

Vipan Kumar

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Webpage: <https://www.hays.k-state.edu/programs/weeds/index.html>

Google Scholar: <https://scholar.google.com/citations?user=RICepJ0AAAAJ&hl=en>

I. EDUCATION:

Ph.D. Plant Science-Montana State University, Bozeman, MT (completed May 2015)
M.S. Agronomy-Louisiana State University, Baton Rouge, LA (completed May 2011)
B.S. Crop Science-Punjab Agricultural University, Punjab, India (completed Aug 2008)

II. APPOINTMENTS:

Sep 2017-present	<u>Assistant Professor of Weed Science</u> Agricultural Research Center-Hays Kansas State University, Hays, KS
Oct 2018-present	<u>Associate Faculty</u> Department of Plant and Soil Sciences Oklahoma State University, Stillwater, OK
Mar 2019-present	<u>Adjunct Faculty</u> Department of Bioagricultural Sciences & Pest Management Colorado State University, Fort Collins, CO
Jun 2015-Aug 2017	<u>Postdoctoral Research Fellow</u> Southern Agricultural Research Center Montana State University, Huntley, MT
Jun 2011-May 2015	<u>Graduate Research Assistant (Ph.D. Student)</u> Montana State University, Huntley, MT

III. A. RESEARCH AND OUTREACH ACTIVITIES:

RESEARCH ACTIVITIES:

My research interests fall within an area of weed biology, ecology and its management. The primary goal of my research program is to evaluate and develop integrated weed management strategies for irrigated and dry land cropping systems in western Kansas. In recent years, the widespread evolution of herbicide-resistant (HR) weeds (mainly kochia, Palmer amaranth, and horseweed) has threatened the profitability and long-term sustainability of no-till dry land crop production in this region. To achieve the overall goal, my program relies on basic and applied weed science research. Some specific research priorities are listed below:

1. Monitoring the occurrence, spread and characterization of new cases of herbicide-resistant weeds in Kansas cropping systems. This is an important aspect of my research program.

2. Environmental and management factors on germination, emergence and growth behavior of Palmer amaranth, kochia and horseweed populations in U.S. Central Great Plains
3. Evaluate new and existing herbicide chemistries for use in rotation or tank-mixtures for crop safety and control of herbicide-resistant and susceptible weeds in wheat, corn, soybean, sorghum, sunflower, and fallow fields
4. Evaluate newly developed/commercialized herbicide-resistant crop technologies (such as Roundup Ready 2 Xtend® soybeans, CoAXium™ Wheat Production, Inzen™ sorghum) for weed control
5. Off-target injury risk assessment from newly developed herbicide-resistant crops through simulation drift studies
6. Integration of chemical, mechanical (tillage) and cultural practices (crop rotation, seeding rates, row spacing, cover crops) for sustainable weed management in no till dry land production systems of western Kansas

Total Peer Reviewed Publications: 41

Google Scholar Citation Indices	All	Since 2015
Citations	414	413
h-index	11	11
i10-index	16	16

1. **Kumar V.**, R. Liu, D.E. Peterson, P.W. Stahlman. 2020. Effective two-pass herbicide programs to control glyphosate-resistant Palmer Amaranth (*Amaranthus palmeri*) in glyphosate/dicamba-resistant soybean. *Weed Technology* (Accepted)
2. De Sanctis JHS, E R. Barnes, S. Z. Knezevic, **V. Kumar**, and A.J. Jhala. 2020. Residual herbicides affect critical time of Palmer amaranth (*Amaranthus palmeri*) removal in dicamba/glyphosate-resistant soybean. *Agronomy Journal* (In Review)
3. **Kumar V.**, R. Liu, M.R. Manuchehri, E. Westra, T.A. Gaines, C. Shelton. 2020. Feral Rye Control in Acetyl-CoA-Carboxylase (ACCCase)-resistant Winter Wheat in Central Great Plains. *Agronomy Journal* (Accepted)
4. **Kumar V.**, A. Obour, P. Jha, R. Liu, M. Manuchehri, J.A. Dille, J. Holman, and P.W. Stahlman. 2020. Integrating Cover Crops for Weed Management in the Semi-Arid U.S. Great Plains: Opportunities and Challenges. *Weed Science*. DOI: <https://doi.org/10.1017/wsc.2020.29>
5. Yadav R., **V. Kumar**, P. Jha. 2020. Herbicide Programs to Manage Glyphosate-Resistant and Dicamba-Resistant Kochia (*Bassia scoparia*) in Glyphosate plus Dicamba-Resistant Soybean. *Weed Technology*. DOI: <https://doi.org/10.1017/wet.2020.3>

6. **Kumar V.**, R. Liu, P.W. Stahlman. 2020. Differential Sensitivity of Kansas Palmer Amaranth to Glyphosate, Chlorsulfuron, 2,4-D, Dicamba, Atrazine, and Mesotrione. **Agronomy Journal**. <https://doi.org/10.1002/agj2.20178> (*Research results from this study were featured in the CSA News magazine of ASA, CSSA, and SSSA. Volume 65, Issue 5, page 14*)
7. Lyon D.J., M.E. Thorne, P. Jha, **V. Kumar**, T.M. Waters. 2019. Volunteer Buckwheat Control in Wheat. **Crop, Forage, and Turfgrass Management**. DOI: 10.2134/cftm2019.05.0033
8. **Kumar V.**, R. Liu, G. Boyer, P.W. Stahlman. 2019. Confirmation of 2,4-D Resistance and Identification of Multiple Resistance in a Kansas Palmer Amaranth (*Amaranthus palmeri*) Population. **Pest Management Science**. DOI:10.1002/ps.5400
9. **Kumar V.**, R. Currie, P. Jha, P.W. Stahlman (2019) First Report of Kochia (*Bassia scoparia*) with Cross-Resistance to Dicamba and Fluroxypyr in Western Kansas. **Weed Technology**. DOI:10.1017/wet.2018.113
10. Mikha M., A. Obour, **V. Kumar**, P. W. Stahlman. 2018. Soil Physicochemical Properties Influenced by Nitrogen Sources and Rates in the Central Great Plains. **Journal of Soil and Water Conservation** (Accepted on 12/03/2019, **In-press**)
11. **Kumar V.**, R. P. Engel, R. Currie, P. Jha, P. Stahlman, C. Thompson (2018) Dicamba-Resistant Kochia (*Bassia scoparia*) in Kansas: Characterization and Management with Fall- or Spring-Applied Preemergence Herbicides. **Weed Technology**. DOI: 10.1017/wet.2019.4 (*Selected as a featured article in weed Technology journal Vol 33, Issue 2; results from this study were highlighted through an online blog on WSSA website and kochia picture from this study was published on the cover page of this issue*).
12. **Kumar V.**, P. Jha, M. Jugulam, R. Yadav, P. W. Stahlman (2018) Herbicide-Resistant Kochia (*Bassia scoparia*) in North America: A Review. **Weed Science**. DOI: 10.1017/wsc.2018.72 (*Selected as a featured article in Weed Science journal Vol 67, Issue 1; results from this study were highlighted through an online blog on WSSA website and kochia picture from this study was published on the cover page of this issue*).
13. **Kumar V.**, P. Jha, C.A. Lim, P. W. Stahlman (2018) Differential Germination Characteristics of Dicamba-Resistant Kochia (*Bassia scoparia*) Populations in Response to Temperature. **Weed Science**. <https://doi.org/10.1017/wsc.2018.54>
14. Shaw J., P. Jha, P. Nugent, A. Donelick, B. Scherrer, **V. Kumar** (2017) Discrimination of Herbicide-Resistant Weeds with Hyperspectral Imaging. **Journal of Applied Remote Sensing**. DOI:10.1117/1.JRS.12.016037

15. Ganie Z.A., S. Kaur, P. Jha, **V. Kumar**, A. J. Jhala (2017) Effect of Late-Season Herbicide Applications on Inflorescence and Seed Production of Glyphosate-Resistant Giant Ragweed (*Ambrosia trifida* L.). **Weed Technology**. <https://doi.org/10.1017/wet.2017.101>
16. Jha P., **V. Kumar**, C. A. Lim, R. Yadav (2017) Evaluation of Preemergence Herbicides for Crop Safety and Weed Control in Safflower. **American Journal of Plant Sciences**. DOI: [10.4236/ajps.2017.810158](https://doi.org/10.4236/ajps.2017.810158)
17. **Kumar V.**, P. Jha., A. J. Jhala (2017) Using Pyroxasulfone for Downy Brome (*Bromus tectorum* L.) Control in Winter Wheat. **American Journal of Plant Sciences**. DOI: [10.4236/ajps.2017.810159](https://doi.org/10.4236/ajps.2017.810159)
18. **Kumar V.**, J. Felix, D. Morishita, P. Jha (2017) Confirmation of Glyphosate-Resistant Kochia (*Kochia scoparia* L.) from Sugar Beet Fields in Idaho and Oregon. **Weed Technology**. DOI: [10.1017/wet.2017.80](https://doi.org/10.1017/wet.2017.80)
19. **Kumar V.**, P. Jha, J. A. Dille, P. W. Stahlman (2017) Emergence Dynamics of Kochia (*Kochia scoparia*) Populations from the US Great Plains: A Multi-Site-Year Study. **Weed Science**. <https://doi.org/10.1017/wsc.2017.55>
20. **Kumar V.**, P. Jha (2017) First Report of Ser₆₅₃Asn Mutation Endowing High-level Resistance to Imazamox in Downy brome (*Bromus tectorum* L.). **Pest Management Science**. <http://onlinelibrary.wiley.com/doi/10.1002/ps.4673/full>
21. Jha P., **V. Kumar** (2017) Pulse Crop Tolerance and Weed Control with Fall-Applied Soil-Residual Herbicides. **Agronomy Journal**. [Doi:10.2134/agronj2017.06.0320](https://doi.org/10.2134/agronj2017.06.0320)
22. **Kumar V.**, P. Jha, A. Jhala (2017) Confirmation of Glyphosate-Resistant Horseweed (*Conyza canadensis* L.) in Montana Cereal Production and Response to Postemergence Herbicides. **Weed Technology**. <https://doi.org/10.1017/wet.2017.49>
23. **Kumar V.**, P. Jha., J. F. Spring, D. J. Lyon, I. C. Burke (2017) Glyphosate-Resistant Russian thistle (*Salsola tragus* L.) Identified in Montana and Washington. **Weed Technology**. <https://doi.org/10.1017/wet.2016.32>
24. **Kumar V.**, P. Jha (2017) Effect of Temperature on Germination Characteristics of Glyphosate-Resistant and -Susceptible *Kochia scoparia*. **Weed Science**. <https://doi.org/10.1017/wsc.2016.26>
25. Gaines T. A., A. L. Barker, E. L. Patterson, P. Westra, E. P. Westra, R. G. Wilson, P. Jha, **V. Kumar**, A. R. Kniss. 2016. EPSPS Gene Copy Number and Whole-Plant Glyphosate Resistance Level in *Kochia scoparia*. **PLoS One**. <http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0168295>.

26. **Kumar V.**, P. Jha. 2016. Differences in Germination, Growth, and Fecundity Characteristics of Dicamba-Fluroxypyr-Resistant and -Susceptible *Kochia scoparia*. **PLoS One**. <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0161533>
27. **Kumar V.**, P. Jha. 2016. Influence of Nitrogen Rate, Seeding Rate, and Weed Removal Timing on Weed Interference in Barley and Effect of Nitrogen on Weed Response to Herbicides. **Weed Science**. DOI: <http://dx.doi.org/10.1614/WS-D-16-00047.1>
28. Jha P., **V. Kumar**, R. K. Godara, B.S. Chauhan. 2016. Weed management using crop competition in the United States. **Crop Protection**. [Doi:10.1016/j.cropro.2016.06.021](https://doi.org/10.1016/j.cropro.2016.06.021)
29. Jha P., **V. Kumar**, C. A. Lim. 2016. Herbicide Resistance in Cereal Production Systems of US Great Plains: A Review. **Indian Journal of Weed Science**. 48 (2):1–5. <http://dx.doi.org/10.5958/0974-8164.2016.00030.7>
30. Udeigwe T. K., J. M. Teboh, P. N. Eze, M. H. Stietiya, **V. Kumar**, J. Hendrix, H. J. Mascagni (Jr), T. Ying, T. Kandakji. 2015. Implications of Leading Crop Production Practices on Environmental Quality and Human Health. **Journal of Environmental Management**. 151: 267-279. [DOI:10.1016/j.jenvman.2014.11.024](https://doi.org/10.1016/j.jenvman.2014.11.024)
31. Jha P., **V. Kumar**. 2015. Variable Response of Kochia [*Kochia scoparia* (L.) Schrad] to Auxinic Herbicides Dicamba and Fluroxypyr in Montana. **Canadian Journal of Plant Science**. 95 (5): 965-972. [10.4141/CJPS-2015-019](https://doi.org/10.4141/CJPS-2015-019)
32. Jha P., J. K. Norsworthy, **V. Kumar**, N. Reichard. 2015. Annual Changes in Temperature and Light Requirements for *Ipomoea purpurea* Seed Germination with After-Ripening in the Field following Dispersal. **Crop Protection**. 67:84-90. [DOI:10.1016/j.cropro.2014.09.021](https://doi.org/10.1016/j.cropro.2014.09.021)
33. Jha P., **V. Kumar**, J. Garcia, N. Reichard. 2015. Tank-Mixing Pendimethalin with Pyroxasulfone and Chloroacetamide Herbicides Enhances In-Season Residual Weed Control in Corn. **Weed Technology**. 29:198-206. DOI: <http://dx.doi.org/10.1614/WT-D-14-00095.1>
34. **Kumar V.**, P. Jha. 2015. Growth and Reproduction of Glyphosate-Resistant and Susceptible Populations of *Kochia scoparia*. **PLoS One**. 10(11): e0142675. [DOI:10.1371/journal.pone.0142675](https://doi.org/10.1371/journal.pone.0142675)
35. **Kumar V.**, T. K. Udeigwe, E. Clawson, R. Rohli, D. Miller. 2015. Crop Water Use and Stage-specific Crop Coefficients for Irrigated Cotton in mid-South United States. **Agricultural Water Management**. 15:63-69. [DOI:10.1016/j.agwat.2015.03.022](https://doi.org/10.1016/j.agwat.2015.03.022)
36. **Kumar V.**, P. Jha. 2015. Influence of Glyphosate Timing on *Kochia scoparia* Demographics in Glyphosate-Resistant Sugar Beet. **Crop Protection**. 76:39-45. [DOI:10.1016/j.cropro.2015.06.010](https://doi.org/10.1016/j.cropro.2015.06.010)

37. **Kumar V.,** P. Jha. 2015. Control of Volunteer Glyphosate-Resistant Canola in Glyphosate-Resistant Sugar Beet. **Weed Technology**. 29:93-100. DOI: <http://dx.doi.org/10.1614/WT-D-14-00059.1>
38. **Kumar V.,** P. Jha. 2015. Influence of Herbicides Applied Postharvest in Wheat Stubble on Control, Fecundity, and Progeny Fitness of *Kochia scoparia*. **Crop Protection**. 71:144-149. DOI: [10.1016/j.cropro.2015.02.016](https://doi.org/10.1016/j.cropro.2015.02.016)
39. **Kumar V.,** P. Jha. 2015. Effective Preemergence and Postemergence Herbicide Programs for Kochia Control. **Weed Technology**. 29: 24-34. DOI: <http://dx.doi.org/10.1614/WT-D-14-00026.1>
40. **Kumar V.,** P. Jha, D. Giacomini, E. Westra, P. Westra. 2015. Molecular Basis of Evolved Resistance to Glyphosate and Acetolactate Synthase-Inhibitor Herbicides in Kochia (*Kochia scoparia*) Accessions from Montana. **Weed Science**. 63: 758-769. DOI: <http://dx.doi.org/10.1614/WS-D-15-00021.1>
41. **Kumar V.,** P. Jha, N. Reichard. 2014. Occurrence and Characterization of Kochia (*Kochia scoparia*) Accessions with Resistance to Glyphosate in Montana. **Weed Technology**. 28:122-130. DOI: <http://dx.doi.org/10.1614/WT-D-13-00115.1> (A photograph from this study was selected by the editorial board and it was published on a cover page of *Weed Technology* volume 29, issue 1, 2015).

First Reports on Herbicide-Resistant Weed Biotypes: 4

1. First report of kochia populations with cross-resistance to dicamba and fluroxypyr in western Kansas. Reported in fall 2018 from corn research plots near Garden City, KS. Available at <http://weedsience.com/Details/Case.aspx?ResistID=10973>.
2. Confirmation of 2,4-D resistance and identification of multiple resistance to glyphosate, chlorsulfuron, atrazine, and mesotrione in a Kansas Palmer amaranth population (**First Confirmed Global Case**). Reported in spring 2019 from a sorghum field in Barton County, KS. Available at <http://weedsience.com/Details/Case.aspx?ResistID=18157>.
3. Occurrence of a *Downy brome* Population with Cross Resistance to ALS Inhibitors. (**First Confirmed Case from Montana**). Reported in fall 2016 from Clearfield® Wheat field in Carter County, MT. Available at <http://weedsience.com/Details/Case.aspx?ResistID=15071>.
4. Confirmation of Glyphosate-Resistant *Russian-thistle* Biotype in Montana. (**First Confirmed Global Case**). Reported in fall 2015 from chemical-fallow field in Choteau County, MT. Available at <http://weedsience.com/Details/Case.aspx?ResistID=12032>.

Extension Publications and eUpdates: 20

1. **Kumar V.**, R. Liu, T. Lambert (2020) Response of Kansas Feral Rye Populations to Aggressor Herbicide and Management in CoAXium Wheat Production System. Kansas Agricultural Experiment Station Research Reports.
2. **Kumar V.**, R. Liu. 2020. New study evaluated different herbicide programs for Palmer amaranth control in post-harvest wheat stubble. eUpdate; Issue 807; Published: June 26, 2020. <https://bit.ly/2NAq1VL>
3. Liu R., **V. Kumar**, N. Aquilina, T. Lambert (2020) Efficacy of Late-Season Herbicide Programs for Controlling Palmer Amaranth in Postharvest Wheat Stubble. Field Research Report. Kansas Agricultural Experiment Station Research Reports.
4. Liu R., **V. Kumar**, T. Lambert. 2020. Control of multiple herbicide-resistant Palmer amaranth in Enlist corn. Kansas Agricultural Experiment Station Research Reports.
5. Liu R., **V. Kumar**, R.S. Currie, T. Lambert, P.W. Stahlman (2020) Response of Dicamba/Fluroxypyr/Glyphosate-Resistant Kochia to Atrazine and Alternative Postemergence Herbicides. Field Research Report. Kansas Agricultural Experiment Station Research Reports.
6. Lancaster S.R., D. E. Peterson, W.H. Fick, R.S. Currie, **V. Kumar**, and J.W. Slocomb (2020) Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland. Report of Progress 1155. Contribution no. 20-103-S from the Kansas Agricultural Experiment Station. <https://www.bookstore.ksre.ksu.edu/pubs/SRP1155.pdf>
7. **Kumar V.**, R. Liu, D.E. Peterson (2019) Management of Feral Rye with CoAXium® Wheat Production System in Kansas. eUpdate; Issue 769; Published: 10/11/2019. <http://bit.ly/2opHNIV>
8. **Kumar V.**, R. Liu, T. Lambert, P.W. Stahlman (2019) Herbicide Strategies for Managing Glyphosate- and Dicamba-Resistant Kochia in Roundup Ready 2 Xtend Soybean. Field Research Report. Kansas Agricultural Experiment Station Research Reports: Vol. 5: Iss. 6. <https://newprairiepress.org/kaesrr/vol5/iss6/19/>
9. **Kumar V.**, R. Liu, T. Lambert, D.E. Peterson, C. Minihan, P.W. Stahlman (2019) Effective Herbicide Options for Controlling Glyphosate-Resistant Palmer Amaranth in Roundup Ready 2 Xtend Soybean. Field Research Report. Kansas Agricultural Experiment Station Research Reports: Vol. 5: Iss. 6. <https://newprairiepress.org/kaesrr/vol5/iss6/20/>
10. **Kumar V.**, R. Liu, T. Lambert (2019) Characterization and Management of Glyphosate- and HPPD-Inhibitor-Resistant Palmer Amaranth in Kansas Corn Production. Kansas Agricultural Experiment Station Research Reports: Vol. 5: Iss. 6. <https://newprairiepress.org/kaesrr/vol5/iss6/21/>
11. Liu R., **V. Kumar**, R. Perumal, T. Lambert, T. Ostmeyer (2019) Influence of Cultural Practices and Herbicide Programs for Managing Glyphosate-Resistant Palmer Amaranth in

Cold-Tolerant Sorghum. Kansas Agricultural Experiment Station Research Reports: Vol. 5: Iss. 6. <https://newprairiepress.org/kaesrr/vol5/iss6/22/>

12. Obour A.K., J.D. Holman, J.A. Dille, **V. Kumar** (2019) Effects of Spring-Planted Cover Crops on Weed Suppression and Winter Wheat Grain Yield in Western Kansas. Kansas Agricultural Experiment Station Research Reports: Vol. 5: Iss. 6. <https://newprairiepress.org/kaesrr/vol5/iss6/12/>
13. Peterson D.E., W. H. Fick, R. S. Currie, **V. Kumar**, J.W. Slocumb (2019) Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland. Report of Progress 1148. Kansas State University, January 2019. Contribution no. 19-100-S from the Kansas Agricultural Experiment Station.
14. Thompson, C. R., D. E. Peterson, W. H. Fick, R. S. Currie, **V. Kumar**, and J.W. Slocumb (2018) Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland. Report of Progress 1139. Kansas State University, January 2018. Contribution no. 18-215-S from the Kansas Agricultural Experiment Station.
15. **Kumar, V.**, P. W. Stahlman, G. Boyer (2018) Palmer Amaranth Populations from Kansas with Multiple Resistance to Glyphosate, Chlorsulfuron, Mesotrione, and Atrazine. *Kansas Agricultural Experiment Station Research Reports*: Vol. 4: Iss. 7. <https://doi.org/10.4148/2378-5977.7611>
16. **Kumar, V.**, P.W. Stahlman, R. Currie, R. Engel, G. Boyer (2018) Variable Response of Kochia Accessions to Dicamba and Fluroxypyr in Western Kansas. *Kansas Agricultural Experiment Station Research Reports*: Vol. 4: Iss. 7. <https://doi.org/10.4148/2378-5977.7612>
17. **Kumar V.**, R. Currie, P.W. Stahlman (2018) Kochia accessions with cross-resistance to dicamba and fluroxypyr identified in western Kansas. eUpdate; Issue 713; Published: 10/5/2018.
18. Peterson D.E., **V. Kumar** (2018) CoAXium wheat and Aggressor herbicide for grass weed control. eUpdate; Issue 719; Published: 11/09/2018.
19. Jha P., K. McVay, A. Varanasi, **V. Kumar**. 2013. Glyphosate-Resistant Kochia in Montana: Herbicide Recommendations and Best Management Practices for Growers. 4602. Montana State University Extension Research Bulletin. Available at <http://store.msuextension.org/publications/AgandNaturalResources/4602.pdf>
20. Jha P., **V. Kumar**. 2013. Effect of Fertilizer N on Crop-Weed Interactions in Montana Cereal Production. 64. Montana State University Extension Agricultural Experiment Station. Available at <http://www.sarc.montana.edu/php/Research/ffacts/?id=64>

Outreach Activities:

- Several interviews with radio stations, including KSU Ag Today, KAYS 94.3, KFRM, and High Plains Public Radio on various topics such as “Kochia resistant to dicamba and

fluroxypyr in western Kansas”, “Discovery of 2,4-D-resistant Palmer amaranth population from Kansas”, Integrated weed management of HR weeds” and “Imidazolinone-tolerant sorghum for grass weed control”

- K-State Research and Extension News: K-State researchers confirm case of 2,4-D resistance in Palmer amaranth. March 8, 2019
- Phone and in-person interview with a staff writer from The New Food Economy on June 14 and July 3, 2019 for a news story on HR Palmer amaranth. This news story has provisionally been accepted for publication in “*The New York Times Magazine*”
- Interviewed with Dan Donnert (videographer with College of Ag) for a video on weed projects in Hays. <https://www.youtube.com/watch?v=SdgkjGSHHgA&feature=youtu.be>
- Provided expert opinion on a general public question “Are there any instances where superweeds have grown or developed because of GMO crops?” to GMO Answers community on July 12, 2018. <https://gmoanswers.com/ask/are-there-any-instances-where-superweeds-have-grown-or-developed-because-gmo-crops>
- DTN/The Progressive Farmers: Kochia resistant to dicamba and fluroxypyr found in Kansas”. October 11, 2018. <https://www.dtnpf.com/agriculture/web/ag/news/crops/article/2018/10/11/kochia-resistant-dicamba-fluroxypyr>

On-Farm Field Research

- Collaborated with 3 growers near Great Bend, KS for field studies on managing HR weeds in corn, soybeans, and wheat.

Presentations and Field Tours:

- Presented 4 times on HR Palmer amaranth management in *Cover Your Acres Conference* on Jan 15 and 16, 2019 in Oberlin, KS (250 attendees). Delivered a talk on HR weed management in *Weeds Schools* on Feb 19 at Hays (17 attendees); at Bazine (38 attendees); on Feb 20 at Goodland (44 attendees); on Feb 21 at Kansington (45 attendees); on Feb 21 at Hill City (5 attendees)
- Organized a weed management field day in Hays on July 2, 2019 (50 attendees)
- Delivered an online talk on “Current Status and Management of Herbicide-Resistant Horseweed in Montana”. *Dealers and CCA Training* at Montana State University Southern Agricultural Research Center in Huntley, MT on Aug 8, 2019 (45 attendees)
- Delivered 4 presentations and facilitated six field tours on annual *Fall Field Days* in Hays and Garden City in 2018 and 2019

Curriculum Vitae

- Presented “Herbicide-Resistant Kochia in Southcentral Great Plains: Current Options and Path Forward” at *Winter Crops School* Hosted by Oklahoma State University, Dec 18, 2019 at Stillwater, OK (~210 attendees).
- Presented “An Update on Weed Control in Wheat: Clearfield and CoAXium Wheat Technologies” at *Crop Production Update* Hosted by Kansas Agribusiness Retailers Association, Dec 5 at Salina, KS (~75 attendees).
- Presented “Biology and management of HR kochia in Great Plains at *Nebraska Independent Crop Consultant Association* meeting in Kearney, NE on Dec 03, 2018 (85 attendees)

Phone Calls/Emails:

- Attended several phone calls from ag agents, growers from western Kansas, eastern Colorado, and Oklahoma panhandle on various weed problems.
- Exchanged emails with Hannah Holmquist with “GMO Answers” for giving an expert opinion on glyphosate residue in wheat grains. Sep 27, and Oct 3, 2017.

Non-Refereed Publications:

- **Conference Proceedings: 111** (49 oral presentations, 62 poster presentations)
These include proceedings/abstracts from international, national, and regional weed science meetings.

Oral Presentations

1. **Kumar V.**, N. Lawrence, N. K. Aquilina, J.F. Jones, C. Creech, J. Spring (2020) Effectiveness of PRE Herbicides Followed By Zidua POST For Controlling Glyphosate-Resistant Weeds in High Plains Sunflower Production. National Sunflower Association Forum Proceedings.
2. **Kumar V.**, R. Liu, T. Lambert, R.S. Currie, P.W. Stahlman (2020) An update on herbicide-resistant kochia and Palmer amaranth in western Kansas. Weed Sci. Soc. Am/West. Soc. Weed Sci., Mar 2-5, Maui, HI.
3. Liu R., **V. Kumar**, R. S. Currie, P. Geier, T. Lambert, P.W. Stahlman (2020) Characterizing response of glyphosate-, dicamba-, and fluroxypyr-resistant kochia to atrazine and metribuzin. Weed Sci. Soc. Am/West. Soc. Weed Sci., Mar 2-5, Maui, HI.
4. Childers J.T., M. R. Manuchehri, **V. Kumar**, T. Oschner, R. Liu, H. C. Lindell, L. S. Newlin (2020) Non-tolerant wheat response to quizalofop-p-ethyl in central Oklahoma. Weed Sci. Soc. Am/West. Soc. Weed Sci., Mar 2-5, Maui, HI.

5. Westra P, K.A. Howatt, G.R. Kruger, P. A. Dotray, M.R. Manuchehri, **V. Kumar**, B. Bruss (2020) Dichloprop-p combination with auxin herbicides for weed control in chemical fallow. Weed Sci. Soc. Am/West. Soc. Weed Sci., Mar 2-5, Maui, HI.
6. **Kumar V.**, R. Liu, N. Aquilina, I.N. Effertz, T. Lambert, P.W. Stahlman. (2019) Herbicide-Resistant Palmer amaranth in Kansas: Survey and Management. North Cent. Weed Sci. Soc., Dec 10-13, Columbus OH.
7. Liu R., **V. Kumar**, T. Lambert, P.W. Stahlman (2019) Response of a Five-Way-Resistant Palmer Amaranth Population to Preemergence Applied Mesotrione and Atrazine. Oral presentation. North Cent. Weed Sci. Soc., Dec 10-13, Columbus OH.
8. Meyeres T.P., S. Lancaster, D.E. Peterson, **V. Kumar** (2019) Response of Non-Dicamba-Tolerant Soybean Varieties and Traits to Dicamba. North Cent. Weed Sci. Soc., Dec 10-13, Columbus OH.
9. Stahlman P.W., **V. Kumar** (2019) Herbicide Resistant Weeds Threaten No-till Systems: Lessons Learned and Management Challenges. Special Symposium-Generational Threats to no-till Systems: Glyphosate and Urea Dependence. Am. Soc. Agron., Nov 10-13, San Antonio, TX.
10. **Kumar V.**, R. Liu, R.S. Currie, P. Jha, T. Lambert (2019) Characterization and Management of Multiple Herbicide-Resistant Kochia in Western Kansas. Proc. West. Soc. Weed Sci., Mar 11–14, Denver, CO.
11. Liu R., **V. Kumar**, T. Lambert, M.R. Manuchehri (2019) Response of Kansas Feral Rye Populations to Imazamox and Quizalofop-p-ethyl. Proc. West. Soc. Weed Sci., Mar 11–14, Denver, CO.
12. **Kumar V.**, R. Liu, T. Lambert, D. Peterson (2019) Status of Multiple Herbicide-Resistant Palmer Amaranth in Kansas. Proc. Weed Sci. Soc. Am, Feb 11–14, New Orleans, LA.
13. Liu R., **V. Kumar**, R. Perumal, T. Lambert (2019) Integrating Cultural Practices and Herbicides for Managing Glyphosate-Resistant Palmer Amaranth in Sorghum. Proc. Weed Sci. Soc. Am, Feb 11–14, New Orleans, LA.
14. Jha P., **V. Kumar**, C. A. Lim, R. Yadav, S. Leland, J. Anjani (2019) Herbicide Resistance in Montana: Current Status and Future Directions. Proc. Weed Sci. Soc. Am, Feb 11–14, New Orleans, LA.
15. Manuchehri M., J.A. Crose, T. A. Baughman, J. Childers, **V. Kumar** (2019) Horseweed (*Conyza Canadensis* L.) Management in Oklahoma Winter Wheat. Proc. Weed Sci. Soc. Am, Feb 11–14, New Orleans, LA.

16. Childers J.T., M. R. Manuchehri, **V. Kumar**, J.C. Crose, and R. Liu. (2019) Sensitivity of Non-Tolerant Wheat to Quizalofop-P-ethyl in Central Oklahoma. Proc. South Soc. Weed Sci., Feb 3–6, Oklahoma City, OK.
17. **Kumar V.**, R. Liu, E.A. Borgatto, P.W. Stahlman (2018) Management of Glyphosate- and HPPD Inhibitor Resistant Palmer Amaranth in Corn. Proc. North Central Weed Sci. Soc., Dec 03–06, Milwaukee, WI.
18. **Kumar V.**, P. W. Stahlman, G. Boyer (2018) Characterization of Palmer Amaranth Populations from Kansas with Resistance to Multiple Herbicides. Proc. West. Soc. Weed Sci., Mar 12–15, Garden Grove, CA.
19. **Kumar V.**, P. Jha, D.W. Morishita, R. Yadav, A. J., C. A. Lim (2018) Enhanced Tolerance of Common Lambsquarters (*Chenopodium album*) to Glyphosate in Corn-Sugar Beet Rotations in the Western U.S. Proc. of Weed Sci. Soc. Am., Jan 29–Feb 1, Arlington, VA.
20. Lim C. A., P. Jha, Anjani J., **V. Kumar** (2018) Reproductive Fitness of Glyphosate-Resistant and Dicamba-Resistant Kochia (*Kochia scoparia*) in the Presence or Absence of Glyphosate and Dicamba. Proc. of Weed Sci. Soc. Am., Jan 29–Feb 1, Arlington, VA.
21. **Kumar V.**, P. Jha, P. W. Stahlman, Anjani J (2017) Confirmation and Management of ALS-Resistant Downy brome in Wheat Production Systems of the U.S. Great Plains. Proc. North Central Weed Sci. Soc., Dec 4–7, Saint Louis, MO.
22. Jha P., **V. Kumar**, A. R. Kniss, G. Sbatella, N. Lawrence (2017) Herbicide-Resistant Kochia in the US Great Palins: What We Know and Path Forward. Global Herbicide Resistance Challenge. Denver, CO, USA. May 14-18.
23. **Kumar V.**, P. Jha, J. F. Spring, Anjani J, D. Lyon, I. C. Burke (2017) Confirmation and Management of Glyphosate-Resistant Russian thistle (*Salsola tragus* L.) from Montana and Washington. Proc. West. Soc. Weed Sci. 78.
24. Lim C.A., P. Jha, **V. Kumar**, S. Leland, Anjani J (2017) Survival, Growth, and Reproductive Fitness of Dicamba-Resistant Kochia in the Presence of Dicamba. Proc. West Weed Sci. 127.
25. **Kumar V.**, P. Jha, Anjani J., S. Leland (2017) Confirmation and Mechanism of Resistance to Imazamox in Downy Brome (*Bromus tectorum* L.) from Montana. Proc. West. Weed Sci. 164.
26. Jha P., J. Shaw, **V. Kumar**, P. Nugent (2017) Hyperspectral Imaging to Detect Herbicide-Resistant Weeds In-Crop: Convergence of Optical and Ag Technologies. Proc. West. Weed Sci. 166.
27. **Kumar V.**, P. Jha, J. F. Spring, Anjani J, V. K. Nandula, K. N. Reddy, D. Lyon, I. C. Burke. (2017) Characterization of Glyphosate-Resistant Russian thistle (*Salsola tragus* L.) Populations in Montana and Pacific Northwest. Proc. Weed Sci. Soc. Am. 330.

28. Jha P., **V. Kumar**, Anjani J., S. Leland (2017) Field-evolved Resistance of Downy brome (*Bromus tectorum* L.) to Imazamox in Cereal Production. Proc. Weed Sci. Soc. Am. 327.
29. **Kumar V.**, P. Jha, C. A. Lim, Anjani J, S. Leland (2016) Biology and Management of Volunteer Buckwheat in Wheat. Proc. West. Soc. Weed Sci. 108.
30. **Kumar V.**, P. Jha, C. A. Lim, Anjani J, S. Leland (2016) Correlation between Dormancy and Herbicide Resistance Levels in Kochia. Proc. Weed Sci. Soc. Am. 372.
31. Jha P., C. A. Lim, **V. Kumar**, Anjani J, S. Leland (2016) Effect of Glyphosate Selection on Survival and Fecundity Characteristics of Glyphosate-Resistant Kochia with Variable EPSPS Gene Copies. Proc. Weed Sci. Soc. Am. 376.
32. Jha P, **V. Kumar**, C. A. Lim, A. Jha (2015) Key Herbicide-Resistant Weeds in the Cereal Production Systems of US Great Plains. Proceedings of 25th Asian-Pacific Weed Sci. Soc. Conf. on “Weed Science for Sustainable Agriculture, Environment and Biodiversity”, Hyderabad, India, Oct 13-16.
33. **Kumar V.**, P. Jha, S. Leland, C. A. Lim, S. Misra (2015) Correlation of EPSPS Gene Amplification with Resistance Level and Fitness of Glyphosate-Resistant Kochia. Proc. West. Soc. Weed Sci. 95.
34. Jha P., C. A. Lim, **V. Kumar**, S. Leland (2015) Characterization of Multiple Herbicide Resistance in Kochia Accessions from Montana. Proc. Weed Sci. Soc. Am. 271.
35. Jha P., **V. Kumar**, S. Leland, C. Lim (2015) Management of Herbicide-Resistant Kochia in Montana. Proceedings of Montana/Wyoming Sugar beet and Barley Symposium, Billings, MT, January 6-7.
36. **Kumar V.**, P. Jha, P. Westra, E. Westra, D. Giacomini, C. Vanhorn, A. Varanasi (2014) Evolution of Multiple Herbicide-Resistant Kochia: A Threat to Montana Wheat-Fallow Cropping System. West. Soc. Crop Sci. meeting at Bozeman, MT, USA.
37. **Kumar V.**, P. Jha, P. Westra, E. Westra, D. Giacomini, C. Vanhorn (2014) EPSPS Gene Amplification Confers Glyphosate Resistance in Kochia Populations from Montana. Proc. Weed Sci. Soc. Am. 381.
38. **Kumar V.**, P. Jha, A. Varanasi (2014) Ecological Fitness of Auxinic Herbicide-Resistant Kochia. Proc. West. Soc. Weed Sci. 80.
39. Jha P., A. Varanasi, **V. Kumar**, S. Leland (2014) Current Status of Herbicide-Resistant Kochia in Montana. Proc. West. Soc. Weed Sci. 89.

40. Varanasi A., P. Jha, **V. Kumar**, S. Leland (2014) Comparative Growth of Kochia (*Kochia scoparia*) Accessions From Northern and Central Great Plains. Proc. Weed. Sci. Soc. Am. 315.
41. **Kumar V.**, P. Jha, N. Reichard, and J. R. KC (2013) Influence of Glyphosate Timing(s) on Kochia Cohorts in Glyphosate-Resistant Sugar Beet. Proc. Weed. Sci. Soc. Am. 326.
42. **Kumar V.**, P. Jha, N. Reichard, and J. R. KC (2013) Integrated Herbicide Programs for Weed Management in Glyphosate-Resistant Sugar Beet. Proc. West. Soc. Weed Sci. 101.
43. Jha P., **V. Kumar**, and N. Reichard (2013) Kochia Management without Glyphosate in Montana. Proc. West. Soc. Weed Sci. 154.
44. Jha P., **V. Kumar**, and N. Reichard (2013) Non-glyphosate Herbicide Programs for Kochia Management. Proc. Weed Sci. Soc. Am. 232.
45. **Kumar V.**, P. Jha., N. Reichard (2012) Herbicide Programs for Kochia Management Revisited. Proc. West. Soc. Weed Sci. 65:121.
46. Jha P., **V. Kumar**, and N. Reichard (2012) Volunteer Glyphosate-Resistant Canola Control in Glyphosate-Resistant Sugar Beet. Proc. Weed Sci. Soc. Am. 371.
47. Jha P., **V. Kumar**, and N. Reichard (2012) Herbicide Programs for Control of Volunteer Glyphosate-Resistant Canola in Glyphosate-Resistant Sugar Beet. Proc. West. Soc. Weed Sci. 65:122.
48. Udeigwe T. K., **V. Kumar** (2011) Local Reference Evapotranspiration Estimation and the Application to Crop Coefficient Development in Northeast Louisiana (Mid-South). ASA-CSSA-SSSA International Annual Meetings. Saint Antonio, Texas.
49. **Kumar V.**, E. Clawson, T.K. Udeigwe, R. Sheffield, J. Chiu, and S. Hribal (2011) Cotton Crop Coefficients (K_c) for Northeast Louisiana using Weighing Lysimeters. Proc. Beltwide Cotton Conf. New Orleans, LA, January 4-6.

Poster Presentations

1. **Kumar V.**, R. Liu, N. Aquilina, T. Lambert, R. Perumal, T. Ostmeier, A. Tucker. 2020. Integration of Cultural Practices and Herbicides For Weed Control In Grain Sorghum And Soybean. Weed Sci. Soc. Am/West. Soc. Weed Sci., Mar 2-5, Maui, HI.
2. Liu R., **V. Kumar**, N. Aquilina, T. Lambert (2020) Effect Of Late-Season Applied Herbicide Tank Mixtures On Control And Seed Production Of Palmer Amaranth In Postharvest Wheat Stubble. Weed Sci. Soc. Am/West. Soc. Weed Sci., Mar 2-5, Maui, HI.

Curriculum Vitae

3. **Kumar V.**, R. Liu, I. N. Effertz, N.K. Aquilina, T. Lambert, P.W. Stahlman (2019) Control of Multiple Herbicide-Resistant Palmer amaranth. North Cent. Weed Sci. Soc., Dec 10-13, Columbus OH.
4. Aquilina N.K., **V. Kumar**, A. Tucker, R. Liu, T. Lambert (2019) Integrated Weed Management in No-Till Dryland Soybeans with Row Spacing, Seeding Rates and Herbicides. North Cent. Weed Sci. Soc., Dec 10-13, Columbus OH.
5. Effertz I.N., **V. Kumar**, J. A. Dille (2019) Effective Herbicide Programs for Controlling 2,4-D-Resistant Palmer Amaranth in Enlist E3™ Soybeans. North Cent. Weed Sci. Soc., Dec 10-13, Columbus OH.
6. Liu R., **V. Kumar**, P.W. Stahlman (2019) Germination Characteristics of 2,4-D-Resistant and –Susceptible Palmer Amaranth Under Varying Temperature Conditions. North Cent. Weed Sci. Soc., Dec 10-13, Columbus OH.
7. Gastler L., J.A. Dille, S. Duncan, **V. Kumar** (2019) Influence of Grain Sorghum Planting Dates and Palmer Amaranth Emergence Timings on Competitive Outcomes. North Cent. Weed Sci. Soc., Dec 10-13, Columbus OH.
8. Scarparo de Sanctis J.H., P. S. Chahal, **V. Kumar**, S. Z. Knezevic, A.J. Jhala (2019) Effect of Late Season Herbicide Applications on Seed Production of Glyphosate-Resistant Palmer Amaranth. North Cent. Weed Sci. Soc., Dec 10-13, Columbus OH.
9. Scarparo de Sanctis J.H., **V. Kumar**, S. Z. Knezevic, A.J. Jhala (2019) Glyphosate Alternatives for Cereal Rye Termination with Different Application Timings in Soybean. North Cent. Weed Sci. Soc., Dec 10-13, Columbus OH.
10. Mikha M.M, A. Obour, **V. Kumar**, P.W. Stahlman (2019) Management Practices Influenced Soil Chemical Properties and Grain Yield of Eroded Cropland. Am. Soc. Agron., Nov 10-13, San Antonio, TX.
11. **Kumar V.**, R. Liu, T. Lambert, D.E. Peterson, P.W. Stahlman (2019) An Update on Multiple Herbicide-Resistant Palmer Amaranth in Kansas. Proc. West. Soc. Weed Sci., Mar 11–14, Denver, CO.
12. Childers J.T., M.R. Manuchehri, **V. Kumar**, R. Liu, J.A. Crose (2019) Non-Tolerant Wheat Response to Simulated Drift of Quizalofop-P-Ethyl in Central Oklahoma. Proc. West. Soc. Weed Sci., Mar 11–14, Denver, CO.
13. Liu R., **V. Kumar**, T. Lambert, J.F. Jones (2019) Effective Herbicide Programs for Managing Glyphosate-Resistant Palmer Amaranth in Kansas Sunflower Production. Proc. West. Soc. Weed Sci., Mar 11–14, Denver, CO.

14. **Kumar V.**, R. Liu, M. Manuchehri, N. C. Lawrence, M.V. Bagavathiannan, T. Gaines (2019) Emergence Dynamics of Palmer Amaranth Populations from the Central Great Plains. Proc. West. Soc. Weed Sci., Mar 11–14, Denver, CO.
15. Jha P., J.A. Shaw, B. J. Scherrer, **V. Kumar**, R. Yadav, J. Anjani, S. Leland (2019) Weed and Crop Discrimination with Hyperspectral Imaging and Machine Learning. Proc. West. Soc. Weed Sci., Mar 11–14, Denver, CO.
16. **Kumar V.**, R. Liu, T. Lambert, D. Peterson (2019) Effective Herbicide Programs for Managing Glyphosate-Resistant Palmer amaranth in Roundup Ready 2 Xtend Soybean. Proc. Weed Sci. Soc. Am, Feb 11–14, New Orleans, LA.
17. Liu R., **V. Kumar**, T. Lambert, M. Manuchehri, N. C. Lawrence, M.V. Bagavathiannan, T. Gaines (2019) Emergence Characteristics of Palmer Amaranth Populations from the U.S. Central Great Plains. Proc. Weed Sci. Soc. Am, Feb 11–14, New Orleans, LA.
18. Yadav R., P. Jha, **V. Kumar**, S. Leland (2019) Response of Dicamba-Resistant Kochia to Dicamba Applied Preemergence. Proc. Weed Sci. Soc. Am, Feb 11–14, New Orleans, LA.
19. **Kumar V.**, R. Liu, P. Jha, P. W. Stahlman (2018) Herbicide Programs for Managing Glyphosate- and Dicamba-Resistant Kochia in Roundup Ready 2 Xtend Soybeans. Proc. North Central Weed Sci. Soc., Dec 03–06, Milwaukee, WI.
20. Meyeres T. P., D.E. Peterson, **V. Kumar** (2018) Soybean Response to Simulated Dicamba Drift with Varying Application Rates and Timings. Proc. North Central Weed Sci. Soc., Dec 03–06, Milwaukee, WI.
21. Scarparo de Sanctis J. H., S. Knezevic, **V. Kumar**, A. Jhala (2018) Critical Period of Palmer Amaranth Removal Affected by Preemergence Herbicides in Dicamba-Resistant Soybean. Proc. North Central Weed Sci. Soc., Dec 03–06, Milwaukee, WI.
22. Obour A.K., J.D. Holman, A.J. Dille, **V. Kumar** (2018) Forage Production and Weed Suppression Potential of Cover Crops in Semiarid Central Great Plains. Proc. Am. Soc. Agron., Nov 4–7, Baltimore, MD.
23. **Kumar V.**, P. W. Stahlman, R. Currie, R. Engel, G. Boyer (2018) Variable Response of Kochia Populations to Dicamba and Fluroxypyr. Proc. West. Soc. of Weed Sci., Mar 12–15, Garden Grove, CA.
24. Jha P., **V. Kumar**, D. W. Morishita, R. Yadav, Anjani J., C. A. Lim (2018) Variable Tolerance of Common Lambsquarters to Glyphosate in Corn-Sugarbeet Fields. Proc. West. Soc. of Weed Sci., Mar 12–15, Garden Grove, CA.
25. Yadav R., P. Jha, V. Kumar, S. Leland (2018) Management of Glyphosate- and Dicamba-Resistant Kochia (*Kochia scoparia*) in Roundup Ready® 2 Xtend Soybean. Proc. West. Soc. of Weed Sci., Mar 12–15, Garden Grove, CA.

26. **Kumar V.**, P.W. Stahlman, G. Boyer (2018) Investigation of Multiple Herbicide Resistance in Palmer amaranth Populations in Kansas. Proc. Weed Sci. Soc. Am., Jan 29–Feb 1, Arlington, VA.
27. Engel R.P., **V. Kumar**, P.W. Stahlman, G. Boyer (2018) Variable Response of Kansas Kochia scoparia Accessions to Dicamba. Proc. Weed Sci. Soc. Am., Jan 29–Feb 1, Arlington, VA.
28. Jha P., **V. Kumar**, Anjani J., R. Yadav, C.A. Lim (2018) Evolution of ALS-Resistant Downy Brome in Montana Cereal Production. Proc. Weed Sci. Soc. Am., Jan 29–Feb 1, Arlington, VA.
29. Yadav R., P. Jha, **V. Kumar**, S. Leland (2018) Management of Glyphosate- and Dicamba-Resistant Kochia (Kochia scoparia) in Roundup Ready Xtend Soybean. Proc. Weed Sci. Soc. Am., Jan 29–Feb 1, Arlington, VA.
30. **Kumar V.**, P. Jha, P. W. Stahlman, M. Jugulam, R.S. Currie, J.A. Dille, D.E. Peterson, C.R. Thompson, D. Shoup (2017) An Overview of Herbicide-Resistant Weeds in Kansas. Proc. North Cent Weed Sci. Soc., Dec 4–8, Saint Louis, MO.
31. **Kumar V.**, P. Jha, Anjani J., C. A. Lim, S. Leland (2017) Evolution and Management of Glyphosate-Resistant Weeds in Wheat-Fallow in Montana. Global Herbicide Resistance Challenge. Denver, USA. May 14-18.
32. Jha P., **V. Kumar**, Anjani J., J. F. Spring, D. J. Lyon, I. C. Burke, V. K. Nandula, K. N. Reddy (2017) Evolution of Glyphosate-Resistant *Salsola tragus* L. (Russian thistle) in Montana and Pacific Northwest. Global Herbicide Resistance Challenge. Denver, USA. May 14-18.
33. Jha P., **V. Kumar**, S. Leland, Anjani J, C. A. Lim (2017) Evolution of Glyphosate-Resistant Horseweed and Russian thistle in Montana Cereal Production. Proc. West Soc. Weed Sci. 31.
34. Lim C. A., P. Jha, **V. Kumar**, S. Leland, Anjani J (2017) Survival, Growth, and Fecundity of Kochia Cohorts with Varying Densities Under Different Crop Canopies. Proc. West Soc. Weed Sci. 47. **(1st position in student oral competition at WSWS meeting in Coeur D’Alene, ID).**
35. **Kumar V.**, P. Jha, Anjani J., C. A. Lim, S. Leland (2017) Confirmation and management of newly evolved glyphosate-resistant Russian-thistle (*Salsola tragus* L.) and horseweed (*Conyza Canadensis* L.) in Montana cereal production. Proc. Weed Sci. Soc. Am. 34.
36. Jha P., **V. Kumar**, P. Nugent, A. Donelick, B. Scherrer, J. Shaw (2017) Hyperspectral imaging to detect glyphosate-resistant vs. glyphosate-susceptible *Kochia scoparia*: Implications for site-specific management. Proc. Weed Sci. Soc. Am. 62.

37. **Kumar V.**, P. Jha, S. Leland, Anjani J, C. A. Lim (2016) Seed Germination Dynamics of Herbicide-Resistant and Susceptible Populations of *Kochia scoparia*. Proc. West Soc. Weed Sci. 64.
38. Lim C.A., P. Jha, **V. Kumar**, Anjani J, S. Leland (2016) Survival and Fecundity of Glyphosate-Resistant *Kochia* with Variable EPSPS Gene Copies in Response to Glyphosate Selection. Proc. West Soc. Weed Sci. 33. (**1st position in student poster competition at WSWs meeting in Albuquerque, NM**).
39. Jha P., J. Felix, D. Morishita, **V. Kumar**, Anjani J (2016) Survey of Glyphosate-Resistant *Kochia* in Eastern Oregon Sugar Beet Fields. Proc. West Soc. Weed Sci. 35.
40. **Kumar V.**, P. Jha, C. A. Lim, Anjani J, S. Leland (2016) Distribution of Multiple Herbicide-Resistant *Kochia* in Montana. Proc. Weed Sci. Soc. Am. 204.
41. Jha P., **V. Kumar**. 2015. Best Management Practices (BMPs) for Herbicide Resistance Management: A Review. 25th Asian-Pacific Weed Sci. Soc. Conf. Hyderabad, India, Oct 13-16.
42. Morishita D., J. Felix, P. Jha, **V. Kumar** (2015) Confirmation of Glyphosate-Resistant *Kochia* in Idaho and Oregon. Proc. West. Soc. Weed Sci. 27.
43. Jha P., **V. Kumar**, S. Leland, C. A. Lim (2015) Variable Response of *Kochia* to Dicamba and Fluroxypyr in Montana. Proc. West. Soc. Weed Sci. 28.
44. Lim C.A., P. Jha, **V. Kumar**, S. Leland (2015) Survey of Multiple Herbicide-Resistant *Kochia* in Montana. Proc. West. Soc. Weed Sci. 31.
45. Lim C. A., P. Jha, **V. Kumar**, S. Leland (2015) Influence of Pyroxasulfone Rate and Application Timing on Downy Brome Control in Clearfield Winter Wheat. Proc. West. Soc. Weed Sci. 40.
46. **Kumar V.**, P. Jha, M. Flenniken, S. Misra (2015) Does *EPSPS* Gene Amplification Confer Fitness Cost in Glyphosate-Resistant *Kochia*? Proc. Weed Sci. Soc. Am. 110.
47. Jha P., D. W. Morsishita, J. Felix, **V. Kumar**, M. Flenniken (2015) Confirmation of Glyphosate-Resistant *Kochia* in Idaho and Oregon. Proc. Weed Sci. Soc. Am. 104.
48. Walsh O., P. Jha, A. Varanasi, **V. Kumar**, S. Leland (2014) Light-Activated Sensor Controlled Sprayer (Weed Seekers[®]) for Cost-Effective Weed Control in Post-Harvest Wheat Stubble. Proc. ASA-CSSA-SSSA International Annual Meeting, Long Beach, CA.
49. **Kumar V.**, P. Jha, P. Westra, E. Westra, D. Giacomini, C. Van Horn, A. Varanasi (2014) Molecular Characterization of Glyphosate- and Acetolactate Synthase Inhibitor-Resistant *Kochia* from Montana. Proc. West. Soc. Weed Sci. 21. (**1st position in student poster competition at WSWs meeting in Colorado Spring**).

50. **Kumar V.**, P. Jha, A. Varanasi, S. Leland (2014) Kochia Management with Herbicides Applied Postharvest in Wheat Stubble. Proc. Weed Sci. Soc. Am. 23.
51. Jha P., **V. Kumar**, A. Varanasi (2014) Use of Pyroxasulfone for Weed Control in Clearfield® Wheat System. Proc. West. Soc. Weed Sci. 34.
52. Jha P., A. Varanasi, **V. Kumar**, S. Leland (2014) Light-Activated Sensor Controlled Sprayer (Weed Seeker®) for Cost-Effective Weed Control in Post-Harvest Wheat-Stubble. Proc. West. Soc. Weed Sci. 30.
53. Varanasi A., P. Jha, **V. Kumar**, S. Leland (2014) Emergence Characterization of Kochia (*Kochia scoparia*) Accessions from Northern and Central Great Plains. Proc. Weed Sci. Soc. Am. 83.
54. **Kumar V.**, P. Jha, N. Reichard, J. R. KC (2013) Does Fertilizer N Influence Crop-Weed Competition and Response to Herbicides? Proc. Weed Sci. Soc. Am. 28.
55. **Kumar V.**, P. Jha, N. Reichard, J. R. KC (2013) Does Fertilizer N Influence Crop-Weed Competition and Weed Response to Herbicides? Proc. West. Soc. Weed Sci. 42.
56. Jha P., **V. Kumar**, N. Reichard (2013) Evaluation of Preemergence Residual Herbicide Programs for Weed Control in Glyphosate-Resistant Corn. Proc. Weed Sci. Soc. Am. 5.
57. Jha P., **V. Kumar**, N. Reichard (2013) Preemergence Residual Herbicides: A Valuable Tool for Weed Control in Glyphosate-Resistant Corn. Proc. West. Soc. Weed Sci. 33.
58. Reichard N., P. Jha, **V. Kumar** (2013) Evaluation of Pyroxasulfone for Crop Safety and Downy Brome Control in Winter Wheat. Proc. West. Soc. Weed Sci. 41.
59. KC J. R., P. Jha, **V. Kumar**, N. Reichard (2013) Herbicide Programs for Weed Control in Clearfield Lentils. Proc. West. Soc. Weed Sci. 49.
60. **Kumar V.**, P. Jha., N. Reichard. 2012) Comparison of Fluroxypyr Herbicide Combinations for Broadleaf Weed Control in Spring Wheat. Proc. West Soc. Weed Sci. 65:55.
61. Jha P., **V. Kumar**, N. Reichard (2012) Zidua (Pyroxasulfone): A New Chemistry for Preemergence Residual Weed Control in Glyphosate-Resistant Corn. Proc. Weed Sci. Soc. Am. 4.
62. Jha P., **V. Kumar**, N. Reichard (2012) Use of Pyroxasulfone for Preemergence Residual Weed Control in Glyphosate-Resistant corn. Proc. West. Soc. Weed Sci. 65:61.

III.B. GRANTS AND CONTRACTS:

Total grant secured **\$1,361,850** as PI/Co-PI (**\$656,996** directed to my program)

2019

Funded total [Principal Investigator (PI) and Co-PI]: \$839,637

Funds Directed to the Program: \$396,196

2018

Funded total [Principal Investigator (PI) and Co-PI]: \$522,213

Funds Directed to the Program: \$260,800

IV. TEACHING AND MENTORSHIP:

Responsible for weed management-related teaching (outreach) to agricultural clientele of Kansas. No formal appointment for classroom instruction. No formal appointment in Kansas Cooperative Extension Service.

Courses Instructed (guest lectures and labs)

- AGRI 621: Weed Science-Fall semester 2017, Fort Hays State University
- AGRI 621: Weed Science-Fall semester 2018, Fort Hays State University
- Hosted a weed science class from Fort Hays State University on Aug 28, 2018 and Sep 3, 2019.

Graduate Students (Advisor/committee member)

- Tyler Meyeres, M.S. student. Department of Agronomy. May 2018- May 2020. *Co-advisor*.
Thesis title: Effect of simulated dicamba drift on non-Xtend soybeans.
- Isaac Effertz, M.S. student. Department of Agronomy. May 2019-present. *Co-advisor*.
Thesis title: Integrated Weed Management in Xtend soybeans.
- Lindsey Gastler, M.S. student. Department of Agronomy. May 2019-present. *Committee Member*
- Tanner Childer, M.S. student. Department of Plant and Soil Sciences, Oklahoma State University. Oct 2018-present. *Committee Member*
- José Henrique De Sanctis, M.S. student. Department of Agronomy and Horticulture, University of Nebraska-Lincoln. Nov 2018-present. *Committee Member*
- Gurpreet Kaur, Ph.D. student. Agronomy department, Punjab Agricultural University, Punjab, India. Aug 2018-present. *External Committee Member*.
Dissertation title: Molecular and biochemical basis of herbicide resistance in *Phalaris minor* and its management in wheat in a rice-wheat system.

Assistant Scientist/visiting scholars

- Dr. Rui Liu (assistant scientist) Oct 2018-present.
- Natalie Aquilina (visiting scholar) June 2019-December 2019.

Undergraduate Students/Summer Interns

- Cole Walters. Undergraduate student. Fort Hays State University. Aug 2018-present.

- Project:* Field research on weed biology/ecology and management.
- Olivia Barber. Undergraduate student. Fort Hays State University. Aug 2019-present.
Project: Herbicide resistance screening of Palmer amaranth from Kansas
- Larae Boaldin. Undergraduate student. Fort Hays State University. Aug 2018-Dec 2018.
Project: Greenhouse research on weed biology/ecology.
- Ryan Engel. Undergraduate student. Fort Hays State University. Sep 2017–Dec 2017.
Project: Evaluating PRE and POST applications of dicamba on dicamba-resistant kochia.
- Peyton Thorell. High school student from Hays, Kansas. May 2018–July 2018.
Project: Weed control in agronomic crops of Kansas.
- Logan. High school student from Hays, Kansas. May 2018–July 2018.
Project: Weed control in soybean and corn.

V. PROFESSIONAL SERVICE:

- American Society of Agronomy (ASA); Member: 2010-present
 - i) **Associate Editor** for *Agronomy Journal*: since Sep 2017
 - ii) Reviewer for *Agronomy Journal* and *Crop, Forage, and Turfgrass Management*
- Weed Science Society of America (WSSA); Member: 2013-present
 - i) **Associate Editor** for *Weed Science Journal*: since Mar 2020
 - ii) **Associate Editor** for *Weed Technology Journal*: since Mar 2020
 - iii) Committee member for outstanding paper in *Weed Technology* journal: 2017-present
 - iv) Committee member for outstanding paper in *Weed Science* journal: 2016-present
 - v) Committee chair of E8: Environmental aspects and weed management:2019-present
 - vi) Served in graduate students’ poster competition as judge at the 2018 and 2019 WSSA meeting
 - vii) Chair-elect for “Formulation, Adjuvant, &Application Technology” session:2019
- Western Society of Weed Science (WSWS); Member: 2012-present
 - i) Chaired for “Agronomic Crops” session for 2019 WSWS annual meetings
 - ii) Chaired herbicide resistant plants committee
 - iii) Served in graduate students’ oral competition as judge at the 2018 annual meeting
- North-central Weed Science Society (NCWSS); Member: 2017-present
 - i) Committee member of distinguished achievement award: 2017-present
 - ii) Served as committee member on strategic planning since Mar 2018- Dec 2019
 - iii) Chaired “Physiology” session for 2019 annual meeting
- Chair of a multistate project (WERA-77) to coordinate research and extension activities on managing invasive weeds in wheat-based cropping systems.
- Reviewed 45 manuscripts for the peer reviewed journals: *Weed Science*, *Weed Technology*, *Pest Management Science*, *Crop Protection*, *Agronomy Journal*, *Journal of Environmental Management*, *Crop, Forage and Turfgrass Management*, *PLoS ONE*, *Journal of Hazardous Materials*, *Canadian Journal of Plant Science*, *Weed Research*, *Science of Total Environment*.

Professional Societies Affiliation

- Weed Science Society of America (WSSA)

- Western Society of Weed Science (WSWS)
- North Central Weed Science Society (NCWSS)
- American Society of Agronomy (ASA)

VI. HONORS AND AWARDS:

- **Outstanding Weed Scientist-Early Career** from Western Society of Weed Science (2020)
- **Outstanding Reviewer for Weed Science Journal** from Weed Science Society of America (2020)
- **Elena Sanchez Memorial Outstanding Weed Science Student** for the Western Society of Weed Science at Portland, OR, USA (2015).
- **First position in student poster contest** in the Western Society of Weed Science conference at Colorado Springs, CO, USA (2014).
- **Second position in student oral presentation contest** in the Western Society of Weed Science conference at Colorado Springs, CO, USA (2014).
- **Third position in A. K. Dobrenz Student Oral Presentation Competition** in Branch meeting of the Western Society of Crop Science at Bozeman, MT, USA (2014).
- Recipient of **Dr. S. S. Labh Singh gold medal for the first position** in Bachelor of Science in agronomy at Punjab Agricultural University, India (2009).