

## CURRICULUM VITAE

### NAME

Phillip Westra

### ADDRESS

Bioagricultural Sciences and Pest Management  
College of Agricultural Sciences

Weed Research Laboratory

### PHONE

(970) 491-5219

### EDUCATION

1980 Ph D, U OF MINNESOTA

1973 CALVIN COLLEGE

1971 U OF WISCONSIN

### ACADEMIC POSITIONS

2017-2018 - Professor (College of Agricultural Sciences)

2016-2017 - Professor (College of Agricultural Sciences)

2015-2016 - Professor (College of Agricultural Sciences)

2014-2015 (College of Agricultural Sciences)

2012-2013 (College of Agricultural Sciences)

2011-2012 (College of Agricultural Sciences)

2010-2011 (College of Agricultural Sciences)

2009-2010 (College of Agricultural Sciences)

### OTHER POSITIONS

1997 - Present Professor, BSPM, Colorado State University, Fort Collins, CO, United States.

1991 - 1997 Associate Professor, BSPM, Colorado State University, Fort Collins, CO, United States.

1985 - 1991 Assistant Professor, BSPM, Colorado State University, Fort Collins, CO, United States.

### PUBLISHED WORKS

#### **Refereed Journal Articles**

- Van Horn, C. R., Moretti, M. L., Robertson, R. R., Segobye, K., Weller, S. C., Young, B. G., Johnson, W. G., Schulz, B., Green, A. C., Jeffery, T., Westra, P. (2017). Glyphosate resistance in *Ambrosia trifida*: Part 1. Novel rapid cell death response to glyphosate. *Pest Management Science.*, Peer Reviewed/Refereed
- Moretti, M. L., Van Horn, C. R., Robertson, R., Segobye, K., Weller, S. C., Young, B. G., Johnson, W. G., Douglas Sammons, R., Wang, D., Ge, X., d'Avignon, D. A., Gaines, T., Westra, P., Green, A., Jeffery, T., Lesperance, M., Tardif, F., Sikkema, P., Hall, J. C., McLean, M., Lawton, M., Schulz, B. (2017). Glyphosate resistance in *Ambrosia trifida*: Part 2. Rapid response physiology and non-target-site resistance. *Pest Management Science.*, Peer Reviewed/Refereed
- Pettinga, D. J., Ou, J., Patterson, E., Jugulam, M., Westra, P., Gaines, T. (2017). Increased Chalcone Synthase (CHS) expression is associated with dicamba resistance in *Kochia scoparia*. *Pest management science.*, Peer Reviewed/Refereed
- Sebastian, D. J., Nissen, S. J., Westra, P., Shaner, D. L., Butters, G. (2017). Influence of soil properties and soil moisture on the efficacy of indaziflam and flumioxazin on *Kochia scoparia* L. *Pest management science*, 73(2), 444-451., Peer Reviewed/Refereed
- Dille, J. A., Stahlman, P. W., Du, J., Geier, P. W., Riffel, J. D., Currie, R. S., Wilson, R., Sbatella, G. M., Westra, P., Kniss, A. R., Moechnig, M. J., Cole, R. M. (2017). *Kochia* (*Kochia scoparia*) Emergence Profiles and Seed Persistence across the Central Great Plains. *WEED SCIENCE*, 65(5), 614-625., Peer Reviewed/Refereed
- Figueiredo, M. R., Leibhart, L. J., Reicher, Z. J., Tranel, P. J., Nissen, S. J., Westra, P., Bernards, M. L., Kruger, G. R., Gaines, T., Jugulam, M. (2017). Metabolism of 2, 4-dichlorophenoxyacetic acid contributes to resistance in a common waterhemp (*Amaranthus tuberculatus*) population. *Pest management science.*, Peer Reviewed/Refereed
- Busi, R., Goggin, D. E., Heap, I., Horak, M. J., Jugulam, M., Masters, R. A., Napier, R., Riar, D. S., Satchivi, N. M., Torra, J., Westra, P. (2017). Weed Resistance to Synthetic Auxin Herbicides. *Pest Management Science.*, Peer Reviewed/Refereed
- Gaines, T., Barker, A. L., Patterson, E., Westra, P., Westra, E. P., Wilson, R. G., Jha, P., Kumar, V., Kniss, A. R. (2016). EPSPS gene copy number and whole-plant glyphosate resistance level in *Kochia scoparia*. *PLOS ONE*, 11(12), e0168295. <http://dx.doi.org/10.1371/journal.pone.0168295>!!!, Peer Reviewed/Refereed
- Li, Z., Kessler, K. C., Figueiredo, Marcelo Rodrigues Alves de, Nissen, S. J., Gaines, T., Westra, P., Acker, R. C. Van, Hall, C., Robinson, D. E., Soltani, N., Sikkema, P. H. (2016). Halosulfuron absorption, translocation, and metabolism in white and adzuki bean. *Weed Science*, 64(4), 705-711. <http://www.wssajournals.org/doi/abs/10.1614/WS-D-16-00029.1>, Peer Reviewed/Refereed
- Sebastian, D. J., Nissen, S. J., Westra, P., Shaner, D., Butters, G. (2016). Influence of Soil Properties and Soil Moisture on the Efficacy of Indaziflam and Flumioxazin on *Kochia scoparia*. *Pest Management Science*. [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1526-4998](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1526-4998), Peer Reviewed/Refereed
- Ostlie, M., Haley, S. D., Anderson, V. A., Shaner, D., Manmathan, H. K., Beil, C. T., Westra, P. (2015). Development and characterization of mutant winter wheat (*Triticum aestivum* L.) accessions resistant to the herbicide quizalofop. *Theoretical and Applied Genetics*, 128(2), 343-351. <Go to ISI>://WOS:000348447600014, Peer Reviewed/Refereed
- Wiersma, A.T., Gaines, T., Preston, C., Hamilton, J.P., Giacomini, D., Buell, C. R., Leach, J. E., Westra, P. (2015). Gene amplification of 5-enol-pyruvylshikimate-3-phosphate synthase in glyphosate-resistant *Kochia scoparia*. *Planta*, 241, 463-474., Peer Reviewed/Refereed

- Nandula, V. K., Wright, A. A., Van Horn, C. R., Molin, W. T., Westra, P., Reddy, K. N. (2015). Glyphosate Resistance in Giant Ragweed (*Ambrosia trifida* L.) from Mississippi Is Partly Due to Reduced Translocation. *American Journal of Plant Sciences*, 6(13), 2104-2113., Peer Reviewed/Refereed
- Kumar, V., Jha, P., Giacomini, D., Westra, E. P., Westra, P. (2015). Molecular Basis of Evolved Resistance to Glyphosate and Acetolactate Synthase-Inhibitor Herbicides in Kochia (*Kochia scoparia*) Accessions from Montana. *Weed Science*, 63(4), 758-769. <Go to ISI>://WOS:000362957200003http://www.bioone.org/doi/pdf/10.1614/WS-D-15-00021.1, Peer Reviewed/Refereed
- Lorentz, L., Gaines, T., Nissen, S. J., Westra, P., Streck, H., Dehne, H.W., Ruiz-Santaella, J. P., Beffa, R. (2014). Characterization of glyphosate resistance in *Amaranthus tuberculatus* populations. *Journal of Agricultural and Food Chemistry*, 62, 8134-8142., Peer Reviewed/Refereed
- Juglam, M., Niehues, K., Godar, A., Wiersma, A., Westra, P. (2014). Tandem Amplification of a Chromosomal Segment Harboring EPSPS Locus Confers Glyphosate Resistance in *Kochia Scoparia*. *Plant Physiology*., Peer Reviewed/Refereed
- Giacomini, D. A., Westra, P., Ward, S. M. (2014). Impact of genetic background in fitness cost studies: an example from glyphosate-resistant Palmer amaranth. *Weed Science*, 62, 29-37., Peer Reviewed/Refereed
- Lindenmayer, R. B., Nissen, S. J., Westra, P., Shaner, D. L., Brunk, G. R. (2013). Aminocyclopyrachlor absorption, translocation, and metabolism in field bindweed (*Convolvulus arvensis*). *Weed Sci*, 16, 63-67., Peer Reviewed/Refereed
- Graus, M., Allyson, S. D., Fall, R., Yuan, B., Qian, Y., Westra, P., Gouw, J., Warneke, C. (2013). Biosphere-atmosphere exchange of volatile organic compounds over C4 biofuel crops. *Atmospheric Environment*, 66, 161-168., Peer Reviewed/Refereed
- Gaines, T., Wright, A.A., Molin, W.M., Lorentz, L., Riggins, C. W., Tranel, P. J., Beffa, R., Westra, P., Powles, S.B. (2013). Identification of genetic elements associated with EPSPS gene amplification. *PLOS One*, 8(6), e65819., Peer Reviewed/Refereed
- (2012). Inheritance of evolved glyphosate resistance in a North Carolina Palmer amaranth (*Amaranthus palmeri*) biotype. *Int J of Agronomy*., Peer Reviewed/Refereed
- (2012). Interspecific hybridization transfers a previously unknown glyphosate resistance mechanism in *Amaranthus* species. *Evolutionary Applications*, 5(1), 29-38., Peer Reviewed/Refereed
- Gaines, T., Ward, S. M., Bukun, B., Preston, C., Leach, J. E., Westra, P. (2012). Interspecific hybridization transfers a previously unknown glyphosate resistance mechanism in *Amaranthus* species. *Evolutionary Applications*, 5, 29-38., Peer Reviewed/Refereed
- (2012). Phenotypic diversity of *Aegilops cylindrica* (jointed goatgrass) accessions from the western United States under irrigated and dryland conditions. *Agriculture, Ecosystems, & Environment - online ahead of print*., Peer Reviewed/Refereed
- (2012). Why Early Season Weed Control Is Important in Maize. *Weed Science: July-September*, 60(3), 423-430., Peer Reviewed/Refereed
- (2011). Backcrossing provides an avenue for gene introgression from wheat to jointed goatgrass (*Aegilops cylindrica*) in the US Great Plains. *Weed Science*, 59, 188-194., Peer Reviewed/Refereed

- (2011). Biosphere-atmosphere exchange of volatile organic compounds over C4 biofuel crops. *Atmospheric Environment, available online.*, Peer Reviewed/Refereed
- (2011). Interspecific hybridization transfers a previously unknown glyphosate resistance mechanism in Amaranthus species. *Evolutionary Applications On-line publication.*, Peer Reviewed/Refereed
- (2011). Mechanism of resistance of evolved glyphosate-resistant Palmer Amaranth (Amaranthus palmeri). *J Agric Food Chem, 59*, 5886-5889., Peer Reviewed/Refereed
- Gaines, T., Shaner, D. L., Ward, S. M., Leach, J. E., Preston, C., Westra, P. (2011). Mechanism of resistance of evolved glyphosate-resistant Palmer amaranth (Amaranthus palmeri). *Journal of Agricultural and Food Chemistry, 59*, 5886-5889., Peer Reviewed/Refereed
- (2010). Absorption and Translocation of Aminocyclopyrachlor and Aminocyclopyrachlor-Methyl Ester in Canada Thistle (Cirsium arvense). *Weed Sci, 58*, 96-102., Peer Reviewed/Refereed
- (2010). Comparison of the Interactions of Aminopyralid vs. Clopyralid with Soil. *Weed Science: October-December, 58(4)*, 473-477., Peer Reviewed/Refereed
- (2010). Gene amplification confers glyphosate resistance in Amaranthus palmeri. *P Natl Acad Sci USA, 107*, 1029-1034., Peer Reviewed/Refereed
- Gaines, T., Zhang, W., Wang, D., Bukun, B., Chisholm, S. T., Shaner, D. L., Nissen, S. J., Patzoldt, W. L., Tranel, P. J., Culpepper, A. S., Grey, T. L., Webster, T. M., Vencill, W. K., Sammons, R. D., Jiang, J.M., Preston, C., Leach, J. E., Westra, P. (2010). Gene amplification confers glyphosate resistance in Amaranthus palmeri. *Proceedings of the National Academy of Sciences of the United States of America, 107(3)*, 1029-1034., Peer Reviewed/Refereed
- (2010). Vapor Movement of Synthetic Auxin Herbicides. *Weed Sci, 58*, 103-108., Peer Reviewed/Refereed
- (2009). Aminopyralid and Clopyralid Absorption and Translocation in Canada Thistle (Cirsium arvense). *Weed Sci, 57*, 15-Oct., Peer Reviewed/Refereed
- Bukun, B., Gaines, T., Nissen, S. J., Westra, P., Brunk, G. R., Shaner, D. L., Sleugh, B. B., Peterson, V. F. (2009). Aminopyralid and clopyralid absorption and translocation in Canada thistle (Cirsium arvense). *Weed Science, 57(1)*, 10-15., Peer Reviewed/Refereed
- (2009). Are herbicide-resistant crops the answer to controlling Cuscuta? *Pest Manag Sci, 65*, 811-816., Peer Reviewed/Refereed
- (2009). Inheritance of Resistance to the Auxinic Herbicide Dicamba in Kochia (Kochia scoparia). *Weed Sci, 57*, 43-47., Peer Reviewed/Refereed
- (2009). Registration of 'Thunder CL' Wheat. *J Plant Regist, 3*, 181-184., Peer Reviewed/Refereed
- (2009). The Effects of Surfactants, Nozzle Types, Spray Volumes, and Simulated Rain on 1-Methylcyclopropene Efficacy on Tomato Plants. *Hortscience, 44*, 1600-1603., Peer Reviewed/Refereed
- (2008). Herbicide-resistance in the Amaranthaceae. *J Plant Dis Protect, 48*, 41-44., Peer Reviewed/Refereed
- (2008). Jointed goatgrass (Aegilops cylindrica) by imidazolinone-resistant wheat hybridization under field conditions. *Weed Sci, 56*, 32-36., Peer Reviewed/Refereed

- (2008). Spatial Variability of Atrazine and Metolachlor Dissipation on Dryland No-tillage Crop Fields in Colorado. *J Environ Qual*, 37, 2212-2220., Peer Reviewed/Refereed
- (2008). Weed population dynamics after six years under glyphosate- and conventional herbicide-based weed control strategies. *Crop Sci*, 48, 1170-1177., Peer Reviewed/Refereed
- Westra, P., Wilson, R. G., Miller, S. D., Stahlman, P. W., Wicks, G. W., Chapman, P. L., Withrow, J., Legg, D., Alford, C., Gaines, T. (2008). Weed population dynamics after six years under glyphosate-and conventional herbicide-based weed control strategies. *Crop Science*, 48(3), 1170-1177., Peer Reviewed/Refereed
- (2007). Adventitious presence of herbicide resistant wheat in certified and farm-saved seed lots. *Crop Sci*, 47, 751-756., Peer Reviewed/Refereed
- (2007). An empirically derived model of field-scale gene flow in winter wheat. *Crop Sci*, 47, 2308-2316., Peer Reviewed/Refereed
- (2007). Canada thistle (*Cirsium arvense*) control with aminopyralid in range, pasture, and noncrop areas. *Weed Technol*, 21, 890-894., Peer Reviewed/Refereed
- (2007). Glyphosate susceptibility in common lambsquarters (*Chenopodium album*) is influenced by parental exposure. *Weed Sci*, 55, 572-577., Peer Reviewed/Refereed
- (2007). Recovery of imidazolinone-resistant hard red wheat lines following imazamox application. *Crop Sci*, 47, 2058-2066., Peer Reviewed/Refereed
- (2006). AMADS increases the efficacy of glyphosate formulations on corn. *Weed Technol*, 20, 179-183., Peer Reviewed/Refereed
- (2006). Comparison of efficacy, absorption and translocation of three glyphosate formulations on velvetleaf (*Abutilon theophrasti*). *Pest Manag Sci*, 62, 1177-1181., Peer Reviewed/Refereed
- (2006). Ethylene effect on kochia (*Kochia scoparia*) and emission following dicamba application. *Weed Sci*, 54, 31-37., Peer Reviewed/Refereed
- (2006). Registration of 'Bond CL' wheat. *Crop Sci*, 46, 993-995., Peer Reviewed/Refereed
- (2006). Registration of 'protection' wheat. *Crop Sci*, 46, 995-996., Peer Reviewed/Refereed
- (2006). Response of selected hard red wheat lines to Imazamox as affected by number and location of resistance genes, parental background, and growth habit. *Crop Sci*, 46, 1206-1211., Peer Reviewed/Refereed
- (2006). Soil dissipation and biological activity of metolachlor and S-metolachlor in five soils. *Pest Manag Sci*, 62, 617-623., Peer Reviewed/Refereed
- (2005). New techniques and findings in the study of a candidate allelochemical implicated in invasion success. *Ecol Lett*, 8, 1039-1047., Peer Reviewed/Refereed
- (2004). Combined effects of herbicides and *Sphenoptera jugoslavica* on diffuse knapweed (*Centaurea diffusa*) population dynamics. *Weed Sci*, 52, 418-423., Peer Reviewed/Refereed
- (2004). Common lambsquarters (*Chenopodium album*) interference with corn across the northcentral United States. *Weed Sci*, 52, 1034-1038., Peer Reviewed/Refereed

- (2003). Above winter wheat. *Can J Plant Sci*, 83, 107-108., Peer Reviewed/Refereed
- (2003). AP502 CL winter wheat. *Can J Plant Sci*, 83, 109-110., Peer Reviewed/Refereed
- (2003). Genetic diversity of jointed goatgrass (*Aegilops cylindrica*) determined with RAPD and AFLP markers. *Weed Sci*, 51, 287-293., Peer Reviewed/Refereed
- (2002). Infestation and spatial dependence of weed seedling and mature weed populations in corn. *Weed Sci*, 50, 54-63., Peer Reviewed/Refereed
- (2002). The potential for mapping nematode distributions for site-specific management. *J Nematol*, 34, 80-87., Peer Reviewed/Refereed
- (2001). Absorption and fate of BAY MKH 6561 in jointed goatgrass and downy brome. *Weed Sci*, 49, 717-722., Peer Reviewed/Refereed
- (2001). Absorption, translocation, and metabolism of imazamox in jointed goatgrass and feral rye. *Weed Sci*, 49, 607-612., Peer Reviewed/Refereed
- (2001). Evaluation of models predicting winter wheat yield as a function of winter wheat and jointed goatgrass densities. *Weed Sci*, 49, 48-60., Peer Reviewed/Refereed
- (2000). Secale cereale interference and economic thresholds in winter *Triticum aestivum*. *Weed Sci*, 48, 720-727., Peer Reviewed/Refereed
- (2000). The seedbank dynamics of feral rye (*Secale cereale*). *Weed Technol*, 14, 14-Jul., Peer Reviewed/Refereed
- (1999). A plant process economic model for weed management decisions in irrigated onion. *J Am Soc Hortic Sci*, 124, 99-105., Peer Reviewed/Refereed
- (1999). Absorption, fate, and soil activity of quinclorac in field bindweed (*Convolvulus arvensis*). *Weed Sci*, 47, 136-142., Peer Reviewed/Refereed
- (1999). Precision farming. *Weed Sci*, 48, 1777-1783., Peer Reviewed/Refereed
- (1999). Site-to-site and year-to-year variation in *Triticum aestivum*-*Aegilops cylindrica* interference relationships. *Weed Sci*, 47, 529-537., Peer Reviewed/Refereed
- (1999). Sorption, dissipation, and leaching of metsulfuron in Colorado soils. *Weed Sci*, 47, 353-359., Peer Reviewed/Refereed
- (1999). Spatial sampling for crop pests in two center pivot irrigated fields. *Weed Sci*, 48, 511-522., Peer Reviewed/Refereed
- (1999). Stability of corn (*Zea mays*)-foxtail (*Setaria* spp) interference relationships. *Weed Sci*, 47, 195-200., Peer Reviewed/Refereed
- (1999). The influence of surfactant and nitrogen on foliar absorption of MON 37500. *Weed Sci*, 47, 270-274., Peer Reviewed/Refereed
- (1999). Use of quinclorac plus 2,4-D for controlling field bindweed (*Convolvulus arvensis*) in fallow. *Weed Technol*, 13, 731-736., Peer Reviewed/Refereed

- (1998). Comparative growth and development of four spurred anoda (*Anoda cristata*) accessions. *Weed Sci*, 46, 91-98., Peer Reviewed/Refereed
- (1998). Impact of timing and frequency of in-row cultivation for weed control in dry bean (*Phaseolus vulgaris*). *Weed Technol*, 12, 548-553., Peer Reviewed/Refereed
- (1998). Seedbank and emerged annual weed populations in cornfields (*Zea mays*) in Colorado. *Weed Technol*, 12, 243-247., Peer Reviewed/Refereed
- (1998). The response of dodder (*Cuscuta* spp) seedlings to phytohormones under various light regimes. *Ann Appl Biol*, 132, 331-338., Peer Reviewed/Refereed
- (1997). Control of sulfonylurea-resistant kochia (*Kochia scoparia*). *Weed Technol*, 11, 270-276., Peer Reviewed/Refereed
- (1997). Economics and efficacy of postemergence spurred anoda (*Anoda cristata*) control in pinto beans (*Phaseolus vulgaris*). *Weed Technol*, 11, 329-334., Peer Reviewed/Refereed
- (1997). Effects of light and mechanical stimulation on coiling and prehaustoria formation in *Cuscuta* spp. *Weed Res*, 37, 219-228., Peer Reviewed/Refereed
- (1997). Growth analysis of sulfonylurea-resistant and -susceptible kochia (*Kochia scoparia*). *Weed Sci*, 45, 691-695., Peer Reviewed/Refereed
- (1997). The competitive ability of wheat (*Triticum aestivum*) compared to rigid ryegrass (*Lolium rigidum*) and cowcockle (*Vaccaria hispanica*). *Weed Sci*, 45, 481-487., Peer Reviewed/Refereed
- (1996). A new approach to determine when to control weeds. *Weed Sci*, 44, 496-503., Peer Reviewed/Refereed
- (1996). Integrated weed management systems for irrigated corn (*Zea mays*) production in Colorado - A case study. *Weed Sci*, 44, 423-428., Peer Reviewed/Refereed
- (1996). Modelling the effect of duration of weed competition, weed density and weed competitiveness on seeded, irrigated onion. *Weed Res*, 36, 259-269., Peer Reviewed/Refereed
- (1996). Stability of corn (*Zea mays*) velvetleaf (*Abutilon theophrasti*) interference relationships. *Weed Sci*, 44, 309-313., Peer Reviewed/Refereed
- (1996). Venice mallow (*Hibiscus trionum*) seed production and persistence in soil in Colorado. *Weed Technol*, 10, 22-28., Peer Reviewed/Refereed
- (1995). Influence of Weed Density and Distribution on Corn (*Zea-Mays*) Yield. *Weed Sci*, 43, 215-218., Peer Reviewed/Refereed
- (1995). The Concept and Application of Early Economic Period Threshold - the Case of Dcpa in Onions (*Allium-Cepa*). *Weed Sci*, 43, 634-639., Peer Reviewed/Refereed
- (1995). Weed-Control Efficacy and Pinto Bean (*Phaseolus-Vulgaris*) Tolerance to Early-Season Mechanical Weeding. *Weed Technol*, 9, 531-534., Peer Reviewed/Refereed
- (1994). A Plant Process-Economic Model for Wild Oats Management Decisions in Irrigated Barley. *Agr Syst*, 45, 355-368., Peer Reviewed/Refereed

- (1994). Controlling Weeds in Corn (*Zea-Mays*) Rows with an in-Row Cultivator Versus Decisions Made by a Computer-Model. *Weed Sci*, 42, 593-600., Peer Reviewed/Refereed
- (1992). Field Bindweed (*Convolvulus-Arvensis*) Control with Various Herbicide Combinations. *Weed Technol*, 6, 949-955., Peer Reviewed/Refereed
- (1992). Reducing Herbicide Loading in Corn with Weed Management Models. *Abstr Pap Am Chem S*, 203, 310-ENVR., Peer Reviewed/Refereed
- (1991). Wild Proso Millet (*Panicum-Miliaceum*) Interference in Corn (*Zea-Mays*). *Weed Sci*, 39, 217-220., Peer Reviewed/Refereed
- (1990). Control of Venice Mallow (*Hibiscus-Trionum*) in Corn (*Zea-Mays*) and Onions (*Allium-Cepa*). *Weed Technol*, 4, 500-504., Peer Reviewed/Refereed
- (1990). Wild-Proso Millet - Proceedings of a Symposium of the Weed-Science-Society-of-America February 9, 1989, Dallas, Texas. *Weed Technol*, 4, 407-408., Peer Reviewed/Refereed

### **Non-Refereed Journal Articles**

- Ostlie, M., Haley, S. D., Manmathan, H. K., Westra, P. (2015). Development and characterization of mutant winter wheat (*Triticum aestivum* L.) accessions resistant to the herbicide quizalofop. *Theoretical and Applied Genetics*., Not Peer Reviewed/Refereed
- Econopouly, B. F., McKay, J. K., Westra, P., Lapitan, N. L. V., Chapman, P. L., Byrne, P. F. (2011). Backcrossing Provides an Avenue for Gene Introgression from Wheat to Jointed Goatgrass (*Aegilops cylindrica*) in the US Great Plains. *Weed science*, 59(2), 188–194., Not Peer Reviewed/Refereed
- Harrington, J. E., Byrne, P. F., Peairs, F. B., Nissen, S. J., Westra, P., Ellsworth, P. C., Fournier, A., Mallory-Smith, C. A., Zemetra, R. S., Henry, W. B. (2010). Perceived consequences of herbicide-tolerant and insect-resistant crops on integrated pest management strategies in the western United States: Results of an online survey. *AgBioForum*., Not Peer Reviewed/Refereed
- Gaines, T., Brien Henry, W., Byrne, P. F., Westra, P., Nissen, S. J., Shaner, D. L. (2008). Jointed goatgrass (*Aegilops cylindrica*) by imidazolinone-resistant wheat hybridization under field conditions. *Weed Science*, 56(1), 32–36., Not Peer Reviewed/Refereed
- Gaines, T., Preston, C., Byrne, P. F., Henry, W. B., Westra, P. (2007). Adventitious presence of herbicide resistant wheat in certified and farm-saved seed lots. *Crop Science*, 47(2), 751–754., Not Peer Reviewed/Refereed
- Gaines, T., Byrne, P. F., Westra, P., Nissen, S. J., Henry, W. B., Shaner, D. L., Chapman, P. L. (2007). An empirically derived model of field-scale gene flow in winter wheat. *Crop Science*, 47(6), 2308–2316., Not Peer Reviewed/Refereed
- Heermann, D., Hoeting, J. A., Thompson, S., Duke, H., Westfall, D., Buchleiter, G., Westra, P., Peairs, F., Fleming, K. C. (2002). Interdisciplinary irrigated precision farming research. *Precision agriculture*, 3(1), 47–61., Not Peer Reviewed/Refereed

### **Non-Refereed Proceedings or Transactions**

- Heermann, D., Hoeting, J. A., Duke, H., Westfall, D., Buchleiter, G., Westra, P., Peairs, F., Fleming, K. C. (2000). Irrigated precision farming for corn production. *Second international on Geospatial Information in*

## **AES Report/Bulletin**

Johnson, J. J., Haley, S. D., Jones, S., Asfeld, E., Meyer, R. F., Trujillo, W., Kaan, D. A., Roesch, K., Larson, K., Vigil, M. F., Pettinger, B. T., Novak, R. A., Peairs, F. B., Broders, K. D., Byrne, P. F., Gaines, T., Westra, P., Walker, T., Erker, B. (2017). *TR17-4: Making Better Decisions, 2017 Colorado Winter Wheat Variety Performance Trials*.: Colorado Agricultural Experiment Station. PO Box 967, Not Peer Reviewed/Refereed

Westra, P., Gaines, T. (in press). Weed Management in Colorado Corn. *Best Management Practices for Colorado Corn*.: CSU Agricultural Experiment Station. [waterquality.colostate.edu/cornbook.shtml](http://waterquality.colostate.edu/cornbook.shtml), Peer Reviewed/Refereed

Johnson, J. J., Haley, S. D., Jones, S. M., Larson, K., Bartolo, M. E., Davidson, J. W., Peairs, F. B., Tisserat, N. A., Westra, P., Davis, J. G., Novak, R. A., Vigil, M., Mostek, G., Bosley, B., Meyer, R., Trujillo, W., Irell, B. (2013). *Making better decisions: 2013 Colorado wheat variety performance trials*. (vol. TR13-4, pp. 51).: AES., Peer Reviewed/Refereed

Byrne, P. F., Gaines, T., Westra, P., Henry, W. B., Nissen, S. J., Chapman, P., Harrington, J. E. (2008). *Estimating gene flow from wheat to wheat and wheat to jointed goatgrass (Aegilops cylindrica)* (vol. TB08-03).: CSU Agricultural Experiment Station., Peer Reviewed/Refereed

## **PAPERS PRESENTED/SYMPOSIA/INVITED LECTURES/PROFESSIONAL MEETINGS/WORKSHOPS**

December 2017, "Genomic and molecular studies of key weeds", North Central Weed Science Society, (Presenter) Westra, P.

December 2017, "Relationship between glufosinate phytotoxicity, inhibition of glutamine synthetase and ammonia accumulation", North Central Weed Science Society, (Presenter) Takano, H. K., peer-reviewed/refereed.

2017, "A novel mechanism that confers reduced glyphosate sensitivity in *Kochia scoparia*", Global Herbicide Resistance Challenge.

2017, "Crop safety and winter annual grass weed control in mutagenesis-derived ACCase-resistant winter wheat lines", Global Herbicide Resistance Challenge.

2017, "Decreased dicamba transport due to increased flavonoid biosynthesis: a candidate dicamba resistance mechanism", Global Herbicide Resistance Challenge.

2017, "Distinct mechanisms contribute to dicamba resistance in *Kochia scoparia* from Kansas and Colorado", Global Herbicide Resistance Challenge.

2017, "Genome sequencing and assembly for *Kochia scoparia*", Global Herbicide Resistance Challenge.

2017, "Glyphosate-resistant *Ambrosia trifida*: Non-target site resistance mechanisms and physiology of rapid tissue death response", Global Herbicide Resistance Challenge.

2017, "Investigating the 2,4-D resistance mechanism in *Sisymbrium orientale* (Indian Hedge Mustard) from Australia using RNA-Seq", Global Herbicide Resistance Challenge.

2017, "*Kochia scoparia* Resistance to Auxin Herbicides", Global Herbicide Resistance Challenge.

- 2017, "Genome-wide analysis of copy number variation in kochia", North Central Weed Science Society.
- 2017, "Investigation of Mechanisms and Genetic Basis of Dicamba Resistance in Kochia from Kansas and Colorado", North Central Weed Science Society.
- 2017, "Decreased Intercellular Transport Due to Increased Flavonoid Biosynthesis: A Candidate Dicamba Resistance Mechanism", Plant and Animal Genome.
- 2017, "Investigating the 2,4-D Resistance Mechanism in Indian Hedge Mustard (*Sisymbrium orientale*) from Australia Using RNA-Seq", Plant and Animal Genome.
- 2017, "The Draft Genome of *Kochia scoparia* : A Foundation for Studying Adaptive Evolution and Its Impacts on Genome Architecture", Plant and Animal Genome.
- 2017, "A Novel Mechanism that Confers Reduced Glyphosate Sensitivity in *Kochia scoparia*", Weed Science Society of America.
- 2017, "Halosulfuron Absorption, Translocation, and Metabolism in Dry Bean", Weed Science Society of America.
- 2017, "A Draft Genome for *Kochia scoparia*", Western Society of Weed Science.
- 2017, "Characterizing the Phenotypic Response to Fluroxypyr in *Kochia scoparia*", Western Society of Weed Science.
- 2017, "Control Dicamba-Resistance in *Kochia* from Colorado and Kansas", Western Society of Weed Science.
- 2017, "Cytochrome P450 Modulates 2,4-D Metabolic Resistance in Waterhemp (*Amaranthus tuberculatus*)", Western Society of Weed Science.
- 2017, "Integrated Weed Management of Winter Annual Grasses in Wheat using Harvest Weed Seed Control", Western Society of Weed Science.
- 2017, "The Basis of Glyphosate Resistance in "Rapid Necrosis" Giant Ragweed Populations", Western Society of Weed Science.
- 2017, "Use of SSR Markers to Track the Evolutionary Trajectory of Glyphosate Resistant *Kochia* in North America", Western Society of Weed Science.
- 2017, "Viability Assessment of Mutagenesis-derived ACCase Resistant Wheat Lines as a New System for Control of Winter Annual Grasses", Western Society of Weed Science.
- May 2017, "Cytochrome P450 modulates 2,4-D metabolic resistance in waterhemp (*Amaranthus tuberculatus*)", Global Herbicide Resistance Challenge, (Presenter) Figueiredo, M. R.A., peer-reviewed/refereed.
- February 2017, "Using the genome of *Kochia scoparia* to inform crop improvement research", Weed Science Society of America, (Presenter) Westra, P., peer-reviewed/refereed.
- 2016, "Using multiple sequencing platforms to assemble the genome of *Kochia scoparia*", 7th International Weed Science Congress.
- 2016, "Weed genomes as potential sources of new, adaptive agronomic traits: a summary of *Kochia scoparia* research in North America", 7th International Weed Science Congress.

- 2016, "Using RNA-Seq to Explore Dicamba Resistance Mechanisms in *Kochia scoparia*", American Society of Plant Biologists Western Meeting.
- 2016, "A draft genome of *Kochia scoparia*", North Central Weed Science Society.
- 2016, "Implications for Glyphosate Resistant Palmer Amaranth and *Kochia* which Now Commingle in Colorado", North Central Weed Science Society.
- 2016, "Crop safety assessment of mutagenesis-derived ACCase resistant wheat lines", Weed Science Society of America.
- 2016, "Developing genomics resources for *Kochia scoparia*", Weed Science Society of America.
- 2016, "Research on herbicide resistant *Kochia* in the Western US and Canada", Weed Science Society of America.
- 2016, "Using RNA-Seq to explore dicamba resistance mechanisms in *Kochia scoparia*", Weed Science Society of America.
- 2016, "Crop Safety Assessment of Mutagenesis-Derived ACCase Resistant Wheat Lines", Western Society of Weed Science.
- 2016, "Determining seed retention of key annual weeds at wheat harvest, and the potential for harvest weed seed control", Western Society of Weed Science.
- 2016, "Developing Simple Sequence Repeat (SSR) Markers for *Kochia Scoparia*", Western Society of Weed Science.
- 2016, "Molecular and Genomic Weed Science Research at Colorado State University", Western Society of Weed Science.
- 2016, "Palynology of Weedy Species", Western Society of Weed Science.
- 2016, "Understanding the Genetic Evolution of Glyphosate Resistance in *Kochia scoparia* Populations", Western Society of Weed Science.
- 2016, "Using Multiple Sequencing Platforms to Assemble the *Kochia scoparia* Genome", Western Society of Weed Science.
- 2015, "A proposed center for ecology, evolution and management of pesticide resistance", 8th International IPM Symposium.
- 2015, "Genomic and Molecular Findings in *Kochia* (*Kochia scoparia*)", North Central Weed Science Society.
- 2015, "Vision for Weed Science Research at Colorado State University", Limagrain.
- 2015, "Background, history, and current status of dicamba resistant *Kochia* in the Western US and Canada", Weed Science Society of America.
- 2015, "Development of a Rapid In Vitro Dose Response Assay for *Kochia*", Western Society of Weed Science.
- 2015, "EPSPS Gene Amplification in *Kochia* from Sugar Beet Fields", Western Society of Weed Science.

- 2015, "Genomic Variability in Kochia and its Potential Impact on Weediness", Western Society of Weed Science.
- 2015, "The History and Status of Herbicide Resistance in Kochia in North America", Western Society of Weed Science.
- March 11, 2015, "Evaluating Bare Ground Herbicide Treatments for Kochia, Field Bindweed, and Downy Brome Control", 68th Annual Western Society of Weed Science Meeting, Western Society of Weed Science, (Presenter) Sebastian, D. J.
- March 10, 2015, "Comparing Indaziflam and Imazapic for Downy Brome and Feral Rye cControl in Range and Pasture", 68th Annual Western Society of Weed Science Meeting, western Society of Weed Science, (Presenter) Sebastian, D. J.
- September 18, 2014, "Update on herbicide resistant kochia research at CSU", Weed Management Academic Summit, Monsanto, (Presenter) Gaines, T., St. Louis, MO.
- March 12, 2014, "Influence of Soil Properties and Soil Moisture on Indaziflam Efficacy", Sixty Seventh Meeting of WSWS, Western Society of Weed Science, (Presenter) Sabastian, D., Colorado Spring, CO, USA.
- February 2014, "Preliminary analysis of the EPSPS amplicon using 454 sequence data", Joint Annual Meeting, Weed Science Society of America/Canadian Weed Science Society, (Presenter) Giacomini, D., Vancouver, Canada.
- 2013, "Miniature inverted-repeat transposable elements (MITEs) associated with EPSPS gene amplification in *Amaranthus palmeri*", Global Herbicide Resistance Challenge.
- 2013, "Genetic relationship of southeastern United States herbicide resistant *Amaranthus palmeri* populations", Weed Science Society of America.
- 2013, "Miniature inverted-repeat transposable elements (MITEs) associated with EPSPS gene amplification in *Amaranthus palmeri*", Weed Science Society of America.
- November 6, 2013, "Nutrient, Sediment and Herbicide Runoff Impacts from Conventional and Conservation Tillage Systems Under Furrow Irrigation", ASA, CSSA, and SSSA International Meeting, (Presenter) Bauder, T. A., Tampa, FL.
- 2012, "Fitness Associated with EPSPS Gene Amplification in Glyphosate Resistant Palmer Amaranth".
- 2012, "Genetic mobile elements involved in gene amplification in Palmer amaranth - presentation at WSWS - 100 participnats".
- 2012, "Kochia Emergence Profiles Across the Central Great Plains".
- 2012, "Multiple presentations were made on glyphosate and dicamba resistant kochia to more than 3000 participants at 15 meetings."
- 2012, "Multiple presentations on gene

amplification in glyphosate resistant kochia were made to 1000 participants".

2012, "Rapid necrosis as a basis for glyphosate resistance in giant ragweed - 100 participants".

2012, "Regional and whole plant response of kochia to glyphosate - presented at 2012 WSWS meeting - 1st place student award - 150 participants".

2012, "Several presentations on invasive weed management with aminocyclopyrachlor were made to 600 participants".

2012, "Examining EPSPS: Assays, Westerns, and mutants", Weed Science Society of America.

2012, "Time dependent binding of pyroxasulfone, dimethenamid and metolachlor to four Australian soils", Weed Science Society of America.

2011, "CHARACTERIZATION OF AMINOCYCLOPYRACHLOR, AMINOPYRALID, AND CLOPYRALID SOIL ACTIVITY. Brad Lindenmayer\*1, Philip Westra2, Scott Nissen1, Dale Shaner3; 1Colorado State University, Fort Collins, CO, 2Colorado State University, Ft. Collins, CO, 3USDA/ARS, Fort Collins, CO (084) Proceedings WSWS 2011."

2011, "CHARACTERIZATION OF EPSPS GENE AMPLIFICATION IN PALMER AMARANTH (AMARANTHUS PALMERI). T. A. Gaines\*1, S. Ward2, J. E. Leach2, S. T. Chisholm2, P. Westra2; 1University of Western Australia, Crawley, WA, Australia, 2Colorado State University, Fort Collins, CO (369) Abstracts WSSA 2011."

2011, "COLORADO LIGHT AVOIDANCE CORN ECOLOGY STUDY. P. Westra\*1, C. J. Swanton2, E. Page2, M. Loux3, A. Dobbels3, K. L. Smith4, J. Bullington4, H. Wright5, C. L. Foresman6; 1Colorado State University, Fort Collins, CO, 2University of Guelph, Guelph, ON, 3The Ohio State University, Columbus, OH, 4University of Arkansas, Monticello, Monticello, AR, 5Syngenta Crop Protection Canada Inc, Guelph, ON, 6Syngenta, Greensboro, NC (334) Abstracts WSSA 2011."

2011, "CONTINUING AMINOCYCLOPYRACHLOR RESEARCH AT COLORADO STATE UNIVERSITY. B.

Lindenmayer\*1, P. Westra1, S. J. Nissen1, D. L. Shaner2; 1Colorado State University, Fort Collins, CO, 2USDA, Fort Collins, CO (286) Abstracts WSSA 2011."

2011, "DISSIPATION AND SOIL INTERACTION OF PYROXASULFONE AND S-METOLACHLOR. Eric P.

Westra\*1, Dale Shaner2, Philip Westra3; 1Colorado State University, Fort Collins, CO, 2USDA/ARS, Fort Collins, CO, 3Colorado State University, Ft. Collins, CO (106) Proceedings WSWS 2011."

2011, "DISSIPATION OF PYROXASULFONE AND S-METOLACHLOR OVER TWO YEARS IN TWO

FIELDS. E. P. Westra\*1, D. L. Shaner2, P. Westra1; 1Colorado State University, Fort Collins, CO, 2USDA, Fort Collins, CO (133) Abstracts WSSA 2011."

2011, "FERAL RYE STAGE OF GROWTH EFFECTS ON IMIDAZOLINONE TRANSLOCATION AND

EFFICACY. M. Ostlie\*1, D. L. Shaner2, P. Westra1; 1Colorado State University, Fort Collins, CO, 2USDA, Fort Collins, CO (295) Abstracts WSSA 2011."

2011, "HERBICIDE OPTIONS FOR CONTROL OF GLYPHOSATE RESISTANT KOCHIA. Andrew R.

Kniss\*1, Phillip W. Stahlman2, Patrick W. Geier2, Robert G. Wilson3, Gustavo M. Sbatella3, Philip Westra4, Michael J. Moechnig5, Richard M. Cole6, Jeffrey M. Tichota7; 1University of Wyoming, Laramie, WY, 2Kansas State University, Hays, KS, 3University of Nebraska-Lincoln, Scottsbluff, NE, 4Colorado State University, Ft. Collins, CO, 5South Dakota State University, Brookings, SD, 6Monsanto, St. Louis, MO, 7Monsanto, Centennial, CO (167) Proceedings WSWS 2011."

2011, "INHERITANCE OF EPSPS GENE AMPLIFICATION IN PALMER AMARANTH. D. A. Giacomini\*1,

S. Ward1, T. A. Gaines2, P. Westra1; 1Colorado State University, Fort Collins, CO, 2University of Western

Australia, Crawley, WA, Australia (85)  
Abstracts WSSA - 2011".

2011, "INHERITANCE OF EPSPS GENE DUPLICATION  
AND GLYPHOSATE RESISTANCE IN PALMER  
AMARANTH. Darci A. Giacomini\*1, Todd  
Gaines2, Sarah M. Ward1, Philip Westra3;  
1Colorado State University, Fort  
Collins, CO, 2University of Western  
Australia, Perth, Australia, 3Colorado  
State University, Ft. Collins, CO (109)  
Proceedings WSSA 2011."

2011, "Characterization of EPSPS gene amplification in glyphosate-resistant Palmer amaranth (*Amaranthus palmeri*)", Plant and Animal Genome XIX.

2011, "RESEARCH ON MECHANISMS OF GLYPHOSATE  
RESISTANCE IN KOCHIA. Philip Westra\*1,  
Andrew Wiersma2, Jan Leach2, Phillip  
Stahlman3, Amar Godar4, Jason Waite4,  
Kassim Al Khatib5, Chris Preston6;  
1Colorado State University, Ft. Collins,  
CO, 2Colorado State University, Fort  
Collins, CO, 3Kansas State University,  
Hays, KS, 4Kansas State University,  
Manhattan, KS, 5University of  
California, Davis, CA, 6University of  
Adelaide, Adelaide, Australia (121)  
Greenhouse and outdoor glyphosate dose  
response research by Kansas".

2011, "RESISTANCE OF CONYZA SPP BRAZILIAN  
BIOTYPES TO GLYPHOSATE. M. Nicolai\*1,  
P. J. Christoffoleti1, J. D. Vassios2,  
M. S. Melo3, S. J. Nissen2, P. Westra2;  
1Univeristy of Sao Paulo - ESALQ -  
Brazil, Piracicaba, Brazil, 2Colorado  
State University, Fort Collins, CO,  
3University of Sao Paulo, Piracicaba,  
Brazil (119) Abstracts WSSA - 2011".

2011, "RESISTANCE OF DIGITARIA INSULARIS  
BRAZILIAN BIOTYPES TO GLYPHOSATE. P. J.  
Christoffoleti\*1, M. Nicolai1, M. S.  
Melo2, J. D. Vassios3, S. J. Nissen3,  
P. Westra3; 1Univeristy of Sao Paulo -  
ESALQ - Brazil, Piracicaba, Brazil,  
2University of Sao Paulo, Piracicaba,  
Brazil, 3Colorado State University,  
Fort Collins, CO (121) Abstracts WSSA  
2011."

2011, "Glyphosate resistance due to EPSPS gene amplification in Palmer amaranth (*Amaranthus palmeri*)",

Rothamsted Resistance 2011.

2011, "SEASONAL EMERGENCE OF KOCHIA IN THE CENTRAL GREAT PLAINS. Phillip W. Stahlman\*1, Patrick W. Geier1, Johanna A. Dille2, Tyler W. Rider2, Jarrett D. Riffel1, Randall S. Currie3, Philip Westra4, Robert G. Wilson5, Gustavo M. Sbatella5, Andrew R. Kniss6, Richard M. Cole7; 1Kansas State University, Hays, KS, 2Kansas State University, Manhattan, KS, 3Kansas State University, Garden City, KS, 4Colorado State University, Ft. Collins, CO, 5University of Nebraska (123). Proceedings WSSA 2011."

2011, "SHADE AVOIDANCE: THE IMPORTANCE OF PLANT-TO-PLANT VARIABILITY. C. J. Swanton\*1, E. Page1, P. Westra2, M. Loux3, A. Dobbels3, K. L. Smith4, J. Bullington4, H. Wright5, C. L. Foresman6; 1University of Guelph, Guelph, ON, 2Colorado State University, Fort Collins, CO, 3The Ohio State University, Columbus, OH, 4University of Arkansas, Monticello, AR, 5Syngenta Crop Protection Canada Inc, Guelph, ON, 6Syngenta, Greensboro, NC (310) Abstracts WSSA 2011."

2011, "UPDATED REPORT ON GENE FLOW. P. Byrne, P. Westra, C. T. Beil\*; Colorado State University, Fort Collins, CO (349) Abstracts WSSA 2011."

2011, "Characterization of EPSPS gene amplification in glyphosate-resistant Palmer amaranth (*Amaranthus palmeri*)", Weed Science Society of America.

2011, "Inheritance of EPSPS gene amplification in Palmer amaranth", Weed Science Society of America.

2011, "Westra, P., T. Gaines, A. Wiersma, and D. Giacomoni. 2011. Use of molecular tools to understand mechanisms of glyphosate resistance in Palmer amaranth, kochia, and other weeds. Proceedings Canadian Society of Weed Science."

2011, "Westra, P., T. Gaines, A. Wiersma, and D. Giacomini. 2011. Molecular insights into glyphosate resistance in Palmer amaranth, tall waterhemp, kochia, common lambsquarter, and giant ragweed.

Proceedings NCWSS – 2011."

2010, "Gaines, Todd, Jan Leach, Philip Westra, Christopher Preston, Jaming Jang, Steven Chisholm, Doug Sammons, and Dale Shaner. Update on novel glyphosate resistance mechanism in Palmer amaranth (*Amaranthus palmeri*). WSSA Abstracts."

2010, "Giacomini, Darci, Sarah Ward, Philip Westra, and Todd Gaines. Apomixis in glyphosate-resistant Palmer amaranth. WSSA Abstracts."

2010, "Joe Vasios, Scott Nissen, Cameron Douglas, Brad Lindenmayer, Melissa Bridges, Phil Westra, and Kenneth Lair. Canada thistle (*Cirsium arvense*) control and grass tolerance using aminopyralid and aminocycloprachlor. WSSA Abstracts."

2010, "Lindenmayer, Brad, Phil Westra, Galen Brunk, Scott Nissen, and Dale Shaner. Field and laboratory studies with aminocyclopyrachlor (DPX-MAT 28). WSSA Abstracts."

2010, "Lindenmayer, Brad, Philip Westra, Scott Nissen, Galen Brunk, and Dale Shaner. Comparing soil dissipation of four auxinic herbicides. 2010 Proceedings WSWS."

2010, "Nissen, Scott, Brad Lindenmayer, Phil Westra, Bekir Bukun, Dale Shaner, Stephen Strachan, Mark Casisni, Kathleen Heldreth, and Joseph Scocas. Aminocyclopyrachlor methyl ester volatility. 2010 Proceedings WSWS."

2010, "Ostlie, Michael, Melissa Bridges, Dale Shaner, and Philip Westra. Feral rye sensitivity to imazamox as measured by the in-vivo enzyme assay and state of lifecycle. WSSA Abstracts."

2010, "Ostlie, Michael, Philip Westra, and Dale Shaner. Vernalization effects on imazamox translocation and ALS activity in feral rye. 2010 Proceedings WSWS."

2010, "Philip Westra, Brad Lindenmayer, Scott Nissen, Dale Shaner, Tim D'Amato, and

Bobby Goeman. Integrating aminocyclopyrachlor into weed management plans. WSSA Abstracts."

2010, "Shaner, Dale, Eric Westra, and Philip Westra. Effect of soil moisture on bioavailability of acetanilide herbicides. 2010 Proceedings WSWS."

2010, "Stahlman, Phillip, Patrick Geier, Leo Charvat, Michael Moechnig, Philip Westra, and Robert Wilson. Regional summary of millet tolerance to preemergence saflufenacil. 2010 Proceedings WSWS."

2010, "Update on novel glyphosate resistance mechanism in Palmer amaranth. (*Amaranthus palmeri*)", Weed Science Society of America.

2010, "Westra, Eric, Dale Shaner, and Philip Westra. Soil dissipation of pyroxasulfone (KIH-485) and S-metolachlor in the field. WSSA Abstracts."

2010, "Westra, Philip, Kassim Al-Khatib, Philip Stahlman, Darci Giacomini, Sarah Ward, Dale Shaner, and Robert Klein. Evaluating the response of kochia populations to glyphosate. WSSA Abstracts."

2010, "Westra, Philip, Sarah Ward, Darci Giacomini, Dale Shaner, Phil Stahlman, Kassim Al-Khatib, and Robert Wilson. The current status of kochia research in the Central Great Plains. 2010 Proceedings WSWS."

2010, "Westra, Philip, Sarah Ward, David Belles, and Chris Preston. History and current status of dicamba resistant kochia in the Central Great Plains. 2010 Proceedings WSWS."

2009, "Molecular biology and genomics of glyphosate resistance in Palmer amaranth", Plant and Animal Genome.

2009, "A novel mechanism of resistance to glyphosate in Palmer amaranth (*Amaranthus palmeri*)", Weed Science Society of America.

2008, "Molecular genetics of glyphosate resistance and gene flow in *Amaranthus palmeri*", 5th International Weed Science Congress.

- 2008, "Molecular methods to study glyphosate-resistant Palmer amaranth (*Amaranthus palmeri*)", Weed Science Society of America.
- 2008, "Mechanisms of resistance and gene flow in glyphosate resistant Palmer amaranth", Western Society of Weed Science.
- 2007, "Molecular methods to study herbicide resistant weeds and inter-specific gene flow", National Scientific Conference – Convergence of genomics and the land-grant mission: Emerging trends in the application of genomics in agricultural research.
- 2007, "Commercial-scale pollen-mediated gene flow in winter wheat in the Central Western Great Plains", North Central Weed Science Society.
- 2007, "Hybridization between jointed goatgrass and imidazolinone-resistant winter wheat", North Central Weed Science Society.
- 2007, "Seed-mediated gene flow in certified and farm-saved seed lots", North Central Weed Science Society.
- 2007, "Transfer of glyphosate resistance from Palmer amaranth to related *Amaranthus* species", Southern Weed Science Society.
- 2007, "Landscape level gene flow from Clearfield winter wheat to conventional wheats and jointed goatgrass", Weed Science Society of America.
- 2007, "Feral rye control with imazamox in Clearfield winter wheat", Western Society of Weed Science.
- 2007, "Glyphosate resistance mechanism in Palmer amaranth", Western Society of Weed Science.
- 2006, "Adventitious presence of herbicide resistant wheat in certified and farm-saved seed lots", Crop Science Society of America.
- 2006, "Molecular methods to study glyphosate-resistant Palmer amaranth", North Central Weed Science Society.
- 2006, "Landscape-level Clearfield winter wheat gene flow to conventional wheats in commercial fields", Weed Science Society of America.
- 2006, "Gene flow in wheat and jointed goatgrass at the landscape level", Western Society of Crop Science.
- 2006, "Leakage of Clearfield wheat to certified and farmer-saved seed lots", Western Society of Weed Science.
- 2006, "Gene flow in wheat and jointed goatgrass at the landscape level", Western Society of Weed Science.
- 2005, "Estimating landscape-level gene flow in wheat and jointed goatgrass", Crop Science Society of America.
- 2005, "Detecting imidazolinone-resistant wheat in conventional wheat varieties", North Central Weed Science Society.
- 2005, "Landscape-level gene flow from Clearfield winter wheat to conventional wheat over three years", North Central Weed Science Society.
- 2005, "Hybridization between a herbicide tolerant wheat variety and jointed goatgrass in the Central Great Plains", Weed Science Society of America.

- 2005, "Estimating landscape-level gene flow in wheat and jointed goatgrass", Western Society of Weed Science.
- 2005, "Jointed goatgrass by winter wheat hybrid dynamics in Colorado wheat fields", Western Society of Weed Science.
- 2005, "Local adaptation of Canada thistle to resource availability", Western Society of Weed Science.
- 2004, "Hybridization between a herbicide tolerant wheat variety and jointed goatgrass in the Central Great Plains", North Central Weed Science Society.

#### **OTHER ACTIVITIES/ACCOMPLISHMENTS – PUBLICATIONS/SCHOLARLY RECORD**

- Haley, S. D., Westra, P. "Acetyl co-enzyme A carboxylase herbicide resistant plants.," Licensed to: CWRF. (Approved: 2017, Renewal: 2017).
- Haley, S. D., Johnson, J. J., Peairs, F. B., Westra, P. "Incline AX winter wheat (wheat cultivar)," Licensed to: Colorado Wheat Research Foundation. (Submitted: 2017, Application: 2017, Approved: 2017, Licensed: 2017).
- Haley, S. D., Johnson, J. J., Peairs, F. B., Westra, P. "LCS Fusion AX winter wheat (wheat cultivar)," Licensed to: Colorado Wheat Research Foundation. (Submitted: 2017, Application: 2017, Approved: 2017, Licensed: 2017).
- Pettinga, D. J., Gaines, T., Westra, P. "Dicamba Resistance Conferred by Upregulation of Chalcone Synthase." (Application: October 26, 2016).
- Hildebrandt, C. M., Gaines, T., Westra, P. "Herbicide safener combinations for Acetyl Co-enzyme A Carboxylase herbicide resistant plants," Assigned to: Colorado Wheat Research Foundation. (Application: February 8, 2016).
- Gaines, T., Westra, P. "Develop Novel Traits in Sunflower Using Mutagenesis." (Submitted: February 10, 2015).
- Haley, S. D., Westra, P. "Patent Application - Acetyl Co-Enzyme A Carboxylase Herbicide Resistant Plants," Licensed to: CWRF. (Submitted: 2012, Application: 2012, Approved: 2012, Licensed: 2012).
- Haley, S. D., Westra, P. "Provisional patent application - Herbicide Tolerant Wheat Plants and Methods for Producing and Identifying Such Plants." (Submitted: 2012, Application: 2012, Approved: 2012, Licensed: 2012).
- Haley, S. D., Johnson, J. J., Peairs, F. B., Westra, P. "Brawl CL Plus winter wheat (wheat cultivar)," Licensed to: Colorado Wheat Research Foundation. (Submitted: 2011, Application: 2011, Approved: 2011, Licensed: 2011).
- "Development of a novel winter wheat mutant for resistance to Accase herbicides.." (Submitted: 2011, Application: 2011, Approved: 2011, Licensed: 2011).
- Haley, S. D., Westra, P. "Provisional patent application - An Acetyl Co-Enzyme A Carboxylase Inhibitor Tolerant Wheat (*Triticum aestivum* L.) for Use in a Herbicide Tolerant Cropping System." (Submitted: 2011, Application: 2011, Approved: 2011, Licensed: 2011).
- (February 2013 - Present). Conference Attendance, "Update on glyphosate resistant kochia in north America," Western Australia Herbicide Resistance Initiative, Perth, Western australia, Australia. Approximate Number

of Hours Spent Per Year: 20.

**TEACHING:**

<u>Year</u>	<u>Semester</u>	<u>Course No./Title</u>	<u>Cr. Hrs.</u>	<u>Enrollment</u>
2017	Spring	BSPM798 - Research	86	16
2016	Fall	BSPM798 - Research	18	18
2016	Spring	CM799 - Dissertation	18	17
2016	Spring	BSPM698 - Research	18	12
2015	Fall	CM799 - Dissertation	18	14
2015	Fall	BSPM699 - Thesis	18	6
2015	Spring	BSPM799 - Dissertation	18	2
2015	Spring	CM795 - Independent Study	18	34
2015	Spring	BSPM798 - Research	18	9
2015	Spring	BSPM699 - Thesis	18	6
2014	Fall	CM795 - Independent Study	18	32
2014	Fall	BSPM787 - Internship	18	1
2014	Fall	BSPM698 - Research	18	10
2014	Fall	BSPM699 - Thesis	18	3
2014	Spring	CM799 - Dissertation	18	20
2014	Spring	BSPM787 - Internship	18	1
2014	Spring	BSPM698 - Research	18	7
2014	Spring	BSPM699 - Thesis	18	5
2013	Fall	BSPM698 - Research	18	8
2013	Fall	BSPM798 - Research	18	11
2013	Fall	BSPM699 - Thesis	18	4
2013	Summer	BSPM699 - Thesis	18	2
2013	Spring	BSPM698 - Research	18	9
2013	Spring	BSPM699 - Thesis	18	6
2012	Fall	CM795 - Independent Study	18	27
2012	Fall	BSPM698 - Research	18	7
2012	Fall	BSPM699 - Thesis	18	3
2012	Spring	BSPM698 - Research	18	10
2011	Fall	BSPM799 - Dissertation	18	7
2011	Spring	BSPM799 - Dissertation	18	5
2011	Spring	BSPM698 - Research	18	12
2011	Spring	BSPM798 - Research	18	12
2010	Fall	BSPM799 - Dissertation	18	5
2010	Fall	BSPM698 - Research	18	18
2010	Fall	BSPM798 - Research	18	12
2010	Spring	BSPM799 - Dissertation	18	3
2010	Spring	BSPM798 - Research	18	10
2009	Fall	BSPM798 - Research	18	10
2009	Spring	BSPM799 - Dissertation	18	3
2009	Spring	BSPM798 - Research	18	10
2008	Fall	BSPM799 - Dissertation	18	6
2008	Fall	BSPM798 - Research	18	11
2008	Spring	BSPM799 - Dissertation	18	4
2008	Spring	BSPM798 - Research	18	10
2007	Fall	BSPM798 - Research	18	8

**EXTENSION/ENGAGEMENT ACTIVITIES/ACCOMPLISHMENTS**

**Field Day**

Updates on new CSU developed ACCase wheat lines. Adult, ARDEC, CO. Number of times program was made: 1. Total number of participants: 25. Percent Responsible: 75%. 2nd Quarter 2016.

CSU weed management studies at ARDEC. Adult, ARDEC, CO. Number of times program was made: 1. Total number of participants: 25. Percent Responsible: 10%. 4th Quarter 2016.

### **Presentation**

ACCcase wheat for grass control in winter wheat. Adult, CO. Number of times program was made: 1. Total number of participants: 125. Percent Responsible: 90%. 1st Quarter 2017.

ACCcase wheat updates. Adult. Total number of participants: 15. Percent Responsible: 100%. 1st Quarter 2017.

Exploring beneficial kochia genes to improve crops. Adult, Tucson, AZ. Number of times program was made: 1. Total number of participants: 100. Percent Responsible: 100%. 1st Quarter 2017.

Kochia genome resources for biotic stress tolerance. Adult, Tucson, AZ. Total number of participants: 100. Percent Responsible: 100%. 1st Quarter 2017.

Using molecular biology to better understand weeds. Adult, coeur d'alene, Idaho. Total number of participants: 150. Percent Responsible: 100%. 1st Quarter 2017.

Various weed science presentations. Adult, Tucson, AZ. Number of times program was made: 1. Total number of participants: 250. Percent Responsible: 75%. 1st Quarter 2017.

New grass weed control technology from CSU. Adult, Ft. Collins, CO. Number of times program was made: 1. Total number of participants: 75. Percent Responsible: 100%. 2nd Quarter 2017.

Colorado weed management updates. Adult, Ft. Collins, co. Number of times program was made: 1. Total number of participants: 30. Percent Responsible: 100%. 3rd Quarter 2017.

Use of molecular biology in weed studies. Adult, St. Louis, Missouri. Number of times program was made: 1. Total number of participants: 150. Percent Responsible: 100%. 4th Quarter 2017.

Molecular and Genomic Weed Science Research at Colorado State University. Adult, Albuquerque. Number of times program was made: 1. Total number of participants: 150. Percent Responsible: 100%. 1st Quarter 2016.

Use of molecular tools to understand herbicide resistance in weeds. Adult, Puerto Rico. Number of times program was made: 1. Total number of participants: 200. Percent Responsible: 100%. 1st Quarter 2016.

Evolution of herbicide resistant weeds in diverse crops. Adult. Number of times program was made: 1. Total number of participants: 350. Percent Responsible: 100%. 2nd Quarter 2016.

Weed genomes as potential sources of new, adaptive agronomic traits: a summary of Kochia scoparia research in North America. Adult, Prague. Number of times program was made: 1. Total number of participants: 150. Percent Responsible: 100%. 2nd Quarter 2016.

Past, present and future of weed science. Adult, Curitiba. Number of times program was made: 1. Total number of participants: 850. Percent Responsible: 100%. 3rd Quarter 2016.

Powerful New Molecular Techniques Shed New Light on Herbicide Resistant Weeds and Functional Weed Genomics. Adult, Curitiba. Number of times program was made: 1. Total number of participants: 500. Percent Responsible: 100%. 3rd Quarter 2016.

Weed management for colorado crops. Adult, Burlington, CO. Number of times program was made: 1. Total number of participants: 60. Percent Responsible: 75%. 3rd Quarter 2016.

Implications for Glyphosate Resistant Palmer Amaranth and Kochia which Now Comingle in Colorado. Adult, Des Moines, IA. Number of times program was made: 1. Total number of participants: 110. Percent

Responsible: 100%. 4th Quarter 2016.

Molecular weed science at Colorado State University. Adult, St. Louis. Number of times program was made: 1. Total number of participants: 30. Percent Responsible: 100%. 4th Quarter 2016.

Weed management and resistant weeds in Colorado row crops. Adult. Total number of participants: 875. Percent Responsible: 100%. 1st Quarter 2015.

Herbicide resistant kochia occurrence and management. Adult. Total number of participants: 600. Percent Responsible: 100%. 2nd Quarter 2015.

Development of novel herbicide resistant crop technology. Adult. Total number of participants: 450. Percent Responsible: 100%. 3rd Quarter 2015.

Molecular weed science research at CSU. Adult. Total number of participants: 350. Percent Responsible: 90%. 4th Quarter 2015.

Weed Science Papers and Posters. Adult, Colorado Springs, Colorado. Number of times program was made: 1. Total number of participants: 350. Percent Responsible: 90%. 1st Quarter 2014.

Updates on weed control with BASF products. Adult, Ft. Collins, CO. Number of times program was made: 1. Total number of participants: 50. Percent Responsible: 100%. 2nd Quarter 2014.

Weed management in Colorado crops and the impact of resistant weeds. Adult, Fort Collins, CO. Number of times program was made: 1. Total number of participants: 100. Percent Responsible: 100%. 2nd Quarter 2014.

CSU Weed Science Program. Adult, Haxtun, CO. Number of times program was made: 1. Total number of participants: 30. Percent Responsible: 20%. 3rd Quarter 2014.

Weed herbicide resistance and alternative management. Adult, Several - Rosario, Cordoba, Grl Pico, Buenos Aires. Number of times program was made: 7. Total number of participants: 650. Percent Responsible: 100%. 3rd Quarter 2014.

### **Workshop**

Herbicide resistance management in the great plains. Adult, Holyoke, CO. Number of times program was made: 1. Total number of participants: 120. Percent Responsible: 25%. 4th Quarter 2017.

### **COMMITTEES**

(2011).

College of Agriculture foreign university explorations, (June 2017 - Present).

BSPM Awards Committee, (October 2017 - September 2018).

(2011).

Search Committee for Spousal Hire, (December 2013 - Present).

BSPM Executive Committee, (September 2013 - Present).

Awards committee, (September 2017 - August 2018).

BSPM Executive Committee, (September 1, 2013 - August 2016).

(2011).

## **PROFESSIONAL AFFILIATIONS AND ACTIVITIES**

North Central Weed Science Society. (January 1, 2014 - Present).

Weed Science Society of America. (January 1, 2014 - Present).

Western Society of Weed Science. (January 1, 2014 - Present).

Committee Chair, Invasive Plant Science and Management. (2012 - Present).

North Central Weed Science Society, St. Louis, MO. (2012 - Present).

Weed Science. (2012 - Present).

Weed Science Society of America, Kona, HI. (2012 - Present).

Weed Science Society of America, HI. (2012 - Present).

Western Society of Weed Science, Reno, NV. (2012 - Present).

Canadian Weed Science Society, Niagara, CO. (2011 - Present).

North Central Weed Science Society, Milwaukee, WI. (2011 - Present).

Weed Science. (2011 - Present).

Weed Science Society of America, Portland, OR. (2011 - Present).

Weed Technology. (2011 - Present).

Western Society of Weed Science, Spokane, WA. (2011 - Present).

Committee Chair, Invasive Plant Science and Management. (2010 - Present).

North Central Weed Science Society, Kansas City, MO. (2010 - Present).

Weed Science. (2010 - Present).

Weed Science Society of America, Denver, CO. (2010 - Present).

Member, Weed Science Society of America. (2010 - Present).

Weed Technology. (2010 - Present).

Western Society of Weed Science, Kona, HI. (2010 - Present).

Member, Western Society of Weed Science. (2010 - Present).

Editor, Associate Editor, Invasive Plant Science and Management. (2011 - 2015).

Editor, Associate Editor, Invasive Plant Science and Management. (2010 - 2015).

CAST representative to WSWS board, WSWS. (January 1, 2014 - October 30, 2015).

Board of Directors, CAST. (2011 - 2014).

Member, North Central Weed Science Society. (2012 - 2013).

Weed Science Society of America. (2012 - 2013).

Board of Directors, Western Society of Weed Science. (2012 - 2013).

Over 50 engagement extension presentations were made in meetings, demonstrations, and workshops to more than 7000 clients in 2011. (2011).

Member, Weed Science Society of America. (2011).

Member, Western Society of Weed Science. (2011).

Member of North Fork Weed Cooperative board of directors; helped on weed management demonstration projects in the North Fork Area. We also did an inventory of invasive weeds on the CSU Maxwell ranch. (2010).

Member of writing group that submitted a 2010 NIFA weed science grant proposal. This proposal was designed to primarily support extension outreach on herbicide resistant weeds in the US. (2010).

**OTHER ACTIVITIES/ACCOMPLISHMENTS – SERVICE/OUTREACH**

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