

VARSHA SINGH, Ph.D.

Extension Weed and Brush Specialist

New Mexico State University

Knox Hall, 2980 S Espina St, Las Cruces, NM 88003

vs2794@nmsu.edu; (575)646-4226

EDUCATION

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| Ph.D. – Weed Physiology Mississippi State University, Mississippi State, MS Dissertation: “Identification and quantification of allelochemicals associated with weed suppression in sweetpotato” | 2023 |
| Master of Science – Molecular Biology and Biotechnology CCS Haryana Agricultural University, Hisar, India Thesis: “Phenotyping and molecular marker analysis in backcross and F ₄ generations of wheat for salt tolerance” | 2018 |
| Bachelor of Science – Botany, Zoology, and Chemistry Kurukshetra University, Kurukshetra, India | 2016 |

PROFESSIONAL EXPERIENCE

Extension Weed and Brush Specialist (February 2026 to Present) at New Mexico State University: In my current role, I will develop and deliver statewide Extension and research programs addressing critical challenges in rangeland weed and brush management. My program will integrate applied research, producer outreach, and stakeholder engagement to provide science-based solutions for invasive species management, herbicide efficacy, and sustainable vegetation management in western rangelands.

Postdoctoral Associate (August 2023 to February 2026) at Pontotoc Ridge-Flatwoods Branch Experiment Station: In my current role, I engage in research, management, and outreach to advance agricultural science. My research focuses on evaluating nutsedge management strategies in sweetpotato and developing virus testing protocols, with research conducted across field, greenhouse, and laboratory settings. I also investigate the impact of cover crops and poultry litter on soybean yield and quality, supporting sustainable crop production practices. With expertise in tissue culture techniques, I establish and maintain virus-free sweetpotato plant populations, contributing to plant health and productivity. In addition to research, I mentor graduate students, foster a collaborative team environment, and oversee research projects to ensure efficient execution and data integrity. I also contribute to grant-writing efforts to support ongoing and future research initiatives. My role extends to outreach, including organizing field days, engaging with farmers, and collaborating with stakeholders to translate research findings into real-world agricultural applications. Through the publication of scientific articles, I aim to disseminate knowledge that bridges the gap between research and practice, reinforcing my commitment to impactful and applied agricultural science.

Teaching Assistant (August 2022 to December 2022) at Mississippi State University: As a Teaching Assistant during the Fall 2022 semester, I played a key role in the course ‘Environmental Fate of Herbicides’. My responsibilities included mentoring students in the practical aspects of the curriculum, with a particular focus on assessing herbicide concentrations in plant tissues. To impart practical skills, I guided students proficiently using advanced analytical instruments, including the

spectrophotometer, Liquid Scintillation Counter, and High-Performance Liquid Chromatography (HPLC). Through hands-on instruction, I ensured students developed a comprehensive understanding of assay techniques, data interpretation, and the application of analytical methods in the context of environmental herbicide fate.

Graduate Research Assistant at Mississippi State University, Mississippi State, MS (January 2020 to May 2023): My doctoral research focused on 1) The identification of weed-suppressive sweetpotato varieties by conducting greenhouse studies using the stair-step assay, 2) Assessing the allelopathic weed-suppressive potential of sweetpotato varieties under field conditions, 3) The identification and quantification of allelochemicals associated with weed suppressive traits in sweetpotato. Our data established that sweetpotato varieties 529, Morado, Centennial, and Hatteras, were allelopathic against Palmer amaranth in the greenhouse study. Under field conditions, sweetpotato varieties Morado and 529 were the most allelopathic against yellow nutsedge, goosegrass, and morningglory. In contrast, Heart-O-Gold and Beauregard were the least allelopathic. Hatteras, 529, and Heart-O-Gold were most effective in reducing redroot pigweed density. We observed the release of several allelochemicals from these allelopathic varieties during HPLC analysis. These varieties could be used in sweetpotato breeding programs for developing cultivars with improved yield and weed-suppressive ability. Additionally, I trained undergraduate and graduate students assigned to our lab to ensure the timely completion of their assigned research projects.

Master's Student at CCS Haryana Agricultural University, Hisar, India (August 2016 to July 2018): Worked on the introgression of salinity-tolerance-imparting genes, *Nax1* and *Nax2*, from a poor-yielding but highly salt-tolerant wheat variety into two popular but salt-sensitive wheat varieties. Various morphological parameters for different generations derived from the crosses HD2967 X Kharchia 65 and WH1105 X Kharchia 65 were evaluated for the effect of initial salt stress. Superior salt stress-tolerant plants were selected using marker-assisted selection (SSRs). These plants were forwarded to the next generation for developing salinity-tolerant wheat lines. I also taught molecular lab techniques during workshops organized by the department.

AWARDS

- **3rd place in Poster presentation** at Graduate Research Symposium, Mississippi State University (October 2022).
- **3rd place in Oral presentation** at Mississippi Academy of Science Annual Meeting, (March 2022).
- **1st place in Oral presentation** at Southern Weed Science Society (SWSS) Annual Meeting (January 2022).
- **2nd place in Poster presentation** at Graduate Research Symposium, Mississippi State University (January 2022).
- **3rd place in oral presentation** at Graduate Research Symposium, Mississippi State University (March 2021).
- **Professional Development Award** from the Mississippi State University graduate school (February 2022).
- **Graduate Student Travel Award** Weed Science Society of America (WSSA) (January 2022).
- **Travel Assistance Grants for Graduate Students (TAGGS)** for attending National Sweetpotato Collaborators Group Annual Meeting in New Orleans (February 2022).

- **Travel Award** from Valent Biosciences for attending the American Society for Horticultural Science (ASHS) annual conference in Denver, Colorado (August 2021).
- Mississippi Academy of Sciences Recognition of the top 20% in a poster presentation (August 2021).

GRANT PROPOSALS

- **Title of project:** “Improving foundation block management of clean plant material for commercial growers and developing a commercial partnership to service the CSA and home garden exchange.”
 - Year: Submitted in 2025, funding year 2025-2026.
 - Amount requested: \$165,000
 - Funding Source: USDA APHIS
 - Role in the proposal: Co-PI
 - Status: Funded
- **Title of project:** “Integrating Herbicides, Cultural Practices, and Sweetpotato Varieties for Enhancing Nutsedge Management.”
 - Year: Submitted in 2024, funding year 2024-2026.
 - Amount requested: \$45,000
 - Funding Source: USDA [Specialty Crop Block Grant Program (SCBGP)]
 - Role in the proposal: Co-PI
 - Status: Funded

PUBLICATIONS

18. Te Ming Tseng, Varsha Singh, Worlanyo Segbefia, Ncomiwe Maphalala, Tabata D. Oliveira, and Ziming Yue (2025). “Advances in bioherbicides/biological control of weeds”. Advances in bioprotection of plants against diseases. *Burleigh Dodds Science Publishing*, Cambridge, UK. 353-374.
17. **Varsha Singh**, Francis Kiemo, and Lorin Harvey. Nematode Sampling for Crops (2025). Mississippi State University Extension
16. **Varsha Singh**, Dibyendu Seth, Amit Kumar, Prakhar Singla, Jyotsana Bishnoi and Pawan Kumar (2025). Genetic Diversity of Soybean. *Springer (Book chapter under review)*.
15. **Varsha Singh**, Mark Hall, Pawan Kumar, Francis Kiemo, Mark Shankle and Lorin Harvey (2026). Integrating Poultry Litter Enhances Soybean Growth and Yield Under Variable Planting Dates in Mississippi. *International Journal of Plant Production (Manuscript under review)*.
14. Francis Kiemo, **Varsha Singh**, Callie Morris, Mark Hall, Mark Shankle, and Lorin Harvey (2025). Phosphorus application impact on sweetpotato yield and nutrient dynamics in soil, roots, and leaves. *(Manuscript under preparation)*
13. Worlanyo Segbefia, **Varsha Singh**, Mary Gracen Fuller, Ziming Yue and Te-Ming Tseng (2024). “Assessment of allelopathic potential of cotton chromosome substitution lines”. *Plants*. 13(8): 1102.

12. Tabata R. de Oliveira, Augusto D. Serafim, Brenton Breland, Alyssa Miller, Karina Beneton, **Varsha Singh**, Worlanyo Segbefia, Josiane C. Argenta, Shaun R. Broderick, and Te Ming Tseng (2023). An integrated weed management approach in tomato using soil steaming, mulching, and winter cover crops. *Frontiers in Agronomy*, 5: 1075726.
11. Atikah Dwi Putri, **Varsha Singh**, Edicarlos B. de Castro, Joseph S. McElroy, Te-ming Tseng, and James D. McCurdy (2023). "Confirmation and differential metabolism associated with quinclorac resistance in smooth crabgrass (*Digitaria ischaemum*)". *Weed Science* 1-30.
10. Pusarla Susmitha, Pawan Kumar, Pankaj Yadav, Smrutishree Sahoo, Gurleen Kaur, Manish Pandey, **Varsha Singh**, and Te Ming Tseng (2023). Genome wide association study (GWAS) as a powerful tool for dissecting competitive traits in Legumes. *Frontiers in Plant Science* 14: 1123631.
9. Taghi Bararpour, Nicholas E Korres, Alyssa Miller, Worlanyo Segbefia, **Varsha Singh**, and Te-Ming Tseng (2023). "Prickly sida (*Sida spinosa* L.), hemp sesbania [*Sesbania herbacea* (Mill.) McVaugh], and pitted morningglory (*Ipomoea lacunose* L.) response to selective and non-selective herbicide in Mississippi, USA". *Journal of Agricultural Science* 15 (5).
8. **Varsha Singh**, Worlanyo Segbefia, Mary Gracen Fuller, Mark W. Shankle, Callie J. Morris, Stephen L. Meyers, and Te-Ming Tseng (2022). "Allelopathy: an eco-friendly approach to control palmer amaranth using allelopathic sweetpotato." *Frontiers in agronomy*, 4: 930378.
7. Ziming Yue, **Varsha Singh**, Josiane Argenta, Worlanyo Segbefia, Alyssa Miller, and Te Ming Tseng (2022). "Use of Plant Secondary Metabolites to Reduce Crop Biotic and Abiotic Stresses: A Review." *Secondary Metabolites: Trends and Reviews*: 123.
6. Pawan Kumar, Jagmohan Singh, Gurleen Kaur, Paul Motunrayo Adunola, Anju Biswas, Sumandeep Bazzar, Harpreet Kaur, Ishveen Kaur, Harpreet Kaur, Karansher Singh Sandhu, Shailaja Vemula, Balwinder Kaur, **Varsha Singh**, and Te Ming Tseng (2022). "OMICS in Fodder Crops: Applications, Challenges, and Prospects." *Current Issues in Molecular Biology* 44, no. 11: 5440-5473.
5. Pawan Kumar, Somveer Nimbale, Rajvir Singh Sangwan, Neeraj Budhlakoti, **Varsha Singh**, Dwijesh Chandra Mishra, and Raju Ram Choudhary (2021). "Identification of novel marker-trait associations for lint yield contributing traits in upland cotton (*Gossypium hirsutum* L.) using SSRs." *Frontiers in Plant Science* 12: 653270.
4. Pawan Kumar, Somveer Nimbale, Neeraj Budhlakoti, **Varsha Singh**, and Rajvir Singh Sangwan (2021). "Genetic diversity and population structure analysis for morphological traits in upland cotton (*Gossypium hirsutum* L.)". *Journal of Applied Genetics* 1-15.
3. **Varsha**, Shikha Yashveer, Vikram Singh, and Pawan Kumar (2020). Morphological analysis and screening of wheat generations derived from HD2967 x Kharchia65 for salt tolerance. *Journal of Environmental Biology* 41: 695-702.
2. **Varsha**, Shikha Yashveer, Vikram Singh, and Priyanka Verma (2020). Phenotyping and molecular marker analysis of wh1105 and kharchia 65 backcrosses and F4 progenies of wheat for salinity tolerance. *International Journal of Agriculture Sciences* 12 (12): 9995-10000.
1. **Varsha**, Verma, Priyanka, Pooja Saini, Vikram Singh, and Shikha Yashveer. "Genetic variability of wheat (*Triticum aestivum* L.) genotypes for agro-morphological traits and their correlation and path analysis." *Journal of Pharmacognosy and Phytochemistry* 8, no. 4 (2019): 2290-2294.

WORKSHOPS/TRAINING

- “Write winning grant proposals” workshop provided by the Grant writers’ seminars and workshops presented by Dr. John Robertson at Mississippi State University, November 2024
- Completed the training on Responsible Conduct of Research (Group 1 RCR) for PIs and co-PIs. CITI Program, October 2024.
- Financial Conflict of Interest training provided by the Office of Research Compliance and Security at Mississippi State University, October 2024.
- Participated in State Level Biosafety Capacity Building Workshop held on March 14, 2018, at Hisar organized by CCS HAU, Hisar and Biotech Consortium India Limited, New Delhi.
- Attended a Knowledge Workshop on Scientific Writing, e-books, and Publication processes organized by the University Science Forum, Directorate of Human Resource Management, CCS HAU, Hisar on April 12, 2017.
- Attended a One-Day Author Workshop conducted by Vivekananda Library in association with Elsevier at MDU, Rohtak on November 18, 2016.

CONFERENCE/SYMPOSIA/MEETINGS

Oral Presentations:

- **Varsha Varsha**, Worlanyo Segbefia, Ziming Yue, Mark W. Shankle, Te-Ming Tseng (2023). Identification and Quantification of Allelochemicals Released by Sweetpotato Roots. *Southern Weed Science Society, Annual Meeting*.
- Atikah D. Putri, Te-Ming Tseng, **Varsha Varsha**, James D. McCurdy (2023). Quinclorac-Resistant Smooth Crabgrass (*Digitaria ischaemum*): Confirmation and Mechanism of Resistance. *Southern Weed Science Society, Annual Meeting*.
- Alyssa L. Miller, Te-Ming Tseng, Josiane C. Argenta, Ziming Yue, **Varsha Varsha**, Ncomiwe A. Maphalala, Worlanyo Segbefia, Tabata R. De Oliveira, Grace A. Fuller (2023). Weed Suppression by Cotton Chromosome Substitution Lines at Different Cover Crop Production Systems. *Southern Weed Science Society, Annual Meeting*.
- Tabata R. De Oliveira, Antonio A. Tavares, **Varsha Varsha**, Ziming Yue, Josiane C. Argenta, Te-Ming Tseng (2023). Improved Herbicide Selectivity in Tomato by Safening Action of Benoxacor, Fenclorim, Melatonin, and 2,4, 6- Trichlorophenoxyacetic Acid. *Southern Weed Science Society, Annual Meeting*.
- Worlanyo Segbefia, **Varsha Varsha**, Ncomiwe A. Maphalala, Ziming Yue, Tabata R. De Oliveira, Turner Garrett, Parth Sharma, Mark W. Shankle, Te-Ming Tseng (2023). Allelopathic Effects of Cotton Chromosome Substitution Lines Against Glyphosate-resistant Palmer Amaranth in Field Conditions. *Southern Weed Science Society, Annual Meeting*.
- **Varsha Singh**, Isabel S. Werle, Mark W. Shankle, Stephen L. Meyers and Te-Ming Tseng (2022). Sustainable weed management under field conditions using allelopathic sweet potato varieties. *Spring Graduate Reserach Symposium, Mississippi State University, MS*.
- **Varsha Singh**, Isabel S. Werle, Mark W. Shankle, Stephen L. Meyers and Te-Ming Tseng (2022) Evaluating Sweetpotato Varieties for their Allelopathic Effects on Growth of Different Weed Species under Field Conditions *National Sweetpotato Collaborators Group*.

- **Varsha Singh**, Isabel S. Werle, Mark W. Shankle, Stephen L. Meyers and Te-Ming Tseng (2022) Screening Sweet potato Varieties for their Allelopathic Effects on Growth of Different Weed Species under Field Conditions *ASA Southern Branch Meeting*.
- **Varsha Singh**, Isabel S. Werle, Mark W. Shankle, Stephen L. Meyers and Te-Ming Tseng (2022) Sweet Potato Allelopathy, a Strategy for Sustainable Weed Management Under Field Conditions *Southern Weed Science Society, Annual Meeting*.
- **Varsha Varsha**, Isabel S. Werle, Mark W. Shankle, Stephen L. Meyers and Te-Ming Tseng (2022) Allelopathy: An alternative approach for Integrated weed management in Sweet Potato. *Weed Science Society of America, Annual Meeting*.
- **Varsha Varsha** and Te-Ming Tseng Allelopathy (2021). Weeds practicing social distancing. *Weed Science Society of America, Annual Meeting*.
- **Varsha Singh**, Isabel S. Werle, Mark W. Shankle, Stephen L. Meyers and Te-Ming Tseng (2021) Allelopathic sweet potato varieties for reducing Palmer amaranth growth. *Graduate Research Symposium, Mississippi State University, Mississippi State, MS*.
- **Varsha Singh**, Isabel S. Werle, Mark W. Shankle, Stephen L. Meyers and Te-Ming Tseng Allelopathic effects of sweetpotato varieties on Palmer amaranth growth. *Southern Weed Science Society, Annual Meeting, Virtual meeting*.
- **Varsha Singh**, Isabel Werle, Mark W. Shankle and Te-Ming Tseng (2021) Allelopathic effects of sweet potato on yellow nutsedge, goosegrass, and Palmer amaranth. *ASA, CSSA, SSSA Annual International Meetings, Virtual meeting*.
- **Varsha Varsha** (2021) Allelopathy-Can it be a replacement for Chemical Herbicides? *The Three Minute Thesis, Mississippi State University, Mississippi State, MS*.
- **Varsha Singh**, Isabel Werle, Mark W. Shankle and Te-Ming Tseng (2021) Allelopathy: An Alternative Weed Management Strategy to Control Palmer Amaranth. *American Society for Horticultural Science, Annual Meeting*.
- **Varsha Singh** (2021) Sustainable Weed Management Strategy. *American Society for Horticultural Science, Annual Meeting*.
- **Varsha Singh**, Mark Shankle and Te-Ming Tseng (2020) Evaluating effects of sweet potato varieties on growth of different weed species. *Graduate Research Symposium, Mississippi State University, Mississippi State, MS*.
- **Varsha Varsha** and Te-Ming Tseng (2020) Weeds practicing social distancing. *The Three Minute Thesis, Mississippi State University, Mississippi State, MS*.

Poster Presentations:

- **Varsha Varsha**, Worlanyo Segbefia, Ziming Yue, Parth Sharma, Callie J. Morris, Mark W. Shankle, Te-Ming Tseng (2023). Weed-suppressing Potential of Sweetpotato Varieties Under Field Conditions. *Southern Weed Science Society, Annual Meeting*.
- Tabata R. De Oliveira, Antonio A. Tavares, **Varsha Varsha**, Ziming Yue, Josiane C. Argenta, Te-Ming Tseng (2023). Improved Herbicide Selectivity in Tomato by Safening Action of Benoxacor, Fenclorim, Melatonin, and 2,4, 6- Trichlorophenoxyacetic Acid. *Southern Weed Science Society, Annual Meeting*.
- Alyssa L. Miller, Te-Ming Tseng, **Varsha Varsha**, Josiane C. Argenta, Ziming Yue, Worlanyo Segbefia, Tabata R. De Oliveira, Ncomiwe A. Maphalala (2023). The Efficacy and Synergistic Effect of Allelocompounds (Coumarin and Chlorogenic Acid) with Glyphosate- Resistant Palmer Amaranth. *Southern Weed Science Society, Annual Meeting*.

- **Varsha Singh**, Isabel S. Werle, Mark W. Shankle, Stephen L. Meyers and Te-Ming Tseng (2022) Allelopathic Sweet Potato Varieties for Palmer Amaranth Growth Reduction. *Southern Weed Science Society*, Annual Meeting.
- **Varsha Singh**, Worlanyo Segbefia, Mark W. Shankle, Callie J. Morris, Te-Ming Tseng (2023) Weed-suppressing potential of sweetpotato varieties under field conditions. *Fall Graduate Reserach Symposium, Mississippi State University*, MS.
- **Varsha Singh**, Isabel S. Werle, Mark W. Shankle, Stephen L. Meyers and Te-Ming Tseng (2022) Effect of allelopathic sweet potato varieties on Palmer amaranth growth: A greenhouse study. *Spring Graduate Reserach Symposium, Mississippi State University*, MS.
- **Varsha Varsha**, Isabel S. Werle, Mark W. Shankle, Stephen L. Meyers and Te-Ming Tseng (2022) Screening of sweet potato varieties for their allelopathic ability to suppress palmer amaranth growth in a stair-step structure. *Weed Science Society of America*, Annual Meeting.
- **Varsha Singh**, Isabel S. Werle, Mark W. Shankle, Stephen L. Meyers and Te-Ming Tseng (2022) Allelopathic Sweet Potato Varieties for Palmer Amaranth Growth Reduction. *Southern Weed Science Society*, Annual Meeting.
- **Varsha Singh**, Isabel Werle, Mark W. Shankle, Stephen L. Meyers and Te-Ming Tseng (2021) Allelopathic Sweetpotato Varieties for Reducing Palmer Amaranth Growth. *Graduate Scholars Symposium at Mississippi INBRE and MAS*.
- **Varsha Varsha**, Isabel S. Werle, Mark W. Shankle and Te-Ming Tseng (2021). Allelopathic effects of sweetpotato varieties on palmer amaranth growth. *Proceedings of Weed Science Society of America* 74: 18.
- **Varsha**, Shikha Yashveer, Vikram Singh, Swati Pratap and Kritika Sharma (2018) Pyramiding of Nax loci for Salt Tolerance in Wheat (*Triticum aestivum* L.). ICBN, February 21-23, 2018, GJU, Hisar, India.
- **Varsha**, Shikha Yashveer, and Vikram Singh (2017) Introgression Salt Tolerance Genes Using Marker Assisted Selection in Wheat. 3rd International Conference On Bioresource & Stress Management- November 8-11, 2017, Jaipur, Rajasthan, India.
- Prakash. N. Tiwari, Pooja Saini, **Varsha Singh**, Shikha Yashveer, and Vikram Singh (2018) Molecular breeding for salt tolerance in wheat using microsatellite markers associated with Nax loci. National conference on current trends in PSMB, February 15-16, 2018, RVSKVV, Gwalior (M.P.), India.
- Kritika Sharma, Shikha Yashveer, Vikram Singh, Sudhir, and **Varsha** (2018) Developing salt-tolerant wheat using marker-assisted selection. ICBN, February 21-23, 2018, GJU, Hisar, India.
- Shikha Yashveer, Vikram Singh, D.N.L.V. Vy, Kritika, **Varsha**, Prakash N. Tiwari and Pooja (2018) Marker assisted selection of salt tolerant wheat (*Triticum aestivum* L. em Thell.) genotypes. ICBN, February 21-23, 2018, GJU, Hisar, India.

SERVICE TO THE ACADEMIC COMMUNITY

- **Reviewer** for Agronomy Journal (2024 to present).
- **Student Contest Judge** for Graduate Research Showcase organized by Mississippi State University (October 2024).

- **Student Contest Judge** for the American Society of Horticultural Science (ASHS) Graduate Poster competition (September 2024).
- **Student Contest Judge** for Undergraduate Research Showcase (poster) organized by Mississippi State University (August 2022).
- **Reviewer** for Agrosystems, Geosciences & Environment journal (May 2023 to present).
- **Reviewer** for Advances in Weed Science (October 2022 to present).
- **Student Ambassador** for the Association of Agricultural Scientists of Indian Origin (AASIO) (2021-2023).
- **Public Relations Officer (PRO)** for the Indian Student Association at Mississippi State University (2021-2022).