



NAME: O. STEVEN NORBERG

TITLE and RANK: Regional Extension Specialist, Associate Professor

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Summary box

Number of journal articles	6
Number of peer reviewed extension publications	8
Grant and revenue generation dollars total	\$2,126,272
Impacts	\$19.5 million
Number of invited international or national presentations	19
Number of international or national abstracts or proceedings	31

EDUCATION

A. Degrees Earned

- 1991 Ph.D., Crop Science – Crop Science, Oregon State University, Corvallis, OR
- 1987 M.S., Agronomy – Crop Production and Physiology, University of Nebraska, NE
- 1982 B.S., Agriculture – Agronomy, University of Nebraska, NE

B. Certificates and Licenses

2011-present Washington State Pesticide License, Washington State Department of Agriculture
2005-present Certified Crop Advisor for the Northwest Region
2005-present Certified Professional Agronomist

EMPLOYMENT

A. University related

2011-present Regional Forage Specialist, Washington State University, Franklin County, (Four county area)
2005-2011 Field Crops and Watershed Mgt., Oregon State University, Malheur County Extension
2002-2003 Agronomy and Horticulture Agent, Colorado State University, Morgan County
1993-2002 Regional Agronomy Specialist, University of Missouri, Harrison County Extension (Four county area)
1991-1992 Teaching /Research Associate, University of Nebraska, Lincoln, NE
1987-1991 Graduate Research Assistant, Oregon State University, Corvallis, OR
1985-1987 Graduate Teaching /Research Assistant, University of Nebraska, Lincoln, NE

B. Other

2004-2005 Soil Conservationist, Natural Resource Conservation Service, Akron, CO

GRANTS, CONTRACTS, AND FUND GENERATION¹

A. Grants and Contracts

Alfalfa Variety Trials. Washington Hay Growers Association \$17,400. P.I.: **Norberg, S., S. Fransen**. 03/22-5/23 **(1, 2, 3, 4, 5, \$17,400)**.

Phenotypic Response of the Soil Microbiome to Environmental Perturbations, Subcontract of DOE Grant Received by PNNL PI. Hofmockel, K., **S. Norberg**. \$100,000. 1/22 – 12/22, **(2, 3, 4, 5, \$100,000)**

Phenotypic Response of the Soil Microbiome to Environmental Perturbations, Subcontract of DOE Grant Received by PNNL PI. Hofmockel, K., **S. Norberg**. \$20,000. 9/21 – 12/21, **(2, 3, 4, 5, \$20,000)**

Twin Ecosystems with Tall Wheatgrass PNNL Berkley, \$242,999. 01/22-9/30/2023 PI. Hofmockel, K., **S. Norberg**, T. Peters, L. Khot, **(2, 3, 5, \$89,998)**

¹Key to indicators or description of contributions to Grants, Contracts and Fund Generation: 1 = Provided the initial idea; 2 = Developed research/program design and hypotheses; 3 = Authorship of grant application; 4 = Developed and/or managed budget; 5 = Managed personnel, partnerships, and project activities.

Maximizing the Value of Cover Crops in the Pacific Northwest, PNNL, Burrows, E., C. Kruger, A. Esser, S. Norberg, D. Collins. 2021. 1/2022-9/2024. \$600,000. **(2, 3, 5, \$167,000)**

Phenotypic Response of the Soil Microbiome to Environmental Perturbations, Subcontract of DOE Grant Received by PNNL PI. Hofmockel, K., **S. Norberg**. \$148,671. 10/17 – 9/21, **(2, 3, 4, 5, \$403,835)**

Alfalfa Variety Trials. Washington Hay Growers Association \$30,000. P.I.: **Norberg, S., S. Fransen**. 03/21-5/22 **(1, 2, 3, 4, 5, \$ \$30,000)**.

Adaptive Symbiotic Technologies Endophyte and Bacteria in Alfalfa. P.I.: **Norberg, S.** \$6,563. 3/21/-5/22, **(1, 2, 3, 4, 5, \$ \$6,563)**

Developing Molecular Markers for Enhancing Resistance to Drought and High Salinity and Improved Forage Quality in Alfalfa. **P.I. Lin, S., S. Norberg**. USDA \$48,500. 7/20-4/21, **(3, 5, \$48,500)**.

Phenotypic Response of the Soil Microbiome to Environmental Perturbations, Subcontract of DOE Grant Received by PNNL PI. Jansson, J., S. Fransen, **S. Norberg**. \$148,671. 10/17 – 9/21, **(4, 5, \$45,000)**

Inland Northwest Pasture Calendar for Agricultural Professionals. Western SARE-Professional Development Program. PI. R. Koenig, D. Llewellyn, S. Fransen, T. Hudson, **S. Norberg**, S. Neibergs, \$74,623, 5/19-9/20. **(2, 3, \$0)**

Use of dairy derived phosphorus as a sole phosphorus source for alfalfa production. Applied BioEnergy Research Program (Appendix A), Harrison, J. and **S. Norberg**. \$35,472. 1/20 to 12/20, **(2,4,6, \$0)**

Alfalfa Variety Trials. Washington Hay Growers Association. **P.I.: Norberg, S., S. Fransen**. \$ 22,935. 04/20-5/21, **(1, 2, 3, 4, 5, \$ 22,935)**.

Determining Genetic Factors that Influence Protein Quality and Yield in Alfalfa, The National Institute of Food and Agriculture (NIFA), Alfalfa and Forage Program, **PI. Norberg, S.**, L. Yu, G. Zanton, G. Shewmaker, G. Wang, D. Llewellyn, S. Fransen, M. Bohle. \$500,000. 9/19-8/22. **(1, 2, 3, 4, 5, \$500,000)**.

Developing Practical Phosphorus and Potassium Tissue Test Recommendations and Utilizing Struvite in Modern Alfalfa Systems, National Alfalfa and Forage Alliance (Third Year) **P.I.: S. Norberg**, Co-P.I.: D. Llewellyn, S. Fransen, J. Harrison and L. Whitefield. \$50,000. 11/19-11/20 **(1, 2, 3, 4, 5, \$50,000)**.

Capturing and Managing Phosphorus for Environmental Stewardship and a Sustainable Dairy Industry/ Evaluating Struvite Efficacy in Alfalfa, Subcontract with Joe Harrison **P.I.: S. Norberg, S. Fransen.** \$26,000. 8/18-07/19 **(1, 2, 3, 4, 5, \$26,000).**

Alfalfa Variety Trials. Washington Hay Growers Association \$22,384. **P.I.: Norberg, S., S. Fransen.** 03/19-4/20, **(1, 2, 3, 4, 5, \$ \$22,384).**

Inland Northwest Pasture Calendar for Agricultural Professionals. Western SARE-Professional Development Program. PI. R. Koenig, D. Llewellyn, S. Fransen, T. Hudson, **S. Norberg, S. Neibergs,** \$74,623. 5/19-9/20, **(3, \$0).**

Developing Molecular Markers for Enhancing Resistance to Drought and High Salinity and Improved Forage Quality in Alfalfa. **P.I. Norberg, S.** USDA \$49,999. 9/18-7/19, **(3, 5, \$49,999).**

Alfalfa Variety Trials. Washington Hay Growers Association **P.I.: Norberg, S., S. Fransen.** \$20,200. 03/18-4/19, **(1, 2, 3, 4, 5, \$20,200).**

Developing Practical Phosphorus and Potassium Tissue Test Recommendations and Utilizing Struvite in Modern Alfalfa Systems, National Alfalfa and Forage Alliance. **P.I.: S. Norberg,** Co-P.I.: D. Llewellyn, S. Fransen, J. Harrison and L. Whitefield. \$50,000. 11/18-11/19 **(1, 2, 3, 4, 5, \$50,000).**

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, (5, \$0)**

Determining Genetic Factors that Influence Forage Quality in Alfalfa, The National Institute of Food and Agriculture (NIFA), Alfalfa and Forage Program, **PI. Norberg, S.,** L. Yu, D. Combs, G. Shewmaker, G. Wang, D. Llewellyn, S. Fransen. \$250,000. 9/17- 8/19. **(1, 2, 3, 4, 5, \$250,000).**

Developing Practical Phosphorus and Potassium Tissue Test Recommendations and Utilizing Struvite in Modern Alfalfa Systems, National Alfalfa and Forage Alliance **P.I.: Norberg, S.,** Co-P.I.: D. Llewellyn, S. Fransen, J. Harrison and L. Whitefield. \$40,000. 11/17-11/18, **(1, 2, 3, 4, 5, \$40,000).**

Capturing and Managing Phosphorus for Environmental Stewardship and a Sustainable Dairy Industry/ Evaluating Struvite Efficacy in Alfalfa, Subcontract from Conservation Innovation Grant **P.I.: Norberg, S., S. Fransen.** \$20,000. 8/17-07/18, **(1, 2, 3, 4, 5, \$20,000).**

Influence of Premier's Arbuscular Mycorrhizae on Forage Yield and Quality of Alfalfa. Premier Tech Technologies Ltd. **P.I.: S. Norberg,** \$5,147. 8/1/17 – 7/31/19, **(2, 3, 4, 5, \$5,147).**

Evaluate Endo Granular Mycorrhiza on Newly Planted Alfalfa, Valent. **P.I.: S. Norberg**, \$2500. 4/17-10/17, **(3, 4, 5 \$2,500)**.

Intercropping Frosty Berseem Clover with Alfalfa, Grassland of Oregon. **P.I.: S. Norberg**, Co-P.I.: D. Llewellyn, S. Fransen and J. Neibergs. \$3,000. 04/17-4/18 **(1, 2, 3, 4, 5, \$3,000)**.

Population and Multi-Cut Systems in Soybean, Grant County Crop Improvement. **P.I.: S. Norberg**, Co-P.I.: D. Llewellyn, Collaborators: S. Fransen and J. Neibergs. \$3,000. 04/17-4/18 **(1, 2, 3, 4, 5, \$2,700)**.

Alfalfa Variety Trials. Washington Hay Growers Association **P.I.: S. Norberg**, S. Fransen. \$20,000. 03/17-4/18, **(1, 2, 3, 4, 5, \$20,000)**.

Strategies to Prevent and Mitigate AP of GMO's in Organic and Export Alfalfa Hay. NIFA - Organic Agriculture Research and Extension Initiative. Co-PD Steve Fransen, **Co-PD Norberg, S.**, Co-PD S. Kesoju, Co-PI S. Neibergs, Co-PI D. Hannaway, Co-PI M. Bohle, Co-PI T. Downing, Co-PI G. Shewmaker, Co-PI D. Roberts, Co-PI R. Mensonides. \$49,915. 01/17-12/17, **(2,3, \$0)**

Yield, Feed Quality and Total Productivity of Teff Overseeded in Timothy. International Plant Nutrition Institute. **P.I.: S. Norberg**, Co-P.I.: D. Llewellyn, Collaborators: S. Fransen and J. Neibergs. \$2,000. 03/16-4/17, **(1, 2, 3, 4, 5, \$1,800)**.

Intercropping Frosty Berseem Clover with Alfalfa, Grassland of Oregon. **P.I.: S. Norberg**, Co-P.I.: D. Llewellyn, Collaborators: S. Fransen and J. Neibergs. \$3,000. 04/16-4/17, **(1, 2, 3, 4, 5, \$3,000)**.

Soybean Morphology Impact on Soybean Hay Quality, Grant County Crop Improvement. **P.I.: S. Norberg**, Co-P.I.: D. Llewellyn, Collaborators: S. Fransen and J. Neibergs. \$3,000. 04/16-4/17, **(1, 2, 3, 4, 5, \$3,000)**.

Alfalfa Variety Trials. Washington Hay Growers Association. **P.I.: S. Norberg**. \$20,725. 03/16-4/17 **(1, 2, 3, 4, 5, \$20,725)**.

Yield, Feed Quality and Total Productivity of Teff Overseeded in Timothy. International Plant Nutrition Institute **P.I.: S. Norberg**, Co-P.I.: D. Llewellyn, Collaborators: S. Fransen and J. Neibergs. \$5,000. 03/14-4/15 **(1, 2, 3, 4, 5, \$5,000)**.

Soybean Morphology Impact on Soybean Hay Quality, Grant County Crop Improvement. **P.I.: S. Norberg**, Co-P.I.: D. Llewellyn, Collaborators: S. Fransen and J. Neibergs. \$3,000. 04/15-4/16 **(1, 2, 3, 4, 5, \$3,000)**.

Alfalfa Variety Trials. Washington Hay Growers Association. **P.I.: S. Norberg.** \$17,400. 03/15-4/16 **(1, 2, 3, 4, 5, \$17,400).**

Intercropping Frosty Berseem Clover with Alfalfa, Grassland of Oregon. **P.I.: S. Norberg,** Co-P.I.: D. Llewellyn, Collaborators: S. Fransen and J. Neibergs. 04/15-4/16, **(1, 2, 3, 4, 5, \$2,700).**

Evaluation of Ensiling Characteristics, Forage Quality, and *in situ* Digestion of Canola Silage for Beef and Dairy Production Systems. Washington Oilseed Cropping Systems Llewellyn, D., **S. Norberg** \$10,500. 7/14-12/16 **(2, 3 \$0).**

Alfalfa Variety Trials. Washington Hay Growers Association **P.I.: S. Norberg.** \$17,400. 03/14-4/15 **(1, 2, 3, 4, 5, \$17,400).**

Yield, Feed Quality and Total Productivity of Teff Overseeded in Timothy, Washington Hay Growers Association \$13,250. **P.I.: S. Norberg,** Co-P.I.: D. Llewellyn, Collaborators: S. Fransen, K. Desta, and J. Neibergs. \$13,250. 03/14-4/15 **(1, 2, 3, 4, 5, \$13,250).**

Yield, Feed Quality and Total Productivity of Soybeans for Hay and Forage, Grant County Crop Improvement. **P.I. Norberg, S.,** Co-P.I.: D. Llewellyn, Collaborators: S. Fransen, K. Desta, and J. Neibergs. \$3,000. 04/14-4/15 **(1, 2, 3, 4, 5, \$3,000).**

Feed Quality of Soybeans Intercropped with Corn, WSU Internal Ag Program Special Projects Grant. P.I.: D. Llewellyn and **Co-P.I. Norberg, S.,** \$6,900. 11/13-11/14. **(1, 2, 4, 5, \$3,450).**

Using the BioIntensive Technique of Intercropping Teff (*Eragrostis tef*) into Timothy to Improve the Economic Sustainability of Timothy. WSU CSNAR BIO-Ag Project Proposals. Competitive. **P.I.: Norberg, S.,** Co-P.I.: D. Llewellyn, Collaborators: S. Fransen, K. Desta, and J. Neibergs. \$40,000. 03/13-6/14, **(1, 2, 3, 4, 5, \$40,000).**

Yield, Feed Quality and Total Productivity of Soybeans for Hay and Forage, Grant County Crop Improvement. **P.I.: S. Norberg,** Co-P.I.: D. Llewellyn, Collaborators: S. Fransen, K. Desta, and J. Neibergs. \$3,000. 04/13-4/14, **(1, 2, 3, 4, 5, \$3,000).**

Alfalfa Variety Trials. Washington Hay Growers Association. **P.I.: Norberg, S.,** \$17,400. 03/13-4/14, **(1, 2, 3, 4, 5, \$17,400).**

Yield, Feed Quality and Total Productivity of Teff Overseeded in Timothy Washington Hay Growers Association. **P.I.: S. Norberg,** Co-P.I.: D. Llewellyn, S. Fransen, K. Desta, and J. Neibergs. \$13,250. 03/13-4/14, **(1, 2, 3, 4, 5, \$13,250).**

High Residue Farming in the Irrigated Far West. Western SARE. Competitive. P.I.: McGuire, A., **S. Norberg,** G. Wang, J. Mitchell, S. Hines, R. Flynn, and C. Shock. \$26,400. 09/13-9/14 **(3, \$0).**

Yield, Feed Quality and Total Productivity of Soybeans for Hay and Forage, Grant County Crop Improvement. **P.I.: S. Norberg**, Co-P.I.: D. Llewellyn, Collaborators: S. Fransen, K. Desta, and J. Neibergs. \$3,000. 04/12-5/13, **(1, 2, 3, 4, 5, \$2,700)**.

Developing Research and Production Information to Evaluate Camelina and Canola in a Sustainable Cropping, Bio-fuel Processing and Livestock Feeding System, WSU CSNAR BIO-Ag Project Proposals. Competitive. P.I.: Llewellyn, D., **Co-P.I.: S. Norberg**, J. Neibergs, and S. Fransen. \$19,650. 03/12-6/13, **(2, 3, \$0)**.

Forage Harvester Repair. Washington State University. **P.I.: Norberg, S.**, \$14,839.95. 01/13-5/13 **(1, 2, 3, 4, 5, \$14,839.95)**.

Forage Harvester Repair. Washington State Hay Growers Association. **P.I.: Norberg, S.**, \$6,000. 01/13-5/13, **(1, 2, 3, 4, 5, \$6,000)**.

Alfalfa Variety Trials. Washington Hay Growers Association. **P.I.: S. Norberg**. \$17,400. 03/12-4/13, **(1, 2, 3, 4, 5, \$17,400)**.

Yield, Feed Quality and Total Productivity of Teff Overseeded in Timothy Washington Hay Growers Association. **P.I.: Norberg, S.**, Co-P.I.: D. Llewellyn, Collaborators: S. Fransen, K. Desta, and J. Neibergs. \$13,250. 03/12-4/13, **(1, 2, 3, 4, 5, \$13,250)**.

Alfalfa Variety Trials. Washington Hay Growers Association. **P.I.: S. Norberg**. \$17,400. 03/11-4/12, **(4, 5, \$17,400)**.

C. Unfunded Grant Proposals – Summarized by Year

Year	Total Grants	Total Dollars
2022	0	0
2021	1	\$403,835
2020	0	0
2019	1	\$369,861
2018	1	\$97,679
2016	2	\$158,675
2015	2	\$513,663
2014	2	\$205,000
2013	3	\$9,680,000
2012	4	\$191,983
2011	2	\$83,483

HONORS AND AWARDS

2016 NACAA Research Poster Contest **2nd Place National Competition \$250 award**

2016 NACAA Research Poster Contest Winner, WA State

2015. NACAA Search for Excellence in Crop Production. **One of Four National Finalists. \$250 award.**

2015. NACAA Research Poster Contest Winner, Western Region.

2015. NACAA Research Poster Contest Winner, WA State.

2009. Winner of a National Election to the American Society of Agronomy – Experiment Station Division (A7), Served from 2007-2010 (Chair 2009)

PUBLICATIONS AND CREATIVE WORK²

A. Peer-reviewed Journal Articles. (The journal must have a professional organization or corporate entity with an editor that manages a blind, peer review process.)

Medina, S. Lin, G. Wang, D. Combs, G. Shewmaker, S. Fransen, D. Llewellyn, **S. Norberg**, L. Yu. 2022. Identification of Genetic Loci Associated with Five Agronomic Traits in Alfalfa Using Multi-Environment Trials. *Plant, Cell & Environment*. Submitted Oct. 25, 2022.

Harrison, J.H., **S. Norberg**, K. Fullerton, L. Morgon, E. Whitefield. 2021. Comparison of Struvite to Mono-ammonium Phosphate for Alfalfa Production at Commercial Alfalfa Farms: A Case Study. *Journal of NACAA*, ISSN 2158-9429 Volume 14: Issue 2 – December 2021. **(1, 2, 3, 4, 5, 6)** <https://www.nacaa.com/file.ashx?id=8b9e96af-4a3d-4cf7-ac5c-4d569e00dad6>

Mackey, E., J. H. Harrison, H. Tao, **S. Norberg**, A. Adams-Progar, E. Whitefeld. 2021. Effect of Application Season on Release of Available Phosphorus from Soil Receiving Mono-ammonium Phosphate or Struvite. *Water Air Soil Pollution* (2021) 232:467
<https://link.springer.com/article/10.1007%2Fs11270-021-05396-6>

Lin, S., C.A. Medina, **S. Norberg**, D. Combs, G.Wang, G. Shewmaker, S. Fransen, D.Llewellyn, Long-Xi Yu. 2021. Genome-Wide Association Studies Identifying Multiple Loci Associated with Alfalfa Forage Quality. *Frontiers in Plant Science*.
<https://doi.org/10.3389/fpls.2021.648192> **(1, 2, 3, 4, 5, 6)**

²Key to indicators or description of contributions to Publications and Creative Work: 1 = Developed the initial idea; 2 = Obtained or provided funds or other resources; 3 = Collected data; 4 = Analyzed data; 5 = Wrote/created product; 6 = Edited product.

Norberg, O.S., D. Llewellyn, S. Fransen, S. Kesoju. 2021. Intercropping Irrigated Corn with Two Soybean Maturity Groups at Different Planting Rates for Forage. *Crop, Forage & Turfgrass Management*. 2021;e20074. <https://doi.org/10.1002/cft2.20074>. **(1, 2, 3, 4, 5, 6)**

Lin, S., C. Medina, C., Boge, B., Hu, J., Fransen, S., **Norberg, S.**, Yu, L. 2020. Identification of Genetic Loci associated with Forage Quality in Response to Water Deficit in Autotetraploid Alfalfa (*Medicago sativa* L.). *Biomed Central (BMC) Plant Biology*. 20. <https://doi.org/10.1186/s12870-020-02520-2>. **(2, 5)**

Llewellyn, D.A., G. Rohwer, **O.S. Norberg**, E. Kimura, J.S. Neibergs, and S.C. Fransen. 2015. Case Study: Evaluating Farm Processed Canola and Camelina Meals as Protein Supplements for Beef Cattle. *J. of NACAA*, 8(2), available online at <http://www.nacaa.com/journal/index.php?jid=545> **(2, 6)**

Norberg, O.S. 2014. Potential Impact of Washington State Alfalfa Variety Testing from 1990 to 2013. *Journal of The NACAA*. Volume 7, Issue 2 available at <http://www.nacaa.com/journal/index.php?jid=449> **(1, 2, 3, 4, 5, 6)**

Norberg, O.S. and J. Felix. 2014. Response of Teff (*Eragrostis tef*), Barnyardgrass and Broadleaf Weeds to Postemergence Applied Herbicides. *Weed Technology*. 28:371–376 **(1, 3, 4, 5, 6)**

Norberg, O.S., B. Brown, and C. Shock. 2010. Optimizing Nitrogen Use for Irrigated Waxy Barley – Online. *Crop Management* doi: 10.1094/CM-2010-0604-01-RS. **(1, 2, 3, 4, 5, 6)**

Norberg, O.S., T.E. Fiez, G.D. Jolliff, and M. Seddigh. 1993. Flower Production and Honey Bee Density Effects on Meadowfoam Seed Yield. *Crop Science* 33:108-112. **(1, 2, 3, 4, 5, 6)**

Norberg, O.S., T.E. Fiez, G.D. Jolliff, M. Seddigh, and J.M. Crane. 1993. Shading and Crop Cover Effects on Meadowfoam Oil Yield. *Agronomy Journal* 85:183-187. **(1, 2, 3, 4, 5, 6)**

Jolliff, G.D., M. Seddigh, **O.S. Norberg**, and T.E. Fiez. 1993. Seeding Rate, Nitrogen Fertilization and Irrigation Effect on Performance of a High Yielding Meadowfoam Line. *Agronomy Journal* 85:188-193. **(4, 6)**

Fiez, T.E., **O.S. Norberg**, and G.D. Jolliff. 1991. Dry Matter Production, Development and Carbohydrate Composition in Three Meadowfoam Lines. *Crop Science* 31:1008-1014. **(3, 4)**

Fiez, T.E., **O.S. Norberg**, and G.D. Jolliff. 1991. Yield Components in Three Meadowfoam Lines. *Agronomy Journal* 83:598-602. **(3, 4)**

Norberg, O.S., S.C. Mason, and S.R. Lowry. 1989. Ethephon Alteration of Corn Plant Morphology. *Agronomy Journal* 81:603-606. **(1, 2, 3, 4, 5, 6)**

Norberg, O.S., S.C. Mason, and S.R. Lowry. 1988. Ethephon Influence on Harvestable yield, Grain Quality and Lodging of Corn. *Agronomy Journal* 80:768-772. **(1, 2, 3, 4, 5, 6)**

B. Peer-reviewed Extension Publications. (The publication must have a formal publishing organization such as WSU Extension that manages a blind, peer review process.)

Bohle, M., J. Sagers, **S. Norberg**, B. Breeze, and G. Wang. 2022. Pasture Management Calendar Chapter 1. Legumes and Forbs for the Dryland and Irrigated PNW. PNW Guide (In Review) **(1, 2, 3, 4, 5, 6)**

Bohle, M., J. Sagers, **S. Norberg**, B. Breeze, and G. Wang. 2022. Pasture Management Calendar Chapter 3. Grass Species. PNW Guide (In Review) **(1, 2, 3, 4, 5, 6)**

Norberg, S., C. Tanner, M. Bohle and S. Fransen. 2022. Pasture Management Calendar Appendix 11. Soil Nutrient Management and Importance for Inland NW Perennial Forage / Pastures Systems. PNW Guide (In Review) **(1, 2, 3, 4, 5, 6)**

Norberg, S., Don Llewellyn, S. Fransen. 2021. Increasing Value of Corn Silage in Corn-Triticale System by Intercropping with Forage Soybean. <https://pubs.extension.wsu.edu/increasing-value-of-corn-silage-in-corn-triticale-system-by-intercropping-with-forage-soybean> **(1, 2, 3, 4, 5, 6)**

Roseberg, R., **S. Norberg**, and Brian Charlton. 2018. Teff Grass for Forage: Nitrogen and Irrigation Requirements. Pacific Northwest Extension Publication PNW709, June 2018. **(1, 2, 3, 4, 5, 6)**

Norberg, S. 2016. Washington State Irrigated Alfalfa Variety Trials- Planted in 2012 and Harvested in 2013 - 2015. TB31E August 2016. **(3, 4, 5, 6)**

Norberg, S. 2016. 2014 Washington State Irrigated Alfalfa Variety Trials- Planted in 2011 and Harvested in 2012, 2013, and 2014. Washington State University Extension Fact Sheet TB11 March 2016. **(1, 2, 3, 4, 5, 6)**

Norberg, S. and D. Llewellyn. 2014. Nitrate Poisoning in Livestock. FS139E July 2014. **(1, 5, 6)**.

Norberg, S. and J. Neibergs. 2014. 2012 Costs of Producing Alfalfa Hay Under Center Pivot Irrigation in the Columbia Basin of Washington State (2012-0601) Washington State University Extension Fact Sheet FS133E. March 2014. **(1, 2, 3, 4, 5, 6)**

Llewellyn, D.A. and **O.S. Norberg**. 2013. Prussic Acid Poisoning in Livestock. Washington State University Extension Fact Sheet FS129E March 2014. **(1, 5, 6)**

Norberg, S. 2010. OSU Guide. Strip Tillage for High Residue Irrigated Cropping Systems. EM9009. Role: Author, guide revision. **(1, 2, 3, 4, 5, 6)**

Norberg, S., C. Shock, and E. Feibert. 2010. OSU Guide. Growing Soybeans in the Pacific Northwest. EM8996. Role: Lead author, guide revision. **(1, 2, 3, 4, 5, 6)**

Norberg, S., R. Roseberg, B. Charlton, and C. Shock. 2009. OSU Guide. Teff - A New Warm Season Annual Grass. EM8970-E. Role: Lead author, conduct research, data collection and analysis guide revision. **(1, 2, 3, 4, 5, 6)**

C. Published Books, Book Chapters, or Monographs (Specify when an entry was peer reviewed according to the criteria described in A or B above.)

Lin, S., **O.S. Norberg,** D. Combs. 2021. Genomics of Forage Quality in Alfalfa, Chapter 7 *In* The Alfalfa Genome. Springer Nature L. Yu and C. Kole editors. **(5, 6)**

Parajuli, A.; Yu, L.; Peel, M.; See, D.; Wagner, S.; **Norberg, S.;** Zhang, Z. 2021. Chapter 15. Self Incompatibility, Inbreeding Depression, and Potential to Develop Inbred Lines in Alfalfa: A Review. *In* The Alfalfa Genome. Springer Nature L. Yu and C. Kole editors. Preprints 2020, 2020110390 (doi: 10.20944/preprints202011.0390.v1). **(6)**

Norberg, O.S. 1991. Meadowfoam Oil Yield as Influenced by Dry Matter Production and Partitioning, Flower Number and Honey Bee Density. Ph.D. *Dissertation. Oregon State University.* **(1, 2, 3, 4, 5, 6)**

Norberg, O.S. 1987. The Influence of Ethephon on Yield, Lodging and Stalk Morphology of Irrigated Corn. *M.S. Thesis, University of Nebraska–Lincoln.* **(1, 2, 3, 4, 5, 6)**

D. Creative Scholarship in Juried Events. (Abstracts, Posters, and Published Papers in Proceedings of a Professional Meeting or Conference. (Note: These are generally not peer reviewed but they may be peer approved or selected through a process.)

Norberg, S., D. Llewellyn, S. Fransen, J. Harrison, J. Driver. 2022. Developing Practical Phosphorus and Potassium Tissue Testing Recommendations and Utilizing Struvite in Modern Alfalfa Systems III. World Alfalfa Congress. **Invited International Proceedings (1, 2, 3, 4, 5, 6)**

Norberg, S., D. Llewellyn, J. Driver, S. Fransen, J. Harrison. 2022. Economics of Alfalfa Fertilization Under Inflated Hay & Fertilizer Prices. World Alfalfa Congress. **Invited International Proceedings (1, 2, 3, 4, 5, 6)**

Norberg, S., E. Mackey, S. Fransen, J. Harrison, D. Llewellyn, L. Whitefield. 2022. Developing Practical Phosphorus & Potassium Tissue Test Recommendations & Utilizing Struvite in Modern Alfalfa Systems III **Invited International Proceedings (1, 2, 3, 4, 5, 6)**

Lin, S., C. Medina-Culma, G. Zanton, G. Wang, G. Shewmaker, S. Fransen, D. Llewellyn, L. Yu., S. Norberg. 2022. Determining Genetic Factors That Influence Protein Quality & Yield in Alfalfa. 2022 North American Alfalfa Improvement Conference. **Invited International Proceedings (1, 2, 3, 5, 6)**

Norberg, S., S. Lin, C. Medina-Culma, G. Zanton, G. Wang, G. Shewmaker, S. Fransen, D. Llewellyn, L. Yu. 2022. Identifying Molecular Markers Associated With Quality & Quantifying Their Potential to Increase Alfalfa Value. 2022 North American Alfalfa Improvement Conference. **(1, 2, 3, 4, 5, 6)**

Dreger, S., D.A. Llewellyn, **O.S. Norberg**, S. Fransen, G. Wang, D. Combs, G. Shewmaker, E. van Santen, L.X. Yu. 2022. Evaluation of Forage Quality of Alfalfa from 200 Varieties Produced in the Pacific Northwest. Proceedings of the 56th Annual Pacific Northwest Animal Nutrition Conference, Boise, ID, January 17-18, 2022. **(1, 2, 3, 6)**

Norberg, S., E. Mackey, S. Fransen, J. Harrison, J. H., D. Llewellyn, L. Whitefield. 2021. Phosphorus and Potassium How Low Can You Go in Alfalfa? **Invited National Proceedings 2021 Virtual Western Nutrient Management Conference. (1, 2, 3, 4, 5, 6)**

Norberg, S., E. Mackey, S. Fransen, J. Harrison, J. H., D. Llewellyn, L. Whitefield. 2021. Phosphorus and Potassium How Low Can You Go in Alfalfa? Invited Regional Proceedings 2021. 2021 Western Alfalfa and Forage Conference, Reno, NV
https://video.ucdavis.edu/media/Session7_Norberg_Hay_Tests_Maximize_Economic_Returns/1_7rrmhcd0/238236482

Norberg, O.S., L. Yu, D.K. Combs, G.E. Shewmaker, G.J. Wang, D. A. Llewellyn, S.C. Fransen and E. van Santen. 2020. Genetic Range in Forage Quality Constituents and Their Value to Forage Quality. Virtual 2020 American Society of Agronomy Annual Meeting. **(1, 2, 3, 4, 5, 6)**

Norberg, S., E. Mackey, S. Fransen, J. Harrison, J. H., D. Llewellyn, L. Whitefield. 2020. Refining Practical Phosphorus and Potassium Tissue Test Recommendations and Utilizing Struvite in Modern Alfalfa Systems. Virtual 2020 American Society of Agronomy Annual Meeting. **(1, 2, 3, 4, 5, 6)**

Harrison, J. H., K. Fullerton, L. Whitefield, E. Mackey, K. Bowers, **S. Norberg**. 2020. Economics of Capture of Phosphorus from Liquid Dairy Manure (Abstract #81629). 2020 American Dairy Science Association Annual Meeting. **(6)**

Lin, S., C. Medina-Culma, **S. Norberg**, D. Combs, G. Wang, G. Shewmaker, S. Fransen, D. Llewellyn, E. van Santen and L. Yu. 2020. Genome-Wide Association Study Identified

Multiple Loci Related to Different Traits on Alfalfa Quality. Virtual 2020 American Society of Agronomy Annual Meeting. **(1, 2, 3, 4, 6)**

Norberg, S., L. Yu, D.K. Combs, G.E. Shewmaker, G.J. Wang, D. A. Llewellyn, S.C. Fransen and E. van Santen. 2020. Quantifying the Potential Increase In Alfalfa Value and Identifying Molecular Markers That Influence Quality. **National Invited.** Virtual NACAA Annual Meeting, **(1, 2, 3, 4, 5, 6)**

Norberg, S., E. Mackey, S. Fransen, J.H. Harrison, D. Llewellyn, L. Whitefield, L. 2020. Developing Practical Phosphorus and Potassium Tissue Test Recommendations and Utilizing Struvite in Modern Alfalfa Systems. **National Invited.** Virtual NACAA Annual Meeting. **(1, 2, 3, 4, 5, 6)**

Harrison, J. H., K. Fullerton, E. Whitefield, K. Bowers, and **S. Norberg**. 2020. Economics of Capture of Phosphorus from Liquid Dairy Manure. American Dairy Association Annual Meeting, West Palm Beach, Florida **(5)**

Norberg, O.S., L. Yu, D.K. Combs, G.E. Shewmaker, G.J. Wang, D. A. Llewellyn, S.C. Fransen and E. van Santen. 2019. Determining Genetic Factors that Influence Forage Quality in Alfalfa. 2019 American Society of Agronomy. San Antonio, TX **(1, 2, 3, 4, 5, 6)**

Norberg, S., D. Llewellyn, and S. Fransen 2019. In-Season Management of N in Timothy. Western Alfalfa and Forage Symposium. **National Invited.** Reno, NV. **(1, 2, 3, 4, 5, 6)**

Norberg, S., Valuing Alfalfa from a Nutrient Perspective. 2019 Western Crop Science Society of America. Pasco, WA **(1, 2, 3, 4, 5, 6)**

Norberg, S., L. Yu, D.K. Combs, G.E. Shewmaker, G.J. Wang, D. A. Llewellyn, S.C. Fransen and E. van Santen. 2019. Multi-State Analysis of Forage Quality. **National Invited.** Western Alfalfa and Forage Symposium. Reno, NV. **(1, 2, 3, 4, 5, 6)**

Mackey, E., S. **Norberg**, J. Harrison, L. Whitefield, K. Fullerton. 2019. Effect of Struvite and Mono-Ammonium Phosphate on Yield and Nutrient Uptake of Alfalfa," Soil Science Society of America, San Diego, CA. **(1, 2, 3, 6)**

Harrison, J. H., **Norberg, O. S.**, K. Fullerton, L. Whitefield, E. Mackey, K. Bowers. 2019. Comparison of Struvite to Mono-ammonium-Phosphate as a Phosphorus Source on Commercial Alfalfa Fields. Proceedings of Waste to Worth Conference.
<https://lpelc.org/comparison-of-struvite-to-mono-ammonium-phosphate-as-a-phosphorus-source-on-commercial-alfalfa-fields/> **(6)**

Norberg, S., Mackey, E., Fransen, S., Harrison, J. H., Llewellyn, D., Whitefield, L. (2019). Developing Practical Phosphorus and Potassium Tissue Test Recommendations and Utilizing

Struvite in Modern Alfalfa Systems (vol. 13, pp. 152 - 162). Western Nutrient Management Conference. **(1, 2, 3, 4, 5, 6)**

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. **(1, 2, 3, 4, 5, 6)**

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. **(1, 2, 3, 4, 5, 6)**

Coblentz, W. and **S. Norberg**. Post-harvest Storage Issues with Hay Quality. 2017. Western Alfalfa and Forage Symposium. Reno, NV. **National Invited**. Web Presentation Video 3:30 PM. <http://alfalfa.ucdavis.edu/+symposium/2017/workshop.aspx> **(5 & 6)**

Norberg, O.S., D.A. Llewellyn, S.C. Fransen, and J.S. Neibergs. Cutting Irrigated Hay Costs by Using Soybeans. 2017. *Western Crop Science Society of America*. Parma, ID. Accepted Abstract June 6, 2017. Peer Reviewed. **(1, 2, 3, 4, 5, 6)**.

Norberg, O.S., D.A. Llewellyn, S.C. Fransen, and J.S. Neibergs. Cutting Irrigated Hay Costs by Using Soybeans. 2017. *Annual Meeting of the National Association of County Agricultural Agents*. Salt Lake City, UT. Accepted Abstract March 31, 2017. **National Invited Peer Reviewed**. **(1, 2, 3, 4, 5, 6)**.

Norberg, O.S., D.A. Llewellyn, S.C. Fransen, and J.S. Neibergs. Cutting Irrigated Hay Costs by Using Soybeans. 2017. *Washington State University Academic Showcase, Pullman, WA*. Accepted Abstract March 31, 2017. Peer Reviewed. **(1, 2, 3, 4, 5, 6)**.

Norberg, O.S., D.A. Llewellyn, S.C. Fransen, and J.S. Neibergs. Cutting Irrigated Hay Costs by Using Soybeans. 2016. *Annual Meeting of the National Association of County Agricultural Agents*. Little Rock, AK. Accepted Abstract July 27, 2016. Peer Reviewed. **Invited National Abstract**. **(1, 2, 3, 4, 5, 6)**.

Norberg, S., D. Llewellyn, S. Fransen, and J. Neibergs. 2016. Using Chlorophyll Meter and Tissue Testing to Determine In-Season Nitrogen Needs in Timothy Hay Production. *Annual Meeting of the National Association of County Agricultural Agents*. Little Rock, AK. **Invited National Abstract**. Peer Reviewed. Accepted Abstract July 27, 2016. **(1, 2, 3, 4, 5, 6)**.

Norberg, S., D. Llewellyn, S. Fransen, and J. Neibergs. 2016. Using Chlorophyll Meter and Tissue Testing to Determine In-Season Nitrogen Needs in Timothy Hay Production. *WSU Academic Showcase*. Pullman, WA. Peer Reviewed. Accepted Abstract July 27, 2016. **(1, 2, 3, 4, 5, 6)**.

Norberg, S., D. Llewellyn, S. Fransen, and J. Neibergs. 2015. Using Chlorophyll Meter and Tissue Testing to Determine In-Season Nitrogen Needs in Timothy Hay Production. *Western Alfalfa & Forage Symposium*, Reno, NV. Dec. 2-4. **Invited National Paper. (1, 2, 3, 4, 5, 6)**

Norberg, S., E. Creech, D. Llewellyn, S. Fransen, and J. Neibergs. 2015. Cutting Irrigated Hay Costs by Using Soybeans. *Western Alfalfa & Forage Paper Symposium*, Reno, NV. Dec. 2-4. **Invited National Paper. (1, 2, 3, 4, 5, 6)**

Norberg, O.S., D.A. Llewellyn, S.C. Fransen, and J.S. Neibergs. 2015. Intercropping Corn with Soybean. BIT's 5th World Congress of Agriculture 2015. Qingdao, China. Peer Reviewed. **(1, 2, 3, 4, 5, 6)**.

Llewellyn, D.A., **O.S. Norberg**, E. Kimura, G. Rohwer, and S.C. Fransen. 2015. Feed Quality and Ensiling Characteristics of Corn Silage with or without Soybean Intercropping. National Association of County Agricultural Agents (NACAA) Annual Meeting and Professional Improvement Conference (AM/PIC). Sioux Falls, SD. **National Invited** Peer Reviewed. July 12-16, 2015.

Norberg, O.S., D.A. Llewellyn, S.C. Fransen, and J.S. Neibergs. Intercropping Irrigated Corn with Soybean to Increase Biodiversity and Protein Content of Silage. *Annual Meeting of the National Association of County Agricultural Agents*. Sioux Falls, SD. July 17, 2015. Peer Reviewed. **NACAA Poster Contest Winner at WA State and Western Region. (1, 2, 3, 4, 5, 6)**.

Norberg, O.S. 2015. Using Chlorophyll Meter and Tissue Testing to Determine In-Season Nitrogen Needs in Timothy Hay Production. *Annual Meeting of the National Association of County Agricultural Agents*. Sioux Falls, SD. Peer Reviewed. **National Invited Paper. (1, 2, 3, 4, 5, 6)**

Norberg, O.S., D. Llewellyn, S. Fransen, and J. Neibergs. 2015. Intercropping Irrigated Corn with Soybean to Increase Biodiversity and Protein Content of Silage. *Washington State University Academic Showcase*, Pullman, WA. March 27, 2015. Peer Reviewed. **(1, 2, 3, 4, 5, 6)**

Llewellyn, D.A., **O.S. Norberg**, E. Kimura, G. Rohwer, and S.C. Fransen. 2015. Feed Quality and Ensiling Characteristics of Corn Silage with or without Soybean Intercropping. *Washington State University Academic Showcase*. Peer Reviewed. March 27, 2015.

Norberg, O.S., D. Llewellyn, S. Fransen, and J. Neibergs. 2014. BioAg Progress Report: Using the Biointensive Technique of Intercropping Teff (*Eragrostis tef*) into Timothy to Improve the Economic Sustainability of Timothy. **(1, 2, 3, 4, 5, 6)**

Norberg, O.S., D. Llewellyn, K. Desta, S. Fransen, and J. Neibergs. 2014. Intercropping Irrigated Corn and Soybeans for Silage. *American Society of Agronomy Meeting*, Long Beach, CA. Nov. 3-5. Peer Reviewed. (1, 2, 3, 4, 5, 6)

Norberg, O.S., E. Creech, D. Llewellyn, K. Desta, S. Fransen, and J. Neibergs. 2013. Soybeans for Hay Production. *American Society of Agronomy Meeting*, Tampa, FL. Nov. 3-6. Peer Reviewed. (1, 2, 3, 4, 5, 6)

Norberg, O.S. 2013. BioAg Progress Report: Using the Biointensive Technique of Intercropping Teff (*Eragrostis tef*) into Timothy to Improve the Economic Sustainability of Timothy. (1, 2, 3, 4, 5, 6)

Norberg, O.S., E. Creech, D. Llewellyn, K. Desta, S. Fransen, and J. Neibergs. 2013. Soybeans for Hay Production. *Western Society of Crop Science Annual Meeting*, Pendleton, OR. June 11-12. Peer Reviewed. (1, 2, 3, 4, 5, 6)

Norberg, S. 2012. Weed Efficacy and Teff Response to Selected Herbicides. 62nd *Washington State Weed Conference*. Yakima, WA. Nov. 7-9. Invited Paper. (1, 3, 4, 5, 6)

Norberg, S. 2012. In-Kind Match and Collaboration Aids in Adoption of No-till Technology. *American Society of Agronomy*. Cincinnati, OH. Oct. 21 -24. Invited International Symposium Paper. Peer reviewed. (1, 2, 3, 4, 5, 6)

Norberg, S. and J. Felix. 2012. Weed Efficacy and Teff Response to Selected Herbicides. *American Society of Agronomy*. Cincinnati, OH, Oct. 21 -24. Peer reviewed. (1, 2, 3, 4, 5, 6)

Norberg, S., E. Creech, D. Llewellyn, K. Desta, and S. Fransen. 5– 2012. Soybeans for Forage Production in the West. *11th Annual NACCA Western Region Professional Improvement Conference*. Twin Falls, ID. October 2 & 3. Peer reviewed. (1, 2, 3, 4, 5, 6)

Norberg, S. and J. Felix. 2012. Weed Efficacy and Teff Response to Selected Herbicides. *North American Alfalfa Improvement Conference*. Ithaca, NY, July 10-13. International Peer reviewed. (1, 2, 3, 4, 5, 6)

Norberg, S. 2011. High Residue Farming in the Treasure Valley of Oregon and Idaho. International Meeting of the *American Society of Agronomy Annual Meeting*. San Antonio, TX. October 18. National Peer reviewed. (1, 2, 3, 4, 5, 6)

Norberg, S. 2011. High Residue Farming Under Irrigation, Advantages and Adoption. *10th Annual NACAA Western Region Professional Improvement Conference*. Pasco, WA. October 12. National Peer reviewed. (1, 2, 3, 4, 5, 6)

E. Other Publications and Creative Works (Those products that did not receive formal peer review, and include popular press articles, newsletters, and other written works)

- F. **Norberg, S.** 2022. 2021 Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials Report. *Northwest Hay Expo*. Kennewick, WA. Jan. 19-20, 2022. **(1, 2, 3, 4, 5, 6)**

Norberg, S., E. Mackey, S. Fransen, T. Peters, O. Sherriff. 2021. Phenotypic Response of the Soil Microbiome to Environmental Perturbations. 2021 Grant Final Report.

Norberg, S., E. Mackey, S. Fransen, J. Harrison, D. Llewellyn, L. Whitefield. 2021. Developing Practical Phosphorus and Potassium Tissue Test Recommendations and Utilizing Struvite in Modern Alfalfa Systems III. 2019 Grant Final Report.

Norberg, S. 2021. 2020 Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials Report. *Northwest Hay Expo*. Kennewick, WA. Jan. 15-16, 2020. **(1, 2, 3, 4, 5, 6)**

Norberg, S. 2020. 2019 Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials Report. *Northwest Hay Expo*. Kennewick, WA Jan. 15-16, 2020. **(1, 2, 3, 4, 5, 6)**

Norberg, S., L. Yu, G. Zanton, G. Shewmaker, G. Wang, D. Llewellyn, S. Fransen, M. Bohle. 2020. Determining Genetic Factors that Influence Protein Quality and Yield in Alfalfa, The National Institute of Food and Agriculture (NIFA), Alfalfa and Forage Program. 2020 Progress Report. **(1, 2, 3, 4, 5, 6)**

Norberg, S., E. Mackey, S. Fransen, J. Harrison, D. Llewellyn, L. Whitefield. 2020. Developing Practical Phosphorus and Potassium Tissue Test Recommendations and Utilizing Struvite in Modern Alfalfa Systems. 2018 Grant Final Report. **(1, 2, 3, 4, 5, 6)**

Norberg, S., E. Mackey, S. Fransen, J. Harrison, D. Llewellyn, L. Whitefield. 2019. Developing Practical Phosphorus and Potassium Tissue Test Recommendations and Utilizing Struvite in Modern Alfalfa Systems (7th ed.). Progressive Forage.

Norberg, S., L. Yu, D. Combs, G. Shewmaker, G. Wang, D. Llewellyn, S. Fransen Determining Genetic Factors that Influence Forage Quality in Alfalfa, The National Institute of Food and Agriculture (NIFA), Alfalfa and Forage Program. 2019. 2019 Final Research Report. **(1, 2, 3, 4, 5, 6)**

Norberg, S., E. Mackey, S. Fransen, J. Harrison, D. Llewellyn, L. Whitefield. 2017. Developing Practical Phosphorus and Potassium Tissue Test Recommendations and Utilizing Struvite in Modern Alfalfa Systems. 2017 Grant Final Report.

Fransen, S. and S. Norberg. 2018. High-nitrate alfalfa hay. Progressive Forage Magazine. May 31, 2018. <https://www.progressiveforage.com/forage-types/alfalfa/high-nitrate-alfalfa-hay> **(6)**.

Fransen, S.C., **O.S. Norberg**, S. Kesoju, J.S. Neibergs, D. Hannaway, M. Bohle, T. Downing, G. Shewmaker, D. Roberts. R. Mensonides. Strategies to Prevent and Mitigate AP of GMO's in Organic and Export Alfalfa Hay. 2017. NIFA - Organic Agriculture Research and Extension Initiative. **(1, 2, 3, 4, 5)**

Norberg, S. 2019. 2018 Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials Report. *Northwest Hay Expo*. Kennewick, WA Jan. 16-17, 2019. **(1, 2, 3, 4, 5, 6)**

Norberg, S., L. Yu, D. Combs, G. Shewmaker, G. Wang, D. Llewellyn, S. Fransen Determining Genetic Factors that Influence Forage Quality in Alfalfa, The National Institute of Food and Agriculture (NIFA), Alfalfa and Forage Program. 2018. 2018 Progress Report. **(1, 2, 3, 4, 5, 6)**

Norberg, S. 2018. 2017 Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials. *Northwest Hay Expo*. Kennewick, WA Jan. 17-18, 2018. **(1, 2, 3, 4, 5, 6)**

Norberg, O.S., D.A. Llewellyn, S.C. Fransen, and J.S. Neibergs. 2016. Determining Nitrogen Needs in Timothy Hay Production. *Progressive Forage Grower*. April 1, 2016. **Invited Article** <http://www.progressiveforage.com/forage-types/other-forage/determining-nitrogen-needs-in-timothy-hay-production> **(1, 2, 3, 4, 5, 6)**

Norberg, O.S., D. Llewellyn, S. Fransen, and J. Neibergs. 2016. BioAg Final Report: Using the Biointensive Technique of Intercropping Teff (*Eragrostis tef*) into Timothy to Improve the Economic Sustainability of Timothy. **(1, 2, 3, 4, 5, 6)**

Norberg, S. 2016. Using Chlorophyll Meter and Tissue Testing to Determine In-Season Nitrogen Needs in Timothy Hay Production. *Proceedings in: Washington State Hay Growers Association - 2016 Northwest Hay Expo*. Kennewick, WA Jan. 20-21, 2016. **(1, 2, 3, 4, 5, 6)**

Norberg, S. 2016. 2015 Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials. *Proceedings in: Washington State Hay Growers Association - 2016 Northwest Hay Expo*. Kennewick, WA Jan. 20-21, 2016. **(1, 2, 3, 4, 5, 6)**

Norberg, S. and C. George. 2016. Cutting Irrigated Hay Costs by Using Soybeans. *Proceedings in: Washington State Hay Growers Association - 2016 Northwest Hay Expo*. Kennewick, WA. Jan. 20-21, 2016. **(1, 2, 3, 4, 5, 6)**

Norberg, O.S., D.A. Llewellyn, S.C. Fransen, and J.S. Neibergs. 2016. Testing to Determine In-Season Nitrogen Needs in Timothy Hay Production. *Basin Business Journal*. January 6th, 2016. http://www.columbiabasinherald.com/basin_business_journal/testing-to-determine-in-season-nitrogen-needs-in-timothy-hay/article_3f9e0b52-b4d3-11e5-8b12-07dceb4fda8.html **(1, 2, 3, 4, 5, 6)**

Norberg, S. 2015. Cutting Irrigated Hay Costs Using Soybeans. Basin Business Journal July 28th, 2015. http://www.columbiabasinherald.com/basin_business_journal/cutting-irrigated-hay-costs-using-soybeans/article_a26eae4-3549-11e5-baa8-73302e940f4e.html (1, 2, 3, 4, 5, 6)

Norberg, S. 2015. 2014 Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials. Proceedings in: Washington State Hay Growers Association - 2015 Northwest Hay Expo. Kennewick, WA. Jan. 14-15, 2015. <http://www.wa-hay.org/> (1, 2, 3, 4, 5, 6)

Norberg, S. and C. George. 2015. Reducing Hay Costs Using Soybeans. *Proceedings in: Washington State Hay Growers Association - 2015 Northwest Hay Expo.* Kennewick, WA. Jan. 14-15, 2015. (1, 2, 3, 4, 5, 6)

Norberg, S. 2015. Using Chlorophyll Meter and Leaf Samples for Determining in Season Nitrogen Fertilization. *Proceedings in: Washington State Hay Growers Association - 2015 Northwest Hay Expo.* Kennewick, WA. Jan. 14-15, 2015. (1, 2, 3, 4, 5, 6)

Norberg, S. 2014. 2013 Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials. *Proceedings in: Washington State Hay Growers Association - 2014 Northwest Hay Expo.* Kennewick, WA. January 15-16, 2014. <http://www.wa-hay.org/> (1, 2, 3, 4, 5, 6)

Norberg, S. and E. Creech. 2014. Cutting Irrigated Hay Costs by Using Soybeans. *Progressive Hay Grower Magazine.* November 15, 2004. (1, 2, 3, 4, 5, 6)

Norberg, S. 2014. Nitrogen Fertilization in Timothy. *Proceedings in: Washington State Hay Growers Association - 2014 Northwest Hay Expo.* Kennewick, WA. Jan. 15-16, 2014. (1, 2, 3, 4, 5, 6)

Norberg, S. and C. George. 2014. Soybeans for Hay. *Proceedings in: Washington State Hay Growers Association - 2014 Northwest Hay Expo.* Kennewick, WA. Jan. 15-16, 2014. (1, 2, 3, 4, 5, 6)

Llewellyn D.A., G.L.Rohwer, J.Rosman, **O.S.Norberg**, and S.C.Fransen. 2014. Chemical Composition and in Situ Degradability of On-Farm processed Canola and Camelina Meals. *2014 Oilseed and Direct Seed Cropping Systems Conference.* Kennewick, WA Jan. 21, 2014. (1, 2)

Llewellyn, D., J.D. Rosman, G.L. Rohwer, **O.S. Norberg**, S. Neibergs, and S. Fransen. 2014. Evaluating Camelina and Canola Meals as Protein Supplements for Beef Heifers. *2014 Oilseed and Direct Seed Cropping Systems Conference.* Kennewick, WA Jan. 21, 2014. (1, 2)

Orloff, S., **S. Norberg**, and D. Putnam. 2013. Diagnosing Problems in the Field. *Proceedings from Western Region Alfalfa and Forage Conference*. Reno, NV. Dec. 12, 2013. **(1, 5, 6)**
<http://alfalfa.ucdavis.edu/+symposium/2013/index.aspx>

Ottman M., D. Putnam, V. Barlow, J. Brummer, M. Bohle, E. Creech, Jay Davison, S. Foster, R. Long, M. Marsalis, **S. Norberg**, S. Orloff, and G. Shewmaker. 2013. Long Term Trends and the Future of the Alfalfa and Forage Industry. 2013. *Proceedings from Western Region Alfalfa and Forage Conference*. Reno, NV. Dec. 12, 2013. **(3)**
http://alfalfa.ucdavis.edu/+symposium/proceedings/2013/13WAS-04_Ottman_LongTerm.pdf

Norberg, S. 2013. 2013 Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials. <http://www.wa-hay.org/> **(1, 2, 3, 4, 5, 6)**

Norberg, S. and D. Lewellyn. 2013. Nitrate Poisoning in Livestock. *Basin Business Journal*.-- July 2013. **(1, 5, 6)**

Norberg, S. and D. Lewellyn. 2013. Nitrate Poisoning in Livestock. "The Ketch Pen", Washington Cattlemen's Association. September 2013. **(1, 5, 6)**

Norberg, S. 2013. 2012 Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials. *Proceedings in: Washington State Hay Growers Association - 2013 Northwest Hay Expo*. Pasco, WA. Jan. 16-17, 2013. **(1, 2, 3, 4, 5, 6)**

Norberg, S. 2013. *Soybeans for Hay or Intercropped with Silage*. Proceedings in: Washington State Hay Growers Association - 2013 Northwest Hay Expo. Pasco, WA. Jan. 16-17, 2013. **(1, 2, 3, 4, 5, 6)**

Norberg, S. 2013. *Weed Control in Teff*. Proceedings in: Washington State Hay Growers Association - 2013 Northwest Hay Expo. Pasco, WA. Jan. 16-17, 2013. **(1, 3, 4, 5, 6)**

Foley, K.M., C.C. Shock, **O.S. Norberg**, and T.K. Welch. 2012. Making Strip Tillage Work for You: A Grower's Guide. Oregon State University, Ext/CrS 140, March 2012. **(1, 2, 3, 4, 6)**

McGuire A., S.M. Smith, G. Hoheisel, K.M. Lewis, D.A. Llewellyn, **O.S. Norberg**, T.J. Smith, T.D. Waters, and C.H. Wohleb. 2012 to present. Columbia Basin Irrigated Agriculture Email Newsletter. **(5, 6)**

Norberg, S. 2012. Alfalfa and Variety Testing, *Basin Business Journal*, December 31, 2012. **(1, 2, 3, 4, 5, 6)**

Norberg, S. 2012. 2012 Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials. <http://www.wa-hay.org/> **(1, 2, 3, 4, 5, 6)**

Norberg, S. 2012. Best Management Practices for Export Alfalfa. *2012 Washington State Hay Growers Annual Conference*. Kennewick, WA **(1, 5, 6)**

Norberg, S. 2012. 2011 Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials Report. *2012 Washington State Hay Growers Annual Conference*. Kennewick, WA **(1, 2, 3, 4, 5, 6)**

Kerr S.R., S.M. Smith, T.D. Hudson, D.A. Moore, J. Schmidt, D.M. Moberg-Williams, C.E. Beus, W.F. Hendrix, H.J. Ferguson, J.S. Neibergs, D.A. Llewellyn, and **O.S. Norberg**. 2012 to present. Washington Animal Agriculture Extension Newsletter. Contributor articles such as Importance of Alfalfa and Alfalfa Variety Testing, Nitrate Poisoning in Livestock. **(5)**

Norberg, S. 2012. Alfalfa and Variety Testing, *Basin Business Journal*, December 31, 2012. Invited article. **(1, 2, 3, 4, 5, 6)**

Norberg, S. 2011 to present. Contributor to the *Questions and Answers, Tri-City Herald*. **(5, 6)**

PRESENTATIONS

A. International

Norberg, S., D. Llewellyn, S. Fransen, J. Harrison, J. Driver. 2022. Developing Practical Phosphorus and Potassium Tissue Testing Recommendations and Utilizing Struvite in Modern Alfalfa Systems III. World Alfalfa Congress. **Invited International Presentation (1, 2, 3, 4, 5, 6)**

Norberg, S., D. Llewellyn, J. Driver, S. Fransen, J. Harrison. 2022. Economics of Alfalfa Fertilization Under Inflated Hay & Fertilizer Prices. World Alfalfa Congress. **Invited International Presentation (1, 2, 3, 4, 5, 6)**

Norberg, S., E. Mackey, S. Fransen, J. Harrison, D. Llewellyn, L. Whitefield. 2022. Developing Practical Phosphorus & Potassium Tissue Test Recommendations & Utilizing Struvite in Modern Alfalfa Systems III **International Invited Presentation.**

Lin, S., C. Medina-Culma, G. Zanton, G. Wang, G. Shewmaker, S. Fransen, D. Llewellyn, L. Yu., S. Norberg. 2022. Determining Genetic Factors That Influence Protein Quality & Yield in Alfalfa. 2022 North American Alfalfa Improvement Conference. **Invited International Presentation**

Norberg, S., S. Lin, C. Medina-Culma, G. Zanton, G. Wang, G. Shewmaker, S. Fransen, D. Llewellyn, L. Yu. 2022. Identifying Molecular Markers Associated With Quality & Quantifying Their Potential to Increase Alfalfa Value. 2022 North American Alfalfa Improvement Conference.

Norberg, O.S., L. Yu, D.K. Combs, G.E. Shewmaker, G.J. Wang, D. A. Llewellyn, S.C. Fransen and E. van Santen. 2021. Using Hay Quality Testing Sample to Improve Alfalfa Fertilizer Recommendations. Alfalfa U, Virtual sponsored by High Plains Journal. Virtual with participants from 3 countries. March 4, 2021. **International Invited Presentation.**

Norberg, O.S., L. Yu, D.K. Combs, G.E. Shewmaker, G.J. Wang, D. A. Llewellyn, S.C. Fransen and E. van Santen. 2021. How Far Can the Genetics of Alfalfa Improve Quality. Alfalfa U., sponsored by High Plains Journal. Virtual with participants from three countries. March 4, 2021. **International Invited Presentation.**

Norberg, O.S., L. Yu, D.K. Combs, G.E. Shewmaker, G.J. Wang, D. A. Llewellyn, S.C. Fransen and E. van Santen. 2021. Using Hay Quality Testing Sample to Improve Alfalfa Fertilizer Recommendations. Virtual Meeting Conducted by Hoards Dairyman. Had participants in 3 countries. February 4, 2021. **International Invited Presentation.**

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. North American Alfalfa Improvement Conference. June 4-6, 2018. Logan, Utah **International Invited Presentation.**

Norberg, O.S., D.A. Llewellyn, S.C. Fransen, and J.S. Neibergs. 2015. *Intercropping Corn with Soybean*. BIT's 5th World Congress of Agriculture 2015. Qingdao, China

Norberg, S. 2012. *In-Kind Match and Collaboration Aids in Adoption of No-till Technology*. American Society of Agronomy. Cincinnati, OH. **Invited National Symposium Presentation.**

B. National

Norberg, O.S. 2021. Alfalfa Fertility and Fertilizing During High Prices. Byron Seeds in Indiana December 7, 2021. **Invited National Presentation**

Norberg, O.S. 2021. Alfalfa Hay Quality and How Far Can We Improve Alfalfa Genetics. Byron Seeds in Indiana. December 7, 2021. **Invited National Presentation**

Norberg, S. 2021. Genetic Potential of Alfalfa (Arizona Virtual Meeting.) April 8, 2021, Invited **National Presentation**

Norberg, O.S., S. Lin, C. Medina, L. Yu, D.K. Combs, G.E. Shewmaker, G.J. Wang, D. A. Llewellyn, S.C. Fransen and E. van Santen. 2021. How Far Can the Genetics of Alfalfa Improve Quality. April 8, 2021.

Norberg, O.S., S. Lin, C. Medina, L. Yu, D.K. Combs, G.E. Shewmaker, G.J. Wang, D. A. Llewellyn, S.C. Fransen and E. van Santen. 2021. Determining Genetic Factors That Influence Forage Quality in Alfalfa. Virtual Grant Update on Progress on NIFA Grant with Alfalfa Breeders in USA. February 25, 2021.

Norberg, S. 2020. Potential to Increase the Dollar Value of Hay per Ton for Dairy, Virtual Presentations for Alfalfa Breeders.

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. 2017. *AP Sensitive and Organic Alfalfa Production in the Pacific Northwest, Adventitious presence (AP) in Organic Alfalfa Symposium*. Kennewick, WA

Norberg, S. 2017. *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. Franklin, TN

Norberg, S. 2016. *Developing Calibration for SPAD Meter and Tissue Test for In-Season Nitrogen Assessment in Timothy Hay*. 2016 National Hay Association. Annual Meeting-Pasco, WA

Norberg, S. 2016. *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. Logan, UT.

Norberg, S. 2015. *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. Lincoln, NE.

Norberg, S. 2014. *No-till Alfalfa and Timothy*. High Residue Farming in the Irrigated Far West. Salt Lake City, UT.

C. Regional

Norberg, O.S. 2021. Alfalfa Fertility and Fertilizing During High Prices. Far-West Agribusiness Consultants. **Invited Presentation.**

Norberg, S. 2020. Pasture Fertility. Virtual PNW Inland Pasture Calendar Series – Train the Trainer.

Norberg, S. 2020. 2019 WSHGA/WSU Variety Trials. 2020 NW Hay Expo, Kennewick, WA.

Norberg, S. 2020. What Potential is Available for Higher Quality Alfalfa? 2020 NW Hay Expo, Kennewick, WA.

Norberg, S. 2020. Phosphorus and Potassium how low can you go in alfalfa? 2020 NW Hay Expo, Kennewick, WA.

Norberg, S. 2019. Washington Forage Research Progress. Oregon Forage Working Group Annual Meeting. Corvallis, OR

Norberg, S. 2019. 2018 Results from NIFA and WSHGA / WSU Variety Trials. 2019 Idaho Hay and Forage Conference. Burley, ID.

Norberg, S. 2019. Diagnosing Pest Problems in Alfalfa. 2019 Idaho Hay and Forage Conference. Burley, ID.

Norberg, S. 2019. Hi-Gest and Fall Dormancy Influence on Alfalfa Yield and Quality. 2019 Idaho Hay and Forage Conference, Burley, ID.

Norberg, S. 2019. 2018 Results from NIFA and WSHGA / WSU Variety Trials. 2019 NW Hay Expo, Kennewick, WA.

Norberg, S. 2019. Development of Tissue Test for Alfalfa Fertility. 2019 NW Hay Expo, Kennewick, 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, S. 2017. 2016 WSU and WSHGA Alfalfa Variety Trials, NW Hay Expo. Kennewick, WA.

Norberg, S., D. Llewellyn, and S. Fransen. 2017. Developing In-Season Nitrogen Rate Assessment Tools for Timothy Hay Production, NW Hay Expo. Kennewick, WA.

Norberg, S. 2017. AP Sensitive and Organic Alfalfa Production in the Pacific Northwest, NW Hay Expo. Kennewick, WA.

Norberg, S. 2017. *Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials.* NW Hay Expo. Kennewick, WA.

Norberg, S., D. Llewellyn, and S. Fransen. 2017. *Timothy Nitrogen Management.* NW Hay Expo. Kennewick, WA.

Norberg, S. 2016. *Timothy, Alfalfa, and Soybean Hay, Corn and Soybean Intercropping Forage Projects Update.* WA & OR Forage Workers Conference. Prosser, WA.

Norberg, S. 2015. *Timothy, Alfalfa, and Soybean Hay, Corn and Soybean Intercropping Forage Projects Update.* Northwest Forage Workers Conference. Corvallis, OR.

Norberg, S., D. Llewellyn, and S. Fransen. 2015. Using a Chlorophyll Meter and Leaf Samples for Determining in Season Nitrogen Fertilization in Timothy Hay. Invited Presentation.

Norberg, S. 2015. *Reducing Hay Costs by Using Soybeans.* Central Oregon Forage Day. Prineville, OR. Invited Presentation.

Norberg, S. 2013. *Best Management Practices for Export Alfalfa-Concerning GMO's.* Central Oregon Forage Day. Prineville, OR. Invited Presentation.

Norberg, S. 2013. *Columbia Basin Alfalfa Variety Trial Results and Future.* Central Oregon Forage Day. Prineville, OR. Invited Presentation.

Norberg, S. 2013. *Soybeans for Hay and Silage.* Central Oregon Forage Day. Prineville, OR. Invited Presentation.

Norberg, S. 2012. *2012 Washington Update.* PNW Forage Workers Conference. Kimberly, ID.

Norberg, S. 2011. *Update on Teff Herbicides & New Extension Projects*. PNW Forage Workers Conference. Pasco, WA.

D. State

Norberg, O.S. 2021. *McGregor Timothy Nitrogen Talk*. 2021. Virtual Meeting with McGregor Company.

Norberg, O.S. 2018. *Valuing Alfalfa from a Nutrient Perspective*. 2018. 2018 Washington State Dairy Conference. Grand Mound, WA [Invited Presentation](#).

Norberg, S. 2016. *Diagnosing Pest Problems in Alfalfa and Timothy*. Stevens County Pesticide Training. Colville, WA [Invited Presentation](#).

Norberg, S. 2016. *Diagnosing Pest Problems in Alfalfa and Timothy*. NE Hay Growers Association Annual Meeting. Clayton, WA [Invited Presentation](#).

Norberg, S. 2016. *Diagnosing Pest Problems in Alfalfa and Timothy*. Kittitas County Pesticide Training. Ellensburg, WA [Invited Presentation](#).

Norberg, S. 2014. *Diagnosing Pest Problems in Alfalfa and Timothy*. West Agribusiness Association's Winter Meeting. Kennewick, WA [Invited Presentation](#).

Norberg, S. 2014. *Diagnosing Pest Problems in Alfalfa and Timothy*. Last Chance Pesticide Training. Walla Walla, WA [Invited Presentation](#).

Norberg, S. 2014. *Soybeans for Grazing and Silage*. 2014 Brim Tractor Forage Workshop. Mount Vernon, WA [Invited Presentation](#).

Norberg, S. 2014. *Principles of Grazing Management and Grazing Systems*. 2014 Pasture Management Professional Development Workshop. Mt. Vernon, WA [Invited Presentation](#).

Norberg, S. 2014. *Progress in Extension Forage Programing in the Columbia Basin*. Extension Agriculture and Natural Resources Annual Conference. Spokane, WA

Norberg, S. 2013. *Impact of Planting Date on Alfalfa Yield. Forage Genetics*. Walla Walla Alfalfa Update. Touchet, WA [Invited Presentation](#).

Norberg, S. 2012. *An Overview Washington Forages and a Vision for the Future*. Washington State Dairy Federation and Washington State Dairy Commission Annual Meeting. Cle Elem, WA [Invited Presentation](#).

Norberg, S. and J. Felix. 2012. *Weed Efficacy and Teff Response to Selected Herbicides*. Washington State Weed Conference. Yakima, WA [Invited Presentation](#).

Norberg, S. 2012. *Soybeans for Hay and Forage Alone and Intercropped with Corn*. Washington Dairy Commission. Linwood, WA

Norberg, S. 2012. *4th Annual OSU/WSU Irrigated Ag Meeting*. Prosser, WA

Norberg, S. 2012. *Forage Extension Programming for the Columbia Basin*. WSU Crop Science Department Meeting. Wenatchee, WA

Norberg, S. 2012. *Clover Root Curculio and Other Pests in Alfalfa*. Forage Genetics CPS Alfalfa Update. Touchet, WA Invited Presentation.

Norberg, S. 2012. *Soybeans for Forage*. Washington State Dairy Federation and Washington State Dairy Commission. Sunnyside, WA Invited Presentation.

Norberg, S. 2012. *Forage Extension Programming for the Columbia Basin*. WSU Crop Science Seminar. Pullman, WA

Norberg, S. 2011. *3rd Annual OSU/WSU Irrigated Ag Meeting*. Hermiston, OR.

Norberg, S. 2011. *Extension Forage and Cropping System Programming*. 2011 Washington Cattlemen's Association Annual Convention. Walla Walla, WA Invited Presentation.

Norberg, S. 2011. *Getting Started in My Washington Extension Programming*. OSU & WSU Irrigated Ag Research and Extension Meeting. Hermiston, OR

D. Local

Norberg, S. 2022. *Pasture Management for Horses*. November Meeting of Purple Sage Riders chapter of the Back Country Horsemen of Washington. Kennewick, WA

Norberg, S. 2020. *2019 WSU/WSHGA Variety Testing Results*. WSU Extension / Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S. 2020. *Phosphorus and Potassium Tissue Testing in Alfalfa*. WSU Extension / Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S. 2020. *Progress in Fiber Quality Research*. WSU Extension / Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S. 2019. *2018 NIFA and WSU/WSHGA Variety Testing Results*. WSU Extension / Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S. 2019. *Phosphorus and Potassium Tissue Testing in Alfalfa*. WSU Extension / Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S. 2019. *Diagnosing Pest Problems in Alfalfa*. WSU Extension / Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S. 2019. *Diagnosing Pest Problems in Alfalfa*. Saddle Mountain Supply Annual Meeting. Othello, WA

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

Norberg, S. 2017. *Assessing Winter Kill and Improving Alfalfa Winter Hardiness*. Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S. 2017. *The Value of Alfalfa Variety Testing*. Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S., D. Llewellyn, and S. Fransen. 2016. *Intercropping Corn with Soybean*. Washington State Dairy Federation. Kennewick, WA

Norberg, S., D. Llewellyn, and S. Fransen. 2016. *Timothy Nitrogen Management*. Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S. 2016. *The Value of Alfalfa Variety Testing*. Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S., D. Llewellyn, and S. Fransen. 2015. *In-Season Timothy Nitrogen Management Using the SPAD Meter*. Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S., D. Llewellyn, and S. Fransen. 2015. *Using RR Soybeans for Weed Control in Timothy Fields*. Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S. 2015. *2014 Alfalfa Variety Trial Results*. Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S. 2015. *Soybeans for Hay Production*. Grant County Crop Improvement. Invited Presentation.

Norberg, S., D. Llewellyn, and S. Fransen. 2014. *Nitrogen Fertilization in Timothy*. Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S. 2014. *2013 Alfalfa Variety Trial Results*. Mid-Columbia Hay Growers Assn. Annual Meeting. Moses Lake, WA

Norberg, S. 2013. *Soybeans for Hay and Silage Production*. Grant County Crop Improvement. Invited Presentation.

Norberg, S., S. Fransen, and M. Bohle. 2013. *Timothy Fertilization*. Mid-Columbia Hay Growers Association Annual Meeting. Moses Lake, WA

Norberg, S. 2013. *2012 Alfalfa Variety Trial Results*. Mid-Columbia Hay Growers Association Annual Meeting. Moses Lake, WA

Norberg, S. 2012. *Pest Control in Alfalfa*. 2012 Kittitas Pesticide Training. Ellensburg, WA Invited Presentation.

Norberg, S. 2012. *Forage Research and Extension Meeting*. Kennewick, WA

Norberg, S. 2012. *Soybeans for Hay Production*. Grant County Crop Improvement. Invited Presentation.

Norberg, S. 2012. *Best Management Practices for Export Alfalfa*. Mid-Columbia Alfalfa Growers. Moses Lake, WA

Norberg, S. 2012. *Stem Nematode in Alfalfa*. Yakima Alfalfa Growers Meeting. Toppenish, WA Invited Presentation.

Norberg, S. 2012. *Best Management Practices for Export Alfalfa*. Intercounty Weed District's Annual Meeting. Royal City, WA Invited Presentation.

Norberg, S. 2012. *Washington State Hay Growers Association and Washington State University Alfalfa Variety Trials*. Inter-county Weed District's Annual Meeting. Royal City, WA Invited Presentation.

UNIVERSITY INSTRUCTION

A. Additional Teaching

2021 - GMO Alfalfa, Fertility in Alfalfa and Potential for Improvement of Quality in Alfalfa (Two guest lectures) for undergraduate course of Forages 302 in the Crop and Soil Science Department, Virtual WSU

2019 - GMO Alfalfa, Alfalfa Variety Trials and Determining Nutrient Value of Alfalfa (guest lecture) for undergraduate course of Forages 302 in the Crop and Soil Science Department, WSU Pullman

B. Advising (Graduate Students and Student Interns)

2021-2022 Graduate Committee Member for Micheal Hipp MSAg. degree at WSU.
2020-2022 Graduate Committee Member for Sarah Dreger M.S. degree at WSU.
2019 –Graduate Committee Member for Katlyn Major, MSAg degree at WSU.
2019 –Graduate Committee Member for Natalie Shaw, MSAg degree at WSU.
2018-2019 - Committee Member for Erin Mackey M.S. in Animal Science at WSU.
2017 – Graduate Committee Member for Alexander Kappes, M.S. Degree In Economic Sciences Department, WSU
2016 – Graduate School Advisor for Master of Agriculture Program for Matt Pursel.
2013 – Present Graduate Student Committee for James Cavender pursuing a M.S. in Agriculture.

PROFESSIONAL SERVICE

A. University

2013, 2016 to present- Graduate Committee Member
2012 – Coordinated the Irrigated Agriculture Bi-State Meeting
2011 – Current WSU Irrigated Agriculture – Communications Team Member
2011 – Current serve as Ex-Officio Member of the Washington State Hay Growers Association

B. Professional Society

2019 Hosted Western Society of Crop Science
2018 Hosted North Central 1182 Working Group – Nitrogen in Forages
2016 – 2021 NIRS Forage and Feed Testing Consortium, Calibration Committee
2016 to Present Washington Extension Agents and Specialists Assoc., Early Career Development Chair
2010 American Society of Agronomy Past Chair, Experiment Station Division (A7)
2009 American Society of Agronomy Chair, Experiment Station Division (A7)
2008 American Society of Agronomy Incoming Chair-Elect, Experiment Station Division (A7)
1986 – present American Society of Agronomy.
2007 – present Crop Science Society of America.
2009 – present Soil Science Society of America.
1993 – present National Association of County Agricultural Agents.
2011 – present Washington State Agents and Specialists Association.
2005 – present Certified Crop Advisor for the Northwest Region.
2005 – present Certified Professional Agronomist.

C. Community

2012 – Current Grant/Adams County Fair – Hay King Judge
2011 – Current Benton/Franklin County Fair – Hay King Superintendent

D. Review Activities

2022 Fast Track 4 reviewed
PNW Guides 1 reviewed

2021 Crop, Forage and Turfgrass Management Journal reviewed 1 article, Journal of NACAA, reviewed 3 articles. Forage Information System, reviewed 1 article. Fast Track WSU – 2 articles. Outside Tenure Review – 1 Vita.

2020 Journal of NACAA, reviewed 4 articles.
WSU Extension Fast Tract, reviewed 1 article.
American Society of Agronomy, reviewed 1 article.

2019 Journal of NACAA, reviewed 1 article.

2018 PNW Publication, reviewed 2 articles.

2017 American Society of Agronomy, reviewed 1 article.
WSU Extension Fast Tract, reviewed 1 article.

2016 WSU Extension Fast Tract, reviewed 3 articles.

2015 Reviews of BioAg Projects
WSU Extension Fast Tract, reviewed 2 articles.

2014 WSU Extension Fast Tract, reviewed 5 articles.
PNW Publication, reviewed 2 articles.

2011 National Alfalfa and Forages Alliance Reviewed, 1 white paper

MANAGERIAL AND ADMINISTRATIVE

2022 1 FTE post-doc, 1 FTE Technician

2019- 2021 2 FTE post-doc, 0.5 FTE summer help

2011-2018 1 FTE summer student help

PROFESSIONAL & SCHOLARLY ORGANIZATION AFFILIATIONS

1986 – present American Society of Agronomy.

2007 – present Crop Science Society of America.

2009 – present Soil Science Society of America.

1993 – present National Association of County Agricultural Agents.

2011 – present Washington State Agents and Specialists Association.

2005 – present Certified Crop Advisor for the Northwest Region.

2005 – present Certified Professional Agronomist.

PROFESSIONAL DEVELOPMENT

(This section includes additional courses for credit, in-service training, and other major professional development activities)

- 2022 World Alfalfa Congress
- 2022 North American Alfalfa Improvement Conference
- 2022 American Forage and Grasslands Conference
- 2022 NIRS Consortium
- 2022 NW Hay Expo
- 2021 Near Infrared Spectroscopy Consortium
- 2021 American Forage and Grassland Council
- 2021 Western Alfalfa and Forage Symposium
- 2021 Hoards Dairy Forage Conference - Virtual
- 2021 Alfalfa U, Virtual with High Plains Journal - Virtual
- 2021 Western Region Fertility Conference, Virtual
- 2020 American Society of Agronomy Annual Meeting – Virtual
- 2020 Mental Health Training, Spokane, WA
- 2020 WSU Extension Joint Unit Meetings, Spokane, WA
- 2020 National Association of County Agriculture Agents
- 2019 American Society of Agronomy, San Antonio, TX
- 2019 Western Alfalfa and Forage Symposium, Reno, NV
- 2019 WSU Extension Joint Unit Meeting, Seattle, WA
- 2019 Western Nutrient Management Conference, Reno, NV
- 2019 Near Infrared Spectroscopy Consortium, St. Louis, MO
- 2018 North American Alfalfa and Forage Improvement Conference, Salt Lake, Utah
- 2018 Far-West Agribusiness Conference, Pasco, WA
- 2018 WERA 1018 Forage Research Group, Bozeman MT
- 2018 Washington and Oregon Forage Workers Annual Meeting, Pasco, WA
- 2018 NC1182 Management and Environmental Factors Affecting Nitrogen Cycling and Use Efficiency in Forage-Based Livestock Production Systems, Pasco, WA
- 2018 Oregon Grasslands Conference
- 2017 WSU Pesticide Training, Pasco, WA
- 2017 NC 1182 Annual Meeting - Management and Environmental Factors Affecting Nitrogen Cycling and Use Efficiency in Forage-Based Livestock Production Systems, Franklin, TN
- 2017 Western Region Alfalfa and Forage Symposium, Reno, NV
- 2017 Western Region Crop Science Meeting, Parma, ID
- 2017 American Forage and Grasslands Council and NIRS Consortium Annual Meeting, Roanoke, VA
- 2017 Washington State University Extension Joint Unit Meeting
- 2017 Washington State Agents and Specialists Association Spring Tour
- 2016 NC 1182 Annual Meeting - Management and Environmental Factors Affecting Nitrogen Cycling and Use Efficiency in Forage-Based Livestock Production Systems. Logan, UT

2016 Annual Meeting of the National Association of County Agricultural Agents. Little Rock, AK

2016 Washington Extension Agents and Specialist Specialists Association (WEASA) Meeting

2016 NIRS Forage and Feed Testing Consortium Annual Conference. Madison, WI

2016 WSU Extension Program Meeting. Puyallup, WA

2015 Northwest Forage Workers Conference. Corvallis, OR

2015 NC 1182 Annual Meeting - Management and Environmental Factors Affecting Nitrogen Cycling and Use Efficiency in Forage-Based Livestock Production Systems. Lincoln, NE

2015 Annual Meeting of the National Association of County Agricultural Agents. Sioux Falls, SD

2015 BIT's 5th World Congress of Agriculture 2015. Qingdao, China

2015 WSU Extension Program Meeting. Spokane, WA

2015 WSU ANR Extension Program Unit Meeting. Spokane, WA

2015 Western Alfalfa & Forage Symposium. Reno, NV

2014 WSU Extension Program Meeting. Spokane, WA

2014 WSU ANR Extension Program Unit Meeting. Spokane, WA

2014 International Annual Meeting of the American Society of Agronomy & Crop Science Society & Soil Science Society of America Annual Meeting. Long Beach, CA

2014 Innovations in Organic Food Systems for Sustainable Production and Enhanced Ecosystem Services. Long Beach, CA

2014 High Residue Farming in the Irrigated Far West. Salt Lake City, UT

2013 2013 Western Region Alfalfa and Forage Conference. Reno, NV.

2013 International Annual Meeting of the American Society of Agronomy & Crop Science Society & Soil Science Society of America Annual Meeting. Tampa Bay, FL

2013 WSU ANR Extension Program Unit Meeting. Anacortes, WA

2013 Washington/Oregon Forage Workers Conference. Hermiston, OR

2013 Western Society of Crop Science Annual Meeting. Pendleton, OR

2012 Oregon/Washington Irrigated Agriculture Update for Research and Extension. Prosser, WA

2012 International Annual Meeting of the American Society of Agronomy, Crop Science Society & Soil Science Society of America Annual Meeting. Cincinnati, OH

2012 11th Annual NACCA Western Region Professional Improvement Conference. Twin Falls, ID

2012 Pacific Northwest Forage Workers Conference. Kimberly, ID

2012 Planning for Meaningful Evaluation (PME) Course. Spokane, WA

2012 CSS Statewide Faculty Meeting. Wenatchee, WA

2012 North American Alfalfa Improvement Conference. Ithaca, NY

2012 Agriculture and Natural Resource Summer Meeting. Puyallup, WA

2012 Write Winning Grants Seminar. Pullman, WA

2011 2011 Western Alfalfa & Forage Conference. Las Vegas, NV

- 2011 WSU Professional Development Evaluation Based Program Development (EBPD) Workshop. Spokane, WA
- 2011 American Society of Agronomy & Crop Science Society & Soil Science Society of America Annual Meeting. San Antonio, TX
- 2011 Pacific Northwest Forage Workers Conference. Pasco, WA
- 2011 Western Region Extension Professional Development Conference. Pasco, WA
- 2011 CAHNRS/WSU Extension All-Faculty Conference. Pullman, WA
- 2011 CAHNRS/WSU New Faculty Orientation. Pullman, WA
- 2011 Washington State University New Faculty Orientation. Pullman, WA
- 2011 Purchasing Card Training. Richland, WA
- 2011 Pullman Orientation for Steve Norberg. Franklin/Adams County