

**Amit J. Jhala**  
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## **Amit J. Jhala**

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## **Current Position**

Assistant Professor and Extension Weed Management Specialist; 50% Research, 48% Extension, 2% Service

Start date of current position: August 1, 2012

## **Education**

Ph.D. Plant Science/Weed Science, University of Alberta, Canada (2009)

M.S. Weed Science, Anand Agricultural University, India (2003)

B.S. Gujarat Agricultural University, India (2000)

## **Professional Experience**

- Assistant Professor and Extension Weed Management Specialist, University of Nebraska-Lincoln (Aug. 2012 to present)
- Adjunct Assistant Professor, Department of Agronomy, Kansas State University (May 2016 to present)
- Postdoctoral Research Associate, University of Florida, Gainesville (March 2011 to July 2012)
- Postdoctoral Research Fellow, University of California-Davis (Jan. 2010 to Feb. 2011)
- Graduate Research Assistant, University of Alberta, Edmonton, Canada (March 2006 to Dec. 2009)
- International Fellowship, Ghent University, Belgium (Jan. 2005 to Jan. 2006)
- Graduate Research Assistant, Anand Agricultural University (June 2001 to Dec. 2004)

## **Awards and Honors**

1. **Honored with Outstanding Early Career Weed Scientist Award by the Weed Science Society of America (2017)**
2. **Honored with Distinguished Achievement Outstanding Young Weed Scientist Award by the North Central Weed Science Society (2016)**
3. Best Oral Presentation Award (1<sup>st</sup> place) from the Canadian Society of Agronomy at the joint annual conference of the Canadian Society of Agronomy, Canadian Society of Soil Science, and Canadian Society of Agricultural and Forest Meteorology, University of Guelph, Canada, 5-7 Aug. 2009 (\$500)
4. Jhala et al. published in *Heredity*, a journal of the Nature Publishing Group (2011, 106: 557-566) was recognized and a two-page commentary was published in the same issue of *Heredity* (2011, 106:907-908) to recognize the model-sampling strategy developed to determine the minimum number of seeds required to detect pollen-mediated gene flow
5. Jhala et al. published in *Crop Science* (2008, 48: 825-840) was selected as a quality paper by the Crop Science Society of America with an invitation to write a press note published in *CSA News* (August 2008 issue)
6. Natural Science and Engineering Research Council (NSERC) of Canada Industrial Postdoctoral R & D Fellowship (Declined)
7. Alberta Ingenuity Ph.D. student scholarship sponsored by the Alberta Ingenuity Fund, Alberta, Canada (May 2008 to April 2010; \$55,000)
8. Ph.D. student travel award by the Canadian Weed Science Society (CWSS) to attend the 63<sup>rd</sup> CWSS Annual Conference at Charlottetown, Prince Edward Island, Canada, 24-26 Nov. 2009 (\$1,000)

9. Canadian Society of Agronomy Pest Management Scholarship Award for 2009 offered to Outstanding Graduate Student in a national level competition (April 2009; \$1,500)
10. The Government of Alberta Graduate Citizenship Award for Student Leadership (March 2009; \$2,000)
11. Pansy and George Strange Graduate Scholarship, University of Alberta (Nov. 2008; \$1,400)
12. Ph.D. student travel award by the International Weed Science Society, sponsored by Bayer Crop Protection, Canada, to attend the 5<sup>th</sup> International Weed Science Congress, Vancouver, Canada, 23-27 June 2008 (\$1,200)
13. Professional Development Grant (PDG) Award by the Graduate Students' Association (GSA), University of Alberta, Canada (June 2008; \$500)
14. Canadian Weed Science Society (CWSS) Ph.D. student travel award to attend the 61<sup>st</sup> CWSS Annual Conference at Mont Tremblant, Quebec, 25-27 Nov. 2007 (\$1000)
15. Graduate student scholarship sponsored by Alberta Innovation and Science, Alberta Government, Canada (\$22,000; Sep. 2006 to March 2008)
16. Entrance Award for Tuition to a new graduate student by Dept. of Agricultural, Food and Nutritional Science, University of Alberta (\$4,000)
17. International Scholarship by the Ministry of Human Resource Development, Government of India, sponsored by the Ministry of Flemish Community, Brussels, Belgium, to conduct a one-year research project at Ghent University, Belgium (Jan. 2005 to Jan. 2006)
18. Best Poster Presentation Award (1<sup>st</sup> Place) for the paper "Management of root-knot nematode *Meloidogyne incognita* through soil solarization and intercropping systems" at the National Nematology Symposium on "Paradigms in Nematological Research for biodynamic farming," GKVK, Bangalore, India, 17-19 Nov. 2004
19. Awarded Senior Research Scholarship sponsored by Department of Science and Technology, Government of India, New Delhi (Feb. 2004 to Dec 2004)

#### **Professional Activity**

1. Member, Weed Science Society of America's Outstanding Graduate Student Award Committee (w3h) (2012 to Present)
2. Member, Weed Science Society of America's Outstanding Young Weed Scientist Award Committee (w3h) (2012 to Present)
3. Chair, Weed Science Society of America's Professional Development Committee (2016 to present)
4. Member, North Central Weed Science Society Graduate Student's Poster Award Committee (2013, 2014, 2015)
5. Member, North Central Weed Science Society Graduate Student's Paper Award Committee (2016)
6. Chair, Extension Section and a Moderator of the Extension Symposium at North Central Weed Science Society Annual Meeting held in Dec. 2016
7. Member and Overseas Editor for Indian Journal of Weed Science, Indian Weed Science Society (2012 to present)
8. Member, Weed Science Society of America
9. Member, Canadian Weed Science Society
10. Member, International Weed Science Society
11. Associate Editor (2014 to present), Canadian Journal of Plant Science (Published by Canadian tri-societies: Canadian Weed Science Society, Canadian Society of Agronomy; and Canadian Society for Horticultural Sciences)

## Publications

**Career Total: 11 Book Chapters; 75 Peer-Reviewed Journal Papers; 100 Abstracts; 5 Peer-Reviewed Extension Publications; 78 Other Extension Publications.**

**Google Scholar: Total Citations: 639; Since 2012: 590; *h*-index 14; *i10*-index: 23.**

**Invited Refereed Book Chapters** (\*Corresponding author; ‡Graduate student or Postdoc; Work at UNL is highlighted as UNL)

1. **Jhala AJ\***, Hall LM (2013) Risk assessment of herbicide resistant crops with special reference to pollen mediated gene flow *in* Price AJ, Kelton JA, eds. *Herbicides- Advances in Research* (ISBN 978-953-51-1122-1). New York: Tech Scientific Publisher. Pages 237-254 (UNL)
2. **Jhala AJ\***, Knezevic SZ, Ganie ZA, and Singh M (2014) Integrated weed management in corn (*Zea mays* L.) *in* Chauhan B, G. Mahajan G, eds. *Recent Advances in Weed Management*. New York: Springer. Pages 177-196 (UNL)
3. Hanson BD, Fischer A, Jasieniuk M, McHughen A, **Jhala AJ** (2014) Herbicide resistant weeds and crops *in* Fennimore S, Bell C, eds. *Principles of Weed Science*, 4<sup>th</sup> edition. Salinas, CA: California Weed Science Society. Pages 168-188 (UNL)
4. Hall LM, Booker H, **Jhala AJ**, Weselake RJ (2015) Flax (*Linum usitatissimum* L.). *in* McKeon TA, Weselake RJ, Hayes DG, Hildebrand DF, eds. *Industrial Oilseeds Crops* (ISBN 978-1-893997-98-1). Urbana, IL: American Oil Chemists' Society (AOCS) Monograph Series on Oilseeds, Vol. 8, AOCS Press. Pages 157-194
5. Chahal PS‡, Jha P, Jackson-Ziems T, Wright R, **Jhala AJ\*** (2016) Glyphosate-resistant volunteer maize (*Zea mays* L.): Impact and management *in* Trevlos IS, Bilalis D, and Chachalis D, eds. *Weed and Pest Control: Molecular Biology, Pesticides, and Environmental Impact* (ISBN 978-1-63484-100-9). Hauppauge, NY: Nova Science Publishers. Pages 83-98 (UNL)
6. Chahal PS‡, Aulakh J, Mithila J, **Jhala AJ\*** (2015) Herbicide-resistant Palmer amaranth (*Amaranthus palmeri* S. Wats.) in the United States: Impact, mechanism of resistance, and management *in* Price AJ, Kelton JA, Sarunaite L (eds.) *Herbicides, Agronomic Crops, and Weed Biology* (ISBN 978-953-51-2218-0). New York: Tech Scientific Publisher. Pages 1-40 (UNL)
7. **Jhala AJ\***, Knezevic SZ (2017) Gene flow and herbicide resistance *in* Thomas B, Murray BG, Murphy DJ, eds. *Encyclopedia of Applied Plant Sciences* (2<sup>nd</sup> edition), Vol 3. Waltham, MA: Academic Press. Pages 447-449 (UNL)
8. Jha P, Godara RK, **Jhala AJ** (2017) Targeting weed seedbanks: Implications to weed management *in* Jugulam M, ed. *Biology, Physiology, and Molecular Biology of Weeds*. Boca Raton, FL: Tylor and Francis Group. Pages 12-26 (UNL)
9. Knezevic SZ, **Jhala AJ**, Datta A (2017) Integrated weed management *in* Thomas B, Murray BG, Murphy DJ, eds. *Encyclopedia of Applied Plant Sciences* (2<sup>nd</sup> edition), Vol 3. Waltham, MA: Academic Press. Pages 459-462 (UNL)
10. **Jhala, AJ\***, Sarangi D, Chahal P, Saxena A, Bagavathianan M, Chauhan B, Jha P (2017) Inter-specific gene flow from herbicide-tolerant crops to their wild relatives *in* Jugulam M, ed. *Biology, Physiology, and Molecular Biology of Weeds*. Boca Raton, FL: Tylor and Francis Group. Pages 87-122 (UNL)
11. Knezevic SZ, **Jhala AJ**, and Gaines T (2017) Weeds: Herbicide-resistance and molecular aspects *in* Thomas B, Murray BG, Murphy DJ, eds. *Encyclopedia of Applied Plant Sciences* (2<sup>nd</sup> edition), Vol 3. Waltham, MA: Academic Press. Pages 455-458 (UNL)

**2017**

1. Sarangi D‡, Tyre A, Patterson E, Gaines T, Irmak S, Knezevic SZ, Lindquist J, and **Jhala AJ\*** (2017) Pollen-mediated gene flow from glyphosate-resistant common waterhemp (*Amaranthus rudis* Sauer): consequences for dispersal of resistance genes. **Nature Scientific Reports** 7:44913 DOI:10.1038/srep44913. <http://www.nature.com/articles/srep44913> (UNL)
2. Sarangi D‡, Sandell LD, Kruger GR, Knezevic SZ, Irmak S, **Jhala AJ\*** (2017) Comparison of herbicide programs for season-long control of glyphosate-resistant common waterhemp (*Amaranthus rudis*) in soybean. **Weed Technology** 31:53-66 (UNL)
3. Soltani N, **Jhala AJ**, Shropshire C, Sikkema PH (2017) Biologically effective rate of metribuzin for glyphosate-resistant Canada fleabane control in soybean. **Canadian Journal of Plant Science** 97:771-774 (UNL)
4. Ganie ZA‡, Lindquist JL, Jugulam M, Kruger G, Marx D, **Jhala AJ\*** (2017) An integrated approach for management of glyphosate-resistant *Ambrosia trifida* with tillage and herbicides in glyphosate-resistant corn. **Weed Research** 57:112-122 (UNL)
5. Yadav R, Bhullar MS, Kaur S, Kaur T, **Jhala AJ\*** (2017) Weed control in conventional soybean with pendimethalin followed by imazethapyr plus imazamox/quizalofop. **Canadian Journal of Plant Science** 97:654-664
6. Werle R, Begcy K, Yerka M, Mover JP, **Jhala AJ**, Lindquist JL (2017) Independent evolution of acetolactate synthase-inhibiting herbicide resistance in weedy sorghum populations across common geographic regions. **Weed Science** 65:164-176 (UNL)
7. **Jhala AJ\***, Sandell LD, Sarangi D, Kruger GR, Knezevic SZ (2017) Control of glyphosate-resistant common waterhemp (*Amaranthus rudis*) in glufosinate-tolerant soybean. **Weed Technology** 31:32-45 (UNL)
8. Chahal PS‡, Varansi VK, Jugulam M, **Jhala AJ\*** (2017) Glyphosate-resistant Palmer amaranth (*Amaranthus palmeri*) in Nebraska: Confirmation, *EPSPS* gene amplification, and response to POST corn and soybean herbicides. **Weed Technology** 31:80-93 (UNL)
9. Ganie ZA‡, **Jhala AJ\*** (2017) Confirmation of glyphosate-resistant common ragweed (*Ambrosia artemisiifolia*) in Nebraska and response to post-emergence corn and soybean herbicides. **Weed Technology** 31:225-237 (UNL)
10. Oliveira MC, **Jhala AJ**, Gaines T, Irmak S, Amundsen K, Scott JE, Knezevic SZ (2017) Confirmation and control of HPPD-inhibiting herbicide-resistant waterhemp (*Amaranthus tuberculatus*) in Nebraska. **Weed Technology** 31:67-79 (UNL)
11. Sarangi D‡, **Jhala AJ\*** (2017) Biologically effective rates of a new premix (atrazine, bicyclopyrone, mesotrione, and S-metolachlor) for PRE or POST control of common waterhemp (*Amaranthus rudis*) in Corn. **Canadian Journal of Plant Science** (in press) (UNL)
12. Barnes E‡, Werle R, Sandell L, Lindquist J, Knezevic SZ, Sikkema P, **Jhala AJ\*** (2017) Influence of tillage on common ragweed (*Ambrosia artemisiifolia* L.) emergence pattern in Nebraska. **Weed Technology** 31:623-631 (UNL)
13. Sarangi D‡, **Jhala AJ\*** (2017) Response of glyphosate-resistant horseweed to a premix of atrazine, bicyclopyrone, mesotrione, and S-metolachlor. **Canadian Journal of Plant Science** 97:702-714 (UNL)
14. Ganie ZA‡, Jugulam M, **Jhala AJ\*** (2017) Temperature influences efficacy, absorption, and translocation of 2,4-D or glyphosate in glyphosate-resistant and susceptible common ragweed (*Ambrosia artemisiifolia*) and giant ragweed (*Ambrosia trifida*). **Weed Science** 65:588-602 (UNL)
15. Kumar V, **Jhala AJ**, Jha P (2017) Confirmation of glyphosate-resistant horseweed (*Conyza Canadensis* L.) in Montana cereal production and response to post-emergence herbicides. **Weed Technology** (in press)
16. Ganie ZA‡, Varansi V, Jugulam M, **Jhala AJ\*** (2017) Investigating mechanism of glyphosate-resistance in a common ragweed biotype from Nebraska. **Canadian Journal of Plant Science** (in press) (UNL)

17. Ganie ZA‡, **Jhala AJ\*** (2017) Interaction of 2,4-D or dicamba with glufosinate for control of glyphosate-resistant giant ragweed (*Ambrosia trifida* L.) in glufosinate-resistant maize (*Zea mays* L.). **Frontiers in Plant Science**. Vol 8; article 1207; Published July 10, 2017. <https://doi.org/10.3389/fpls.2017.01207> (UNL)
18. Barnes E‡, Knezevic S, Sikkema PH, Lindquist J, **Jhala AJ\*** (2017) Control of glyphosate-resistant common ragweed in glufosinate-resistant soybean. **Frontiers in Plant Science**. Vol 8; article 1455. Published on Aug 18, 2017. <https://doi.org/10.3389/fpls.2017.01455> (UNL)
19. Oliveira MC, Gaines TA, Dayan FE, Patterson EL, **Jhala AJ**, Knezevic SZ (2017) Reversing resistance to tembotrione in an *Amaranthus tuberculatus* (syn. *Rudis*) population from Nebraska, USA with cytochrome P450 inhibitors. **Pest Management Science** (in press) (UNL)
20. Ganie ZA‡, **Jhala AJ\*** (2017) Pollen mediated gene flow from glyphosate-resistant to susceptible giant ragweed (*Ambrosia trifida* L.) under field conditions. **Nature Scientific Reports** (in press) (UNL)
21. Chahal PS‡, Irmak S, Gaines T, Amundsen K, Jugulam M, Jha P, Travlos I, **Jhala AJ\*** (2017) Control of photosystem (PS) II- and 4-hydroxyphenylpyruvate dioxygenase (HPPD)-inhibitor-resistant Palmer amaranth (*Amaranthus palmeri* S. Wats.) in conventional corn. **Weed Technology** (in press) (UNL)
22. Ganie ZA‡, Kaur S, Jha P, Kumar V, **Jhala AJ\*** (2017) Effect of late season herbicide applications on inflorescence and seed production of glyphosate-resistant giant ragweed (*Ambrosia trifida* L.). **Weed Technology** (in press) (UNL)
23. Sarangi D‡, **Jhala AJ\*** (2017) Comparison of a premix of atrazine, bicyclopyrone, mesotrione, and S-metolachlor with other pre-emergence herbicides for weed control and corn yield in no-tillage and reduced-tillage production systems in Nebraska, USA. **Soil and Tillage Research** (accepted) (UNL)
24. Chahal PS‡, Ganie ZA, **Jhala AJ\*** (2017) Overlapping residual herbicides for control of photosystem II and 4-hydroxyphenylpyruvate dioxygenase (HPPD) inhibitor-resistant Palmer amaranth (*Amaranthus palmeri* S. Watson) in glyphosate-resistant maize. **Frontiers in Plant Science** (accepted) (UNL)

## **2016**

25. Sarangi D‡, Irmak S, Lindquist JL, Knezevic SZ, **Jhala AJ\*** (2016) Effect of water stress on the growth and fecundity of common waterhemp. **Weed Science** 64:42-52 (UNL)
26. Kaur S‡, Werle R, Sandell LD, **Jhala AJ\*** (2016) Spring tillage has no effect on the emergence pattern of glyphosate-resistant giant ragweed in Nebraska. **Canadian Journal of Plant Science** 96:726-729 (UNL)
27. Ganie ZA‡, Sandell LD, Jugulam M, Kruger G, Marx D, **Jhala AJ\*** (2016) Integrated management of glyphosate-resistant giant ragweed (*Ambrosia trifida*) with tillage and herbicides in soybean. **Weed Technology** 30:45-56 (UNL)
28. Chahal PS‡, **Jhala AJ\*** (2016) Factors affecting germination and emergence of glyphosate-resistant hybrid corn and its progeny. **Canadian Journal of Plant Science** 96:613-620 (UNL)
29. Chahal PS‡, **Jhala AJ\*** (2016) Effect of glyphosate-resistant volunteer corn density, control timing, and late season emergence on soybean yield. **Crop Protection** 81:38-42 (UNL)
30. Werle R, **Jhala AJ**, Yerka MK, Dille A, Lindquist JL (2016) Distribution of herbicide-resistant shattercane and johnsongrass populations in sorghum production areas of Nebraska and northern Kansas. **Agronomy Journal** 108:321-328 (UNL)
31. Kaur S‡, Aulakh JS, **Jhala AJ\*** (2016) Growth and seed production of glyphosate-resistant giant ragweed (*Ambrosia trifida* L.) in response to water stress. **Canadian Journal of Plant Science** 96:828-836 (UNL)

## **2015**

32. Chahal PS‡, **Jhala AJ\*** (2015) Herbicide programs for control of glyphosate-resistant volunteer corn in glufosinate-resistant soybean. **Weed Technology** 29:431-443 (UNL)
33. Aulakh JS‡, **Jhala AJ\*** (2015) Comparison of glufosinate based herbicide programs for broad-spectrum weed control in glufosinate-tolerant soybean. **Weed Technology** 29:419-430 (UNL)
34. **Jhala AJ\***, Malik MS, Willis JB (2015) Weed control and crop response of micro encapsulated acetochlor applied sequentially in glyphosate-resistant soybean. **Canadian Journal of Plant Science** 95:973-981 (UNL)



35. Sarangi D‡, Sandell LD, Knezevic SZ, Aulakh JS, Lindquist JL, Irmak S, **Jhala AJ\*** (2015) Confirmation and control of glyphosate-resistant common waterhemp in Nebraska. **Weed Technology** 29:82-92 (UNL)
36. Ganie ZA‡, Stratman G, **Jhala AJ\*** (2015) Dose response of selected glyphosate-resistant weeds to premix of mesotrione and fluthiacet-methyl (Solstice™). **Canadian Journal of Plant Science** 95:861-869 (UNL)
37. Bhullar MS, Kaur G, Kaur M, **Jhala AJ\*** (2015) Integrated weed management in potato using atrazine and straw mulch. **Hort Technology** 25:335-339

#### 2014

38. **Jhala AJ\***, Sandell LD, Rana N, Kruger G, Knezevic SZ (2014) Confirmation and control of triazine and 4-hydroxyphenylpyruvate dioxygenase-inhibiting herbicide-resistant Palmer amaranth in Nebraska. **Weed Technology** 28:28-38 (UNL)
39. Ramirez AHM, **Jhala AJ**, Singh M (2014) Factors affecting germination of citron melon (*Citrullus lanatus* var. *citroides*). **Weed Science** 62:45-50
40. Mubeen K, Nadeem MA, Tanveer A, **Jhala AJ\*** (2014) Effects of seeding time and weed control methods in direct seeded rice (*Oryza sativa* L.). **Journal of Animal and Plant Science** 24:534-542
41. Kaur S‡, Sandell LD, Lindquist JL, **Jhala AJ\*** (2014) Glyphosate-resistant giant ragweed control (*Ambrosia trifida*) in glufosinate-resistant soybean. **Weed Technology** 28:569-577 (UNL)
42. **Jhala AJ\***, Sandell LD, Kruger GR (2014) Control of glyphosate-resistant giant ragweed (*Ambrosia trifida* L.) with 2,4-D followed by pre-emergence or post-emergence herbicides in glyphosate-resistant soybean (*Glycine max* L.). **American Journal of Plant Science** 5:2289-2297 (UNL)
43. Chahal PS‡, Kruger GR, Humberto-Blanco C, **Jhala AJ\*** (2014) Efficacy of pre-emergence and post-emergence soybean herbicides for control of glufosinate, glyphosate and imidazolinone-resistant volunteer corn. **Journal of Agricultural Science** 6:131-140 (UNL)
44. Mubeen K, **Jhala AJ**, Hussain M, Siddiqui MH, Zahoor F, Shehzad M, Mehmood K (2014) Effects of seeding time and competition period on weeds, growth and yield of direct seeded fine rice (*Oryza sativa* L.). **Academic Journal of Interdisciplinary Studies** 3 (5): 55-64

#### 2013

45. **Jhala AJ\***, Ramirez AHM, Singh M (2013) Tank mixing saflufenacil, glufosinate and indaziflam improved burndown and residual weed control. **Weed Technology** 27:422-429
46. **Jhala AJ\***, Ramirez AHM, Knezevic SZ, VanDamme P, Singh M (2013) Tank mixing herbicides for broad-spectrum weed control in Florida citrus. **Weed Technology** 27:129-137
47. Hanson BD, Gao S, Gerik J, Qin R, Cabrera JA, **Jhala AJ**, Abit MJM, Cox D, Correiar B, Wang D, Browne GT (2013) Preplant 1,3-D treatments test well for perennial crop nurseries, but challenges remain. **California Agriculture** 67:181-189
48. Bhullar MS, Kaur S, Kaur T, Singh T, Singh M, **Jhala AJ\*** (2013) Control of broadleaf weeds with post-emergence herbicides in four barley (*Hordeum* spp.) cultivars. **Crop Protection** 43:216-222
49. Nadeem MA, Tanveer A, Naqqash T, **Jhala AJ**, Mubeen K (2013) Determining critical weed competition periods in blackseed. **Journal of Animal and Plant Science** 23:216-221

#### 2012

50. **Jhala AJ\***, M. Singh M (2012) Leaching of indaziflam compared with residual herbicides commonly used in Florida citrus. **Weed Technology** 26:602-607
51. **Jhala AJ\***, Ramirez AHM, Singh M (2012) Leaching of indaziflam applied at two rates under different rainfall situations in Florida Candler soil. **Bulletin of Environmental Contamination and Toxicology** 88:326-332
52. **Jhala AJ\***, Ramirez AHM, Singh M (2012) Rimsulfuron tank mixed with flumioxazin, pendimethalin or oryzalin for control of broadleaf weeds in Florida citrus. **Hort Technology** 22:638-643
53. Ramirez AHM, **Jhala AJ**, Singh M (2012) Efficacy of PRE and POST herbicides for control of citron melon (*Citrullus lanatus* var. *citroides*). **Weed Technology** 26:783-788

54. Singh M, Ramirez AHM, Sharma SD, **Jhala AJ** (2012) Factors affecting germination of ivyleaf morningglory (*Ipomoea hederecea*). **Weed Science** 60:64-68
55. **Jhala AJ**, Gao S, Gerik JS, Qin R, Hanson BD (2012) Effects of surface seals and application shanks on nematode, pathogen and weed control with 1,3-dichloropropene. **Pest Management Science** 68:225-230
56. Singh M, Ramirez AHM, **Jhala AJ**, Malik MS (2012) Weed control efficacy and citrus response to flazasulfuron applied alone or in combination with other herbicides. **American Journal of Plant Sciences** 3:520-527
57. Ramirez AHM, Singh M, **Jhala AJ** (2012) Germination and emergence characteristics of common beggar's-tick (*Bidens alba*). **Weed Science** 60:374-378
58. Bhullar MS, Walia US, Singh S, Singh M, **Jhala AJ\*** (2012) Control of morningglories (*Ipomoea* spp.) in sugarcane (*Saccharum* spp.). **Weed Technology** 26:77-82. (A photograph from this study was selected by the editorial board and was published on the cover page of *Weed Technology* volume 26, issue 1, 2012.)

#### 2011

59. Singh M, Malik MS, Ramirez AH, **Jhala AJ\*** (2011) Tank mix of saflufenacil with glyphosate and pendimethalin for weed control in Florida citrus. **Hort Technology** 21:606-615
60. Singh M, Sharma SD, Ramirez AH, **Jhala AJ\*** (2011) Glyphosate efficacy, absorption and translocation in selected four weed species common to Florida citrus. **Hort Technology** 21:599-605
61. **Jhala AJ\***, Bhatt H, Keith A, Hall LM (2011) Pollen mediated gene flow in flax: Can genetically engineered and organic flax coexist? **Heredity (Nature Publishing Group; Impact Factor 4.6)** 106:557-566 (A sampling strategy published to determine the minimum number of seeds required to detect gene flow was recognized by Dr. Mike Wilkinson, Professor of Plant Science, United Kingdom, who wrote a two-page commentary published in the same issue of *Heredity*.)
62. Dexter JE, **Jhala AJ**, Hills MJ, Yang RC, Topinka KC, Weselake RJ, Hall LM (2011) Harvest loss and seed bank longevity of flax (*Linum usitatissimum* L.): Implications for seed-mediated gene flow. **Weed Science** 59:61-67

#### 2010

63. Dexter JE, **Jhala AJ\***, Hills MJ, Yang RC, Topinka KC, Weselake RJ, Hall LM (2010) Quantification and mitigation of adventitious presence of volunteer flax (*Linum usitatissimum* L.) in wheat. **Weed Science** 58:50-58
64. **Jhala AJ\***, Raatz L, Dexter JE, Hall LM (2010) Adventitious presence: Volunteer flax (*Linum usitatissimum* L.) in herbicide resistant canola (*Brassica napus* L.). **Weed Technology** 24:244-252
65. Dexter JE, **Jhala AJ\***, Hills MJ, Yang RC, Weselake RJ, Hall LM (2010) Emergence and persistence of volunteer flax (*Linum usitatissimum* L.) in western Canadian cropping systems. **Agronomy Journal** 102:1321-1328
66. Rathod PH, Patel RB, **Jhala AJ\*** (2010) Persistence and management of dinitroaniline herbicide residues in sandy loam soil. **International Journal of Environment and Sustainable Development** 9:58-73
67. **Jhala AJ\***, Hall LM (2010) Flax (*Linum usitatissimum* L.): Current uses and future applications. **Australian Journal of Basic and Applied Sciences** 4:4304-4312
68. Rathod PH, Patel JC, **Jhala AJ\*** (2010) Potential of gamma irradiated sewage sludge as fertilizer in radish (*Raphanus sativus* L.): Evaluating heavy metal accumulation in sandy loam soil. **Communications in Soil Science and Plant Analysis** 42:263-282

#### 2009

69. **Jhala AJ\***, Weselake RJ, Hall LM (2009) Genetically engineered flax (*Linum usitatissimum* L.): Potential benefits, risks, regulations, and mitigation of transgene movement. **Crop Science** 49:1943-1954 (A photograph from this study was selected by the editorial board and was published on the cover page of *Crop Science* volume 49, issue 5, 2009.)
70. Rathod PH, Patel JC, Shah MR, **Jhala AJ\*** (2009) Recycling gamma irradiated sewage sludge as fertilizer: A case study using onion (*Allium cepa* L.). **Applied Soil Ecology** 41:223-233



## 2008

71. **Jhala AJ\***, Hall LM, Hall JC (2008) Potential hybridization of flax with wild and weedy species: An avenue for movement of engineered genes? **Crop Science** 48 (2): 825-840 (*This paper was selected as a quality paper by the Crop Science Society of America and the researchers were invited to write a press note that was published in Crop, Soil, and Agronomy News in Aug. 2008.*)
72. **Jhala AJ\***, Shah SC, Rathod PH, Trivedi GC (2008) Integrated effect of seed rates and weed management practices in wheat (*Triticum aestivum* L.). **Research Journal of Agricultural and Biological Sciences** 4:704-711
73. Rathod PH, Patel JC, Shah MR, **Jhala AJ\*** (2008) Evaluation of gamma irradiation for bio-solid waste management. **International Journal of Environment and Waste Management** 2:37-48

## 2005 and 2004

74. **Jhala AJ\***, Rathod PH, Patel KC, VanDamme P (2005) Growth and yield of peanut (*Arachis hypogaea* L.) influenced by weed management practices and Rhizobium inoculation. **Communications in Agricultural and Applied Biological Sciences** 70:493-500
75. Parmar RS, Akula B, Shekh AM, **Jhala AJ** (2004) Inter seasonal climatic variability of Gujarat State. **Journal of Agrometeorology** 7:214-219

## Abstracts (National and International Conferences)

Year	Total papers/posters presented
2017	16
2016	12
2015	14
2014	16
2013	14
2012	8
2011	2
2010	5
2009	3
2008 to 2003	10
<b>Total</b>	<b>100</b>

## **RESEARCH (50% Responsibility)**

### **STATEMENT OF RESEARCH CONTRIBUTION**

My research program at the University of Nebraska—Lincoln is focused on the biology, gene flow, and management of herbicide-resistant weeds. Our paper published in **Nature Scientific Reports** (<http://www.nature.com/articles/srep44913>) about pollen-mediated gene flow from glyphosate-resistant common waterhemp as well as a paper published in **Heredity** (a journal of the Nature Publishing Group) about gene flow in flax (<http://www.nature.com/hdy/journal/v106/n4/full/hdy201081a.html>) was not only recognized by the journal, but the paper led to a commentary published in the same issue of *Heredity* discussing the statistical methods used in the study to determine the minimum sample size needed to detect gene flow. I am an author/coauthor of 75 papers published/accepted in peer-reviewed journals, of which I'm the first or senior author on 59 papers. Additionally, I have published 11 book chapters. **Since 2012, my program has averaged 9.66 peer-reviewed journal papers per year. I have obtained numerous grants totaling \$3.937 million, out of which \$1.556 million was as principal investigator (PI) and \$2.381 million was as a Co-PI from different**

sources, including the USDA, commodity boards (Nebraska Corn/Soybean Board/Sorghum Checkoff), and the seed/herbicide industry.

### **PHILOSOPHY OF RESEARCH:**

I received training that was not only methodologically rigorous, but also sparked my interest and excitement about scholarly research in academia. My research program in weed science is guided by my belief that it is my responsibility and duty to pursue, capture, discover, create, and transmit knowledge about the way that science is developed, managed, and used. The purpose and result of this is to enable me to translate what I have learned into information that can be disseminated via peer-reviewed publications and correspondence to clientele in- and outside of the classroom, to the university, and to the broader community. It is critical that the research in which I engage not only be interesting to me, but also of use to other academics and growers at large to solve their weed-related problems in agronomic crops. For my research to be of high quality, it is also essential that I maintain personal and professional integrity in all of my endeavors. In summary, I believe that research is a fascinating endeavor that I am fortunate to be able to engage in.

### **1. CURRENT RESEARCH PROGRAM**

More than 95% of soybeans and 80% of corn planted in Nebraska are glyphosate-resistant. Due to repeated and continuous use of glyphosate in corn-soybean cropping systems, six broadleaf weeds have evolved resistance to glyphosate in Nebraska and are widespread. I have established an applied research program focusing on the confirmation, characterization, biology, and management of herbicide-resistant weeds in Nebraska. I work closely with other weed scientists at UNL and a range of stakeholders (crop consultants, growers, extension educators, commodity boards) as part of my Extension Program, which provides an excellent opportunity to learn their research needs. My applied research program addresses current and future challenges for weed management in corn, soybean, and sorghum. Research results are communicated to clientele via extension programs that provide solutions to weed management challenges.

**Institute of Agriculture and Natural Resources (IANR) Strategic Focus Area: Food**

**Research Goal:** Plan, implement, and lead projects for the management of economically important, herbicide-resistant, and problem weeds in corn, soybean, and sorghum, and develop a better understanding of weed biology (including gene flow and response to water stress). My program is currently investigating three specific research areas:

#### **A. Management of herbicide-resistant weeds**

Herbicide-resistant weeds have become one of the most pressing issues facing Nebraska growers and land managers. Nine weed species of agronomic importance have evolved resistance to at least one group of herbicides in Nebraska. This problem has received widespread attention with the evolution of glyphosate-resistant weeds. Six weed species, including marestail, kochia, giant ragweed, common waterhemp, Palmer amaranth, and most recently, common ragweed have been confirmed resistant to glyphosate in Nebraska. A Palmer amaranth biotype resistant to atrazine and 4-hydroxyphenylpyruvate dioxygenase (HPPD) inhibitor is a particular challenge for seed corn producers in south central Nebraska.

**Objectives:** (1) Confirmation, characterization, and determining distribution of herbicide-resistant weeds in Nebraska; (2) Evaluating alternate herbicide programs for control of herbicide-resistant weeds; (3) Integrated management of herbicide-resistant weeds with tillage and herbicides.

**Delivery and Impact:** A recent survey by the agricultural research company Stratus reported that more than 2.1 million acres in eastern Nebraska are infested with glyphosate-resistant common waterhemp, 2.2 million acres of glyphosate-resistant marestail, and 0.5 million acres of glyphosate-resistant giant ragweed. Several research experiments were conducted for management of glyphosate-resistant weeds at growers' sites; efficient weed management programs for glyphosate-resistant common waterhemp, giant ragweed, and marestail have been created; and ten refereed journal papers have been published. Growers are looking for management options to deal with the widespread occurrence of glyphosate-

resistant weeds in Nebraska; therefore, this research objective has the greatest impact. Extension presentations, Guide for Weed, Disease, and Insect Management in Nebraska (EC130), and research reports based on applied research projects communicate results to clientele.

## **B. Weed biology (gene flow and response to water stress)**

Understanding pollen-mediated gene flow is important for predicting the reproductive and evolutionary processes of plant or weed species. Inadequate attention has been centered on the potential for herbicide-resistance spread through pollen to susceptible weed species and the interspecific hybridization of herbicide-resistant weeds with closely related species. Glyphosate-resistant weeds have been confirmed in Nebraska, and information is required on gene flow from glyphosate-resistant weeds. Common waterhemp (*Amaranthus rudis* L.) is a dioecious species (male and female reproductive organs borne on separate plant of the same species), while giant ragweed (*Ambrosia trifida* L.), a monoecious species (male and female reproductive organs present on the same plant) native to eastern North America, is an early emerging, dicot, summer annual weed species. Glyphosate-resistant giant ragweed biotypes have been confirmed in 11 states in the United States and in Ontario, Canada. One of the reasons for the increased prevalence of giant ragweed is the rapid evolution of herbicide resistance and the ability to produce millions of pollen grains. Information on gene flow under field conditions would provide additional knowledge about the dissemination of resistance through pollen movement.

Weeds compete with commodity crops for a variety of resources, including light, nutrients, and water. Among them, water is the most limiting factor for optimum crop production. It is well-known that water stress adversely affects crop growth and yield; however, the effects of water stress on weed growth and seed production are poorly understood.

**Objectives:** (1) Quantify pollen-mediated gene flow from glyphosate-resistant to susceptible common waterhemp and giant ragweed under field conditions; (2) Determine the effect of degree and duration of water stress on the growth and fecundity of common waterhemp, giant ragweed, and Palmer amaranth.

**Delivery and Impact:** The rapid dissemination of herbicide-resistant weeds is not only due to seed movement, but pollen movement (gene flow) also plays an important role, especially for common waterhemp, an obligate outcrossing species. Field experiments were conducted over the last three years to determine the distance and frequency of gene flow from glyphosate-resistant common waterhemp and giant ragweed to susceptible species. Results from these projects provided better understanding of the reproductive biology of economically important glyphosate-resistant weeds. Our gene flow projects papers have been published in Nature Scientific Reports, indicating the importance of this novel research. A paper published in Weed Science examining the results of water stress in common waterhemp and similar work in giant ragweed is published in the Canadian Journal of Plant Science.

## **C. Risk assessment and developing product stewardship of multiple herbicide-resistant crops**

Multiple herbicide-resistant corn and soybean have been developed for the control of glyphosate-resistant weeds. These include dicamba-resistant soybean (Roundup® Ready 2 Xtend), 2,4-D plus glufosinate-resistant corn and soybean (Enlist™ and Enlist E3™), isoxaflutole-resistant soybean (Balance Bean™), and mesotrione, glufosinate, and isoxaflutole-resistant soybean (MGI soybean™). Additionally, ALS-inhibitor-resistant (INZEN) sorghum has been developed with the intent of post-emergence control of grass weeds. It is expected that multiple herbicide-resistant crops will be commercialized in the near future; however, before commercial cultivation, product stewardship is needed to ensure the long-term sustainability of newly developed multiple herbicide-resistant crop cultivars. Limited information is available on gene flow from sorghum (*Sorghum bicolor* L.) to johnsongrass [*Sorghum halepense* (L.) Pers.], a closely related species. Information is needed about the genetics of INZEN sorghum x johnsongrass hybrids. This research-based information will be useful for developing product stewardship before the cultivation of novel cultivars of corn, soybean, and sorghum.

**Objectives:** (1) Weed control efficacy and crop safety in multiple herbicide-resistant corn and soybean; (2) Herbicide programs that include herbicides with multiple modes of action; (3) Inter-specific hybridization of ALS-resistant (INZEN) sorghum to johnsongrass to determine the distance and frequency of gene flow under field conditions.

**Delivery and Impact:** Growers are relying on multiple herbicide-resistant corn and soybean for managing glyphosate-resistant weeds; however, before their commercial cultivation, product stewardship is needed to provide accurate, science-based information to clientele about herbicide programs, crop safety, and weed control efficacy. Multiple herbicide-resistant crops have been tested in Nebraska and results are presented at scientific meetings and during extension programs. Multi-state trials have been established that will provide information about the control of glyphosate-resistant weeds in multiple herbicide-resistant crop cultivars and their environmental impact. Three manuscripts will be published from this collaborative work.

## 2. Summary of Research Publications

Type of Publication	Total	Work at UNL
Refereed Journal Articles	75	38
Refereed Book Chapters	11	7
Abstracts	100	72
Technical Reports to Funding Agencies	124	124
Annual Reports	5	5

### Impact Factors for Refereed Research Journals Where Jhala Lab Publishes

Journal	Impact Factor <sup>a</sup>	Tier by Category	# Articles <sup>b</sup>
Academic Journal of Interdisciplinary Studies	None	-	1
Agronomy Journal	1.464	Top	2
American Journal of Plant Science	none	-	2
Applied Soil Ecology	2.670	Top	1
Australian Journal of Basic and Applied Sciences	none	-	1
Bulletin of Environmental Contamination and Toxicology	1.255	Top	1
California Agriculture	0.951	Top	1
Canadian Journal of Plant Science	0.919	Top	10
Communications in Soil Science and Plant Analysis	0.390	Middle	1
Communications in Agricultural and Applied Biological Sciences	none	-	1
Crop Protection	1.493	Top	2
Crop Science	1.575	Top	2
Frontiers in Plant Science	4.3	Top	4
Heredity	3.801	Top	1
Hort Technology	0.711	Middle	4
International Journal of Environment and Sustainable Development	none	-	1
International Journal of Environment and Waste Management	none	-	1
Journal of Agricultural Science	0.653	Middle	1
Journal of Animal and Plant Science	0.448	Middle	2
Journal of Agrometeorology	0.145	Middle	1
Nature Scientific Reports	5.228	Top	1

Pest Management Science	2.694	Top	2
Research Journal of Agricultural and Biological Sciences	None	-	1
Soil and Tillage Research	3.401	Top	1
Weed Research	1.517	Top	1
Weed Science	1.993	Top	8
Weed Technology	1.487	Top	21

<sup>a</sup> 2015 ISI Impact Factor, InCites™ Journal Citation Reports by Thompson and Reuters available at <http://about.jcr.incites.thomsonreuters.com/>; <sup>b</sup> A list of publications is available on page 3.

### Involvement in Graduate Student Education:

I exhibit great enthusiasm for the weed science graduate program, eagerly embracing the opportunity to educate students whenever possible. As a major advisor, I have graduated three MS students and two Ph.D. students in the last five years, in addition to supervising two postdoctoral fellows, two Ph.D. students, and an MS student as a major advisor and serving as a committee member for five other graduate students. My students have received several awards, including the best poster/paper presentation awards and placements among the top three rankings in the North Central Weed Science Society (NCWSS)'s Weed Contests and the Weed Science Society of America's Weed Olympics.

Role	M.S. Students		Ph.D. Students	
	Completed	In Progress	Completed	In Progress
Major Advisor	3	1	2	2
Committee Member	2	3	2	5

### Graduate Student Advising (Major Advisor)

1. Parminder Chahal, M.S. (completed Dec. 2014). Impact of glyphosate-resistant volunteer corn density, control timing, and late-season emergence on soybean yield.
2. Simranpreet Kaur, M.S. (completed May 2015). Biology and management of glyphosate-resistant giant ragweed (*Ambrosia trifida* L.).
3. Ethann Barnes, M.S. (completed April 2017). Emergence, competition, and management of glyphosate-resistant common ragweed in Nebraska soybean.
4. Debalin Sarangi, Ph.D. (completed May 2016). Biology, gene flow, and management of glyphosate-resistant common waterhemp.
5. Zahoor Ganie, Ph.D. (completed Dec 2016). Mechanism of resistance, gene flow, and integrated management of glyphosate-resistant giant ragweed (*Ambrosia trifida* L.) in Nebraska.
6. Parminder Chahal, Ph.D. (Jan. 2015 to present). Biology and management of atrazine and HPPD inhibitors-resistant Palmer amaranth (*Amaranthus palmeri*) in Nebraska field and seed corn.
7. Jacob Ziggafos, M.S. (May 2016 to present; co-advising with Dr. J. Lindquist). Genetics of ALS inhibitor-resistant sorghum x johnsongrass hybrids.
8. Ethann Barnes, Ph.D. (May 2017 to present). Gene flow, response to herbicides, and critical period of weed removal in Nebraska popcorn.

### Graduate Student Advising (Committee Member)

1. Rodrigo Werle, Ph.D. (completed May 2015). Herbicide-resistance in shattercane and johnsongrass: Current status and future predictions.

2. Zhu Yan, M.S. (completed Dec 2015). Performance of frequency domain and time domain reflectometry soil moisture sensors in coarse and fine textured soils.
3. Jesse Brown, M.S. (completed Dec. 2013). Changes in genetic diversity of annual bluegrass (*Poa annua*) in response to herbicides and plant growth regulators.
4. Maxwell Oliveira, Ph.D. (Jan. 2013 to Dec 2017). Confirmation and management of HPPD inhibitor-resistant common waterhemp in Nebraska.
5. Spenser Samuelson (completed April 2017). Distribution and frequency of glyphosate-resistant weeds in Nebraska.
6. Vasudha Sharma, Ph.D. (Jan. 2015 to present). Effect of variable and fixed rate fertigation on corn water use efficiency.
7. Don Treptow, M.S. (Jan 2016 to present). Demographic of johnsongrass in Nebraska.
8. Koffi Badou Jeremie Kouame, M.S. (Sep 2015 to present). Effect of irrigation regime and density of common ragweed and common waterhemp on soybean growth and yield.
9. Rupinder Kaur, Ph.D. (Jan 2017 to present). Crop-water use modeling.
10. Ali Mohammed, Ph.D. (Jan 2017 to present). Water use efficiency and evapotranspiration in corn.
11. Clint Beiermann, Ph.D. (Sep 2016 to present; Co-advising with Dr. Nevin Lawrence). Control of herbicide-resistant Palmer amaranth and kochia in Nebraska Panhandle.

#### **Postdoctoral Fellows Supervised**

1. Dr. Debalin Sarangi (May 2016 to Dec 2017).
2. Dr. Zahoor Ganie (Jan 2017 to present).
3. Dr. Jatinder Aulakh (Feb. 2014 to July 2015). Current Position: Weed Scientist, Connecticut Agricultural Experiment Station, Valley Laboratory, Windsor, CT.
4. Umm-e-Kulsoom (Aug. 2015 to present). A visiting scholar from the University of Peshawar, Pakistan sponsored by the Pakistan Higher Education Commission visited my lab for six months to conduct a greenhouse experiment and write a manuscript.

#### **Grants/Extramural Funding**

I have been awarded a total of **\$3.937 million**, including **\$1.556 million** as a PI and **\$2.381 million** as Co-PI since joining UNL in August 2012. Grant money is used to support applied research programs and extension activities. The majority of funds come from the herbicide/seed industry, the federal government (USDA), and competitive and non-governmental research foundations such as commodity boards (Nebraska Soybean Board, Nebraska Corn Board, Sorghum Checkoff). Grant money is used to fund salaries, supplies, research support, and expenses for technicians, graduate students, and undergraduate interns. Not listed are grants not funded, which include 8 competitive research grant proposals as a PI requesting a total of \$3.5 million of support and an additional 5 competitive research grant proposals as a co-PI requesting a total of \$3.8 million of support. Proposals not funded were submitted to the USDA-NIFA Foundation Program, the USDA-Biotechnology Risk Assessment Research Grant Program (BRAG), and the USDA-Sustainable Agriculture Research and Education (SARE).

#### **Grants Obtained Since Joining UNL**

- **Jhala AJ**, Kruger G, Knezevic Z, Proctor C, Lawrence N, Sarangi D, Ganie ZA (2017 to 2019) Comparison of herbicide efficacy and economics of glyphosate-resistant weed management in multiple herbicide tolerant soybean in Nebraska: Research and Extension. Nebraska Soybean Board; **\$301,939**
- **Jhala AJ**, Lindquist J (2014 to 2017) Gene flow from ALS-inhibiting herbicide-resistant sorghum to johnsongrass. E. I. DuPont; **\$296,286**
- **Jhala AJ** (2015 to 2017) Confirmation and control of atrazine and HPPD inhibitor-resistant Palmer amaranth in field and seed corn. Nebraska Corn Board; **\$95,673**

- Rasby R, Wright R, Ogg C, **Jhala AJ**, Green J, Larson J, Glewen K, Bradshaw J, Jackson-Ziems T (2017 to 2019) Nebraska Extension implementation program. USDA-NIFA Crop Protection and Pest Management / Extension Implementation Program. **\$627,447**
- Lindquist J, **Jhala AJ**, Sigmon B, Tenhumberg B, Werle R, Yerka M (2017 to 2021) A risk assessment model and population genomics tools for monitoring herbicide-resistance evolution in weedy sorghum. USDA-Biotechnology Risk Assessment Research Grants Program (BRAG); **\$499,998**.
- Hein G, **Jhala AJ**, Sydney E, Giesler L, Gouglas G, Hunt T, Lee D, Sandell L (2016 to 2021) Bridging the gap: Educating multidisciplinary professionals to steward pest management technologies for sustainable agriculture. USDA-NIFA; **\$238,500**
- Lindquist J, **Jhala AJ** (2013 to 2015) ALS inhibitor-resistance in shattercane and Johnsongrass in Nebraska and Kansas. United Sorghum Checkoff Program; **\$220,525**
- Koelsch R, Wright R, Ogg C, Glewen K, **Jhala AJ**, Cortinas M, Kamble S, Bradshaw J, Jackson-Ziems T (June 2014 to August 2016) Nebraska Extension Implementation Program, USDA-NIFA; **\$477,400** (my program: \$80,000)
- Wright R, **Jhala AJ**, Hunt T, Meinke L, Kruger G, Jackson-Ziems T, Sandell L, Bernards M (2011 to 2014) Impact of volunteer corn density, control timing, and late season emergence on soybean yield. USDA-NIFA; **\$98,959** (my program: **\$70,000**)
- Koelsch R, J. Bradshaw J, Glewen K, Hunt T, Hygnstrom SE, Jackson-Ziems T, **Jhala AJ**, Kamble S, Ogg CL, Reicher Z, Sandell L, Streich AM, Wright R, Amundsen K, Schild J, Cortinas MR, Doster A, Vantassel S, Ferraro D (April 2013 to August 2014) Increasing IPM Adoption in Nebraska. USDA-NIFA; **\$150,000** (my program: \$15,000)
- Sandell L, Knezevic S, Kruger G, **Jhala AJ**, Glewen K (2014) Herbicide-resistant weed management Field Days. Nebraska Soybean Board; **\$68,000**
- **Jhala AJ** (2015) Evaluation of MON 63479 pre-emergence and post-emergence in soybean. Monsanto; **\$6,800**
- **Jhala AJ** (2015) Weed control and market development in soybean. Monsanto; **\$6,800**
- **Jhala AJ** (2015) Marestail control in dicamba-resistant soybean. Monsanto; **\$10,200**
- **Jhala AJ** (2015) Weed control in Roundup Ready 2 Xtend soybean. Monsanto; **\$10,880**
- **Jhala AJ** (2015) Weed control in isoxaflutole tolerant soybean. Bayer Crop Science; **\$15,000**
- **Jhala AJ** (2015) Weed control and crop safety in MGI soybean. Syngenta; **\$9,000**
- **Jhala AJ** (2015) Herbicide programs for weed control in 2,4-D plus glyphosate-resistant (Enlist) corn and soybean. Dow Agro Sciences; **\$14,500**
- **Jhala AJ** (2014) Evaluate premix of fomesafen and encapsulated acetochlor for weed control and crop safety in glyphosate-resistant soybean. Monsanto; **\$15,884**
- **Jhala AJ** (2014) Evaluate crop tolerance and efficacy of weed control programs in isoxaflutole-resistant soybean. Bayer Crop Science; **\$10,000**
- **Jhala AJ** (2014) Herbicide programs for weed control and crop safety in dicamba resistant soybean. Monsanto; **\$10,880**
- **Jhala AJ** (2014) DHT efficacy / HTMS soybean/ Enlist program with Sonic or Surveil for weed control in 2,4-D resistant soybean. Dow Agro Sciences; **\$15,000**
- **Jhala AJ** (2014) Enlist corn pre- and post-emergence herbicide program. Dow Agro Sciences; **\$18,000**
- **Jhala AJ** (2014) Dose response and control of atrazine and HPPD-resistant palmer amaranth. Nebraska Corn Board; **\$6,000**
- **Jhala AJ** (2013) Evaluate weed control and crop safety of acetochlor (Warrant) applied in tank-mixes with pre-emergence or post-emergence soybean herbicides. Monsanto; **\$13,056**
- **Jhala AJ** (2013) Evaluate efficacy of glyphosate plus dicamba with a new water conditioner on difficult-to-control weeds. Monsanto; **\$6,300**



- **Jhala AJ** (2013) Evaluate weed control efficacy and crop safety in dicamba resistant soybean. Monsanto; **\$10,080**
- **Jhala AJ** (2013) Herbicide programs with Sonic or Gangster in 2,4-D plus glyphosate-resistant (Enlist) E2 and E3 soybean. Dow Agro Sciences; **\$25,500**
- **Jhala AJ** (2013) MON-76757 Fall and spring application. Monsanto; **\$5,040**
- Received several **other grants** from herbicide/seed industry as a PI. They are NOT listed here, but the following table provides a summary of additional total grants received during 2013 to 2016:

Year	Grants (\$)
2013	131,000
2014	170,350
2015	178,700
2016	175,000

### **Multidisciplinary Research Projects/Team Work**

- Initiated research projects with Dr. Mithila Jugulam, Herbicide Physiologist at the Kansas State University to study mechanisms of glyphosate-resistance in a common ragweed biotype (manuscript published in Canadian Journal of Plant Science) as well as to determine the impact of temperature on efficacy, absorption, and translocation of glyphosate or 2,4-D in glyphosate-resistant and susceptible ragweed species (manuscript published in Weed Science).
- Collaborating with Dr. Todd Gaines, Weed Geneticist, Colorado State University, to detect gene flow using molecular markers in common waterhemp (published in Nature Scientific Reports) and to determine reversing resistance to tembotrione in Palmer amaranth with cytochrome P450 inhibitors (manuscript in press in Pest Management Science).

### **International Activity/ Collaboration**

- Collaborating with Dr. Peter Sikkema, University of Guelph, Canada for the projects related with management of glyphosate-resistant weeds.
- Collaborating with Dr. Makhan S. Bhullar, Punjab Agricultural University, India for the projects related with weed control in potato, sugarcane, soybean, and corn.

### **Scientific Service to Professional Societies**

I have demonstrated leadership among weed science professional societies.

- I have served on the Board of Directors for the North Central Weed Science Society as the Chair of Extension Section and moderator of the symposia “Public & communication issues in weed science extension.” In this capacity I have introduced a new graduate student video contest.
- I have also served as a judge for poster/paper presentations over the last three years during North Central Weed Science Society annual meetings. I’m a very active member of the Weed Science Society of America (WSSA), and I have served as the Chair of the Integrated Weed Management Section during the 2016 annual meeting, chair of the Professional Development Committee, member of the Outstanding Graduate Student Committee, and the Early-Career Outstanding Weed Scientist Committee.
- Due to my interdisciplinary research experience and publications, I have been asked to review several manuscripts for top-tier journals such as *Weed Science*, *Weed Technology*, *Agronomy Journal*, *Heredity*, *Crop Science*, *PLoS ONE*, *Pest Management Science*, etc.

## **PHILOSOPHY OF EXTENSION:**

My extension philosophy is growers oriented, to translate research-based information into learner-centered resources that growers can use and to train extension educators, crop consultants, pest control advisors, and Nebraska Extension issue team members on topics relevant to weed control and off-target movement of herbicides such as dicamba. The information I generate and transfer guides them through the process of decision-making for weed management. The numerous tools available to us today can serve great use in explaining theories (such as weed ID app), fundamentals, and techniques, as well as contribute to the real-life relevance of the knowledge that farmers gain during extension meetings, Extension Field Days, and group discussions (resistant weed management workshops). For example, using clicker questions will engage attendees and provide better responses through evaluation questions and using Twitter can connect you with clientele to disseminate science based information.

## **STATEMENT OF EXTENSION CONTRIBUTION**

I have developed a weed science extension and outreach program by developing sustainable corn and soybean production system and by teaching the principles of safe and cost-effective weed management. I have had the privilege to serve as a coordinator of the Crop Production Clinics (CPCs; 2014 to 2017), one of the largest extension programs in the Nebraska Extension system. On average, 1,500 to 1,800 clientele attend CPCs across nine locations in Nebraska annually, many of whom also obtain pesticide recertification through CPCs. I have worked with extension specialists and educators across multiple disciplines, departments, and research centers for program planning, advertising, and implementation of this statewide program, in addition to serving as an editor of the CPC Proceedings (a 200-page hard copy containing all information about the CPC presentations). I also organize the Weed Management Field Day at the South Central Ag Lab attended by 100 to 165 clientele every year, as well as the Resistant Weed Management Field Day funded by the Nebraska Corn/Soybean Board. As a further indication of the high visibility of my extension program, I'm frequently interviewed for articles in agricultural trade magazines such as *Nebraska Farmer* and *Corn & Soybean Digest*, newsletters such as Crop Watch (the University of Nebraska Extension's online newsletter for timely information), and industry mailers, as well as online, video (Market Journal, Pure Nebraska), and radio (KRVN, Ag Almanac) commentaries.

I have obtained numerous extension grants: for example, a Co-PI of Nebraska Extension implementation program, a USDA-NIFA funded [\$477,400 (2014 to 2017); \$627,447 (2017 to 2019)] statewide program. I am the PI of a project sponsored by the Nebraska Soybean Board (\$301,939) for the management of glyphosate-resistant Palmer amaranth; and a project from the Nebraska Corn Board (\$95,673) for the management of atrazine and HPPD inhibitor-resistant Palmer amaranth in field and seed corn.

## **CURRENT EXTENSION PROGRAM (48% responsibility)**

Corn and soybean are major crops in eastern Nebraska and grown on 8 to 10 and 4.5 to 6 million acres annually, respectively. Corn and soybean generate more than \$5.0 billion annually, and weed management is a vital component of corn and soybean production. Nebraska has several thousand corn and soybean growers and crop consultants. With such a large and diverse industry, there is great demand for information and education about weed management, specifically when six weeds have evolved resistance to glyphosate and they are widespread. The goal of my extension program is to meet that demand for education with research-based information. The primary objective of my extension program is to develop a more sustainable corn and soybean production system by teaching the principles of safe, effective, and cost-effective weed management. I am a member of **Nebraska Extension Issue Team # 3: Resistant and invasive pests** and providing leadership for activities related to the management of herbicide-resistant weeds. My weed science extension program is divided into three major goals:

**Extension Interest Group:** Crops and Water

**A. Develop weed management educational resources and serve as leader of a weed science extension action team that translates research-based information into learner-centered resources that Nebraskans can use**

**Objectives:**

- To inform the issue team (# 3 Resistance and invasive pests, Crops of the Future, and Extension implementation program) and other clientele about the latest research-based weed control information.
- Creating educational resources and recommendations to solve weed problems in corn, soybean, and sorghum.
- Provide leadership and contribution to extension programs, including Crop Production Clinics, Crop Management Diagnostic Clinics, Herbicide-Resistance Management Field Days, Weed Management Field Days, etc.

**Goal Accomplishments/Outcomes**

- Coordinated **Crop Production Clinics (CPCs)** during 2014 to 2017. On average, 1,500 to 1,800 clientele attend CPCs across nine locations in Nebraska. I work with several extension specialists and educators in multiple disciplines/departments and research centers for program planning and implementation of this program. CPCs are also a venue for pesticide recertification. Served as an editor of the Proceedings of CPCs for last four years. Prepared 14 presentations for new herbicide updates and I am the lead author in several other presentations, including the management of herbicide-resistant weeds.
- Discussion leader each year at the **Crop Management Diagnostic Clinics (CMDC)** at the Agriculture Research and Development Center [ARDC now Eastern Nebraska Research & Extension Center (ENREC), Mead. Demonstrated and discussed research plots to participants on the topic “Herbicide options for resistance weed management in corn and soybean”, “How to identify weeds”, and “Herbicide-resistant weeds in Nebraska and their management.”
- Organized **Weed Management Field Days in Corn and Soybean** at South Central Ag. Lab, Clay Center each year (2013 to 2017) to demonstrate the latest information for multiple herbicide-resistant crops; new herbicides in corn and soybean. I served as organizer and tour leader and demonstrated several projects (3- to 4-hour program in the field) to 70 to 165 clientele.
- Member of a team organizing **Herbicide-Resistant Weed Management Field Days** at multiple locations for the on-site demonstration of glyphosate-resistant common waterhemp, giant ragweed, and marestail control in soybean funded by Nebraska Soybean Board. Total Attendees: 100 to 230 for each Field Day.
- Organized **Atrazine and HPPD-inhibitor-Resistant Palmer amaranth Management Field Days** near Shickley, NE in 2015 and 2016 funded by Nebraska Corn Board. Total Attendees: 100 to 150.
- Member of a team organizing UNL Extension **Winter Workshops for Weed Resistance Management** at four locations in Nebraska from 2013 to 2015. Delivered presentations about “How herbicide-resistant weeds evolve and disseminate.” Participants: 10 to 40.

**Impacts:**

- **Crop Production Clinics (CPCs)** are a team effort, with a total of 1,500-1,800 attendees across nine locations representing over 10 million acres. The weighted average per acre anticipated value of the program is \$3.5-4.0. The value of the program to the state’s crop production is \$25-40 million annually, and survey work revealed that 75% of participants described weed management information provided during CPCs as very valuable for weed control in corn and soybean.

Year	Total attendees	Pesticide recertification	Total acres influenced (Million acres)	Program value (Million \$)
2013	1,428	679	18	40
2014	1,777	1,098	15	25
2015	1,543	704	20	28
2016	1,680	992	6.6	26
2017	1,540	847	7.2	28

- **Corn and Soybean Weed Management Field Days** that I began organizing annually at South Central Ag Laboratory near Clay Center starting in 2013. The Field Days are attended by 70-165 clientele, with 80 to 86% saying that the program was above average or one of the best they'd attended, and 68 to 78% saying that information provided during the field day helped them manage hard-to-control, herbicide-resistant weeds.

Year	Total attendees	Additional program value/Acre (\$)	Program evaluation/Impact
2013	70	3.5	71% of participants noted significant improvement in knowledge gained; 63% of participants will expand/modify herbicide programs with different modes of action
2014	75	3.8	65% of participants noted significant improvement in knowledge gained; 78% of participants will expand/modify weed management programs
2015	135	4.2	36% of participants noted significant improvement; 34% noted major improvement in knowledge gained for multiple herbicide-resistant crop cultivars; 60% of participants will expand/modify herbicide programs with information provided in field day
2016	142	4.1	85% of participants noted significant improvement in knowledge gained; 78% of participants will expand/modify weed management programs
2017	165	5.2	82% of participants noted significant improvement in knowledge gained; 80% of participants will expand/modify weed management programs

- **Herbicide-Resistant Weed Management Field Days** conducted by UNL weed scientists at various locations were attended by 100-300 clientele and rated extremely useful and timely in learning about control options for glyphosate-resistant common waterhemp, giant ragweed, and marestail. The feedback from 62% of Fremont and 70% of Lincoln attendees suggested above-average improvement in grower knowledge for managing herbicide-resistant weeds. Invited out of state, renowned speakers such as Dr. Jason Norsworthy, Dr. Curtis Thompson for the Field Day at Shickley.

Year	Location (NE)	Weed	Total attendees
2013	David City	Glyphosate-resistant giant ragweed	109
2013	Fremont	Glyphosate-resistant waterhemp	190
2014	Lincoln	Glyphosate-resistant marestail	210
2014	Fremont	Glyphosate-resistant waterhemp	185
2015	Shickley	Atrazine + HPPD inhibitor-resistant Palmer amaranth	105
2016	Shickley	Atrazine + HPPD inhibitor-resistant Palmer amaranth	152

- **Crop Management Diagnostic Clinics** is a team effort organized at ARDC (now ENREC), Mead, where I serve as a discussion leader for weed management-related topics. Attendees represent 40-50 Nebraska counties and 6-8 states; total land area managed or influenced by the advisors/employees is 5.4-8.0 million acres; estimated value of the knowledge gained or anticipated practice changes on a per acre basis is \$7 to 9; estimated total value of the program is \$17-80 million.

Year	Attendees	Total acres influenced (Million)	Program value* (Million \$)	Impact of Amit's presentation
2013	80	7	66	74% of participants noted major or significant improvement in knowledge gained for weed control in corn; 69% of participants will expand/modify or start using herbicides with different modes of action
2014	75	7.9	77	56% of participants noted major or significant improvement in weed control in soybean; 50% of the participants noted major or significant improvement in management of herbicide-resistant weeds in soybean.

2015	60	5.46	39	62% of participants noted significant improvement in weed identification; 74% noted moderate or significant improvement in their knowledge of new herbicides
2016	35	2.25	17.2	100% of participants noted moderate or significant improvement in weed identification

\*Program value figures are based on the producer and advisors/employee responses to the acres managed inquiry and those who responded to the estimated per acre value inquiry –so these are conservative figures.

**B. Deliver timely information to growers’ questions during the crop season through Trade Journals/Magazine Articles/Telephone interviews (e.g., Crop Watch, Market Journal, and other appropriate venues)**

**Objectives:**

- To solve growers’ problems/inquiries by telephone and personal visit (if required) for suspected-herbicide-resistant weed seed collection and/or herbicide-injury diagnostics. When several inquiries are received on the same topic, provide timely information to clientele by writing articles for a mass media outlet (such as Crop Watch, or telephone interviews with media outlets such as Nebraska Farmer, Corn & Soybean Digest, No-Till Farmer, Great Lakes Hybrids, etc.).
- Support UNL’s Plant and Pest Diagnostic Clinic for weed identification and herbicide injury symptoms.
- Provide research-based, timely, and economic weed management recommendations in corn, soybean, and sorghum.

**Goal Accomplishments/Outcomes:**

- Made over 75 weed management-focused presentations to Nebraska stakeholders at extension and external meetings. Presented current weed management information to over 10,000 individuals.
- Updated weed management recommendations (2013 to 2017) in the Guide for Weed, Disease, and Insect Management in Nebraska (EC 130) based on herbicide efficacy trials and other research projects.
- Provided solutions to more than 400 telephone inquiries from growers and crop consultants about weed control issues, primarily for the management of herbicide-resistant weeds. Some example questions include: What are post-emergence herbicide options for controlling glyphosate-resistant marestail and common waterhemp in soybean? What are burndown herbicide options before planting soybean or corn? Which are residual herbicide options after soybean emergence?
- Provided solutions to about 50 samples received by UNL’s Plant and Pest Diagnostic Clinic for weed identification and herbicide injury symptoms.
- Published several extension articles based on growers’ questions, serving as author or coauthor of 66 Crop Watch articles and several interviews on weed control topics by trade magazines.
- Using Twitter (@AmitUNL) to extend extension program delivery and impact; have 317 followers.

**Impacts:**

- The Guide for Weed, Disease, and Insect Management in Nebraska (EC 130) is a team effort. It is the largest and most widely distributed extension publication in the University of Nebraska system. Recent distribution of the guide: 2013: 13,000 copies; 2014: 14,500 copies; 2015: 13,000 copies; 2016: 15,000 copies, with a retail price of \$15 per copy.
- The survey conducted during the 2016 Crop Production Clinics estimate weed management information provided by the Guide for Weed, Disease, and Insect Management in Nebraska (EC130) publication to be \$5.15/acre on average.
- Invited by the American Society of Agronomy to be a panelist in a webinar, “In-Season Crop Production Issues”: 350 clientele attended; discussed information about management of Palmer amaranth.
- Interviewed by No-Till Farmer (no-tillfarmer.com) for input on an article, “New tools to knock down troublesome weeds,” published in the book, “Top tips for raising high-yielding no-till soybeans.”

- Interviewed by the United Soybean Board about herbicide options in soybean. Article published on their website: <http://unitedsoybean.org/article/reinforcements-have-arrived>
- Extension article published in Crop Watch received 759 page views; picked up by Corn and Soybean Digest and posted on their website: <http://cornandsoybeandigest.com/crop-chemicals/tips-soil-residual-herbicide-application-emerged-corn>
- Interviewed by the United Soybean Board (based on my article published in Crop Watch) for an article published on their website: <http://unitedsoybean.org/article/eight-residual-herbicide-options-to-consider-after-soybean%20emergence>. The story was also tweeted by the United Soybean Board to several thousand soybean growers and members.
- Interviewed by KRVN, Brownfield Ag News, Market Journal, and Nebraska Farmer about off-target movement of dicamba in Nebraska. Invited by Monsanto and BASF to attend dicamba symposium to discuss off-target movement of dicamba in Nebraska soybean.

### **C. Confirm the occurrence of herbicide-resistant weeds in Nebraska crops and cropping systems and communicate this information to clientele at different venues**

#### **Objectives:**

- Conduct dose-response studies to confirm herbicide-resistant weeds in Nebraska.
- Educate clientele through publications in Crop Watch and other trade journal articles and presentations during Crop Production Clinics, Resistance Management Field Days, etc.
- Conduct field experiments for controlling herbicide-resistant weeds in corn and soybean and organize Field Days for on-site demonstration of research results.

#### **Goal Accomplishments:**

- Dose-response studies confirmed the first cases of glyphosate-resistant common waterhemp, common ragweed, and Palmer amaranth, and atrazine and HPPD-inhibitor-resistant Palmer amaranth in Nebraska.
- Conducted several field experiments to identify alternate herbicide options for control of glyphosate-resistant common waterhemp, marehail, giant ragweed, and common ragweed.
- Confirmation of triazine and HPPD-inhibitor-resistant Palmer amaranth in a seed corn production field in south central Nebraska. Several field experiments conducted for the management of resistant Palmer amaranth in field and seed corn.
- Provided leadership to document dicamba off-target injury issues in Nebraska in 2017 growing season. Collected statewide information about dicamba off-target injury information; informed extension administration, educators, and growers about an issue.

#### **Impacts:**

- Invited by the Agri-Business Association of Nebraska (2014 to 2017) to give a presentation about number of topics in a Research Symposium. Attendees: 50 to 80.
- Invited by Bayer Crop Science to serve as a Board member for the “Respect the Rotation” committee meeting held in Vermont.
- Lead author of a Crop Watch article “Soil residual herbicide options after soybean emergence.” This article received 3,200 page views and garnered attention from several growers, crop consultants, and media outlets.
- Interviewed by Nebraska Farmer for an article, “Fight herbicide-resistance with rotation.” Available at <http://magissues.farmprogress.com/nef/NF09Sep13/nef048.pdf>
- Lead author in a Crop Watch article “Soil residual herbicide options after soybean emergence” Total page views for this article: 17,833.
- Interviewed by Nebraska Farmer (FarmProgress.com) for a story on Palmer amaranth published at <http://farmprogress.com/story-palmer-amaranth-herbicide-resistance-confirmed-nebraska-9-103317>

- Invited by the Nebraska Department of Agriculture (NDA) to give a presentation, “Pollen drift and implication for herbicide-resistance dissemination” for the EPA R7 Regional Pesticide Workshop held at Nebraska City, NE.

### Summary of Extension Publications / Interviews

Type of Publication	Number
Peer-Reviewed Extension Publications (NebGuide and Extension Circulars)	5
Extension Articles in Crop Watch ( <i>UNL Extension’s Online Publication for timely information to clientele</i> )	67 (77,654 views)
Articles in Crop Production Clinics Proceedings	10
Market Journal Videos	15
Telephone interviews published in trade journals/ agriculture magazines	57
Nebraska Ag. Almanac Radio Interviews	8

### Peer-Reviewed Extension Publications

1. Sarangi D, **Jhala AJ** (2017). Identification of grass weeds commonly found in agronomic crops in Nebraska. Extension Circular # 3020. Lincoln, NE: UNL Extension.
2. **Jhala AJ**, Redfearn D, Anderson B, Drewnowski M, Proctor C (2016) Herbicide options for planting forage cover crops following corn and soybean. Pages 1-6 *in* NebGuide (G2276). Lincoln, NE: UNL Extension.
3. Sarangi D, **Jhala AJ** (2015) Tips for identifying post-emergence herbicide injury symptoms in soybean. Pages 1-8 *in* Peer-reviewed Extension Circular (EC 304). Lincoln, NE: UNL Extension.
4. **Jhala AJ**, Sandell L, Knezevic S, Kruger G, Wilson R (2014) Herbicide-resistant weeds in Nebraska. Pages 1-6 *in* Extension Circular (EC 1278). Lincoln, NE: UNL Extension.
5. Sarangi D, **Jhala AJ** (2014) Identification of winter annual weeds. Pages 1-8 *in* Extension Circular (EC 304). Lincoln, NE: UNL Extension.

### Extension Publications in Crop Production Clinics Proceedings

In addition to serve as an editor (2014 to 2017) of the Crop Production Clinics Proceedings (*a 200-page hard copy containing all information about the CPC presentations*), I have authored/coauthored 10 articles published in the Proceedings of Crop Production Clinics in last four years covering various topics for management of herbicide-resistant weeds.

**Other Extension Publications** [Crop Watch Articles; *Crop Watch is a central resource for University of Nebraska–Lincoln Extension information on crop production and pest management available at [www.cropwatch.unl.edu](http://www.cropwatch.unl.edu)*].

(Number of views for each article is listed in a parenthesis; Total number of views 77,549 including all articles)

### 2017 (Total views 19,510)

1. **Jhala AJ**, Rees J (2017) Low temperature and frost may affect efficacy of burndown herbicides. Crop Watch. Nov 9, 2017. <https://cropwatch.unl.edu/2017/low-temperature-and-frost-may-affect-efficacy-burndown-herbicides> (205)
2. **Jhala AJ** (2017) Dicamba injury reports rise in Nebraska. Crop Watch. July 18, 2017. <http://cropwatch.unl.edu/2017/dicamba-injury-reports-rise-nebraska> (1,142)
3. **Jhala AJ** (2017) Liberty label revision allows rate increase. Crop Watch. July 13, 2017. <http://cropwatch.unl.edu/2017/liberty-label-revision-allows-rate-increase> (271)
4. **Jhala AJ**, S. Knezevic, R. Klein (2017) Dicamba injury symptoms on sensitive crops. Crop Watch. June 28, 2017 <http://cropwatch.unl.edu/2017/dicamba-injury-symptoms-sensitive-crops> (1,269)
5. **Jhala AJ** (2017) Grower Q & A: Is this herbicide-resistant Palmer amaranth? June 23, 2017. <http://cropwatch.unl.edu/2017/grower-qa-are-these-weeds-resistant-herbicides> (518)



6. **Jhala AJ** (2017) Consider application restrictions of postemergence herbicides based on soybean growth stage. Crop Watch. June 19, 2017. <http://cropwatch.unl.edu/2017/consider-application-restrictions-postemergence-herbicides-based-soybean-growth-stage> (476)
7. **Jhala AJ** (2017) Consider corn growth stage when applying postemergence herbicides. Crop Watch. June 14, 2017. <http://cropwatch.unl.edu/2017/consider-corn-growth-stage-when-applying-postemergence-herbicides> (504)
8. **Jhala AJ** (2017) Control of glyphosate-resistant corn volunteers in Liberty Link soybean. June 14, 2017. <http://cropwatch.unl.edu/2017/control-glyphosate-resistant-volunteer-corn-liberty-link-soybean> (264)
9. **Jhala AJ** (2017) PPO-inhibiting herbicides and soybean seedling injuries. June 14, 2017. <http://cropwatch.unl.edu/2017/ppo-inhibiting-herbicides-and-soybean-seedling-injuries> (839)
10. **Jhala AJ** (2017) Planting interval of corn after previous year's soybean herbicides. Crop Watch. April 21, 2017. <http://cropwatch.unl.edu/2017/planting-interval-corn-after-previous-years-soybean-herbicides> (383)
11. **Jhala AJ** Proctor C (2017) Post-emergence (rescue) herbicide options for control of glyphosate-resistant marehail in corn and soybean. Crop Watch. March 24, 2017. <http://cropwatch.unl.edu/2017/post-emergence-rescue-herbicide-options-control-glyphosate-resistant-marehail-corn-and-soybean> (1,315)
12. **Jhala AJ** (2017) Effect of excessive rainfall on efficacy of residual herbicides applied in corn and soybean. Crop Watch. May 23, 2017. <http://cropwatch.unl.edu/2017/effect-excessive-rainfall-efficacy-residual-herbicides-applied-corn-and-soybean> (647)
13. **Jhala AJ** (2017) How to differentiate common waterhemp and Palmer amaranth seedlings. Crop Watch. May 16, 2017. <http://cropwatch.unl.edu/2017/how-differentiate-common-waterhemp-and-palmer-amaranth-seedlings> (388)
14. **Jhala AJ**, McMechan M, Rees J, R. Wright, R Elmore, R Klein, Britt Weiser, K. Glewen (2017) Watch for Palmer amaranth in conservation reserve program (CRP) fields. Crop Watch. May 12, 2017. <http://cropwatch.unl.edu/2017/watch-palmer-amaranth-conservation-reserve-program-crp-fields> (205)
15. Klein R, **Jhala AJ**, Knezevic SZ, Kruger GR (2017) Spraying the new phenoxy herbicide formulations in Xtend and Enlist soybeans will present challenges. Crop Watch. May 11, 2017. <http://cropwatch.unl.edu/2017/spraying-new-phenoxy-herbicide-formulations-xtend-and-enlist-soybeans> (522)
16. **Jhala AJ** (2017) Timing is critical with pre-emergence flumioxazin based herbicides in soybeans. Crop Watch. April 26, 2017. <http://cropwatch.unl.edu/2017/do-not-apply-flumioxazin-based-herbicides-after-soybean-have-begun-crack-or-are-emerged> (336)
17. Rees J, Elmore R, Giesler L, Hunt T, Irmak S, **Jhala AJ**, Klein R, Mueller N, Shapiro C, Specht J, Vyhnaek A, Wright R (2017) Planting soybean after soybean (Part 2): In-season management considerations. Crop Watch. April 13, 2017. <http://cropwatch.unl.edu/2017/planting-soybean-after-soybean-part-2-season-management-considerations> (236)
18. Rees J, Elmore R, Giesler L, Hunt T, Irmak S, **Jhala AJ**, Klein R, Mueller N, Shapiro C, Specht J, Vyhnaek A, Wright R (2017) Planting soybean after soybean (Part 1): Planting considerations. Crop Watch. April 13, 2017. <http://cropwatch.unl.edu/2017/planting-soybean-after-soybean-part-1-planting-considerations> (684)
19. **Jhala AJ** (2017) Planting interval of corn and soybean after 2,4-D/dicamba burndown application. Crop Watch. April 7, 2017. <http://cropwatch.unl.edu/2017/planting-interval-corn-and-soybean-after-24-d-dicamba-burndown-application> (2,945)
20. **Jhala AJ** (2017) Status of herbicide-resistant weeds in Nebraska. Crop Watch. March 20, 2017. <http://cropwatch.unl.edu/2017/status-herbicide-resistant-weeds-nebraska> (587)
21. Chahal PS, **Jhala AJ** (2017) Glyphosate-resistant Palmer amaranth confirmed in south-central Nebraska. Crop Watch. March 15, 2017. <http://cropwatch.unl.edu/2017/glyphosate-resistant-palmer-amaranth-confirmed-south-central-nebraska> (946)

22. Sarangi D, **Jhala AJ** (2017) When is a good time to scout and control glyphosate-resistant marestail? Crop Watch. March 8, 2017. <http://cropwatch.unl.edu/2017/when-good-time-scout-and-control-glyphosate-resistant-marestail> (580)
23. **Jhala AJ** (2017) New soybean herbicides for 2017. Crop Watch. March 6, 2017. <http://cropwatch.unl.edu/2017/new-soybean-herbicides-2017> (1,993)
24. **Jhala AJ** (2017) New corn herbicides for 2017. Crop Watch. March 6, 2017. <http://cropwatch.unl.edu/2017/new-corn-herbicides-2017> (856)
25. **Jhala AJ** (2017) 2017 chart for selection of herbicides based on site of action. Crop Watch. Feb 26, 2017. <http://cropwatch.unl.edu/2017/2017-chart-selection-herbicides-based-site-action> (1,199)

**Summary of extension articles published in Crop Watch (2013 to 2017) and their total views:**

Year	No of extension articles	Total views
2017	25	19,510
2016	11	16,997
2015	13	10,111
2014	10	26,708
2013	8	4,428
<b>Total</b>	<b>67</b>	<b>77,654</b>

**Extension Video Segments with Market Journal** (*Market Journal is an educational outreach effort through video presented by the University of Nebraska-Lincoln. Market Journal also airs across the US on RFD-TV.*)

Frequently interviewed by Market Journal for 15 video segments in last four years. Videos are available online on YouTube. **List of example videos in last two years.**

1. **Jhala AJ** (2017) Weed management tips as crop producers prepare for the 2017 growing season. Market Journal. March 24, 2017. <https://www.youtube.com/watch?v=wcjRiaPPA6k>
2. **Jhala AJ** (2017) Dicamba injury issues in Nebraska. Market Journal. Aug 11, 2017. <https://www.youtube.com/watch?v=HN5fPPmHkuY&feature=youtu.be>
3. **Jhala AJ** (2017) Weed control and crop safety in Balance Bean. Market Journal. July 21, 2017. <https://www.youtube.com/watch?v=HLAij8LKBt0&t=70s>
4. **Jhala AJ** (2016) EPA registers XtendiMax- a new formulation of dicamba. Market Journal. Nov 18, 2016. <https://www.youtube.com/watch?v=hNNuwX3LYQg>
5. **Jhala AJ** (2016) New weed control options in soybean. Market Journal. July 8, 2016. <https://www.youtube.com/watch?v=4jUesBzLiO>
6. **Jhala AJ** (2016) Weed management concepts in corn and soybean. Market Journal. June 17, 2016. [https://www.youtube.com/watch?v=zeP-Ug9e\\_jg](https://www.youtube.com/watch?v=zeP-Ug9e_jg)
7. **Jhala AJ** (2016) Management of glyphosate-resistant common waterhemp. Market Journal. May 6, 2016. <https://www.youtube.com/watch?v=KR4rL5mp9MM>
8. **Jhala AJ** (2016) Management of glyphosate-resistant giant ragweed. Market Journal. April 8, 2016. <https://www.youtube.com/watch?v=dfbZNXi1F8s>

**Telephone/Radio Interviews Published in Agriculture Magazines/Radio Programs**

- Frequently interviewed for articles in agricultural magazines such as *Nebraska Farmer*, *Midwest Messenger*, *Corn & Soybean Digest*, newsletters such as Crop Watch and industry mailers, as well as online, video (including Market Journal and NETV), and radio interviews (*KRVN*, *Ag. Almanac*, *Brownfield Ag News*, and *Ag PhD Radio*).
- Invited by Senator Jerry Johnson, Chair of the Agriculture Committee at the Nebraska State Building, to attend a meeting with grape growers about an issue of potential drift and volatility from the

commercialization of soybean tolerant to dicamba and what steps should be taken to mitigate the off-target movement of dicamba. Interviewed by a panel of advocates of the Antitrust Division of the U.S. Department of Justice about the Dow-DuPont merger and its potential impact on the herbicide market in the state of Nebraska.

### **Multidisciplinary Extension Projects/Team Work**

- Co-PI in Nebraska Extension Implementation Program (a USDA-NIFA funded project \$627,447), an excellent example of an interdisciplinary extension program for conducting extension and outreach activities for integrated pest and pesticide management in multiple crops, along with non-crop, public health, and urban areas.
- Provided leadership in Nebraska Crop Production Clinics (CPCs) (2014 to 2017). I work with several faculty members and extension educators in multiple disciplines/departments and research centers for program planning, CPC Proceedings preparation, advertising, and implementation of this program at nine locations across Nebraska.
- Collaborated with several extension educators (Keith Glewen, Jenny Rees, Ron Seymour, Gary Stone, etc.) for extension programs and delivery.
- Co-PI in a USDA-NIFA funded (\$238,500) program “Bridging the gap: Educating multidisciplinary professionals to steward pest management technologies for sustainable agriculture.” Working with several multidisciplinary extension specialists to train Doctor of Plant Health students.
- Co-author of the recently published, “Nebraska Soybean and Corn Pocket Field Guide,” edited by Drs. Jim Specht and Tom Hoegemeyer.
- Due to increasing interest in cover crops, a number of questions were received from growers about herbicides to be used in corn/soybean that will provide opportunities to plant cover crops in the fall and crops that can be used for forage. An interdisciplinary team was built and a Neb Guide is published. **Jhala AJ**, Redfearn D, Anderson B, Drewnowski, M, Proctor C (2016). Herbicide options for planting forage cover crops following corn and soybean. NebGuide (G2276).

### **PHILOSOPHY OF SERVICE:**

My philosophy of service is to engage in activities where I can most effectively apply my professional knowledge, unique skills, and interests for the enrichment of the university and the community. To meet this philosophy, I take every opportunity to volunteer, especially in areas where I feel I can make a contribution to my profession, to the students, the college, the community, and society. Encouraging clientele to feel personally engaged in their learning, the college, and the community is a central part of my commitment to service. It is my belief that having a strong commitment to service enhances my professional and personal growth.

### **SERVICE (2% responsibility)**

#### Service on Department, Institute, and University Committees

- Member of Faculty Biotechnology Release Committee, Institute of Agriculture and Natural Resources (IANR): 2014 to present
- Member of Faculty Advisory Committee, Department of Agronomy & Horticulture: 2013 to 2014
- Member of Safety Committee, Department of Agronomy & Horticulture: 2015 to present
- Chair of Weed Science Working Group (July 2014 to June 2015)
- Member of Graduate Student Fellowship Committee, School of Graduate Studies, UNL (2013 to 2015)
- Serving as a mentor to a new faculty (Dr. Nevin Lawrence)

#### Service on Search Committees

- Member of search committee for extension assistant in Pesticide Safety and Education Program (2014) and weed science research technician for Dr. Lindquist (2016) and Dr. Wortman (2016)

- Member of search committee for weed science extension educator position (2015) and Clay County extension educator position (2017)

### **TEACHING (0% responsibility)**

Though I have no teaching appointment, I am enthusiastic about opportunities to interact with undergraduate and graduate students through guest lectures.

- I integrate my applied research program and my experience working with clientele in my extension program to prepare Agronomy undergraduate students for real-life weed control challenges in a guest lecture for AGRO 405 (Pest Management Session) taught by Dr. Steve Mason.
- I prepare presentations and videos for the Pesticide Safety & Education Program (ASEP) to teach in commercial and private pesticide applicator training programs on the topics “Weeds of Field Crops” and “Right-of-Way Chapter 6: Noxious Weeds.”

### **Advising, Counseling, and Recruiting Students**

- Since joining UNL, I have graduated three M.S. students and two Ph.D. students as a major advisor, have served on the committees of 4 graduate students, and am currently serving on the committees of 7 graduate students.
- I actively involve undergraduate students in my program and employ 2 to 4 undergraduate students each semester.
- Advising a Doctor of Plant Health (DPH) student (Amy Hauver) for her research internship in weed science in summer 2017. Advising an M.S. Agronomy student (Blair Nickelson) in a distance-education program in the Department of Agronomy & Horticulture.
- **Impact:** Invited to the graduate students’ Professional Development Symposium at the North Central Weed Science Society’s annual meeting to present “Want to be a weed scientist with university or industry?” Dec. 10 to 13, 2012. St. Louis, MO.

### **PROFESSIONAL DEVELOPMENT**

- Attended Nebraska Extension Fall Conference in Kearney every year. Attended a session "Learning how to learn" by keynote speaker Dr. Barbara Oakley, Oakland University. Moderator of the session "Applying learning engagement to extension" leading group discussion on the topic.
- Attended Eastern Nebraska Research and Extension Center (ENREC) Spring Conference to learn “How will ENREC increase Nebraska extension and research reach”; “Vision for effective needs assessment.”
- Invited renowned weed scientists (Drs. Jason Norsworthy, Jonathan Gressel, Curtis Thompson, Phil Stahlman; Peter Sikkema) to UNL to deliver research or extension presentations for scientific interactions and learning engagement.
- Attended annual meetings of the North Central Weed Science Society and the Weed Science Society of America to interact with colleagues and students. Attended several presentations for professional development; including “Navigating the new landscape of federal funding”; “Understanding and reducing the impact of herbicide off-site movement”; “Precision agriculture and weed science”; “Teaching undergraduate weed science strategies to improve learning”; “Weed control in 2050: Imagining future strategies and the knowledge needed to achieve them”; “Use of endemic plant diseases and insect pests for biological control of invasive weeds.”