

CURRICULUM VITAE

NAME

Gaines, Todd A

ADDRESS

Bioagricultural Sciences and Pest Management
College of Agricultural Sciences

1177 Campus Delivery

PHONE

(970) 491-6824

EDUCATION

2009 Ph D, Colorado State University

2006 MS, Colorado State University

2004 BS, Colorado State University

ACADEMIC POSITIONS

January 3, 2014 - Present Assistant Professor, Colorado State University.

PUBLISHED WORKS

Refereed Journal Articles

Christoffoleti, P. J., Figueiredo, M., Pereira Peres, L. E., Nissen, S. J., Gaines, T. (2015). Auxinic herbicides, mechanisms of action, and weed resistance: A look into recent plant science advances. *Scientia Agricola*, 72(4), 356-362. <Go to ISI>://WOS:000357631900011

Brunharo, C. A., Patterson, E., Carrijo, D. R., de Melo, M. S., Nicolai, M., Gaines, T., Nissen, S. J., Christoffoleti, P. J. (2015). Confirmation and mechanism of glyphosate resistance in tall windmill grass (*Chloris elata*) from Brazil. *Pest Management Science*.

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.

Powles, S. B., Gaines, T. (in press). Exploring the potential for a regulatory change to encourage diversity in herbicide use. *Weed Science*.

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.

Sammons, D. R., Gaines, T. (2014). Glyphosate resistance: State of knowledge. *Pest Management Science*, 70, 1367-1377.

Busi, R., Gaines, T., Vila-Aiub, M. M., Powles, S. B. (2014). Inheritance of evolved resistance to a novel

- herbicide (pyroxasulfone). *Plant Science*, 217, 127-134.
- Vila-Aiub, M. M., Goh, S. S., Gaines, T., Han, H., Busi, R., Yu, Q., Powles, S. B. (2014). No fitness cost of glyphosate resistance endowed by massive EPSPS gene amplification in *Amaranthus palmeri*. *Planta*, 239, 793-801.
- Gaines, T., Lorentz, L., Figge, A., Herrmann, J., Maiwald, F., Ott, M., Han, H., Busi, R., Yu, Q., Powles, S. B., Beffa, R. (2014). RNA-Seq transcriptome analysis to identify genes involved in metabolism-based diclofop resistance in *Lolium rigidum*. *The Plant Journal*, 78, 865-876.
- Busi, R., Vila-Aiub, M. M., Beckie, H. J., Gaines, T., Goggin, D. E., Kaundun, S. S., Lacoste, M., Neve, P., Nissen, S. J., Norsworthy, J. K., Renton, M., Shaner, D. L., Tranel, P. J., Wright, T., Yu, Q., Powles, S. B. (2013). Herbicide-resistant weeds: from research and knowledge to future needs. *Evolutionary Applications*, 6(8), 1218-1221.
- 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.
- Gaines, T., Cripps, A., Powles, S. B. (2012). Evolved resistance to glyphosate in junglerice (*Echinochloa colona*) from the tropical Ord River region in Australia. *Weed Technology*, 26(3), 480-484.
- 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.
- Busi, R., Gaines, T., Walsh, M. J., Powles, S.B. (2012). Understanding the potential for resistance evolution to the new herbicide pyroxasulfone: field selection at high doses versus recurrent selection at low doses. *Weed Research*, 52, 489-499.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.

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.

Refereed Chapters in Books

Gaines, T., Tranel, P., Fleming, M. B., Patterson, E., Kuepper, A., Ravet, K., Giacomini, D., Gonzalez, S., Beffa, R. Applications of Genomics in Weed Science. In Mithila Jugulam (Ed.), *Biology, Physiology and Molecular Biology of Weeds*. CRC Press.

Knezevic, S., Jhala, A., Gaines, T. (in press). Weeds: Herbicide Resistance and Molecular Aspects. *Encyclopedia of Applied Plant Sciences, 2nd Edition*. Elsevier.

Gaines, T. (in press). Mechanisms of herbicide resistance. In Sarah M. Ward (Ed.), *Herbicide Resistance in Agroecosystems*. Elsevier.

Non-Refereed Journal Articles

Westra, E., Gaines, T., Shaner, D. L. Sorption and dissipation of pyroxasulfone in six Australian soils. *Pest Management Science*.

AES Report/Bulletin

Byrne, P. F., Seshadri, A., Gaines, T. *GM Crops: Environmental Benefits and Concerns*. CSU Agricultural Experiment Station.

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

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

January 2016, "Population genomics of glyphosate-resistant Palmer amaranth (*Amaranthus palmeri*) using genotyping-by-sequencing (GBS)", Plant and Animal Genome XXIV.

2015, "A proposed center for ecology, evolution and management of pesticide resistance", 8th International IPM Symposium.

2015, "Physiological and molecular characterization of multiple herbicide resistance in kochia", 8th International IPM Symposium.

2015, "Molecular Weed Science – Down the rabbit hole of big data", Canadian Weed Science Society 69th Annual Meeting.

2015, "Evolution of herbicide resistance in weeds", The Ohio State University- Department of Horticulture and Crop Science, The Ohio State University.

2015, "Genomic and Molecular Findings in Kochia (*Kochia scoparia*)", North Central Weed Science Society.

2015, "Herbicide programs for control of atrazine- and HPPD inhibitors-resistant Palmer amaranth in

- glufosinate-resistant corn", North Central Weed Science Society.
- 2015, "HPPD resistance in Waterhemp from Nebraska: Evidence for multiple genes conferring enhanced metabolism", North Central Weed Science Society.
- 2015, "Lectures on molecular biology in weed science and glufosinate mode of action", Tennessee Weed Science Short Course, University of Tennessee.
- 2015, "Vision for Weed Science Research at Colorado State University", Limagrain.
- 2015, "Evolution of herbicide resistance in weeds", Weed control group seminar, The Scotts Company, (Presenter) Gaines, T., Marysville, OH.
- 2015, "The road ahead for resistance diagnostics", Weed Resistance Global Symposium, Bayer CropScience.
- 2015, "Background, history, and current status of dicamba resistant kochia in the Western US and Canada", Weed Science Society of America.
- 2015, "Transcriptomic approaches to study herbicide resistance in weeds", Weed Science Society of America, (Presenter) Gaines, T., Lexington, KY.
- 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, "Glyphosate-Resistant Kochia Management in Canola", Western Society of Weed Science.
- 2015, "Population Genetics of Glyphosate-Resistant Palmer Amaranth", Western Society of Weed Science.
- 2015, "The History and Status of Herbicide Resistance in Kochia in North America", Western Society of Weed Science.
- 2014, "Evolution of herbicide resistance in weeds", Crop Science Society of America, C05 Turfgrass Science, (Presenter) Gaines, T., Long Beach, CA.
- 2014, "Evolution of herbicide resistance in weeds", Department of Agronomy seminar, Kansas State University, (Presenter) Gaines, T., Manhattan, KS.
- 2014, "Improving herbicide resistant weed diagnostic tools using bioinformatics and molecular biology approaches", F. Dan Hess Endowment Weed Science Seminar, University of California - Davis, (Presenter) Gaines, T., Davis, CA.
- 2014, "Developing novel herbicide resistance traits in wheat", Herbicide Biology Group, Bayer CropScience, (Presenter) Gaines, T., Frankfurt am Main, Germany.
- 2014, "Metabolism-based herbicide resistance in *Lolium rigidum*: Using RNA-Seq transcriptome analysis to identify resistance-endowing genes", Herbicide Resistance Working Group Workshop, European Weed Research Society, (Presenter) Gaines, T., Frankfurt am Main, Germany.
- 2014, "Genomic approach to reveal non-target-site herbicide resistance mechanisms", IUPAC International Congress of Pesticide Chemistry, American Chemical Society, Division of Agrochemicals.

- 2014, "Update on EPSPS gene amplification in glyphosate-resistant weeds", IUPAC International Congress of Pesticide Chemistry, American Chemical Society, Division of Agrochemicals, (Presenter) Gaines, T., San Francisco, CA.
- 2014, "HPPD resistance in Nebraska's waterhemp: Enhanced metabolism or target site mutation", North Central Weed Science Society.
- 2014, "Association of mobile genetic elements with EPSPS gene duplication", Plant and Animal Genome XXII, (Presenter) Gaines, T., San Diego, CA.
- 2014, "Genomics of non-target-site herbicide resistance", Plant and Animal Genome XXII.
- 2014, "Metabolism-based herbicide resistance in *Lolium rigidum*: Using RNA-Seq transcriptome analysis to identify resistance-endowing genes", Weed Science Society of America, (Presenter) Gaines, T., Vancouver, BC.
- 2014, "Metabolism-based herbicide resistance in *Lolium rigidum*: Using RNA-Seq transcriptome analysis to identify resistance-endowing genes", Western Society of Weed Science, (Presenter) Gaines, T., Colorado Springs, CO.
- September 18, 2014, "Update on herbicide resistant kochia research at CSU", Weed Management Academic Summit, Monsanto, (Presenter) Gaines, T., St. Louis, MO.
- March 2014, "On the discovery of genes involved in metabolism-based resistance to herbicides using RNA-Seq transcriptome analysis in *Lolium rigidum*", German Conference on Weed Biology and Weed Control.

OTHER ACTIVITIES/ACCOMPLISHMENTS – PUBLICATIONS/SCHOLARLY RECORD

- Gaines, T., Westra, P. "Develop Novel Traits in Sunflower Using Mutagenesis." (Submitted: February 10, 2015). (August 18, 2014). Workshop, "New Faculty Orientation," CSU, Fort Collins, CO, United States.
- (June 23, 2014 - June 24, 2014). Conference Attendance, "NSF Grant Conference," NSF, Denver, CO, United States.
- (April 24, 2014). Workshop, "New Employee Orientation," CSU, Fort Collins, CO, United States.
- (January 29, 2014). Individual meeting, "CSU Ventures orientation meeting," CSU Ventures, Fort Collins, CO, United States.

TEACHING:

<u>Year</u>	<u>Semester</u>	<u>Course No./Title</u>	<u>Cr. Hrs.</u>	<u>Enrollment</u>
2016	Spring	BSPM698 - Research	18	12
2016	Spring	BSPM798 - Research	18	14
2016	Spring	BC499A - Thesis-Laboratory Research-Based	3	11
2015	Fall	BSPM580A4 - Molecular Genetics and Evolution of Pesticide Resistance	3	10
2015	Fall	BSPM698 - Research	18	10
2015	Summer	BSPM798 - Research	18	1
2015	Spring	BSPM792 - Seminar	2	13
2014	Fall	BSPM792 - Seminar	2	10

Guest Lectures:

<u>Year</u>	<u>Semester</u>	<u>Course No./Title</u>	<u># of Guest Lectures</u>	<u>Delivery Mode</u>
2015	Fall	BSPM308 - Ecology and Management of Weeds	1	Face to Face
2015	Fall	BSPM - Fundamentals of BSPM	1	Face to Face
2015	Fall	SOCR460 - Plant Breeding	1	Face to Face
2015	Spring	BSPM451/551 - Integrated Pest Management	1	Face to Face
2014	Fall	SOCR430 - Applications of Plant Biotechnology	1	Face to Face
2014	Fall	BSPM - Fundamentals of BSPM	2	Face to Face
2014	Fall	BSPM509 - Herbicide Selectivity and Mode of Action	2	Distance
2014	Fall	SOCR730 - Topics in Plant Breeding	1	Face to Face

Tenure and Promotion Evidence of Teaching Effectiveness (Tenure and Promotion Input)**Development of New Courses**

I developed a new graduate level course on the evolution, molecular genetics, and management of pesticide resistance.

Development of New Teaching Techniques**Integration of Service Learning****Conference/Workshop Assessments****Participation in Professional Development Activities Related to Teaching****Professional Consultation Related to Teaching****Other Evidence****COMMITTEES**

CAS Recruitment Team, (December 4, 2014 - May 2015).

Crop Functional Genomics position Search Committee, (October 2014 - April 2015).

State FFA Officer Information Session, (October 13, 2014).

BSPM Strategic Vision Committee, (October 2015 - Present).

BSPM Department Head Search Committee, (September 2015 - Present).

BSPM Program Coordinator Search Committee, (January 15, 2015 - May 2015).

Explore CSU Info Fair, (October 10, 2014).

BSPM Weed Science faculty ad-hoc, (March 6, 2014).

PROFESSIONAL AFFILIATIONS AND ACTIVITIES

Western Society of Weed Science. (February 2014 - Present).

International Weed Science Society. (2012 - Present).

American Chemical Society Agrochemical Division. (2010 - Present).

Weed Science Society of America. (February 2008 - Present).

Greeley Tribune. (May 26, 2015).

Conference-Related, Global Herbicide Resistance Challenge Conference 2017, Denver, CO. (October 2014 - Present).

Committee Member, WERA-60 Coordinating Committee. (February 2, 2014 - Present).

Conference-Related, International Weed Science Congress, Prague. (September 2015 - June 2016).

Conference-Related, International Weed Science Congress, Prague. (July 2015 - June 2016).

Session Chair, Western Society of Weed Science. (March 2015 - March 2016).

Reviewer, Journal Article, Invited Peer Reviewer. (January 2015 - December 2015).

Session Chair, Western Society of Weed Science. (March 2014 - March 2015).

Reviewer, Journal Article, Invited Peer Reviewer. (January 2014 - December 2014).

Attendee, Meeting, Monsanto and regional kochia academic researchers, Denver, CO. (April 9, 2014 - April 11, 2014).

Session Chair, Weed Science Society of America. (February 2013 - February 2014).

Session Chair, Weed Science Society of America. (February 2012 - February 2013).

Committee Member, Global Herbicide Resistance Challenge Conference 2013, Perth, Western Australia. (March 2010 - September 2011).

OTHER ACTIVITIES/ACCOMPLISHMENTS – SERVICE/OUTREACH

Curator for EPSPS mutation database, International Survey of Herbicide Resistance. (2014 - Present).

Interaction with Industry, Western Sugar Cooperative Joint Grower Research Committee, Loveland, CO. (January 25, 2016).

Interaction with Industry, Dow AgroSciences, Fort Collins, CO. (January 14, 2016).

Interaction with Industry, Bayer CropScience, Fort Collins, CO. (August 24, 2015 - August 25, 2015).

Interaction with Industry, Bayer CropScience, Urbana, IL. (August 18, 2015).

Interaction with Industry, BASF, Research Triangle Park, NC. (July 28, 2015).

Interaction with Industry, CWAC Board Research Review, Fort Collins, CO. (April 2, 2015).

Interaction with Industry, CWRP Research Board, Fort Collins, CO. (April 1, 2015).

Interaction with Industry, Western Sugar Cooperative Joint Grower Research Committee, Billings, MT. (January 19, 2015).

Interaction with Industry, CWRP Research Board, Denver, CO. (December 1, 2014).

Interaction with Industry, Monsanto Graduate Student Forum, Fort Collins, CO. (October 24, 2014 - October 25, 2014).

Interaction with Industry, NSF I/UCRC Planning Meeting, Lincoln, NE. (September 29, 2014 - October 1, 2014).

Interaction with Industry, Monsanto Weed Management Academic Summit. (September 17, 2014 - September 19, 2014).

Interaction with Industry, Bayer CropScience Respect the Rotation Advisory Board. (August 20, 2014 - August 22, 2014).

Interaction with Industry, CWRP, Limagrain, Albaugh, Fort Collins, CO. (April 7, 2014).

Interaction with Industry, CWAC Board Research Review, Fort Collins, CO. (April 2, 2014).

Interaction with Industry, Monsanto field development team, Fort Collins, CO. (March 7, 2014).

Interaction with Industry, Western Sugar Cooperative Joint Grower Research Committee, Loveland, CO. (January 21, 2014).

Herbicide resistance testing, Fort Collins, CO. (January 2016 - March 2016).

Guest Speaker, Western Colorado Pest Management Workshop, Montrose, CO. (February 17, 2016).

Guest Speaker, Rocky Mountain Agribusiness Association, Denver, CO. (January 13, 2016).

Guest Speaker, Independent Agriculture Consultants of Colorado, Denver, CO. (January 11, 2016).

Guest Speaker, CSU Extension Crop Production Clinic, Fort Morgan, CO. (January 6, 2016).

CSU AES Technical Report contributor, CO Wheat Field Days. (2015).

Guest Speaker, Colorado Wheat Ag Classic meeting, Loveland, CO. (December 9, 2015).

Guest Speaker, CSU Extension Crop Clinic, Fort Morgan, CO. (December 2, 2015).

Guest Speaker, Colorado Agricultural Aviation Association Convention, Loveland, CO. (November 11, 2015).

Guest Speaker, Greeley Chamber of Commerce, Greeley, CO. (November 10, 2015).

Guest Speaker, Pest Management in the Intermountain West, Loveland, CO. (October 28, 2015).

Guest Speaker, Club 20 Annual Meeting, Grand Junction, CO. (March 28, 2015).

Guest Speaker, Club 20 Agricultural Policy Committee, Grand Junction, CO. (February 25, 2015).

Workshop Organizer, Agronomists and retailers, Fort Collins, CO. (February 18, 2015).

CSU AES Technical Report contributor, CO Wheat Field Days. (2014).

Guest Speaker, Crop Quest Information Quest, Colorado Springs, CO. (November 6, 2014).

Public service to test corn sample for transgene, Farmer submitted sample. (August 2014 - October 2014).

Workshop Organizer, Harvest weed seed control workshop, Akron, CO. (August 21, 2014).

Guest Speaker, Industry Innovation Symposium, Loveland, CO. (November 21, 2013).

Guest Speaker, Western Australia Agribusiness Crop Updates, Perth, Western Australia. (February 2011).

Guest Speaker, Grower Field Days, York and Kununurra, Western Australia. (2010).

Guest Speaker, Agronomists and retailers, Perth, Western Australia. (2009).

Guest Speaker, Rocky Mountain Agribusiness Association, Denver, CO. (January 2008).
