

## CURRICULUM VITAE

### NAME

Westra, Philip

### 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

### OTHER POSITIONS

1997 - Present Professor, BSPM, Colorado State University.

1991 - 1997 Associate Professor, BSPM, Colorado State University.

### PUBLISHED WORKS

#### Refereed Journal Articles

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

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.

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.

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

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.

- 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*.
- 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.
- 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.
- 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.
- 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.
- (2012). Inheritance of evolved glyphosate resistance in a North Carolina Palmer amaranth (*Amaranthus palmeri*) biotype. *Int J of Agronomy*.
- (2012). Interspecific hybridization transfers a previously unknown glyphosate resistance mechanism in *Amaranthus* species. *Evolutionary Applications*, 5(1), 29-38.
- 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.
- (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*.
- (2012). Why Early Season Weed Control Is Important in Maize. *Weed Science: July-September*, 60(3), 423-430.
- (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.
- (2011). Biosphere-atmosphere exchange of volatile organic compounds over C4 biofuel crops. *Atmospheric Environment*, available online.
- (2011). Interspecific hybridization transfers a previously unknown glyphosate resistance mechanism in *Amaranthus* species. *Evolutionary Applications On-line publication*.
- (2011). Mechanism of resistance of evolved glyphosate-resistant Palmer Amaranth (*Amaranthus palmeri*). *J Agric Food Chem*, 59, 5886-5889.
- 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.
- (2010). Absorption and Translocation of Aminocyclopyrachlor and Aminocyclopyrachlor-Methyl Ester in Canada Thistle (*Cirsium arvense*). *Weed Sci*, 58, 96-102.
- (2010). Comparison of the Interactions of Aminopyralid vs. Clopyralid with Soil. *Weed Science:*

October-December, 58(4), 473-477.

- (2010). Gene amplification confers glyphosate resistance in *Amaranthus palmeri*. *P Natl Acad Sci USA*, 107, 1029-1034.
- 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.
- (2010). Vapor Movement of Synthetic Auxin Herbicides. *Weed Sci*, 58, 103-108.
- (2009). Aminopyralid and Clopyralid Absorption and Translocation in Canada Thistle (*Cirsium arvense*). *Weed Sci*, 57, 15-Oct.
- 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.
- (2009). Are herbicide-resistant crops the answer to controlling *Cuscuta*? *Pest Manag Sci*, 65, 811-816.
- (2009). Inheritance of Resistance to the Auxinic Herbicide Dicamba in *Kochia* (*Kochia scoparia*). *Weed Sci*, 57, 43-47.
- (2009). Registration of 'Thunder CL' Wheat. *J Plant Regist*, 3, 181-184.
- (2009). The Effects of Surfactants, Nozzle Types, Spray Volumes, and Simulated Rain on 1-Methylcyclopropene Efficacy on Tomato Plants. *Hortscience*, 44, 1600-1603.
- (2008). Herbicide-resistance in the Amaranthaceae. *J Plant Dis Protect*, 48, 41-44.
- (2008). Jointed goatgrass (*Aegilops cylindrica*) by imidazolinone-resistant wheat hybridization under field conditions. *Weed Sci*, 56, 32-36.
- Gaines, T., Henry, W. B., 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, 32-36.
- (2008). Spatial Variability of Atrazine and Metolachlor Dissipation on Dryland No-tillage Crop Fields in Colorado. *J Environ Qual*, 37, 2212-2220.
- (2008). Weed population dynamics after six years under glyphosate- and conventional herbicide-based weed control strategies. *Crop Sci*, 48, 1170-1177.
- 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.
- (2007). Adventitious presence of herbicide resistant wheat in certified and farm-saved seed lots. *Crop Sci*, 47, 751-756.
- 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.

- (2007). An empirically derived model of field-scale gene flow in winter wheat. *Crop Sci*, 47, 2308-2316.
- 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.
- (2007). Canada thistle (*Cirsium arvense*) control with aminopyralid in range, pasture, and noncrop areas. *Weed Technol*, 21, 890-894.
- (2007). Glyphosate susceptibility in common lambsquarters (*Chenopodium album*) is influenced by parental exposure. *Weed Sci*, 55, 572-577.
- (2007). Recovery of imidazolinone-resistant hard red wheat lines following imazamox application. *Crop Sci*, 47, 2058-2066.
- (2006). AMADS increases the efficacy of glyphosate formulations on corn. *Weed Technol*, 20, 179-183.
- (2006). Comparison of efficacy, absorption and translocation of three glyphosate formulations on velvetleaf (*Abutilon theophrasti*). *Pest Manag Sci*, 62, 1177-1181.
- (2006). Ethylene effect on kochia (*Kochia scoparia*) and emission following dicamba application. *Weed Sci*, 54, 31-37.
- (2006). Registration of 'Bond CL' wheat. *Crop Sci*, 46, 993-995.
- (2006). Registration of 'protection' wheat. *Crop Sci*, 46, 995-996.
- (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.
- (2006). Soil dissipation and biological activity of metolachlor and S-metolachlor in five soils. *Pest Manag Sci*, 62, 617-623.
- (2005). New techniques and findings in the study of a candidate allelochemical implicated in invasion success. *Ecol Lett*, 8, 1039-1047.
- (2004). Combined effects of herbicides and *Sphenoptera jugoslavica* on diffuse knapweed (*Centaurea diffusa*) population dynamics. *Weed Sci*, 52, 418-423.
- (2004). Common lambsquarters (*Chenopodium album*) interference with corn across the northcentral United States. *Weed Sci*, 52, 1034-1038.
- (2003). Above winter wheat. *Can J Plant Sci*, 83, 107-108.
- (2003). AP502 CL winter wheat. *Can J Plant Sci*, 83, 109-110.
- (2003). Genetic diversity of jointed goatgrass (*Aegilops cylindrica*) determined with RAPD and AFLP markers. *Weed Sci*, 51, 287-293.
- (2002). Infestation and spatial dependence of weed seedling and mature weed populations in corn. *Weed Sci*, 50, 54-63.
- (2002). The potential for mapping nematode distributions for site-specific management. *J Nematol*, 34, 80-87.

- (2001). Absorption and fate of BAY MKH 6561 in jointed goatgrass and downy brome. *Weed Sci*, 49, 717-722.
- (2001). Absorption, translocation, and metabolism of imazamox in jointed goatgrass and feral rye. *Weed Sci*, 49, 607-612.
- (2001). Evaluation of models predicting winter wheat yield as a function of winter wheat and jointed goatgrass densities. *Weed Sci*, 49, 48-60.
- (2000). Secale cereale interference and economic thresholds in winter Triticum aestivum. *Weed Sci*, 48, 720-727.
- (2000). The seedbank dynamics of feral rye (Secale cereale). *Weed Technol*, 14, 14-Jul.
- (1999). A plant process economic model for weed management decisions in irrigated onion. *J Am Soc Hortic Sci*, 124, 99-105.
- (1999). Absorption, fate, and soil activity of quinclorac in field bindweed (Convolvulus arvensis). *Weed Sci*, 47, 136-142.
- (1999). Precision farming. *Weed Sci*, 48, 1777-1783.
- (1999). Site-to-site and year-to-year variation in Triticum aestivum-Aegilops cylindrica interference relationships. *Weed Sci*, 47, 529-537.
- (1999). Sorption, dissipation, and leaching of metsulfuron in Colorado soils. *Weed Sci*, 47, 353-359.
- (1999). Spatial sampling for crop pests in two center pivot irrigated fields. *Weed Sci*, 48, 511-522.
- (1999). Stability of corn (Zea mays)-foxtail (Setaria spp) interference relationships. *Weed Sci*, 47, 195-200.
- (1999). The influence of surfactant and nitrogen on foliar absorption of MON 37500. *Weed Sci*, 47, 270-274.
- (1999). Use of quinclorac plus 2,4-D for controlling field bindweed (Convolvulus arvensis) in fallow. *Weed Technol*, 13, 731-736.
- (1998). Comparative growth and development of four spurred anoda (Anoda cristata) accessions. *Weed Sci*, 46, 91-98.
- (1998). Impact of timing and frequency of in-row cultivation for weed control in dry bean (Phaseolus vulgaris). *Weed Technol*, 12, 548-553.
- (1998). Seedbank and emerged annual weed populations in cornfields (Zea mays) in Colorado. *Weed Technol*, 12, 243-247.
- (1998). The response of dodder (Cuscuta spp) seedlings to phytohormones under various light regimes. *Ann Appl Biol*, 132, 331-338.
- (1997). Control of sulfonyleurea-resistant kochia (Kochia scoparia). *Weed Technol*, 11, 270-276.
- (1997). Economics and efficacy of postemergence spurred anoda (Anoda cristata) control in pinto beans (Phaseolus vulgaris). *Weed Technol*, 11, 329-334.
- (1997). Effects of light and mechanical stimulation on coiling and prehaustoria formation in Cuscuta spp. *Weed*

*Res*, 37, 219-228.

- (1997). Growth analysis of sulfonyleurea-resistant and -susceptible kochia (*Kochia scoparia*). *Weed Sci*, 45, 691-695.
- (1997). The competitive ability of wheat (*Triticum aestivum*) compared to rigid ryegrass (*Lolium rigidum*) and cowcockle (*Vaccaria hispanica*). *Weed Sci*, 45, 481-487.
- (1996). A new approach to determine when to control weeds. *Weed Sci*, 44, 496-503.
- (1996). Integrated weed management systems for irrigated corn (*Zea mays*) production in Colorado - A case study. *Weed Sci*, 44, 423-428.
- (1996). Modelling the effect of duration of weed competition, weed density and weed competitiveness on seeded, irrigated onion. *Weed Res*, 36, 259-269.
- (1996). Stability of corn (*Zea mays*) velvetleaf (*Abutilon theophrasti*) interference relationships. *Weed Sci*, 44, 309-313.
- (1996). Venice mallow (*Hibiscus trionum*) seed production and persistence in soil in Colorado. *Weed Technol*, 10, 22-28.
- (1995). Influence of Weed Density and Distribution on Corn (*Zea-Mays*) Yield. *Weed Sci*, 43, 215-218.
- (1995). The Concept and Application of Early Economic Period Threshold - the Case of Dcpa in Onions (*Allium-Cepa*). *Weed Sci*, 43, 634-639.
- (1995). Weed-Control Efficacy and Pinto Bean (*Phaseolus-Vulgaris*) Tolerance to Early-Season Mechanical Weeding. *Weed Technol*, 9, 531-534.
- (1994). A Plant Process-Economic Model for Wild Oats Management Decisions in Irrigated Barley. *Agr Syst*, 45, 355-368.
- (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.
- (1992). Field Bindweed (*Convolvulus-Arvensis*) Control with Various Herbicide Combinations. *Weed Technol*, 6, 949-955.
- (1992). Reducing Herbicide Loading in Corn with Weed Management Models. *Abstr Pap Am Chem S*, 203, 310-ENVR.
- (1991). Wild Proso Millet (*Panicum-Miliaceum*) Interference in Corn (*Zea-Mays*). *Weed Sci*, 39, 217-220.
- (1990). Control of Venice Mallow (*Hibiscus-Trionum*) in Corn (*Zea-Mays*) and Onions (*Allium-Cepa*). *Weed Technol*, 4, 500-504.
- (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.

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

Sebastian, D. J., Nissen, S. J., Westra, P., Shaner, D., Barbarick, K. A., Butters, G. Influence of Soil Properties

and Soil Moisture on the Efficacy of Indaziflam and Flumioxazin on *Kochia scoparia*. *Pest Management Science*.

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*.

### **AES Report/Bulletin**

Westra, P., Gaines, T. (in press). Weed Management in Colorado Corn. *Colorado Corn Handbook*. CSU Agricultural Experiment Station.

Johnson, J. J., Haley, S. D., Sauer, 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). Fort Collins, CO: AES.

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.

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

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 WWS, 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.

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 WWS - 100 participants".

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 WWS meeting - 1st place student award - 150 participants".

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

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 WWS 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 WSSA 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, "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. Christoffoleti<sup>1</sup>, J. D. Vassios<sup>2</sup>,  
M. S. Melo<sup>3</sup>, S. J. Nissen<sup>2</sup>, P. Westra<sup>2</sup>;  
<sup>1</sup>Univeristy of Sao Paulo - ESALQ -  
Brazil, Piracicaba, Brazil, <sup>2</sup>Colorado  
State University, Fort Collins, CO,  
<sup>3</sup>University of Sao Paulo, Piracicaba,  
Brazil (119) Abstracts WSSA - 2011".

2011, "RESISTANCE OF DIGITARIA INSULARIS  
BRAZILIAN BIOTYPES TO GLYPHOSATE. P. J.  
Christoffoleti\*<sup>1</sup>, M. Nicolai<sup>1</sup>, M. S.  
Melo<sup>2</sup>, J. D. Vassios<sup>3</sup>, S. J. Nissen<sup>3</sup>,  
P. Westra<sup>3</sup>; <sup>1</sup>Univeristy of Sao Paulo -  
ESALQ - Brazil, Piracicaba, Brazil,  
<sup>2</sup>University of Sao Paulo, Piracicaba,  
Brazil, <sup>3</sup>Colorado State University,  
Fort Collins, CO (121) Abstracts WSSA  
2011."

2011, "SEASONAL EMERGENCE OF KOCHIA IN THE  
CENTRAL GREAT PLAINS. Phillip W.  
Stahlman\*<sup>1</sup>, Patrick W. Geier<sup>1</sup>, Johanna  
A. Dille<sup>2</sup>, Tyler W. Rider<sup>2</sup>, Jarrett D.  
Riffel<sup>1</sup>, Randall S. Currie<sup>3</sup>, Philip  
Westra<sup>4</sup>, Robert G. Wilson<sup>5</sup>, Gustavo M.  
Sbatella<sup>5</sup>, Andrew R. Kniss<sup>6</sup>, Richard M.  
Cole<sup>7</sup>; <sup>1</sup>Kansas State University, Hays,  
KS, <sup>2</sup>Kansas State University, Manhattan,  
KS, <sup>3</sup>Kansas State University, Garden  
City, KS, <sup>4</sup>Colorado State University,  
Ft. Collins, CO, <sup>5</sup>University of Nebraska  
(123). Proceedings WSSA 2011."

2011, "SHADE AVOIDANCE: THE IMPORTANCE OF  
PLANT-TO-PLANT VARIABILITY. C. J.  
Swanton\*<sup>1</sup>, E. Page<sup>1</sup>, P. Westra<sup>2</sup>, M.  
Loux<sup>3</sup>, A. Dobbels<sup>3</sup>, K. L. Smith<sup>4</sup>, J.  
Bullington<sup>4</sup>, H. Wright<sup>5</sup>, C. L.  
Foresman<sup>6</sup>; <sup>1</sup>University of Guelph,  
Guelph, ON, <sup>2</sup>Colorado State University,  
Fort Collins, CO, <sup>3</sup>The Ohio State  
University, Columbus, OH, <sup>4</sup>University of  
Arkansas, Monticello, Monticello, AR,  
<sup>5</sup>Syngenta Crop Protection Canada Inc,  
Guelph, ON, <sup>6</sup>Syngenta, 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, "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 aminocyclopyrachlor. 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 WSSA."

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 WSSA."

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, "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."

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

- 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:**

<b><u>Year</u></b>	<b><u>Semester</u></b>	<b><u>Course No./Title</u></b>	<b><u>Cr. Hrs.</u></b>	<b><u>Enrollment</u></b>
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**

### **Presentation**

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.

## **COMMITTEES**

(2011).

(2011).

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

BSPM Executive Committee, (September 2013 - Present).

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

(2011).

## **PROFESSIONAL AFFILIATIONS AND ACTIVITIES**

Council for Agricultural Science and Technology. (January 1, 2014 - Present).

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).

North Central Weed Science Society. (January 2013 - Present).

Weed Science Society of America. (January 2013 - Present).

Western Society of Weed Science. (January 2013 - Present).

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

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

CAST. (2011 - 2014).

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

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

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

Weed Science Society of America. (2011).

Western Society of Weed Science. (2011).

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, HI. (2012 - Present).

Weed Science Society of America, Kona, 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).

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

Weed Science Society of America. (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**

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

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

\*\*\*\*\*