of Sulfur fertilization rate and timing on forage quality, yield, and persistence in cool-season perennial grass stands. MT Fertilizer Tax Assessment Committee. 05/1/2018-4/30/2020.

Meccage, E. Do different methods of outdoor round bale hay storage impact dry matter and forage quality losses in Montana? BAIR Ranch Foundation. 8/1/17-7/31/18

Wanner, K. and E. Meccage. Increasing the adoption of alfalfa weevil integrated pest management in the Western region. WRIPM. 3/1/17-2/1/18.

Olson, B. and J. Berardinelli. Winter Grazaing in Montana. NIFA MONB. 10/1/16-9/30/2021

Delcurto, T., M. VanEmon, L. McNew, T. Murphy, B. Sowell, J. Mosely, C. Carr, E. Glunk, C. Parsons, J. Dafoe. Beef production strategies that optimize use of western rangelands. NIFA MONB. 07/2/18-06/30/2023

Carr, P. Intensifying and diversifying dryland cropping systems using full and warm-season crops and crop mixtures in central Montana. Hatch Project. 07/1/17-06/30/2020

Seipel, T., A. Bekkerman, P. Carr, T. Murphy, E. Burns, F. Menalled. Integrating little hammers: using crop variety, crop diversification, cover crops, and targeted grazing to chip away at multiple herbicide resistant weeds. USDA NIFA. 09/01/17- 08/31/2020

Jabbour, R., F. Peairs, J. Ritten, M. Islam, T. Rand, B. Lee. Integration of early harvest with biological control for sustainable alfalfa production. USDA NIFA. 09/01/18-08/31/2022

**Oregon Grants**

Ates, S. Evaluation of seasonal yield, forage quality, and persistence of cool-season grass and legume species for sheep production systems in non-irrigated western Oregon pastures (ARF Grant)

Ates, S. Milk and Forage Production from Mixed or Spatially Separated Simple and Diverse Pastures (ARF Grant)

Ates, S. Milk Yield and Composition of Dairy Cows from Diversified Grass, Herb or Legume-based Summer Pastures (ODFA Grant)

Ates, S. Fodder Beets as winter forage for cattle in eastern Oregon (W. SARE farmer rancher/researcher)

Filley, S. Prepared and received funding for a proposal for updating and improving the Forage Information System for the Forage-Livestock Systems Working Group. $10,000.

Filley, S. “Evaluation of seasonal yield, forage quality, and persistence of cool-season grass and legume species for sheep production systems in non-irrigated western Oregon pastures.” Funded for $12,500 by the Agricultural Research Foundation, Oregon State University. PI: Serkan Ates; Cooperators: David Hannaway, Mary Smallman, Claudia Ingham, Shelby Filley, Gene Pirelli, and Jerry Hall.

Wang, G. Cover crops after forage spring triticale in eastern Oregon. $12,500 from ARF.

Wang, G. Developing a fall-winter grazing system by using fodder beets. $12,500 from ARF.

Wang, G. Irrigation and seeding date effects on winter grasses and forbs forage production and quality in eastern Oregon. $17,434 from OBC.

**Utah Grants**

Utah Native Plant Society. 07/01/16-06/30/18. Developing a restoration strategy for *Eriogonum* *mitophyllum* Reveal. $500. MacAdam, P.I.

USDA NIFA AFRI Agroecosystem Management Program. 06/01/16-05/031/20. Tannin-containing legumes in pasturelands and their ecological services. Grant #2016-67019-25086. $499,884. MacAdam Co-P.I.

USDA NIFA AFRI Food Security Program. 02/15/16-02/14/18. Legume-finished beef: Achieving current production with greater environmental, economic and social sustainability. Grant #2016-69004-24855. $150,000. MacAdam Co-P.I.

USDA NIFA AFRI Climate and Microbial Processes in Agroecosystems program. 02/15/16-02/14/19. Microbial carbon-use efficiency in agroecosystems: The effect of drought and N availability on soil microbial production and respiration. Grant# 2016-67004-24920. $714,080. MacAdam Co-P.I.

USU Office of Research and Graduate Studies, Research Catalyst Grant. Understanding the increased omega-3 fatty acid concentration in legume-fed beef. 05/01/18-04/30/20. $20,000. MacAdam P.I.

**Washington Grants**

Alfalfa Variety Trials. Washington Hay Growers Association $20,000. P.I.: S. Norberg. (03/18-4/19)

Developing Practical Phosphorus and Potassium Tissue Test Recommendations and Utilizing Struvite in Modern Alfalfa Systems, National Alfalfa and Forage Alliance $50,000. P.I.: S. Norberg, Co-P.I.: D. Llewellyn, S. Fransen, J. Harrison and L. Whitefield. (11/18-11/19)

Phenotypic Response of the Soil Microbiome to Environmental Perturbations, Subcontract of DOE Grant Received by PNNL (PI J.K. Jansson,) $148,671 (10/17 – 9/20) S. Fransen, S. Norberg.

Determining Genetic Factors that Influence Forage Quality in Alfalfa, The National Institute of Food and Agriculture (NIFA), Alfalfa and Forage Program, $250,000. PD. S. Norberg, L. Yu, D. Combs, G. Shewmaker, G. Wang, D. Llewellyn, S. Fransen 9/17- 8/19.

Developing Practical Phosphorus and Potassium Tissue Test Recommendations and Utilizing Struvite in Modern Alfalfa Systems, National Alfalfa and Forage Alliance $40,000. P.I.: S. Norberg, Co-P.I.: D. Llewellyn, S. Fransen, J. Harrison and L. Whitefield. (11/17-11/18)

Capturing and Managing Phosphorus for Environmental Stewardship and a Sustainable Dairy Industry/ Evaluating Struvite Efficacy in Alfalfa, Subcontract with Joe Harrison $20,000. P.I.: S. Norberg, S. Fransen (8/17-07/18).

Influence of Premier’s Arbuscular Mycorrhizae on Forage Yield and Quality of Alfalfa. Premier Tech Technologies Ltd. $5,147 P.I.: S. Norberg (8/1/17 – 7/31/19)

**Wyoming Grants**

Energy GA Fellowships, UW. 2018-2020. Islam, M.A. Reclamation of disturbed areas used by gas industries in Wyoming by using some promising grass and legume genotypes. $55,008.

Y Cross Ranch Tuition and Fee Award, COANR, UW. 2018-2019. Islam, M.A. Developing a potassium fertility management program on alfalfa. $9,000

Edward H. and Susan King Lloyd Graduate Research Award, UW. 2018-2019. Islam, M.A and Baidoo, M. Potassium and harvest management in alfalfa. $3,000.

UW School of Energy Resources. 2018-2019. Stahl, P.D., Eberle, C.A., Norton, J.B., Islam, M.A., and Coupal, R.H. Use of Coal Residues as a Soil Amendment. $83,000.

Specialty Crop Block Grant Program – Farm Bill (SCBGP-FB), USDA Wyoming Department of Agriculture. 2017-2019. Islam, M.A. Evaluation of chickpeas in Wyoming Environments. $24,500.

USDA-NIFA Alfalfa and Forage Research Program. 2016-2019. Islam, M.A., Burmmer, J., and Min, D. The silent decline in soil potassium levels and its effect on alfalfa productivity in the central and western US. $250,000.

UW School of Energy Resources. 2016-2019. Stahl, P.D., Coupal, R.H., Islam, M.A., McLaughlin, J.F., and Norton, J.B. Use of coal residues as soil amendments. $242,000.