Proceedings of the Southern Weed Science Society 78th Annual Meeting

Charleston Marriott
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Regulations and Instructions for Papers and Abstracts

Regulations

1. Persons wishing to present a paper(s) at the conference must first electronically submit a title to the SWSS web site (http://www.swss.ws/) by the deadline announced in the "Call for Papers".

2. Only papers presented at the annual conference will be published in the Proceedings. An abstract or paper must be submitted electronically to the SWSS website by the deadline announced at the time of title submissions.

3. Facilities at the conference will be provided for LCD-based presentations only.

4. Terminology in presentations and publications shall generally comply with the standards accepted by the Weed Science Society of America. English or metric units of measurement may be used. The approved common names of herbicides as per the latest issue of Weed Science or trade names may be used. Chemical names will no longer be printed in the annual program. If no common name has been assigned, the code name or trade name may be used and the chemical name should be shown in parenthesis if available. Common names of weeds and crops as approved by the Weed Science Society of America should be used.

5. Where visual ratings of crop injury or weed control efficacy are reported, it is suggested that they be reported as a percentage of the nontreated check where 0 equals no weed control or crop injury and 100 equals complete weed control or crop death.

6. Each author is assured of one senior-author presentation, but multiple senior-author submissions will be accepted only as space and time are available. If you have several papers or posters you wish to present, please indicate which is highest priority by adding a note in the comments section on the title submission form

7. Papers and abstracts must be prepared in accordance with the instructions and form provided in the "Call for Papers" and on the SWSS web site. Papers not prepared in accordance with these instructions will not be included in the Proceedings.

Instructions to Authors

Instructions for title submissions, and instructions for abstracts and papers will be available in the "Call for Papers" and on the SWSS website (http://www.swss.ws/) at the time of title or abstract/paper submission.

Word templates will be available on the web to help ensure that proper format is followed. It is important that submission deadlines and instructions are carefully adhered to, as the abstracts are not edited for content.

Typing Instructions-Format

1. Margins, spacing, etc.: Use 8-1/2 x 11" paper. **Leave 1" margins on all sides.** Use 10 point type with a ragged right margin, **do not justify and do not use hard carriage returns** in the body of the text. Single space with double space between paragraphs and major divisions. **Do not indent paragraphs.**

2. Content:

Abstracts - Title, Author(s), Organization(s) Location, the heading ABSTRACT, text of the Abstract, and Acknowledgments. Use double spacing before and after the heading, ABSTRACT.

Papers - Title, Author(s), Organization(s), Location, Abstract, Introduction, Methods and Materials (Procedures), Results and Discussion, Literature Citations, Tables and/or Figures, Acknowledgements.

Each section of an abstract or paper should be clearly defined. The heading of each section should be typed in the center of the page in capital letters with double spacing before and after. Pertinent comments regarding some of these sections are listed below:

Title - All in capital letters and bold. Start at the upper lefthand corner leaving a one-inch margin from the top and all sides.

Author(s), Organizations(s), Location: - Start immediately after title. Use lower case except for initials, first letters of words, etc. Do not include titles, positions, etc. of authors.

Example: Competiiton and control of smellmelon (*Cucumis melo* var. *dudaim* Naud.) in cotton

C.H. Tingle, G.L. Steele and J.M. Chandler; Department of Soil and Crop Sciences, Texas A&M University, College Station, TX 77843.

ABSTRACT

First line of abstract begins at left margin. **Do not indent paragraphs.**

Acknowledgements - Show as a footnote at the end of the abstract (not end of the page) or the bottom of the first page of papers.

Literature Citations - Number citations and list separately at the end of the text.

Table and Figures - Place these after literature citations. Single space all tables. Tables should be positioned vertically on the page. Charts and figures must be in black and white.

2025 Awards

Outstanding Young Weed Scientist - Academia
Vijay Singh, Virgina Tech

Dr. Vijay Singh is an Assistant Professor and Extension Weed Specialist in the School of Plant and Environmental Sciences at Eastern Shore Agricultural Research and Extension Center, Virginia Tech. He received his BS and MS from the CCS Haryana Agricultural University, India. Dr. Singh began his weed science career as a Research Scientist with International Rice Research institute. Later, he moved to the US and obtained his PhD in weed science from the University of Arkansas and gained postdoctoral experience at Texas A&M University. Currently, he provides expertise on weed research and extension in row-crops (corn, soybean, cotton), small grains, and vegetables. He is also working on digital agriculture and data driven technologies under Virginia Tech's Smart Farming Initiative. Dr. Singh has authored/ co-authored 44 journal articles and book chapters, 38 extension publications/ newsletters, 1 book, and 109 abstracts in conference proceedings. He has delivered 125 presentations at professional meetings and conferences and has given keynotes and invited talks on several occasions. Dr. Singh organized or contributed to around 20 extension events annually, which were attended by more than 10,000 stakeholders in the past 5 years. As a PI/co-PI he secured $9.5 million worth of grants, where his program received $2.1 million in competitive funds. Dr. Singh graduated 2 students, currently advising 4 (2 PhDs and 2 MS), served on student committees, and mentored several undergraduate students. Dr. Singh's students have won numerous awards and scholarships, including positions in the weed contest, and society's outstanding student award. Along with Southern Weed Science Society (SWSS), Dr. Singh served on the executive committees of 2 more societies; Northeastern Weed Science Society (NEWSS) and Weed Science Society of America (WSSA). He judged students' oral and poster contests, and served as section chair at SWSS, NEWSS, WSSA, and American Society of Agronomy (ASA) annual meetings. Dr. Singh is serving as an associate editor of Agronomy Journal (ASA) and Frontiers in Agronomy, a reviewer for many other journals, and edited/reviewed more than 130 journal articles. Previously, he received awards recognizing his contribution to weed science including Outstanding Researcher Award 2024 (NEWSS), and Outstanding Reviewer Award 2024 (Weed Technology; WSSA). He hopes to continue to serve weed science societies in the future as well.

Past Winners of the Outstanding Young Weed Scientist Award

Year	Name	University / Company
1980	John R. Abernathy	Texas A & M University
1981	Harold D. Coble	North Carolina State
1982	Lawrence R. Oliver	University of Arkansas
1983	Ford L. Baldwin	University of Arkansas
1984	Don S. Murray	Oklahoma State University
1985	William W. Witt	University of Kentucky
1986	Philip A. Banks	University of Georgia
1987	Kriton K. Hatzios	VPI & SU
1988	Joe E. Street	Mississippi State University
1989	C. Michael French	University of Georgia
1990	Ted Whitwell	Clemson University
1991	Alan C. York	North Carolina State
1992	E. Scott Hagood, Jr.	VPI & SU
1993	James L. Griffin	Louisiana State University
1994	David R. Shaw	Mississippi State University
1995	John C. Wilcut	North Carolina State
1996	David C. Bridges	University of Georgia
1997	L.B. McCarty	Clemson University
1998	Thomas C. Mueller	University of Tennessee
1999	Daniel B. Reynolds	Mississippi State University
2000	Fred Yelverton	North Carolina State
2001	John D. Byrd, Jr.	Mississippi State University
2002	Peter A. Dotray	Texas Tech. University
2003	Scott A. Senseman	Texas A & M University
2004	David L. Jordan	North Carolina State
2004	James C. Holloway	Syngenta
2005	Eric Prostko	University of Georgia
2005	No nominations	--
2006	Todd A. Baughman	Texas A & M University
2006	John V. Altom	Valent USA Corporation
2007	Clifford "Trey" Koger	Mississippi State University
2007	No nominations	--
2008	Stanley Culpepper	University of Georgia
2008	No nominations	--
2009	Jason K. Norsworthy	University of Arkansas
2009	No nominations	--
2010	Bob Scott	University of Arkansas
2010	No nominations	--
2011	J. Scott McElroy	Auburn University

2011	Eric Palmer	Syngenta Crop Protection
2012	Jason Bond	Mississippi State University
2012	Cody Gray	United Phosphorus Inc.
2013	Greg Armel	BASF Company
2013	Shawn Askew	Virginia Tech
2014	Jason Ferrell	University of Florida
2014	Vinod Shivrain	Syngenta
2015	Jim Brosnan	University of Tennessee
2015	No nominations	--
2016	Daniel Stephenson, IV	LSU-Ag Center
2016	Drew Ellis	Dow AgroSciences
2017	Wes Everman	North Carolina State
2017	Hunter Perry	Dow AgroSciences
2018	Ramon Leon	North Carolina State
2019	Peter Dittmar	University of Florida
2020	Kelly Backscheider	Corteva AgriSciences
2021	Muthukumar Bagavathianan	Texas A & M University
2021	Matthew Wiggins	FMC
2022	Michael Flessner	Virginia Tech
2022	Sandeep Rana	Bayer Crop Science
2023	Charles Cahoon	North Carolina State
2024	Thomas (Tommy) Butts	University of Arkansas
2024	Peter Eure	Syngenta

Outstanding Educator Award
Nick Basinger, University of Georgia

Dr Basinger is an Associate Professor of Weed Science at the University of Georgia in the Department of Crop and Soil Science. Dr. Basinger received his Masters and Ph.D. from North Carolina State University where he studied the impacts of weed interference on biomass accumulation of weed and crop species as well as the impacts on crop yield of several annual and perennial horticultural crops under the direction of Drs. Katie Jennings and David Monks. At the University of Georgia Dr. Basinger has 55% research, 40% teaching, and 5% service appointments in the Department of Crop and Soil Sciences. His work focuses on altering and manipulating agroecosystems to minimize the effects of weeds. He is devoted to Integrated Weed Management (IWM) as a means to manage weeds, minimize the potential for herbicide resistance, and improve the productivity of desirable crops in crop and forage systems. Since his appointment to the University, he has been teaching undergraduate and graduate-level courses. He teaches across all three UGA campuses, through distance education with students on these campuses, and across the state of Georgia. He teaches Weed Science (CRSS 4340/6340-CRSS 4340L/6340L), Herbicide Technology (CRSS 6350), and Experiential Weed Science Contest Preparation (CRSS 6360). He has been the UGA weed team coach since 2019 and continues to work to encourage students to view weed science through an integrated 5 lens. His approach to teaching is one where students learn to think critically, and as a result, act thoughtfully. Providing students with hands-on applications of content discussed in class lectures allows them to see a more complete picture of the concept than any lecture can provide. In his own experience, these opportunities provide "teachable moments" that force students to troubleshoot issues and see the impacts of their actions. In addition to teaching courses, he is currently the Director and Coordinator of the Masters of Plant Protection and Pest Management (MPPPM) program at UGA. This program is a terminal master's program where students focus on the plant protection disciplines in preparation for extension or industry job placements. He has been a member of SWSS since the beginning of his Masters degree in 2012, has served as the chair for the Outstanding Graduate Student Award for the WSSA and SWSS, and has served as a judge for student oral and poster contests since 2019. He looks forward to expanding his service to the SWSS as a Member at Large representative from academia.

Past Winners of the Outstanding Educator Award

Year	Name	University
1998	David R. Shaw	Mississippi State University
1999	Ronald E. Talbert	University of Arkansas
2000	Lawrence R. Oliver	University of Arkansas
2001	James L. Griffin	Louisiana State University
2002	Thomas F. Peeper	Oklahoma State University
2003	Daniel B. Reynolds	Mississippi State University
2004	William Vencill	University of Georgia
2005	John W. Wilcut	North Carolina State University
2006	Don S. Murray	Oklahoma State University
2007	Thomas C. Mueller	University of Tennessee
2008	James M. Chandler	Texas A&M University
2009	William W. Witt	University of Kentucky
2010	Peter Dotray	Texas Tech. University
2011	Eric Prostko	University of Georgia
2012	Gregory Mac Donald	University of Florida
2013	Tim Grey	University of Georgia
2014	Scott Senseman	University of Tennessee
2015	Nilda Roma-Burgos	University of Arkansas
2016	Katie Jennings	North Carolina State University
2017	Jason Norsworthy	University of Arkansas
2018	Stanley Culpepper	University of Georgia
2019	Larry Steckel	University of Tennessee
2020	Stephen Enloe	University of Florida
2021	No nomination	--
2022	Ramon Leon	North Carolina State University
2023	Darrin Dodds	Mississippi State University
2024	Tom Barber	University of Arkansas

Excellence in Regulatory Stewardship Award

Past Winners of the Excellence in Regulatory Stewardship Award

Year	Name	University
2020	Robert Nichols	Cotton Incorporated
2021	Larry Steckel	University of Tennessee
2024	Thomas Mueller	University of Tennessee
2025	(no award)	(no award)

Outstanding Graduate Student Award (MS)
Megan Singletary, Texas Tech University

Megan Singletary of Mission, TX, graduated from Texas A&M University in 2018 with a B.S. in Animal Science and a minor in Agronomy. Her interest in crop production and research grew substantially after participating in a summer internship with Wonderful Citrus in Edinburg, TX. After her bachelor's degree, Megan participated in a 6-month Co-Op with Corteva AgriScience as a sorghum breeding assistant in Weslaco, TX. She worked as the southern California and Baja California assistant strawberry breeder at Driscoll's in Oxnard, CA from 2018 to 2020. Her work with host-resistance to powdery mildew and two-spotted spider mite created an appreciation for the role of pest management, which led her to pursue her M.S. in Plant and Soil Science from Texas Tech University under the direction of Dr. Peter Dotray. Her thesis research focused on the evaluation of weed control and crop tolerance in AxantFlex cotton, a new quadruplestack herbicide tolerant technology developed by BASF Corporation. Results from her thesis will assist producers on how best to adapt their weed management practices in light of a new cotton germplasm. As a Master of Science graduate student, Megan presented 13 abstracts/proceedings at scientific conferences and received 8 awards. She was a member of the 2022 SWSS contest first place team sprayer calibration and served on the SWSS graduate student organization board as Social Media Chair, Vice-President, and now President. Megan has authored one peer-reviewed journal publication from her thesis research and has an additional paper in review. She has presented or co-presented at 16 grower meetings. Megan is currently pursuing a PhD degree in Plant and Soil Science with an emphasis in Crop Protection at Texas Tech University.

Past Winners of the Outstanding Graduate Student Award (MS)

Year	Name	University
1998	Shawn Askew	Mississippi State University
1999	Patrick A Clay	Louisiana State University
2000	Wendy A. Pline	University of Kentucky
2001	George H. Scott	North Carolina State University
2002	Scott B. Clewis	North Carolina State University
2003	Shawn C. Troxler	North Carolina State University
2004	Walter E. Thomas	North Carolina State University
2005	Whitney Barker	North Carolina State University
2006	Christopher L. Main	University of Florida
2007	No nomination	--
2008	No nomination	--
2009	Ryan Pekarek	North Carolina State University
2010	Robin Bond	Mississippi State University
2011	George S. (Trey) Cutts, III	University of Georgia
2012	Josh Wilson	University of Arkansas
2013	Bob Cross	Clemson University
2014	Brent Johnson	University of Arkansas
2015	Garret Montgomery	University of Tennessee
2016	Chris Meyer	University of Arkansas
2017	John Buol	Mississippi State University
2018	Zachary Lancaster	University of Arkansas
2019	Swati Shrestha	Mississippi State University
2020	Lawson Priess	University of Arkansas
2021	Nick Hurdle	University of Georgia
2022	Delaney Foster	Texas Tech University
2023	Tristen Avent	University of Arkansas
2024	Vipin Kumar	Virginia Tech University

Outstanding Graduate Student Award (PhD)
Mason Castner, University of Arkansas

Mason received a B.S. in Plant and Soil Sciences from Oklahoma State University in 2017. During his time at OSU, Mason gained valuable experience during his two summers as an intern for Syngenta and two summers with Farr Agriculture Consulting in Crawfordsville, AR. His time in Arkansas led him to continue his education at the University of Arkansas under the direction of Dr. Jason Norsworthy where he obtained his M.S. and Ph.D. in Crop, Soil, and Environmental Sciences with a concentration in Weed Science in 2020 and 2024, respectively. Mason's dissertation focused the novel herbicide tetflupyrolimet and specifically answering key questions for producers in the Midsouth prior to commercialization of the herbicide for use in rice. His research addressed weed spectrum and efficacy in both paddy and furrow-irrigated rice, rice tolerance, off-target movement, dissipation in soil and risk of carryover, resistance screenings, soil moisture, and a 14C component. (continued on page 6) 6 During his time at the University of Arkansas, Mason authored or co-authored 6 peer-reviewed papers in academic journals, 11 extension or technical reports, and 87 abstracts from scientific presentations at national and regional conferences. Mason was recognized as the Crop, Soil, and Environmental Sciences Outstanding M.S. Student, the Dale Bumpers Distinguished M.S. Scholar, Ron and Alice Talbert Endowed Weed Science Scholar, Gerald O. Mott Meritorious Graduate Student in Crop Science and was a Doctoral Academy Fellowship recipient. He also had the privilege of be selected for SWSS Endowment Enrichment scholarship in 2023. Mason has received 18 oral and 5 poster contest awards from research presentations at the annual meetings of the Southern Weed Science Society, Weed Science Society of America, Arkansas Crop Protection Association, Beltwide Cotton Conference, and the Rice Technical Working Group. Mason was also actively involved in the Southern Weed Science Society, where he served as Vice President and President of the SWSS Graduate Student Organization from 2022-2024. He was a member of the first place University of Arkansas SWSS Weed Team in 2022 and 2023 and finished as the second and third place individual in these contests, respectively. Mason is forever grateful for the opportunity to participate and develop as a young weed scientist in the SWSS and would strongly encourage other students to become involved as they further their education.

Past Winners of the Outstanding Graduate Student Award (PhD)

Year	Name	University
1998	Nilda Roma Burgos	University of Arkansas
1999	A. Stanley Culpepper	North Carolina State University
2000	Jason K. Norsworthy	University of Arkansas
2001	Matthew J. Fagerness	North Carolina State University
2002	William A. Bailey	North Carolina State University
2003	Shea W. Murdock	Oklahoma State University
2004	Eric Scherder	University of Arkansas
2005	Ian Burke	North Carolina State University
2006	Marcos J. Oliveria	Clemson University
2007	Wesley Everman	North Carolina State University
2008	Darrin Dodds	Mississippi State University
2009	Sarah Lancaster	Texas A&M University
2010	Tom Eubank	Mississippi State University
2011	Sanjeev Bangarwa	University of Arkansas
2012	Edinalvo (Edge) Camargo	Texas A&M University
2013	Kelly Barnett	University of Tennessee
2014	James McCurdy	Auburn University
2015	Sushila Chaudhari	North Carolina State University
2016	Reiofeli Algodon Salas	University of Arkansas
2017	Misha Manuchehri	Texas Tech University
2018	Sandeep Rana	Virginia Tech
2019	Nicholas Basinger	North Carolina State University
2020	John Brewer	Virginia Tech
2021	Sam Rustom	Louisiana State University
2022	Maria Zaccaro-Gruener	University of Arkansas
2023	Taylor Randell-Singleton	University of Georgia
2024	Sarah Kezar	Texas A&M University

Fellow Award
John Richburg, Corteva Agriscience

John Richburg is an Integrated Field Scientist for AL and GA with Corteva agriscience. He is a native of Grove Hill, Alabama where his first agriculture experiences were on the family's cattle farm. He received his B.S. from Auburn University in Agronomy and Soils in 1988 and a M.S. under Dr. Harold Walker at Auburn in Weed Science in 1991. He completed his Ph.D. in Weed Science under the direction of the late Dr. John Wilcut at the University of Georgia in 1994. John began his professional career with Dow AgroSciences in 1994 as a Weed Scientist at the company's Greenville, MS Field Station with emphasis on rice, soybeans and cotton. In 1999 he relocated to Dow AgroSciences's global headquarters in Indianapolis, IN as the lead biologist in Herbicide Discovery for rice herbicides. He held several other Discovery and Field R&D roles before relocating back to Greenville, MS in 2003 as the Field Station Leader. In early 2009 he transitioned into a regional manager role for Field Development R&D then in 2010 to his current role. Throughout his career, he has helped develop products including Strongarm for peanuts, Clincher, Grasp, GraspXtra and RebelEX for rice and WideStrike/WideStrike3 insect protection in cotton. He was instrumental in the development of Enlist Cotton and the Enlist Weed Control System as well as several new insecticide, fungicide and nematicide products. He has authored or co-authored 27 refereed journal articles, 190+ abstracts, hundreds of internal project summary milestone reports and 6 patents.John has been involved with SWSS since 1989 serving in various roles including judge for the weed contest, judge for the student paper contest, Chairman of the Student Awards Committee, the Finance Committee, Chairman of the Sustaining Members Committee and previously as an Industry Rep on the SWSS Board. He is active in numerous other professional organizations and served as MWSS President 2007-2008.

Past Winners of the Distinguished Service Award
(Renamed Fellow Award in 2015)

Year	Name	University/Company
1976	Don E. Davis	Auburn University
1976	V. Shorty Searcy	Ciba-Geigy
1977	Allen F. Wiese	Texas Agric. Expt. Station
1977	Russel F. Richards	Ciba-Geigy
1978	Robert E. Frans	University of Arkansas
1978	George H. Sistrunck	Valley Chemical Company
1979	Ellis W. Hauser	USDA, ARS Georgia
1979	John E. Gallagher	Union Carbide
1980	Gale A. Buchanan	Auburn University
1980	W. G. Westmoreland	Ciba-Geigy
1981	Paul W. Santelmann	Oklahoma State University
1981	Turney Hernandez	E.I. DuPont
1982	Morris G. Merkle	Texas A & M University
1982	Cleston G. Parris	Tennessee Farmers COOP
1983	A Doug Worsham	North Carolina State University
1983	Charles E. Moore	Elanco
1984	John B. Baker	Louisiana State University
1984	Homer LeBaron	Ciba-Geigy
1985	James F. Miller	University of Georgia
1985	Arlyn W. Evans	E.I. DuPont
1986	Chester G. McWhorter	USDA, ARS Stoneville
1986	Bryan Truelove	Auburn University
1987	W. Sheron McIntire	Uniroyal Chemical Company
1987	No nominations	--
1988	Howard A.L. Greer	Oklahoma State University
1988	Raymond B. Cooper	Elanco
1989	Gene D. Wills	Mississippi State University
1989	Claude W. Derting	Monsanto
1990	Ronald E. Talbert	University of Arkansas
1990	Thomas R. Dill	Ciba-Geigy
1991	Jerome B. Weber	North Carolina State University
1991	Larry B. Gillham	E.I. DuPont
1992	R. Larry Rogers	Louisiana State University
1992	Henry A. Collins	Ciba-Geigy
1993	C. Dennis Elmore	USDA, ARS Stoneville
1993	James R. Bone	Griffin Corporation
1994	Lawrence R. Oliver	University of Arkansas
1994	No nominations	--
1995	James M. Chandler	Texas A & M University
1995	James L. Barrentine	DowElanco
1996	Roy J. Smith, Jr.	USDA, ARS Stuttgart
1996	David J. Prochaska	R & D Sprayers

1997	Harold D. Coble	North Carolina State University
1997	Aithel McMahon	McMahon Bioconsulting, Inc.
1998	Stephen O. Duke	USDA, ARS Stoneville
1998	Phillip A. Banks	Marathon-Agri/Consulting
1999	Thomas J. Monaco	North Carolina State University
1999	Laura L. Whatley	American Cyanamid Company
2000	William W. Witt	University of Kentucky
2000	Tom N. Hunt	American Cyanamid Company
2001	Robert M. Hayes	University of Tennessee
2001	Randall L. Ratliff	Syngenta Crop Protection
2002	Alan C. York	North Carolina State University
2002	Bobby Watkins	BASF Corporation
2003	James L. Griffin	Louisiana State University
2003	Susan K. Rick	E.I. DuPont
2004	Don S. Murray	Oklahoma State University
2004	Michael S. DeFelice	Pioneer Hi-Bred
2005	Joe E. Street	Mississippi State University
2005	Harold Ray Smith	Biological Research Service
2006	Charles T. Bryson	USDA, ARS, Stoneville
2006	No nominations	--
2007	Barry J. Brecke	University of Florida
2007	David Black	Syngenta Crop Protection
2008	Thomas C. Mueller	University of Tennessee
2008	Gregory Stapleton	BASF Corporation
2009	Tim R. Murphy	University of Georgia
2009	Bradford W. Minton	Syngenta Crop Protection
2010	No nominations	--
2010	Jacquelyn "Jackie" Driver	Syngenta Crop Protection
2011	No nominations	--
2011	No nominations	--
2012	Robert Nichols	Cotton Incorporated
2012	David Shaw	Mississippi State University
2013	Renee Keese	BASF Company
2013	Donn Shilling	University of Georgia
2014	Tom Holt	BASF Company
2014	Dan Reynolds	Mississippi State Univsity
2015	Bobby Walls	FMC Corporation
2015	John Harden	BASF Corporation
2016	No award	--
2017	James Holloway	Syngenta Crop Protection
2018	Scott Senseman	University of Tennessee
2018	Jerry Wells	Syngenta Crop Protection
2019	John Byrd	Mississippi State University
2020	Greg MacDonald	University of Florida
2020	Cletus Youmans	BASF Corporation
2021	David Jordan	North Carolina State University

2021	Henry McLean	Syngenta Crop Protection
2022	Peter Dotray	Texas Tech University
2022	Henry McLean	University of Georgia
2023	Larry Steckel	University of Tennessee
2023	Gary Schwarzlose	Bayer CropScience
2024	Jason Norsworthy	University of Arkansas
2024	Nilda Burgos	University of Arkansas

Past Winners of the Weed Scientist of the Year Award
(Renamed Fellow Award in 2015)

Year	Name	University
1984	Chester L. Foy	VPI & SU
1985	Jerome B. Weber	North Carolina State University
1986	No nominations	--
1987	Robert E. Frans	University of Arkansas
1988	Donald E. Moreland	USDA, ARS, North Carolina
1989	Roy J. Smith, Jr.	USDA, ARS, North Arkansas
1990	Chester McWhorter	USDA, ARS, Mississippi
1991	Ronald E. Talbert	University of Arkansas
1992	Thomas J. Monaco	North Carolina State University
1993	A. Douglas Worsham	North Carolina State University
1994	Stephen O. Duke	USDA, ARS, Mississippi
1995	Lawrence R. Oliver	University of Arkansas
1996	William L. Barrentine	Mississippi State University
1997	Kriton K. Hatzios	VPI & SU
1998	G. Euel Coats	Mississippi State University
1998	Robert E. Hoagland	USDA, ARS, Mississippi
1999	James H. Miller	U.S. Forest Service
2000	David R. Shaw	Mississippi State University
2001	Harold D. Coble	North Carolina State University
2002	No nominations	--
2003	John W. Wilcut	North Carolina State University
2004	Gene D. Wills	Mississippi State University
2005	R. M. Hayes	University of Tennessee
2006	James L. Griffin	Louisiana State University
2007	Alan C. York	North Carolina State University
2008	Wayne Keeling	Texas A&M University
2009	W. Carroll Johnson, III	USDA, ARS, Tifton
2010	Don S. Murray	Oklahoma State University
2011	Krishna Reddy	USDA, ARS, Mississippi
2012	Daniel Reynolds	Mississippi State University
2013	Barry Brecke	University of Florida
2014	No nominations	--
2017	James Holloway	Syngenta Crop Protection

Past Presidents of the Southern Weed Science Society

1948-49	C.A. Brown	1986-87	H.M. LeBaron
1949-50	E.C. Tullis	1987-88	R.L. Rogers
1950-51	O.E. Sell	1988-89	L.B. Gillham
1951-52	G.M. Shear	1989-90	L.R. Oliver
1952-53	D.A. Hinkle	1990-91	J.R. Bone
1953-54	W.B. Ennis, Jr.	1991-92	J.M. Chandler
1954-55	W.C. Shaw	1992-93	J.L. Barrentine
1955-56	G.C. Klingman	1993-94	A.D. Worsham
1956-57	W.B. Albert	1994-95	P.A. Banks
1957-58	E.G. Rogers	1995-96	S.O. Duke
1958-59	R. Behrens	1996-97	B.D. Sims
1959-60	V.S. Searcy	1997-98	R.M. Hayes
1960-61	R.A. Darrow	1998-99	R.L. Ratliff
1961-62	W.K. Porter, Jr.	1999-00	D.S. Murray
1962-63	J.T. Holstun, Jr.	2000-01	L.L. Whatley
1963-64	R.F. Richards	2001-02	J.E. Street
1964-65	R.E. Frans	2002-03	J.W. Wells
1965-66	D.E. Wolf	2003-04	W.W. Witt
1966-67	D.E. Davis	2004-05	J.S. Harden
1967-68	R.A. Mann	2005-06	D.R. Shaw
1968-69	W.L. Lett, Jr.	2006-07	J.A. Driver
1969-70	J.B. Baker	2007-08	D.W. Monks
1970-71	D.D. Boatright	2008-09	A.M. Thurston
1971-72	J.R. Orsenigo	2009-10	D.B. Reynolds
1972-73	T.J. Hernandez	2010-11	T.J. Holt
1973-74	A.F. Wiese	2011-12	B.J. Brecke
1974-75	W.G. Westmoreland	2011-12	2012-13
1975-76	P.W. Santlemann	2014-15	S.A. Senseman
1976-77	A.J. Becon	2015-16	B. Minton
1977-78	G.A. Buchanan	2016-17	P. Dotray
1978-79	C.G. Parris	2017-18	G. Schwarzlose
1979-80	M.G. Merkle	2018-19	B. Scott
1981-82	J.B. Weber	2019-20	James Holloway
1982-83	J.E. Gallagher	2020-21	Eric Webster
1983-84	C.G. McWhorter	2021-22	Cletus Youmans
1984-85	W.S. McIntire	2022-23	Darrin Dodds
1985-86	R.E. Talbert	2023-24	Todd Baughman

Dedication of the Proceedings of the SWSS

Past Dedication of the Proceedings of the SWSS

Year	Name	University or Company
1973	William L. Lett, Jr.	Colloidal Products Corporation
1975	Hoyt A. Nation	Dow Chemical Company
1978	John T. Holstun, Jr.	USDA, ARS
1988	V. Shorty Searcy	Ciba-Geigy
1995	Arlen W. Evans	DuPont
1997	Michael & Karen DeFelice	Information Design
1999	Glenn C. Klingman	Eli Lilly and Company
1999	Allen F. Wiese	Texas A&M University
2004	Chester G. McWhorter	USDA-ARS
2004	Charles E. Moore	Lilly Research Laboratories
2008	John Wilcut	North Carolina State University
2008	Larry Nelson	Clemson University
2012	Jacquelin Edwards Driver	Syngenta Crop Protection
2015	Paul Santelmann	Oklahoma State University
2016	Ted Webster	USDA-ARS
2017	Dennis Elmore	USDA-ARS
2018	Timothy R. Murphy	University of Georgia
2019	John Ray Abernathy	Texas Tech University
2024	Gilbert Neil Rhodes, Jr	University of Tennessee

List of SWSS Committee Members
January 31, 2025 - January 31, 2026

Note: Duties of each Committee are detailed in the Manual of Operating Procedures, which is posted on the SWSS website at http://www.swss.ws

100. SOUTHERN WEED SCIENCE SOCIETY OFFICERS AND EXECUTIVE BOARD

100a. OFFICERS

President	Eric Palmer	2026
President Elect	Shawn Askew	2026
Vice-President	Drew Ellis	2026
Secretary-Treasurer	Hunter Perry	2024-2026
Editor (Proceedings)	Paul Tseng	2024-2026
Immediate Past President	Todd Baughman	2026

100b. ADDITIONAL EXECUTIVE BOARD MEMBERS

Member-at-Large – Academia	David Russell	2024-2026
Member-at-Large- Industry	Matthew Wiggins	2024-2026
Member-at-Large – Academia	Nick Basinger	2025-2027
Member-at-Large- Industry	John Richburg	2025-2027
Representative to WSSA	Pete Dotray	2024-2026

100c. EX-OFFICIO BOARD MEMBERS

Constitution and Operating Procedures	Carroll Johnson	2024-2026
SWSS Business Manager	Eric Gustafson	2025-2029
Student Representative	Meagan Singletary	2025-2026
Director of Communications	Justin Calhoun	2024-2026

101. SWSS ENDOWMENT FOUNDATION

101a. BOARD OF TRUSTEES - ELECTED

President	Gary Schwarzlose*	2025-2029
Secretary	Sandeep Rana	2021-2026
	Lauren Lazaro	2022-2027
	Lawson Priess	2023-2028
	Connor Webster	2024-2029
Graduate Student Rep	Gustavo Silva	2025-2026

101b. BOARD OF TRUSTEES - EX-OFFICIO

Gary Schwarzlose	Past President of Endowment Foundation Board of Trustees
Eric Gustafson	SWSS Business Manager

102. AWARDS COMMITTEE PARENT (STANDING) - The Parent Awards Committee shall consist of the immediate Past President as Chairperson and each Chair of the Award Subcommittees.

Todd Baughman*	2026	Darrin Dodds	2027	Nick Basinger	2028
Gary Schwarzlose	2026	Charlie Cahoon	2027	Matt Goddard	2028

The Awards Subcommittees shall consist of six members including the Chair, serving staggered three- year terms with two rotating off each year.

102a. SWSS Fellow Award Subcommittee

Gary Schwarzlose*	2026	Jason Norsworthy	2027	John Richburg	2028
Larry Steckel	2026	Nilda Burgos	2027		2028

102b. Outstanding Educator Award Subcommittee

Darrin Dodds*	2026	Tom Barber	2027	Nick Basinger	2028
Ramon Leon	2026	Jason Bond	2027	Aniruddha Maity	2028

102c. Outstanding Young Weed Scientist Award Subcommittee

Charlie Cahoon*	2026	Pete Eure	2027	Vijay Singh	2028
Scott Nolte	2026	Chris Leo	2027		2028

102d. Outstanding Graduate Student Award Subcommittee

Nic Basinger *	2026	Zachary Treadway	2027	Andrew Blythe	2028
Luis Avila	2026	Jenny Dudak	2027	Andrew Hixson	2028

102e. Excellence in Regulatory Stewardship Award Subcommittee

Matt Goddard*	2026	Garrett Montgomery	2027	Joey Williams	2028
Dan Reynolds	2026	Tom Mueller	2027		2028

103. COMPUTER APPLICATION COMMITTEE (STANDING)

Gary Schwarzlose*	2026	Muthu Bagavathiannan	2027	Shawn Askew	2028
Hannah Wright-Smith	2026	Justin Calhoun	2027	VJ Singh	2028
Eric Gustafson – SWSS Business Manager					

104. CONSTITUTION AND OPERATING PROCEDURES COMMITTEE (STANDING)

W. Carroll Johnson*	2024-2026

105. FINANCE COMMITTEE (STANDING) - Shall consist of the Vice President and President-Elect, Secretary-Treasurer as Chair, Chair of Sustaining Membership Committee, and others as the President so chooses, with the Editor serving as ex-officio member.

Hunter Perry* (Sec.-Treasurer)	2026
Shawn Askew (Pres. Elect)	2026
Drew Ellis (VP)	2026
Eric Castner (Sustaining Mem.)	2026
Gary Schwarzlose	2026
Darrin Dodds	2026
Paul Tseng (ex-officio)	2026
Eric Palmer (President)	2026
Eric Gustafson – SWSS Business Manager	

106. GRADUATE STUDENT ORGANIZATION

President	Megan Mills-Singletary	2026
Vice President	Tanner King	2026
Secretary	Juan Romero	2026
Weed Resistance & Technology Comm. Rep	Jackson Alsdorf	2026
Endowment Committee	Gustavo Silva	2026
Social Chair/Student Program Committee	Mikerly M. Joseph	2026
Student Program Committee	Ryan Hamburg	2026

107. WEED RESISTANCE AND TECHNOLOGY STEWARDSHIP (STANDING)

Alabama	Steven Li	North Carolina	Charlie Cahoon
Arkansas	Jason Norsworthy*	Oklahoma	Liberty Gavin
Florida	Greg MacDonald	South Carolina	Matthew Cutulle
Georgia	Eric Prostko	Tennessee	Larry Steckel
Kentucky	Travis Legleiter	Texas	Pete Dotray
Louisiana	Daniel Stephenson	Virginia	Michael Flessner
Mississippi	Luis Avila	Puerto Rico	Wilfredo Robles
Missouri	Alex Mangialardi	Grad. Student Rep	Jackson Alsdorf

109. LEGISLATIVE AND REGULATORY COMMITTEE (STANDING)

Drew Ellis*	Chair & Vice-President	2026
Lee Van Wychen	(ad hoc) WSSA Science Policy Executive Director	2026
Janice MacFarland	(ad hoc) Chair of the WSSA Science Policy Comm.	2026
Mark VanGessel	(ad hoc), EPA liaison	2026
David Russell	Member-at-Large - Academia	2026
Matthew Wiggins	Member-at-Large - Industry	2026
Nick Basinger	Member-at-Large - Academia	2026
	Member-at-Large - Industry	2026

110. LOCAL ARRANGEMENTS COMMITTEE - (STANDING)

Larry Steckel*	2026	Nashville, TN
Gary Schwarzlose	2027	Corpus Christi,TX
TBD	2028	Savannah, GA

111. LONG-RANGE PLANNING COMMITTEE (STANDING) – Shall consist of the Past-Past President (chair), Past-President, President, and President-Elect.

Eric Castner*	2026
Todd Baughman	2027
Eric Palmer	2028
Shawn Askew	2029

112. MEETING SITE SELECTION COMMITTEE (STANDING) - Shall consist of six members and the SWSS Business Manager. The members will be appointed by the President on a rotating basis with one member appointed each year and members shall serve six-year terms. The Chairmanship will rotate to the senior committee member from the geographical area where the meeting will be held.

Stanley Culpepper* (SE)	2026	Kelly Backscheider (TN)	2028	Eric Castner (OK)	2030
Michael Flessner (SE)	2027	Darrin Dodds (MS)	2029	Todd Baughman (TX)	2031
Eric Gustafson – SWSS Business Manager					

113. NOMINATING COMMITTEE (STANDING) - Shall be composed of the Past President as Chair.

Todd Baughman*	2026

114. PROGRAM COMMITTEE – 2026 MEETING (STANDING)

Shawn Askew*	2026
Drew Ellis	2027
TBD	2028

117. RESOLUTIONS AND NECROLOGY COMMITTEE (STANDING)

David Russell*	2026	Ryan Edwards	2027		2028

118. SOUTHERN WEED CONTEST COMMITTEE (STANDING) open to all SWSS members

Mississippi	T. Bararpour		Missouri	A. Mangelardi
Alabama	S. Li		North Carolina	C. Calhoun
Arkansas	H. Wright-Smith N. Burgos		Oklahoma	L. Gavin
Florida	G. MacDonald		South Carolina	M. Cutulle
Georgia	N. Basinger		Tennessee	M. Wiggins*
Kentucky	T. Legleiter		Texas	P. Dotray
Louisiana	C. Webster		Virginia	S. Askew
Ad Hoc - Current	B. Scott		Puerto Rico	W. Robles

119. STUDENT PROGRAM COMMITTEE (STANDING)

Lawson Priess*	2026	
Taylor Randell-Singleton	2027	
Mason Castner	2028	
Meagan Singletary	2026	Graduate Student Organization Rep. – Ex-officio member

120. SUSTAINING MEMBERSHIP COMMITTEE (STANDING)

Joey Williams*	2026	Greg Steele	2027	Kelly Backscheider	2028
Eric Castner	2026	Ryan Edwards	2027	Zach Treadway	2028
Cletus Youmans	2026	Pete Eure	2027		2028

121. CONTINUING EDUCATION UNITS COMMITTEE (SPECIAL)

AL - Steve Li	2026		MO – Alex Mangialardi	2026
AR - Tom Barber*	2026		NC – Charlie Cahoon	2026
FL - Calvin Odero	2026		OK – **	2026
GA – Nic Basinger	2026		SC - Alan Estes	2026
KY – Travis Legleiter	2026		TN – Julie Reeves	2026
LA – Daniel Stephenson	2026		TX - Jacob Reed	2026
MS -Te-Ming Paul Tseng	2026		VA – **	2026

*Chair
**CEU's not provided by that state

SWSS Board of Directors Meeting Minutes & Committee Reports

SWSS Spring Board of Directors Meeting

Monday, March 11, 2024 (2:00 PM Central)

- In Attendance: Carroll Johnson, Navdeep Godara, Todd Baughman, David Russell, Charlie Cahoon, Peter Dotray, Michelle Breton (IMI), Eric Castner, Shawn Askew, Matthew Wiggins, Justin Calhoun, Eric Palmer, Kelley Apodaca
- Call To Order: Baughman
- Motion to approve agenda: Castner, 2^{nd} Carroll Johnson, motion carries
- Have not received previous minutes; will approve along with todays minutes
- Old Business
    - Kelley will get financials out along with old minutes
    - Palmer- get program out earlier in order for folks to make travel plans
        - Joint meeting made more difficult.
        - Should be easier with just SWSS program
        - Call for papers earlier
        - New system for building program? Will it be done in time?
    - Baughman- some rooms too hot after filled with people
        - Remind hotel to account for this
        - A few session rooms had TVs instead of projectors; lasers would not work with TV
        - Need consistency; same equipment, setup across sections
        - Let student know ahead of time
    - Askew – Promoting group photos; having a photographer dedicated to take group/lab photos
        - Could potentially get sponsorship for photographer?
        - Could get Clemson communications?
    - Godara – appreciated professional photo opportunities
    - Kelley – financials
        - Registration: 129 SWSS; 85 student; 15 add on students; 37 added on regular members; 214 total SWSS attendees (lower than past years; 258 in 2023; 303 in 2022; 276 in 2021; 282 in 2020)
        - Eric received final bill 2 weeks ago; currently dividing up billing
        - Don't have final financials yet
        - Will send email report prior to summer board meeting
        - Did we have past SWSS members that did not register at SWSS this year? Can we ask them to renew their membership? Todd will send out reminder email
        - Kelley and Eric can work out some members who traditionally sign up SWSS but did not this year
        - Kelley will work to identify these folks
        - Kelley will grab numbers for last joint meeting (San Juan); may not have number for SWSS because everyone signed up as WSSA
        - Have not got final money for broken hoe etc.

        - Sustaining member- Castner to send out thank you notes; Kelley will get final list to Castner
        - Palmer- out of 237K in operating money; 100k in CDs, 137K in separate RBC money not tied to endowment
            - Plan to roll over CD that is expiring; have to update CDs each time; do not automatically rollover; Kelley will check on that and rates/terms (will copy Palmer)
    - Officer candicates- Palmer and Castner
        - Should be good on committees
        - Hannah Wright-Smith, Lawson Priess, and Taylor Randell-Singleton make up grad competition committee
        - Officers-Palmer leading effort; Matt Goddard, Drew Ellis, and Mike Lovelace to consider VP
            - Additional officers to be filled
            - Members at large Industry; John Richburg; Ken Hutto
            - Members at large academia – Nilda Burgos, Jenny Dudack,
            - Endowment- Gary Schwarzlose; need one more for endowment
            - Cody Gray agreed to serve in some capacity
        - Get Kelley updated list and she will pass along to website editor (David Kruger) to update webpage
        - Castner and Palmer will send lists to Baughman
    - Justin Calhoun is new communications person
    - Endowment- Baughman work with endowment committee to get yearly funding level to know where endowment needs to be to cover expenses
        - Need goals for targeted fundraising; capital fundraising project
        - Don't have to go ask for money to cover things after the fact
        - Carroll has expenses (award money and plaques; travel scholarships; helps pay for weed contest when needed) and will send to group
        - When it first started it paid for 1/3 of rooms and awards at meetings
        - Has paid for student events at meeting
        - Budget long overdue
        - Concern of using endowment funds too often
        - Some confusion around how endowment funds are being used (TopGolf)
            - Net zero networking event that some members think is using endowment funds
            - Be clear on activities and how funds are being used
        - Can someone from Endowment Committee highlight history of endowment spending/activities (Dotray suggested)
            - Committee turnover; might need member with longer historical knowledge of endowment
            - Endowment activities have changed over time
        - Newsletter update on endowment?
            - Calhoun willing to highlight endowment events etc.
        - Askew- Symposium on history of weed science, could include endowment history
- New Business

- Godara- Would board be okay with additional social media accounts to better reach students/society
  - Godara will share login info with Kelley
- Calhoun- Also wants to expand social media footprint
- Motion to Expand Social Media Footprint → Calhoun; Second → Johnson;
  - Discussion
  - Dotray: comment made that need daily attention
  - Baughman: for informational purposes, don't need daily attention just to share info with members
  - Calhoun: has coordinated with Sarah about how frequent to post; nothing daily
  - Johnson: need to maintain professionalism on social media
  - Wiggins: be careful what information is being shared; phone numbers; emails etc.
  - Askew: Guiding doc to pass down to social media coordinators and how to engage with public
  - Castner: WSSA has a MOP for social media that we may can modify
  - Motion to amend motion to include production of Social Media MOP, then expand social media footprint → Calhoun; Second → Askew
    - Discussion → get Kelley login info
    - Motion carries
- Castner→ Endowment enrichment skews toward PhD students
  - Do we need a dedicated slot for MS students?
  - Do hosts care if MS or PHD?
  - Master candidates are at major disadvantage
  - Castner→ to look into selection process
  - Jason Bond committee chair
  - Can discuss at summer board meeting
- Weed Contest-Askew; SWSS competition looking good; going to send out rules soon; extremely excited about trophy; August 7 is day of competition
- Summer Board Meeting:
  - Kelley will create a doodle poll
  - Need to add Cutelle for local arrangement
  - Charlie will send contact to Kelley
- Hunter sent Old Minutes to Baughman and he will send out for approval
- Charlie will send today's minutes to Hunter

- Motion to Adjourn→Askew; second → Palmer; motion passes

SWSS Summer Board of Directors Meeting
Tuesday, July 23, 2024 (6:30AM Central)

- In Attendance: F2F; Carroll Johnson, Navdeep Godara, Todd Baughman, David Russell, Charlie Cahoon, Michelle Breton (IMI), Eric Castner, Matthew Wiggins, Justin Calhoun, Eric Palmer, Kelley Apodaca, Matt Cuttelle. Zoom: Hunter Perry; Adam Hixon; Shawn Askew; Peter Dotray, Paul Tseng; Connor Webster

- Call To Order: Baughman
- Old Business:
- 2025 Officers: Eric Palmer
    - Motion Carroll; 2nd Wiggins, motion carries
    - Difficult to get VP candidates, others not that difficult
- 2025 Meeting:
    - Audio/Visual
        - Cuttelle will arrange projectors (Cahoon can bring some)
        - Society has pointers
- Newsletter
    - Call for papers
    - Call for auction items
    - Highlight Enrichment Scholarships
- Gun raffle???
    - Do we want to do that again
    - Charlie will talk to his contact about details
- WSSA investment accounts
    - Should Pete ask WSSA plan for their investment funds? Never hurts to ask
        - Help Lee Van Wychen?
- SWSS Endowment
    - ~387K; 200K in CDs; 175k in RBC fund; 11k in checking
    - Endowment committee not really functioning as a committee (need to remind committee what we need)
    - Do we want ad hoc member from Endowment on board to increase communication?
    - Targeted communication about endowment goals (and what it covers)
    - Todd will talk to committee
- Charleston Tours?
- TopGolf
    - Cutelle will talk to Luke Ethridge about space and food
- New Business:
    - SWSS swag? Pins, hats, shirts?
    - Redesign logo? Make it a contest?
- USDA Tour on Thursday?
- Motion to adjourn Carroll, 2nd Castner, motion carries

SWSS Fall Board of Directors Meeting

Monday, November 25, 2024 (2:00 PM Central)

Attendees: Todd B., Carroll J., Eric G., Shawn A., Paul T., Adam H., Matt Cuttele, Eric C., Peter D., Eric P., Matthew W., Jason Bond

Call to order: Todd @ 2:01 pm; Eric C motions, Carroll seconded. No objections

SWSS 2025 Meeting Update (Eric P.): Program is pretty much in place. Eric will be working with Gus on an export to get in program format. Eric G. will print. Matt C. is working on poster boards for poster contest. A couple of late requests came in, but Eric P. has told some folks "no". A couple of students were helped shortly after the deadline, but all "no" from here on. Dr. David Shields (??) Will give a history of the Charleston area. Randy Ratliff will give the background of the SWSS Endowment Fund. Dr. Tony Byrd and Stanley Culpepper will give an update on the ESA herbicide strategy. Lee van Wychen will give a science policy update. Pat Wechter. will be providing a welcome to SC . Enrichment scholarship presentations. Lastly Shawn A. will discuss the new broken hoe trophy.

Eric gave a student contest update regarding number of presentations as well as session updates each day, Christian fellowship breakfast, student contest, etc. BOD meetings Sunday 3:30-5:30 pm, Monday 11-noon, and Thursday 7-9 am.

Discussions around the Convex system. Todd B. asks if the program will be on a app. There will be no app. We will have an online version only.

Matt C. was hoping to get poster boards from the College of Charleston but may have to rent from a vendor.

Top Golf discussion…. should we add 25 more spots (50 reserved to-date) or may 50 more? Need to clarify that transportation will not be provided to and from Top Golf.

Matt C. and Eric P will be bringing projectors and extra computers for the meeting rooms.

227 total abstracts for the '25 meeting. This is a good number based on previous meetings.

SWSS Business Manger Update (Eric G.): We will be working directly with SWSS for the near term. Currently 120 registered to-date. Voting is open. Need an estimate on number of programs to print. Mark from NCWSS is having an issue with presentation upload, but the problem should be fixed soon.

SWSS Proceedings Update (Paul): Issues getting committee updates this past meeting. No fault of Paul or Hunter. Simply difficult getting them in.

WSSA Update (Peter D.): Peter will provide a full report at Charleston but plans for 2025 meeting are well underway. The program will be joint with the CWSS in Vancouver, BC, Feb 24-27. Call for papers have started with a December 2nd deadline. Budget discussions were good. Discussions around ESA. Replacement for Jim K as the new NIFA fellow for WSSA. Eric G. mentioned potential travel difficulties and he discussed WSSA routes of communication just in case it affects some SWSS students.

Constitution and Operating Procedures (Carroll): A quorum for BOD business is not defined. Askew motions, Hunter seconded, no opposition. No new business regarding the COP.

Eric P suggested addressing number of support letters required for awards. Todd recommends a hard number so too many support letters are put in the packet. Eric C. will investigate and discuss at board meeting in January. Peter recommends considering discussion around committee members voting. It has happened in the past and the member recused themselves.

New Business (Todd): Todd asks the BOD if we should only have one award for Young Weed Scientist since we have had trouble getting nominees for academia and industry. Both industry and academia would be eligible, but only one winner (will discuss at later meeting).

Sheraton Music City will be hotel in Nashville.

Omni Fort Worth or the Omni Corpus Christi for the 2027 meeting. Several members speak favorably toward the Corpus Christi option. Eric G. will investigate a couple of other options. Need to solidify an annual meeting date (rather earlier or late-January), to avoid flip flopping and causing scheduling confusion in the future.

Awards update (Eric C.) – Fellow done, Educator done, outstanding young weed scientist done (no industry nominee), graduate student done, excellence in regulatory. Eric will have a full report first part of December. Issue with the election…. started a little late. Has to run 30 days according to MOP. One or two more reminders will come out.

Motion to adjourn from Carroll, Shawn seconded.

SWSS Board of Directors Meeting

Sunday, January 19, 2025 (3:30 PM Eastern)

Charleston, SC

Attendees: Todd Baughman, Eric G., Eric P., Matthew Wiggins, Eric C., Justin Calhoun, Matt Cutulle, Hunter Perry, Carroll Johnson, Shawn Askew, Charlie Cahoon, Paul Tseng, Navdeep Godara, David Russell

Call to order (Todd): 3:30

Approval of minutes: Carroll motions to approve, Hunter seconded

Matt Cutulle (local arrrangements) update: Poster boards are set up. Donated by College of Charleston. Maybe a little small but should fit with a little overlap. Some extra foam boards available. Top Golf is set up for tonight at 6:00 pm. No intentional mixing of students and professionals. Poster boards have to be down by Wednesday evening at ~ 4-5. Charlie volunteered his crew to help take down boards. Computer set up to get remaining talks uploaded.

Old Business: Lee van Wychen – science policy fellows, call for submissions coming out soon. Proposal for growth for the WSSA. Looking to expand contractors/contractees/paid help to do more things with the WSSA. One idea for contractor is to have someone focused on regulatory and ESA (Bill Chisolm has been doing it). Another contactor could be a variety of focuses…sustaining members, recruitment and education, advertising, grant writing, etc. These would be paid through stipend at first then review (up to $50k total). Todd went to DC in May with the other society presidents. **Lee reviewed his science policy report. For extensive detail, please review Lee's science policy report to see details.**

Meeting update (Eric P.): 274 registered as of Friday. 223 total entries for poster/oral, 110 poster, 113 oral, 28 in poster contest, 54 in oral contest, Dr. David Shields coming in general session to speak, Randy Ratliff will give a history of the Endowment, Todd will give president's speech. Stanley Culpepper and T. Burd will give an ESA Herbicide Strategy review. Three Endowment Enrichment scholarship recipients to present. Shawn Askew will talk about the making of the new broken hoe. Graduate student luncheon on Tuesday. Grad student awards luncheon on Wednesday. Charlie is heading up the raffle….will number 100 or more tickets. 82 registered for Top Golf….food for 85. Several students went into the system and changed their presentations to be in the contest when they had not originally signed up. Eric P had those changed back because it threw the program out of whack.

Award Update (Eric C.): Awards are on track. There are a few changes moving forward. We will not be giving Young Weed Scientist Industry and Regulatory awards.

Financial/Endowment Update (Eric G.): Shared the SWSS December Balance Sheet. Total asset balance of $300K. Hotel, AV, etc. has been prepaid. A few items like plaques, programs, etc. will need to be paid afterward. Plan is to consolidate the RBC accounts. Eric showed a balanced sheet for the Endowment Fund as of December 31, 2024. Todd proposed the idea of the Secretary/Treasurer Charing the Finance Committee since the Secretary/Treasurer serves a 3-year term. Todd also proposed changing the Endowment Chair a 3-year position and ex-officio to the BOD. Composition change of the Finance Committee could be done amongst the BOD internally. Todd will talk to Gary Schwarzlose about the Endowment Change and we may vote on the Finance Committee change on the Monday meeting. Several comments made regarding ways to continue growing the Endowment. One suggestion was to send mailouts or other methods to pull in retired former members. Endowment/Board needs to have a plan if the Endowment continues to increase.

New Business: Todd asks the question do we consider making committee Chairs multiple years instead of one to avoid things falling through the cracks. This would work for some committees and not others. The graduate student contest for example, have a system put together since it is a very intensive Chair position. Discussed site selection options. Currently only have two options and waiting on the third (eastern option). David Russell asked about necrology entries. Todd sent him two, but nobody else on the

Adjourn: Charlie motions to adjourn. Carroll seconded. No opposition

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SWSS Board of Directors Meeting

Monday, January 20, 2025

Charleston, SC

Attendees: Paul Tseng, Eric P., Shawn Askew, Eric Gustafson, Navdeep Godara, Carroll Johnson, Todd Baughman, Charlie Cahoon, David Russell, Peter Dotray, Matthew Wiggins, Eric C., Adam Hixson, Hunter Perry, Tristen Avent, Gregory Dahl

Eric Palmer update: Will wait and set out auction items on Tuesday morning. We are still waiting on a couple of talks. Ran a test this morning and things worked well….should be good to go for presentations. Eric will take last-minute auction items. Charlie said raffle is going well. We are already in the green but hope to continue selling more tickets. There was some confusion at Top Golf on Sunday night. In the past there was more game organization. Agreement amongst the board that we need to go back to a more organized event involving randomized players (students, industry, academia, etc.). This would encourage more networking among participants. Going forward the Endowment will be responsible for finding location, gaining sponsorships, etc. Student representative will be responsible for setting up groups, randomizations, etc.

Poster boards were a little short, but everything is working out okay. College of Charleston donated the boards and saved the society approximately $10-11K. Price in this range is becoming more common. Discussion around the size of posters and potentially reducing the size, adjusting poster rules, etc.

Old Business: Eric P motions to get Eric G and Hunter added to all SWSS banking and financial accounts, Carroll seconded. No opposition.

Finance committee change recommendations: Finance committee Chair would be secretary/treasurer for 3-year term. Also, members of the Finance Committee would serve a three-year term. Membership would consist of the President, past president and VP. Also, the Endowment Chair would be represented. Shawn Askew motions to make the secretary/treasurer would be the Finance Committee Chair (3-year term), Carroll seconded. Charlie motioned to make the President a member of the Finance Committee, Matthew Wiggins seconded. Decision was made not to add additional 3-year terms to the Finance Committee from general membership. Carroll will have to make changes to the duties of the individual officers serving on the Finance Committee. He will do this immediately.

Need think about potentially changing 2-3 other Chair terms to 3 years (e.g. Site Selection, Endowment). Changes to most committees occurs during the summer. It's not in the MOP to do it that way, but rather historically it has been done that way. Todd suggests attacking these committee changes/adjustments sooner rather than summer so many of these things are lost or missed prior to the next meeting.

Endowment Committee members agree more consistency is needed within the Endowment Committee (longer term Chair assignment).

Eric C. discussed proposed Award Committee changes, clarifying language, etc. Typically done at the summer meeting, but Eric C and others suggest making the changes immediately. Change would be three letters of recommendation. WSSA has three recommendations (2 internal and 1 outside recommendation).

Weed Contest updates (Matthew): 2025 Contest site will be Lonoke, AR. Changes to the contest rules do not have to be voted on by the BOD. Clarification on graduate vs undergraduate particiants….to be considered graduate contestant, the student in question has to be taking graduate hours. If undergraduates want to play up into the graduate contest they can. Shawn and others discuss putting in a "3-month clause".

Committee suggests contestants can compete five times (including alternate). 100 weeds and 25 herbicides will be limit in the contest which will be chosen by the host. Some herbicide rates need to be corrected (mesotrione, topramezone). Adjuvant section needs to be cleaned up. Need clarification on herbicide group name or #.

Navdeep discussed graduate student luncheon (speakers, activities, etc.). Navdeep to send Hunter an overview of the event.

Eric P motions to adjourn and Charlie seconded.

SWSS Board of Directors Meeting

Thursday, January 23, 2025

Charleston, SC

Attendees: Eric Palmer, Pete Dotray, Meghan Singletary, Hunter Perry, John Richburg, David Russell, Justin Calhoun, Nick Bassinger, Paul Tseng, Matt Cutulle, Matthew Wiggins, Gary Schwarzlose, Carroll Johnson, Todd Baughman, Greg Dahl, Eric Gustafson, Hannah Wright

Carroll motions to approve the minutes, Todd seconded.

Introductions for new board members.

Old Business: None

Meeting update: 290 final registrations. Only a couple of walk-ups. Eric thought attendance was good. Luncheon and meal attendance was good this year (may be attributed to weather-related closures). Endowment auction went well. Charlie sold all raffle tickets. Matt will forward contracts to Larry Steckel. Larry is going to reach out to some poster board sources locally. In the future, may be able to shorten coffee to reduce expense. Graduate student lunch went great (98 in attendance). We had 55 items in the silent auction and we earned $1,941. Everyone liked the "Endowment ribbons" for those who purchased raffle tickets. General session was a little long. Will have a call with Convex. Meghan would like to do a "day one" test of the registration site. Eric will probably have a Convex call with Shawn. Eric got the impression no many used the online program. A lot of discussion around the Convex program. Gary recommended the Computer Application committee get involved with this program. SWSS spent around $2500 on printed programs. Different ideas being thrown around about what they liked about award ceremonies and some proposing potential ideas for future. Majority agreed the electronic award booklet with the QR code was nice. Justin will put a link to bios on social media. Mostly reviews of the Marriot venue were positive. There were a few things out of our control (e.g. elevator issue). Most agree they would return to this location. Carroll recommended putting the auction items in a closed room. Presentation rooms were good….quiet, good sound, decent seating. Meghan made a comment about the rooms where the mic had to be held. The poster board issue discussed extensively. Do we reduce the size?? What are other societies doing? Ideally, we conform to other societies so students not expected to change poster size.

Eric sent information to Shawn regarding the Nashville meeting….kind of like a skeleton of the venue/event.

Student contest update (Hannah): A couple of comments made from membership about not having a designated time for students to stand by posters. Logistically the contest went well. Suggestion was to submit a PDF of the poster so posters are available before and after the meeting. It would benefit judges as well. Significant discussion around students being present at their poster. Most like the students standing by their posters….it's good for the students for multiple reasons. Need to fix the submission system so students aren't confused about what session to enter. All posters were present, but one abstract was off. For oral presentations, a couple dropped and a few wanted in but didn't get in due to wrong submission section. Microsoft forms for judging scores went really well. Good feedback from judges as well. Submission site issue will be addressed and should be easy to fix with a simple radio button indicating the student is enrolling in the student contest. Need to consider changing the MOP to state that only 4 judges are required per section. Currently, MOP requires 5 judges per section. Can be very difficult finding the required number.

New Business: 2027 Meeting Location (Jan 23-29). Todd motions to meet at the Omni in Corpus, Matthew seconds. No opposition.

Nashville dates – Jan 26-29

2028 Meeting date (east location) discussion: Site selection proposed Miami, Tampa, Jacksonville, San Juan and Savannah riverfront. Significant discussion around if the list should be narrowed to **Tampa, San Juan and Savannah.** Sourcing professionals would be used to get quotes from these three locations. Todd motions using the sourcing professional, Carroll seconded…no opposition.

Will discuss proposals at the summer board meeting.

MOP discussions:

Carroll motions to make changes to Finance Committee, Shawn seconded….No opposition

Award Committee changes:

Proposal to make change to letter of support (3 letters must be included in the nomination package)

A subcommittee member can nominate and write a letter of support, but they have to recuse themselves from voting.

Carroll motions to make the Awards Committee changes, Shawn seconded…no opposition

GSO:

GSO wants to clean up language around terms of service and what happens if the student leaves (for whatever reason)

Carroll motions to make GSO language changes, Shawn seconded….No opposition

Changes to the constitutional by-laws will have to be announced via Newsletter prior to the 2026 meeting and will be voted on by the general membership at the 2026 business meeting.

Summer board meeting dates: Several dates proposed for July.

2025 SWSS Committee Report Compilation

Finance Committee Report

The finance committee met at the annual meeting in Charleston, having 6 members present including the chair (Askew), business manager (Gustafson), and sit-in attendance by the SWSS President (Baughman). The committee discussed recent executive board discussions regarding changes to the committee structure. The board proposed changes to the current structure to add longevity to the chair and key membership positions to improve consistency and the transfer of societal knowledge. Key changes would include switching the chair position from the incoming Vice President to the Treasurer and adding the President to the committee. The committee also made plans to institute mandatory bi-annual meetings with financial advisors to review investments.

Legislative and Regulatory Committee Report

The legislative and regulatory committee met at the annual meeting in Charleston with 5 members present, including the chair (Askew) and Executive Director of Science Policy, Lee Van Wychen. The committee discussed topics regarding the Endangered Species Act, further summarizing topics delivered in the General Session and in Lee's Washington Report. Lee reiterated the call for applications for the 2025 WSSA Science Policy Fellows. The committee discussed the potential for monarch butterfly to be added to the "threatened species" list. The wrap up was a discussion on the lack of regulatory guidance for spray drone applications. The committee agreed to investigate a potential CAST article on the subject in hopes of spurring regulatory action and improving guidance for this budding industry and technology.

2025 SWSS Resolutions and Necrology committee report

Joey Williams and Ryan Edwards could not attend the meeting, so I (David Russell) presented our report during the business meeting on Monday, Jan. 20, 2025. There were two reports of individuals who passed in 2024, Dr. Ned Mims French II and Dr. Gilbert "Neil" Rhodes, Jr. We observed a moment of silence.

Dr. Ned Mims French II

We remember the life of Dr. Ned French II, a brilliant scientist, dedicated husband and father, and a true friend. Born in Memphis, Tennessee, Ned's early life fostered a deep curiosity for the natural world, a passion that fueled his academic journey.

He pursued his love of science with vigor, earning his Bachelor of Science in Chemistry from Millsaps College. He continued his studies at Mississippi State University, earning his Master of Science in Entomology, and ultimately achieving a PhD in Entomology with a minor in Crop Science from North Carolina State University.

Ned's academic pursuits translated into a distinguished career in agricultural product development. He dedicated his professional life to advancing sustainable practices and improving the agricultural industry. His roles were varied and impactful, including Field Scientist, Professor, Technical Director, and CEO. He was renowned for his innovative ideas, his collaborative spirit, and his unwavering commitment to helping others succeed.

Beyond his professional accomplishments, Ned cherished his family deeply. He was a devoted husband to Sabrina and a loving father to his sons, Austin and Carson, and stepdaughters, Kylie and Karina. He was a constant source of support and encouragement, always cheering them on in their endeavors.

Ned lived by the inspiring motto: "To me there are three things you should do every day. Number one is laugh. Number two is to think... Number three is you should have your emotions moved you to tears." He encouraged those around him to live with purpose, to embrace joy, and to never stop learning.

His legacy of scientific achievement, unwavering dedication, and unwavering love will continue to inspire us all.

Dr. Gilbert "Neil" Rhodes, Jr.

We remember the life and legacy of Dr. Gilbert “Neil” Rhodes, Jr., a distinguished weed scientist, dedicated public servant, and beloved colleague. Dr. Rhodes, who passed away on April 27, 2024, leaves behind a profound impact on the field of agriculture and the lives of countless individuals.

Following in the footsteps of his father, Gilbert N. Rhodes, Sr., also a prominent figure in Tennessee agriculture, Dr. Rhodes dedicated his career to the University of Tennessee. After completing his PhD in Crop Science from North Carolina State University, he returned to his alma mater, where he served as a faculty member for over three decades.

Dr. Rhodes was more than just a researcher; he was a mentor, a colleague, and a friend. He approached his work with a unique blend of intellectual rigor, practical wisdom, and a genuine concern for the well-being of farmers and the environment. His contributions to weed science were significant, leading to the development of more sustainable and effective weed management strategies.

Dr. Rhodes' dedication to his profession was recognized by his peers through numerous awards, including the Weed Science Society of America Outstanding Extension Worker Award and the Southern Weed Science Society Excellence in Regulatory Stewardship Award. He was a Fellow of the Southern Weed Science Society and received the Webster Pendergrass Award from the University of Tennessee for his exceptional contributions to teaching, research, and extension.

Perhaps most telling of Dr. Rhodes' character are his own words, spoken upon being named an Honorary Member of the Tennessee Agricultural Production Association: "Weed scientists use what they know about crops and the weeds themselves to develop economically viable and environmentally sustainable weed management systems. Stewarding crop protection is critical to safeguarding the environment and keeping farmers in business." This statement perfectly encapsulates his commitment to both agricultural productivity and environmental stewardship.

Dr. Rhodes will be deeply missed by his colleagues, students, and the entire agricultural community. His legacy will continue to inspire future generations of scientists and researchers to strive for excellence in their work and to always prioritize the well-being of both people and the planet.

Weed Resistance and Technology Stewardship Committee

- Texas (Dr. Peter Dotray)
  - Nothing new.
  - Dr. Muthu conducted a survey in the Texas High Plain which mostly includes Palmer amaranth: 1st highest number of resistant accessions, glyphosate; 2nd atrazine; 3rd dicamba and 2,4-D; 4th glufosinate.
  - 5-way resistance kochia has been detected.
  - Johnsongrass (south Texas) resistant to glyphosate and group 1.
- Kentucky (Dr. Travis Legleiter)
  - Palmer amaranth and waterhemp control with auxinics is challenged but resistance is not confirmed.
  - Ryegrass resistant to glyphosate.
  - Johnsongrass: one population resistant to quizalofop and ALS, due to continuous use of the chemical.
- Tennessee (Dr. Larry Steckel)
  - Grasses are one of the top issues with wee resistance.
  - Ryegrass resistant to glyphosate.
  - Barnyard and goosegrass is surviving burndown application and clethodim has no effect.
    - Goosegrass impacts looking at timing, tolerance, and resistance.
  - Johnsongrass resistant to glyphosate.
  - Palmer amaranth populations resistant to glyphosate, PPOs, dicamba; also, not controlled by atrazine or HPPD but resistance is not confirmed yet.
- Arkansas (Dr. Jason Norsworthy)
  - Ryegrass resistant to glyphosate in the entire Mississippi delta region.
  - Johnsongrass resistant to glyphosate, FOPs (group 1), and issues with antagonism.
  - Palmer amaranth: seven-way resistance has been confirmed imazethapyr (ALS), glyphosate (EPSPS), fomesafen (PPO), glufosinate (glutamine synthetase), 2,4-D (auxin mimicking), diuron (PSII), and mesotrione (HPPD) – glufosinate resistance distribution in the state seems to be broadening.
  - High rates of Glufosinate not working on palmer.
  - Residual herbicides are working better, especially PPOs.

- Mississippi (Dr. Taghi Barapour)
  - Ryegrass tolerant to paraquat and resistant to glyphosate.
  - Johnsongrass resistant to herbicides seems to be suppressed by glufosinate.
  - Virginia pepperweed has become one of the major weeds in the state.
  - Issues with sedges.
  - Residual herbicides have been huge allies and posts are not reliable with some of these accessions.
  - Current prices are definitely driving the crop management decisions.
  - Concerns about the ESA.

Notes from Past Chairman – Drew Ellis; added following the committee meeting

Given changes in employment with Dr. Hunter Bowman (now with Corteva in commercial role) who was to be the Chair in 2025 the committee was lacking a Chair. Thankfully those in attendance captured notes to provide to the Society and BOD.

Drew will work with the University and Industry Representatives to have proper chain of leadership as listed in the SOP for the Society and ensure that the committee is fully operable.

Once such is fulfilled he will provide the updated list of representatives and roles to the BOD and have the Website committee list updated accordingly.

2025 SWSS Endowment Board Committee Report

Attending – Lawson Priess, Connor Webster, Lauren Lazaro, Tristen Avent, and Eric Gustafson. Jason Bond and Sandeep Rana not in attendance. Randy Ratliff, Gary Schwarzlose, and Eric Palmer joining.

Eric Gustafson gave Update on Financials: Total current assets: $419,977.43. Balance Sheet attached to this report. Consolidations of the multiple accounts will be investigated to help streamline how the Endowment Funds are managed and how income and expenses can be better tracked during the year.

Randy Ratliff gave a brief report on the History of the Endowment Foundation (formal presentation during the General Session today at 2 pm).

The committee discussed various topics on improving communications from and to the Foundation. Quarterly Committee meetings will be planned as well as developments of Goals and setting up of Budgets to help achieve the goals.

Discussion on review of SWSS Endowment Committee member tenures. Request to the SWSS Board that tenure of Chair should be increased from 1 year to 3 years to improve continuity of the Endowment Foundation. MOP will be reviewed for accuracy.

Process of nominations needs to be added to SWSS MOP, again for historical information.

Discussion on adding the SWSS Endowment Foundation Committee Chair to become a SWSS Board member. This request will enable the Endowment Foundation to have a voice on the Board and to provide better communication between the two Boards.

Top Golf – Very positive experience. Another success!

Last night's participation included 66 students and 17 regular registrations.

Good site for Graduate Student interaction and communication.

$25 is an easy ask for Graduate Students.

Members are encouraged to help sponsor the event.

Three (3) SWSS Endowment Enrichment Scholarships given in 2024.

2024 Endowment winners will make presentations during the General Session. Need the processes we use to select winners need to be added to the SWSS MOPs for historical information.

Silent Auction and Raffle – Setting up now. Ask people to come check out what is going on. Put some bids down to make a little money. Items can be paid with Cash, Check or Credit Card. Ends Wednesday at 1:00pm.

No new business

Motion to adjourn

Adjourned

Southern Weed Science Society Endowment Foundation

Balance Sheet

As of December 31, 2024

	TOTAL
ASSETS	
Current Assets	
Bank Accounts	
Checking (4539)	2,746.71
RBC (0444)	201,130.55
RBC (Hussman)	5,895.59
Trust account (7516)	60,870.94
Trust account (7517)	56,361.43
Trust account (7560)	45,301.14
Trust account (7561)	47,671.07
Total Bank Accounts	**$419,977.43**
Total Current Assets	**$419,977.43**
TOTAL ASSETS	**$419,977.43**
LIABILITIES AND EQUITY	
Total Liabilities	
Equity	
Opening Balance Equity	416,774.28
Owner's Pay & Personal Expenses	0.00
Retained Earnings	-37,019.45
Net Income	40,222.60
Total Equity	**$419,977.43**
TOTAL LIABILITIES AND EQUITY	**$419,977.43**

Student Program Committee Report

Committee:

a. Chair: Hannah Wright-Smith (hewright@uada.edu) – Academia (University of Arkansas)

b. Co-chair: Lawson Priess (Lawson.Priess@fmc.com) – Industry (FMC)

c. Member: Taylor Randell-Singleton (trandell@uga.edu) – Academia (University of Georgia)

Meeting Date: January 20-23, 2025

ITEMS OF BUSINESS:

1. **Student Contest Participation:**

Year	Poster Contest Participants				Oral Paper Contest Participants			SST			Total Participants
	Undergrad	MS	PhD	Total	MS	PhD	Total	MS	PhD	Total	
2025	0	15	13	28	29	22	51				79
2024[a]	1	23	22	46	26	24	50	4	11	15	111
2023	0	14	15	29	29	29	58				87
2022	3	30	13	46	25	24	49				95
2021[b]	0	22	24	46	28	34	62				108
2020	0	13	9	22	29	26	55				77
2019	0	15	15	30	26	17	43				73

[a] Joint meeting with WSSA
[b] Virtual

2. **Student Contest Overview**

a. Numbers are down from joint meeting last year but on par with participation in previous years.

b. Three separate rooms were used for the student paper contest with a total of 6 sections; 3 MS sections and 3 PhD sections. Oral presentations ran from 7:30 to 12:15 on Tuesday January 21, 2025

c. Minor cancellations this year: One poster canceled in December 2024 after program was printed. Had 2 students cancel posters in 2025, one before the program was made and the other was in the program. One PhD student withdrew the week before the meeting and 2 withdrew on the first day of the meeting (Jan 20, 2025). Final numbers are reported in the table above.

d. We had 43 volunteer judges, 3 were unable to attend the meeting. We had 4 judges for each section for a total of 40 judges.

e. There were 7 students volunteer to moderate, only 6 were needed. There were two moderators arranged per room, with one moderator serving from 7:30 until the 10:00 break and the other serving from 10:15 to 12:15.

3. Preparations Prior to Meeting

a. Title submission closed in October 2024, after which Eric Palmer, program chair, reached out to Hannah Wright-Smith with titles submitted to the student contest.

b. There was some confusion about students selecting the contest in Confex. This was discussed with the executive board and will be addressed in the future.

c. Hannah Wright-Smith, student contest committee chair, arranged student titles into sections according to SWSS MOP and established the oral presentation schedule within 48 hours of receiving titles from Eric Palmer. Due to the number of presentations submitted, 3 sections were needed for both MS and Ph.D. oral presentations and 2 sections were needed for both MS and Ph.D. posters, for a total of 10 sections.

d. Committee chair began seeking judges and moderators for the student contest at the beginning of November 2024. Emails were sent out to members via Eric Gustafson calling for moderators and judges.

e. Judging assignments were emailed to judges approximately one week prior to the meeting and some judges were moved to different sections to avoid potential conflicts of interest.

f. Once judge's assignments were finalized, approximately 5 days before the meeting, abstracts and a web link to the section Microsoft Forms were emailed to judges.

g. Judge's packets were printed containing the QR code to the Microsoft Form, abstracts, and scoresheets. Scoresheets were prepopulated with students' names, paper/poster number, title, and presentation time.

4. At the Meeting

a. Both Oral and Poster contests were held on Tuesday, January 21. Three rooms were assigned for student presentations, and presentations alternated between MS and Ph.D. All student contest presentations were complete by 12:30 PM on January 21.

b. A judge's breakfast was held on Tuesday, January 21 where judges received their packets. Judges were instructed to have scores entered by 5:00 PM.

c. Online Ranking Recording

    i. A Microsoft Form prepopulated with students' names and titles was created for each section shared with the judges for that section as a link sent via email and QR code included in each judges packet. The form had a drag and drop section where judges could arrange names in rank order and a place for judges to enter the total score for each student.

            1. Student rank was used to determine 1st and 2nd place for each section. Total score was collected as well and used in the event of a tie.
        ii. Access to scores was limited to Hannah Wright-Smith, committee chair, as the creator of the Forms. Hannah was able to access and download scores to an Excel spreadsheet from Forms. No judge could see any other student scores submitted by other judges.
        iii. Overall response to the online ranking recording was positive. Only one judge had issues submitting scores, but I believe they were having an internet connectivity issue and were not having trouble with Microsoft Forms.
            1. Google Sheets was previously used to collect scores, however there were several issues with access to the form from company-issued phones. Microsoft Forms
    d. Communication with Judges
        i. An email was sent to judges a week before the contest to resolve any potential conflicts of interest.
        ii. An email was sent to judges by section the weekend prior to the contest with abstracts and a link to the Microsoft Form where they would enter their scores on the day of the contest.
        iii. Instructions for judging were given in email prior to the meeting and at the Judge's Breakfast on the day of the contest.
        iv. Committee member (Wright-Smith, Priess, and Randell-Singleton) contact information was shared with judges prior to and day-of the contest.
        v. Updates on the day of the contest were shared with judges via text message when needed and email
    e. Troubleshooting
        i. One room (Crystal F) had a technical issue, however this was quickly resolved.
        ii. One judge missed a talk, after conferring with the SWSS Program Chair and President it was determined that the talk they missed did not significantly change the outcome of the final rankings, thus their scores were included.
    f. When student score sheets were submitted, they were checked by Hannah to ensure the score and ranking matched what was submitted online. Once checked, Taylor and David Nistler (Hannah's Program Associate) places score sheets in folders prepopulated with student names and affiliations. All scoresheets were in their respective packets by 5:00 PM on the day of the contest.

5. Committee Succession Plan

a. Chair: Lawson Priess (Lawson.Priess@fmc.com) - Industry (FMC), will be the committee chair in 2026.

b. Co-Chair: Taylor Randell-Singleton (trandell@uga.edu) - Academia (University of Georgia), will be the committee chair in 2027.

c. Member: Mason Castner – Industry (FMC), will be the committee chair in 2028

6. Contest Results

a. In the event of a tie, the student's numeric score was used to determine 1st and 2nd place

b. Section winners were announced at the awards reception held on Wednesday, January 22nd.

c. Score sheets were distributed back to student contest participants following the announcement of winners at the reception.

Winners for the 2025 SWSS Graduate Student Contest

Posters

	First place	Second place
MS		
Section 1	Guilia Bortlon (LSU)	James Malone (Arkansas)
Section 2	Akashdeep Singh (Auburn)	Aman Jakhar (VA Tech)
PhD		
Section 1	Bismark Anokye (Texas A&M)	Fatemah Esbaeilbeiki (VA Tech)
Section 2	Ryan Hamberg (Texas A&M)	Kayla Broster (MS State)

Oral Presentations

	First place	Second place
MS		
Section 1	Colton Fuller (Tennessee)	Colden Bradshaw (NCSU)
Section 2	Michael Dodde (Arkansas)	Samuel Kreinberg (Arkansas)
Section 3	Wesley Herrman (Arkansas)	Jackson Alsdorf (NCSU)
PhD		
Section 1	Matthew Woolard (Texas Tech)	Brock Dean (NCSU)
Section 2	Navdeep Godara (VA Tech)	Megan Singletary (Texas Tech)
Section 3	Gustavo Camargo Silva (Texas A&M)	Cory Ketchum (Arkansas)

Nominating Committee Report

Eric Castner – Nominating Committee Chair

Eric Castner and Eric Palmer led the effort to find candidates willing to be considered for the 2025 SWSS elections which included Vice-President, Member-at-Large Academia, Member-at-

Large Industry and the SWSS Endowment. The SWSS BOD approved the following list of candidates:

Vice President – Drew Ellis , Ken Hutto

Member at Large – Academia – Nick Basinger, Jenny Dudak

Member at Large – Industry – John Richburg, Matt Goddard

Endowment Fund – Gary Schwarzlose, Cody Gray

The candidate bios with photos were included in the SWSS August Newsletter and voting online began on November 20 and ended on December 19, 2024.

Candidates elected were Drew Ellis (Vice President), Nick Basinger (Member-at-Large Academia), John Richburg (Member-at Large Industry) and Gary Schwarzlose (SWSS Endowment). The selection of new officers was communicated in the SWSS December Newsletter.

SWSS Awards Committee Report

Eric Castner

Past President – Awards Chairman

The call for nominations for SWSS awards which included the SWSS Fellow Award, Outstanding Educator Award, Outstanding Young Weed Scientist Award, Outstanding Graduate Student Award (MS & PhD) and Excellence in Regulatory Stewardship Award was included in the SWSS August Newsletter as well as sent via email to the SWSS membership in August along with email reminders prior to the October 15th deadline. Subcommittee Chairs were Dr. Eric Prostko – Fellow Award, Dr. Larry Steckel – Outstanding Educator Award, Dr. Sandeep Rana – Outstanding Young Weed Scientist Award, Dr. John Brewer – Outstanding Graduate Student Award and Joey Williams – Excellence in Regulatory Stewardship Award.

Award nominations were received for all award categories except Outstanding Young Weed Scientist (Industry) and Excellence in Regulatory Stewardship Award where there were no nominations received.

Subcommittee chairs submitted award winners to Awards Chairman (Castner) who in turn submitted to President Todd Baughman. President Baughman presented the award winners to the SWSS BOD for approval on December 2, 2024 and all awards were approved via email vote. Award recipients are as follows:

SWSS Fellow Award

Recipient – Dr. John Richburg – Corteva

Outstanding Educator Award

Recipient – Dr. Nick Basinger – University of Georgia

Outstanding Young Weed Scientist

Academia – Dr. Vijay Singh – Virginia Tech

Industry – no nominations

Outstanding Graduate Student Award

MS – Megan Singletary – Texas Tech University

PhD – Dr. Mason Castner – University of Arkansas

Excellence in Regulatory Stewardship

No nominations

SWSS Award were presented on Wednesday, January 22, 2025 at the SWSS Awards Luncheon. All recipients were present and awards were presented by Eric Castner.

The SWSS Awards committee proposed clarification in regard to the awards nomination process and specifically in regard to the number of support letters recommended for all nominations. The SWSS Awards committee also proposed clarification in regard to subcommittee members nominating and writing letters of support for nominees for the award in which they are a subcommittee member.

Additional guidance for all nominations presented to SWSS BOD on January 23, 2024.

1. Recommendation of 3 letters of support with all nominations in all award categories
2. Clarification: a member of the award subcommittee can nominate and provide a letter of support for a candidate for an award in which the nominator is a member the selection subcommittee. In this case, the subcommittee member must recuse himself/herself from the vote for the candidate in which he/she nominated.

2024 WSSA Representative Report to SWSS Board

President: Dahl, Gregory GKDahl@landolakes.com

President-Elect: Sandler, Hillary hsandler@umass.edu

Vice-President: Burke, Ian icburke@wsu.edu

Past-President: Moseley, Carroll carroll.moseley@syngenta.com

Secretary: Backsheider, Kelly Kelly.a.barnett@corteva.com

Treasurer: Lazaro, Lauren lauren.lazaro@bluerivertech.com

Director of Publications: Willenborg, Chris chris.willenborg@usask.ca and Ward, Sarah sarahward1@earthlink.net

Chair, Constitution and Operating Procedures: Lindquist, John jlindquist1@unl.edu

Member-at-Large: Flessner, Michael flessner@vt.edu

Member-at-Large: Sprague, Christy sprague1@msu.edu

Graduate Student Member: Werle, Isabel isabels6@illinois.edu

Executive Director of Science Policy: Van Wychen, Lee (Ex-off and non-voting) lee.vanwychen@wssa.net

Regional Representatives

Aquatic Plant Management Society: Howell, Andrew awhowell@ncsu.edu

Canadian Weed Science Society: Robinson, Darren drobinso@uoguelph.ca

North Central Weed Science Society: Miller, Brett brett.miller@syngenta.com

Northeastern Weed Science Society: Pyle, Steve steve.pyle@syngenta.com

Southern Weed Science Society: Dotray, Peter peter.dotray@ttu.edu

Western Society of Weed Science: Helm, Alan ahelm@gowanco.com

NIFA Representative: Kells, Jim kells@msu.edu

CAST Representative: Schroeder, Jill jischroe1@gmail.com

EPA Liaison: VanGessel, Mark mjv@udel.edu

Executive Secretary (ex-off and non-voting): Gustafson, Eric eric@imigroup.org

Interactive Management, Inc Staff Vice-President and CEO: Leeper, Gary

The 65th meeting of the Weed Science Society of America will be joined with the Canadian Weed Science Society at the Sheraton Vancouver Wall Centre in Vancouver, BC on February 24-27. WSSA registrations are at 234 and CWSS have 76 registrations. Seventy-four students have pre-registered for WSSA. There are 421 submitted titles (230 oral and 185 posters). Dr. Jennifer Grenz, Assistant Professor and Indigenous Scholar in the Department of Forest Resources Management, jointly appointed between the Faculty of Forestry and Faculty of Land and Food Systems at the University of British Columbia, will provide a keynote address titled "Are they rising from the ashes? Re-learning invasive species management on post-wildfire landscapes in British Columbia". We will have four outstanding symposia (Description of the EPA's Herbicide Strategy, Communication Resources, and Scientific Information Useful to Regulators; Not your Old Professor's Journals – Rapid Change in Academic Publishing; Experiences and Insights from Recently Funded Weed Scientists in NIFA's Competitive Grant Programs; Contributions of Genomics to Non-target Site Resistance Knowledge and Management). Graduate student events will include a student bowling night, joint WSSA/CWSS student business meeting and luncheon and "Stand out in the crows: Job search and interview strategies" session, "Exploring bioinformatics in weed science" workshop, student poster contest, and a single-slide talk contest. There also will be a "Women in Weed Science" networking event.

WSSA Travel Enrichment Experience:

2023 WSSA TEE: Isabelle Aicklen, University of Guelph; Victor Hugo Vidal Ribeiro, Oregon State University; Bholuram Gurjar, Texas A&M University; Jeanine Arana Cordonero, Purdue University; Eli Russell, Virginia Tech. 2024 WSSA TEE: Cristiana Rankrape, Southern Illinois University Carbondale; Hannah Johnson, Michigan State University; Aleah Butler-Jones, Cornell University; Navdeep Godara, Virginia Tech; Luisa Baccin, Oregon State University

The 2024-2025 Science Policy Follows: Sarah Ann Drumm Chu, Texas A&M University; Joshua Miranda, Oregon State Univeristy.

Three tours have been organized: Tour to Granville Market, a Craft Beer Tour, and a Harbor Tour and Show.

WSSA Awards: To Be Announced at the annual meeting

WSSA Finance Committee:

1. Financial Health: *Total Assets $2,434,623.65 (as of 10/31/2024)*
2. Innovative grants program - There were 22 proposals for the Innovative Grants program (proposal deadline was 10/31/2024). The Executive committee met to prioritize and select recipients. The winners were Dr. Shawn Askew, Virginia Tech. Individual Weed Treatment with Cryogenic Liquid in Managed Turfgrass: A Foundation for Machine-Vision Applicators; Dr. Sophie Westbrook, Kansas State University. Integrating Research and Education to Understand Adaptation at Multiple Spatiotemporal Scales in Water-Limited Rangeland Weeds; and Dr. Thomas Butts, Purdue University. Development of an artificially-intelligent, image-based soil seedbank sampling tool. The collective budgets were $100,000.

Jim Kells, NIFA Fellow - In October, there was a webinar for graduate students. The event was successful. Todd Baughman, Center Director from the Texas A&M AgriLife Research Center in Lubbock, will replace Jim Kells as NIFA Fellow.

Mark VanGessel, EPA Liaison - Larry Steckel gave a presentation to the EPA on multiple-resistant Palmer amaranth and it was well received. Mark mentioned that his three-year term will end in the spring of 2025.

Lee Van Wychen, Science Policy - Lee presented a proposal for weed science society growth. He is seeking $40,000 plus up to an additional $15,000 per year for three main initiatives. **Endangered Species Act (ESA) and Regulatory Consultant.** A stipend of $20,000 per year, plus up to an additional $10,000 per year for travel costs. **Weed Science Society Growth and Development Consultant(s).** A stipend of $20,000 per year. This will be based on expertise and could be split into 2 or 3 areas as needed (i.e. membership recruitment and development, grant writing, social media management, endowment fund growth etc..). **Publication of the Most Common and Troublesome Weeds Survey.** Up to $5,000. Seeking individual(s) to analyze, write and publish the results of the weeds survey from 2015-2024. Lee also indicated that the ESA tour in September in Wisconsin was successful. There are a lot of questions about the new administration starting in 2025 and the impact on the farm bill, position nominees, etc.

Sarah Ward and Chris Willenborg, Publications Committee –We are moving quickly to Weed Science and APSM being open access, which will occur in January 2025. Cambridge University Press has resolved all issues from the ransomware attack earlier this year. There were some delays in publications, but those should be resolved and caught up by December. There is no update on the Herbicide Handbook.

John Lindquist, Constitution and Operating Procedures - Additional language was added to the MOP for better awareness for board members of their responsibilities to committees. The goal is for board members to follow up with their respective committees to make sure that the committees are completing their respective tasks and supplying reports. There was discussion on wording for the Awards Committee members.

Ian Burke, WSSA Committees/Membership Survey - Ian thinks the committees are in good shape at this point in time. The results from the WSSA Membership survey was positive overall. Most members are satisfied with the WSSA as it currently exists. There were several comments on areas that could be improved. There were suggestions of mentorship opportunities for young scientists. The response rate was 138 members out of 700-800 members. Approximately 79 of the respondents had more than 20 years of experience so the results may be skewed towards those who have more experience. Ian will present the results at the annual meeting.

Isabela Werle, WSSA GSO President - The WSSA GSO hosted a two-day workshop (October 22nd and October 29th) on statistics, focusing on the R programming language, led by Dr. Andrew Kniss. The event attracted over 100 student registrations, with approximately 50 students actively participating in the sessions. For those who were unable to attend, both sessions were recorded and made accessible to all registered participants, ensuring that everyone had the opportunity to benefit from the event. The WSSA GSO collaborated with the North Central Weed Science Society to organize a student webinar on November 4th. This event featured Dr. Ajit Knott and Dr. Dawn Refsell, who shared insights on enhancing poster presentations for annual meetings. They also provided practical tips for improving communication skills when presenting research in professional settings.

The WSSA GSO continues to recognize outstanding students and WSSA alumni through monthly newsletters (10 newsletters distributed in 2024). The GSO is also enhancing its presence on social media, with currently over 1,600 followers on X. This platform serves as a key tool for sharing information, updates, and resources with students and Society members.

Future meetings:

2026 - Crabtree Valley Marriott in Raleigh, NC February 9-12

2027 – Likely Washington D.C.

Respectfully submitted,

Peter A. Dotray, WSSA Representative

Science Policy Report

2024 Science Policy Fellows (SPFs)

- Sarah Chu- Texas A&M. 3rd year Ph.D. student. Advisor: Muthu Bagavathinnian
- Joshua Miranda – Oregon St. 2nd year Ph.D. student; Advisor: Dr. Marcelo Moretti
- Participated in EPA and FWS tour on Endangered Species Issues in WI. Sep. 3-5
- Conducted Congressional Visits and met with other NGO’s in DC during Nov. 19-21

Proposal for Growth for the Weed Science Societies

• WSSA Board discussed new "consultant" roles for weed science society growth at the fall Board of Director's meeting.

- Endangered Species Act/Regulatory Consultant
- Weed Science Society Growth and Development Consultant(s)
    - Could be split into 2 or 3 areas as needed such as membership recruitment and development, federal grant writing and procurement, social media management, endowment fund growth etc..
- Unanimously approved by WSSA Board of Directors. A temporary ad-hoc committee will discuss job descriptions and reporting requirements before WSSA annual meeting in Vancouver and request funding for these positions

Weed Science Presidents Travel to DC to Promote Ag Research Funding

During the week of May 6 – 9, five weed science society presidents visited Washington DC to advocate for federal agriculture research funding. They also attended the National Coalition for

Food and Agricultural Research (NCFAR) annual meeting, which provided a great overview of federal agriculture spending and priorities. We also heard from USDA's Deputy Under Secretary for Research, Education, and Economics (REE), Sanah Baig and from the main House and Senate Ag Committee staff working on the Research Title in the Farm Bill. This included:

Brandon Honeycutt with Senate Ag Committee Chairwoman Debbie Stabenow

Jeremy Witte, with Senate Ag Committee Ranking Member John Boozman

Ricki Schroeder, with House Ag Committee Chairman G.T. Thompson

Emily Pliscott, with House Ag Committee Ranking Member Austin Scott

We visited 25 Congressional offices. Our top priority issues were:

1. Support the USDA **NIFA Crop Protection and Pest Management (CPPM)** program at $21 million in FY 2025. The President's Budget Request for FY 2025 slashed this program by 85% to $3 million. The CPPM was funded at $21 million in both FY 2023 and FY 2024. The CPPM tackles real world weed, insect, and disease problems with applied solutions through the concepts of integrated pest management (IPM). The CPPM funds Extension IPM personnel as well as a competitive IPM grants program.
2. Support the USDA NIFA **IR-4 Project** funding at $25 million in FY 2025. The IR-4 Project was funded at $15 million in FY 2024. The President's Budget Request for FY 2025 is $15 million. The IR-4 Project conducts research and develops the data needed to facilitate the registration of crop protection products, including reduced risk and bio-based pesticides, for fruits and vegetables, as well as herbs, spices, ornamental plants and other horticultural

crops. The IR-4 Project provides an incredible return on investment as it contributes $8.97 billion to the annual U.S. GDP.

The Congressional visits were very successful. The House and Senate Ag Appropriations Committee has restored the USDA NIFA CPPM program funding to $21 million for FY 2025. For the IR-4 Project, the House Ag Appropriations Committee provided a $750,000 increase for FY 2025 to $15.75M.

We also met with several other agricultural groups, including the National Alliance of Independent Crop Consultants (NAICC) and the National Farmers Union (NFU). One of the outcomes of those meetings was a tour for EPA and FWS to review Endangered Species Act issues in Wisconsin. The tour was co-sponsored by WSSA and NAICC and was held during September 3-5. We discussed mitigations for endangered species like the Massasauga Rattlesnake and the Rusty Patched Bumble Bee, observed the unique challenges posed by WI's Central Sands hydrology and irrigated potato production, and viewed IPM practices being used in cranberry production. Finally, the group toured the Winfield United Innovation Center in River Falls, WI to view the latest research in spray drift reduction technologies.

Weed Science Society Presidents visit to Washington DC in May 2024.

From L to R: Lee Van Wychen, Executive Director of Science Policy; Dawn Refsell, NCWSS President; Todd Baughman, SWSS President; Tim Prather, WSWS President; Greg Dahl, WSSA President; and Erin Hitchner, NEWSS President

WSSA Endangered Species Act Committee- Very Busy! Chaired by Bill Chism

- EPA released "final" Herbicide Strategy Aug. 20. https://downloads.regulations.gov/EPA-HQ-OPP-2023-0365-1137/content.pdf
- Draft Insecticide Strategy: released July 25. https://www.regulations.gov/docket/EPA-HQ-OPP-2024-0299/document
- The spray drift and runoff/erosion mitigation strategies for herbicides and insecticides share significant similarities

- The WSSA ESA committee continues to expand and widen representation. Tom Anderson with the Entomological Society of America has agreed to serve on the committee. Working to find a representative from ASA-CSSA-SSSA. Current committee members include:
    - Bill Chism, chair
    - Lee Van Wychen, WSSA
    - Stanley Culpepper, UGA
    - Cameron Douglass, USDA OPMP
    - Leah Duzy, CSI
    - Taylor Randell-Singleton, UGA
    - Aaron Hager, U of Illinois
    - Brad Hanson, UC-Davis
    - Carroll Moseley, Syngenta
    - Mark VanGessel, U of Delaware
    - Nicole Zinn, EPA OPP
    - Emily Unglesbee, GROW
    - Frank Wong, American Phytopathological Society (APS)
    - Tom Anderson, Entomological Society of America (ESA)
    - Sarah Chu, Grad Student Rep, TX A&M
    - Daewon Koo, Grad Student Rep, VA Tech
- WSSA website for ESA resources: https://wssa.net/endangered-species/
- FYI- Bill Chism received the NAICC's "Service to Agriculture Award" for his ESA work. NAICC's annual meeting is in San Diego and is the same week as SWSS.

Weed Science Societies Support the Use of DRAs for ESA Mitigations

The six National and Regional Weed Science Societies sent a letter to EPA supporting the addition of Drift Reduction Adjuvants (DRAs) to the list of mitigation options available to pesticide users for Endangered Species Act (ESA) compliance. EPA's Draft Herbicide Strategy does not currently list DRAs as a tool to reduce spray drift and run off, even though DRAs are used on over 100 million acres every year.

The letter from the six Weed Science Societies supports a letter sent earlier this year on the same topic from many other stakeholder groups, including the Council of Producers & Distributors of Agrotechnology (CPDA), CropLife America (CLA), and the National Alliance of Independent Crop Consultants (NAICC). EPA responded favorably to our request and has included some mitigation options for DRAs in their Final Herbicide Strategy. DRA letter is at: https://wssa.net/2024/07/national-and-regional-weed-science-societies-support-drift-reduction-adjuvants-dras-as-mitigation-options-for-endangered-species-act-esa-compliance/

EPA Increases Atrazine CE-LOC From 3.4 to 9.7 µg/L

On July 7, the EPA announced an update to the level at which atrazine is expected to adversely affect aquatic plants. The new revised atrazine concentration of 9.7 micrograms per liter (µg/L), which was derived following an August 2023 FIFRA Science Advisory Panel (SAP) peer review, will be used to develop a revised regulatory decision to help protect aquatic plants as well as fish, invertebrates, and amphibians. Many thanks go to Aaron Hager, Jay Ferrell, John Madsen and Kurt Getsinger for their service on the 2023 FIFRA SAP.

On December 3, EPA released an "Updated Mitigation Proposal" for atrazine. This proposal contains mitigation measures to reduce exposure to non-target species and minimize impacts to federally endangered and threatened (listed) species and their designated critical habitats. The updated mitigation proposal incorporates the revised level at which atrazine is expected to adversely affect aquatic plant communities, 9.7 µg/L, as well as surface water monitoring data, runoff mitigation menu and point system from the Final Herbicide Strategy. Also included are updated maps (with and without roads) where the level of concern is expected to be exceeded and a list of counties with the proposed level of mitigations for those counties. See EPA atrazine website https://www.epa.gov/ingredients-uzsed-pesticide-products/atrazine

The "Updated Mitigation Proposal" for the Atrazine Interim Registration Review Decision, along with all atrazine registration review documents, are available at: https://www.regulations.gov/document/EPA-HQ-OPP-2013-0266-2134

NOTE- this document does not represent a PID or ID, so EPA is taking comment on this updated mitigation proposal now, (**comments DUE February 3, 2025).** EPA will then have to release another amended PID/ID for public comment next year that accounts for human health mitigations.

FWS Proposes That Monarch Butterfly Be Listed as "Threatened" Species

The U.S. Fish and Wildlife Service (USFWS) published a 12-month finding on the endangered species listing status of the monarch butterfly as "threatened" on December 12, 2024. The USFWS is seeking public input on a proposal under section 4(d) of the Endangered Species Act (ESA). Public comments will be accepted on the proposal until March 12, 2025. The Service will then evaluate the comments and any additional information on the species and determine whether to list the monarch butterfly.

With monarchs being listed as "**threatened**" (as compared to "endangered"), the USFWS can issue a more flexible 4(d) rule, including special rules to tailor protections to the specific needs of the threatened species. A 4(d) rule can modify or exempt certain species protections to balance conservation efforts with economic impacts. It allows flexibility to incentivize positive conservation actions, based on the comments received.

With the monarch butterfly being listed as a threatened species by USFWS, the EPA must include it within its standard process for pesticide label registrations, treating it with the same consideration as other protected species. Potential impacts to pesticide labels will likely be seen starting in **2026** as new and previously registered active ingredients undergo registration review.

To assist with monarch conservation efforts, the USFWS is also proposing critical habitat for the **western migratory monarch** at a portion of its overwintering sites in coastal California. In total, the USFWS is proposing **4,395 acres** of critical habitat for the **western migratory monarch** population across Alameda, Marin, Monterey, San Luis Obispo, Santa Barbara, Santa Cruz and Ventura counties in California. A critical habitat designation imposes no requirements on state or private land unless the action involves federal funding, permits or approvals.

WSSA EPA Liaison: Mark VanGessel

- First new registration under the Herbicide Strategy- glufosinate-P
- First new re-registrations coming under the Herbicide Strategy- metribuzin, oxyfluorfen, (eventually atrazine)
- Larry Steckel gave a seminar to EPA about herbicide resistance in Palmer amaranth.

WSSA NIFA Fellow: Jim Kells

- Todd Baughman, Texas A&M, approved by WSSA BOD as next NIFA Fellow
- Todd will start as NIFA Fellow on May 1, 2025
- Kells will overlap with him for 1 year to help transition.

USDA-ARS NP 304 Stakeholder Review

In March, USDA-ARS held a stakeholder meeting to review their National Program 304 (NP-304) and layout research priorities for 2025-2030. The NP-304 covers research for systematics, weeds, insects, and post-harvest pest management. Many thanks to those who could attend and represent weed science interests: Ian Burke, Carroll Moseley, John Byrd, Bill Chism, Jim Anderson, Dave Horvath, and Emily Unglesbee. A special thanks goes to ARS scientists Steve Young and Steve Mirsky for presentations on weed science issues during the review.

The 2025-2030 strategic plan was released on July 27, 2024. Overall, the plan reflects well on the priorities and challenges we face in weed science: ……***ARS will leverage recent advances in robotics and machine learning, genome sequencing, gene editing, crowdsourcing and information analysis, biochemistry, plant physiology and development, and population genetics to develop novel, affordable, safe, and effective weed control strategies, and to anticipate and prevent the introduction and spread of weeds***.

The question is if ARS will provide enough resources to meet those challenges. My Science Policy Fellows are drafting a letter to the Secretary of Agriculture discussing the importance of funding for federal research for weed management. We heard from at least four major commodity groups (cotton, soybean, sorghum, sugarbeets) during the stakeholder meeting that weed management and resistance issues are at the top of their list for the biggest challenges faced by their growers. USDA needs to hear about those challenges, so we hope to have the letter endorsed by as many grower and stakeholder groups as possible.

Congress Punts Farm Bill and Government Funding Decisions into 2025.

- The House Ag Committee passed their Farm Bill draft on May 24, 2024. Senate Ag did not release their draft of the Farm Bill until November 19, 2024, almost two weeks after the elections.
- The 2023 Farm Bill extension had expired on Sep. 30, 2024
- On December 21, 2024 the U.S. Senate passed a continuing resolution (CR) by a vote of 85 to 11, extending FY 2024 government funding levels to March 1, 2025. It also authorizes a one-year farm bill extension to Sep. 30, 2025 and secures farm and disaster aid.
- The House of Representatives passed the CR by a vote of 366 to 34.
- The 119th session of Congress began on Jan. 3, 2025 with a Republican House, Senate and Administration.

Some notable provisions included in the House Farm Bill:

- Provides $2.5 billion in mandatory funding for a competitively awarded agriculture research facilities grant program. (i.e. Infrastructure funding for land-grants)
- Mandates $100 million in funding for student scholarships at land-grant colleges and universities.
- Directs USDA to establish at least 15 Centers of Excellence, which were previously authorized to receive priority for funding. Changed the eligible areas of focus to include aquaculture, biosecurity, **biotechnology, invasive species**, water quality, and other topics.

House Agriculture Committee Members for the 119th Congress Set

House and Senate Agriculture Committee members have now been announced.

Notes a Representative or Senator from the SWSS region.

Republican House Agriculture Members

Rep. Glenn "GT" Thompson (PA-15), **Chairman**

Rep. Frank Lucas (OK-03)

Rep. Austin Scott (GA-08)

Rep. Rick Crawford (AR-01)

Rep. Michael Bost (IL-12)

Rep. Scott DesJarlais (TN-04)

Rep. Doug LaMalfa (CA-01)

Rep. David Rouzer (NC-07)

Rep. Trent Kelly (MS-01)

Rep. Don Bacon (NE-02)

Rep. Dusty Johnson (SD-AL)

Rep. Jim Baird (IN-04)

Rep. Tracey Mann (KS-01)

Rep. Randy Feenstra (IA-04)

Rep. Mary Miller (IL-15)

Rep. Barry Moore (AL-02)

Rep. Kat Cammack (FL-03)

Rep. Brad Finstad (MN-01)

Rep. Monica De La Cruz (TX-15)

Rep. Ronny Jackson (TX-13)

Rep. John Rose (TN-06)

Rep. Zach Nunn (IA-03)

Rep. Derrick Van Orden (WI-03)

Rep. Dan Newhouse (WA-04)

Rep. Tony Wied (WI-08)

Rep. Rob Bresnahan (PA-08)

Rep. Mark Harris (NC-08)

Rep. Mark Messmer (IN-08)

Rep. David Taylor (OH-02)

Democratic House Agriculture Members

Rep. Angie Craig, Minnesota, **Ranking Member**

Rep. David Scott, Georgia

Rep. Jim Costa, California

Rep. Jim McGovern, Massachusetts

Rep. Alma Adams, North Carolina

Rep. Jahana Hayes, Connecticut

Rep. Shontel Brown, Ohio

Rep. Sharice Davids, Kansas

Rep. Andrea Salinas, Oregon

Rep. Don Davis, North Carolina

Rep. Jill Tokuda, Hawai`i

Rep. Nikki Budzinski, Illinois

Rep. Eric Sorensen, Illinois

Rep. Gabe Vasquez, New Mexico

Rep. Jonathan Jackson, Illinois

Rep. Shri Thanedar, Michigan

Rep. Adam Gray, California

Rep. Kristen McDonald Rivet, Michigan

Rep. Shomari Figures, Alabama

Rep. Eugene Vindman, Virginia

Rep. Josh Riley, New York

Rep. John Mannion, New York

Rep. April McClain Delaney, Maryland

*Two open seats remain to be filled at a later date.

Republican Senate Agriculture Committee Members

Sen. John Boozman, Arkansas, Chairman

Sen. Mitch McConnell, Kentucky

Sen. John Hoeven, North Dakota

Sen. Joni Ernst, Iowa

Sen. Cindy Hyde-Smith, Mississippi,

Sen. Roger Marshall, Kansas

Sen. Tommy Tuberville, Alabama

Sen. Jim Justice, West Virginia

Sen. Charles Grassley, Iowa

Sen. John Thune, South Dakota

Sen. Deb Fischer, Nebraska

Sen. Jerry Moran, Kansas

Democratic Senate Agriculture Committee Members

Sen. Amy Klobuchar, Minnesota- **Ranking Member**

Sen. Michael Bennet, Colorado

Sen. Tina Smith, Minnesota

Sen. Richard Durbin, Illinois

Sen. Cory Booker, New Jersey

Sen. Ben Ray Lujan, New Mexico

Sen. Raphael Warnock, Georgia

Sen. Peter Welch, Vermont

Sen. John Fetterman, Pennsylvania

Sen. Adam Schiff, California

Sen. Elissa Slotkin, Michigan

Annual Survey of the Most Common and Troublesome Weeds

- The 2024 data for common and troublesome weeds in **Aquatic and Non-Crop Areas** has been compiled and summarized. The 2024 survey, as well as all the weed surveys going back to 2015 are available at https://wssa.net/weed/surveys/
- **The 2025 survey** will focus on common and troublesome weeds in in **broadleaf crops, fruits & vegetables (and hemp)**.
- I have started work with Sarah Ward on **publishing an open-access paper in *Weed Sci*** that will summarize the past 10 years of weed survey results. Each of categories: 1) broadleaf crops, fruits and vegetables; 2) grass crops, pasture and turf; and 3) aquatic and non-crop areas now have 4 complete years of survey results. https://wssa.net/weed/surveys/

Lee Van Wychen, Ph.D.

Executive Director of Science Policy

Weed Science Society of America

5720 Glenmullen Pl, Alexandria, VA 22303

Cell: 202-746-4686

Meetings of the National and Regional Weed Science Societies

Jan. 20 - 23, 2025 Southern Weed Science Society (SWSS), Charleston, SC www.swss.ws

Feb. 24 - 27, 2025 Weed Science Society of America (WSSA), Vancouver, BC www.wssa.net

Mar 10-13, 2025 Western Society of Weed Science (WSWS), Seattle, WA www.wsweedscience.org

Jul. 14 - 17, 2025 Aquatic Plant Management Society (APMS), Providence, RI www.apms.org

Dec 15-18, 2025 North Central Weed Science Society (NCWSS), Grand Rapids, MI www.ncwss.org

Jan. 5 - 9, 2026 Northeastern Weed Science Society (NEWSS), Hershey, PA www.newss.org

Sustaining Membership Committee Report:

Committee Chair: Kelly Backscheider

Committee Members: Name, Term Ending

Kelly Backscheider	2025	Eric Castner	2026	Greg Steele	2027
Ray Kelley	2025	Joey Williams	2026	Ryan Edwards	2027
James Holloway	2025	Cletus Youmans	2026	Pete Eure	2027

The following companies paid SWSS Sustaining Memberships at the indicated level in 2023 and 2024.

Membership Level	2023	2024
Platinum ($10,000 +):	Syngenta	Bayer CropScience Syngenta Crop Protection
Gold ($5,000-$9,999):	Corteva Agriscience FMC	BASF Corporation Corteva Agriscience FMC
Silver ($2000-S4,999)	BASF Cotton Inc.	BASF Trait Development Blue River Tech Cotton Inc. Gylling Data Management Nutrien
Bronze ($200-$1,999)	Bellspray, Inc. Blue River Tech Diligence Technologies, Inc. Nichino America Nutrien The Scotts Company UPL Winfield United	ADAMA Agricenter International Bellspray Inc. Diligence Technologies, Inc. Envu Frontier Precision Gowan Helena Agri-Enterprises K.I. Chemical U.S.A. Inc. Nichino Nufarm SePro The Scotts Company United Phosphorus, Inc. Valent USA Corp.
Total:	$35,900.00	$61,200

Final Sustaining Member support for 2024 was $61,200. This was up by $25,300 from the previous year. The difference was due largely to adding several sustaining members that did not support in 2023 and increased support from certain companies as well.

I really appreciate the help from the Sustaining Membership Committee, Don Gossard and Eric Gustafson with IMI, and to the Sustaining Members for supporting the SWSS in a difficult environment.

Kelly Backscheider, SWSS Sustaining Membership Chair

Proceedings Editor Report

Report by: Paul Tseng

Proceedings Editor's Report of the 2024 Meeting

The **2024 Weed Science Society of America (WSSA)/Southern Weed Science Society (SWSS) joint meeting** took place in San Antonio, TX, from January 22-25, 2024. The 2024 joint-meeting Proceedings featured 477 pages and included 454 abstracts. For comparison:

- **2023:** 295 pages, 215 abstracts (Baton Rouge, LA)
- **2022:** 253 pages, 265 abstracts (Autin, TX)
- **2021:** 276 pages, 165 abstracts (virtual format)
- **2020:** 362 pages, 252 abstracts (Biloxi, MS)
- **2019:** 357 pages, 241 abstracts (Oklahoma City, OK)
- **2018:** 429 pages, 293 abstracts (Atlanta, GA)
- **2017:** 425 pages, 229 abstracts (Birmingham, AL)
- **2016 (WSSA/SWSS joint meeting):** 639 pages, 505 abstracts (San Juan, PR)
- **2015:** 397 pages, 253 abstracts (Savannah, GA)
- **2014:** 398 pages, 259 abstracts (Birmingham, AL)
- **2013:** 387 pages, 274 abstracts (Houston, TX)
- **2012:** 375 pages, 277 abstracts (Charleston, SC)
- **2011:** 515 pages, 342 abstracts (San Juan, PR)
- **2010:** 365 pages, 245 abstracts (Little Rock, AR)
- **2009 (WSSA/SWSS joint meeting):** 588 pages (Orlando, FL)
- **2008:** 315 pages (Jacksonville, FL)
- **2006:** 325 pages (San Antonio, TX)
- **2005:** 363 pages (Charlotte, NC)

The 2024 Proceedings also featured the Presidential Address, a list of committees and their members, and minutes from the January and summer board meetings. Additionally, it contained reports from the Program Chair, Editor, Business Manager, Legislative & Regulatory Committee, Director of Science Policy, Graduate Student Contest, Weed Resistance & Technology Stewardship, Endowment, Nominating, Site Selection, Manual of Operations Procedures, and Necrology. The document concluded with the award winners and abstracts.

2025 MEETING ABSTRACT

Efficacy of TerraVue with Several Forestry Site Preparation Herbicide Tank Mixes on an Upper Coastal Plain Site in Georgia. D. Clabo[1], D. Dickens[2]. [1]University of Georgia Warnell School of Forestry & Natural Resources, Tifton, United States; [2]University of Georgia Warnell School of Forestry & Natural Resources, Statesboro, GA, United States.

Glyphosate herbicide alternatives in forestry site preparation continued to be investigated. TerraVue (aminopyralid and florpyrauxifen benzyl) is a relatively new herbicide that has shown promise for range and right-of-way applications, but limited information for forestry applications is available. In addition, minimal information exists on compatibility of TerraVue with commonly used forestry site preparation herbicides. The two objectives of this study were to 1) investigate the efficacy of TerraVue herbicide tank mixes in forestry site preparation applications with Chopper Gen2 (imazapyr), glyphosate (Accord XRT II) and several auxin herbicides used in forestry site preparation, and 2) determine if control with these tank mixes differs with 30 versus 20 gallons water per acre (gpa). Two field trials were installed in a recent clearcut in the Upper Coastal Plain physiographic region of Georgia. Woody competition on the site consisted of wilding loblolly and slash pine as well as several species of hardwoods and shrubs. Pine and hardwood natural regeneration averaged 2.1 ft. Woody stem densities ranged averaged 10,237 stems per acre in the 30 gpa study to 17,860 stems per acre in the 20 gpa study. The same twelve herbicide treatments plus an untreated control were installed at each study area during September 2021. Study one used 30 gpa while study two used 20 gpa. Eight of the 12 treatments in each trial contained TerraVue herbicide. Treatments were applied using a Model 4F CO_2 sprayer with a single KLC-9 nozzle (Bellspray, Inc. R&D Sprayers, Opelousas, LA) to simulate a heavy aerial application. All tree and woody shrub stems were recorded by one foot height class prior to application. Woody plant control was evaluated at 120, 240, 365, and 720 days after treatment (DAT), while herbaceous vegetation coverage was ocularly estimated at 30, 60, 90, 120, 150, 180, 210, 240, 365, and 720 DAT. Woody stems were grouped into tree and shrub classes due to low sample sizes for several individual species. The dependent variable was percent control (percent control = 1 – cumulative height growth pre-treatment/cumulative height growth at 120, 240, 365 and 720 DAT × 100). Herbaceous vegetation was analyzed using the same formula for percent change in total cover across all species. At one-year post-application in study one, the seven treatments that contained imazapyr offered satisfactory to excellent control (>80%) and all of those treatments except one contained TerraVue. Two-years after application, the 20 gpa trial generally offered better control of shrubs and trees than the 30 gpa rate. The only exceptions to this were treatments that contained 6.3 lb acid equivalent (ae) triclopyr (30 gpa better percent control). Herbaceous vegetation coverage recovered to pretreatment levels by 365 DAT in both trials and exceeded pretreatment levels by 720 DAT. TerraVue appears to be compatible with imazapyr and other auxin herbicides (i.e., 4 and 6.3 lb ae ester triclopyr, 4 lb/gal choline triclopyr, 3.8 lb/gal 2,4-D, 2.8 lb/gal fluroxypyr, and 5.07 lb/gal glyphosate) used in forestry chemical site preparation to control common Upper Coastal Plain woody tree and shrub species.

Chemical Site Preparation with TerraVue, Imazapyr, and Other Auxin Herbicides and Planted Loblolly Pine First Year Response. D. Clabo[1], D. Dickens[2]. [1]University of Georgia Warnell School of Forestry, Tifton, United States; [2]University of Georgia Warnell School of Forestry & Natural Resources, Statesboro, GA, United States.

Southern pine chemical site preparation prescriptions refinement continues, and as new herbicides are tested, concerns about soil persistence and planted pine seedling phytotoxicity, growth stunting and mortality related to new herbicides or new herbicides mixed with commonly used herbicides exist. Trials to determine potential phytotoxic effects on newly planted pine seedlings are needed to address managers' concerns when new chemistries become available. The objective of this study was to determine if TerraVue (aminopyralid and florpyrauxifen benzyl) tank mixed with imazapyr and combinations of several auxin herbicides commonly used for forestry site preparation cause phytotoxic effects on planted open- and closed-pollinated loblolly pine (*Pinus taeda*) seedlings. A field trial was installed in a recent clearcut located in the Upper Coastal Plain of Georgia. Twelve herbicide treatments plus an untreated control were installed during September 2021 as two separate studies investigating 20 versus 30 gallons per acre (gpa) of water carrier. Eight of the 12 treatments in each trial contained TerraVue herbicide. Treatments were applied using a Model 4F CO_2 sprayer with a single KLC-9 nozzle (Bellspray, Inc. R&D Sprayers, Opelousas, LA). Containerized 1-0 stock loblolly pine seedlings were obtained from International Forest Company (IFCO—Moultrie, GA) from an open-pollinated (31CP00121) and a closed pollinated family (31CMP10721). Five seedlings were planted in the same arrangement one foot outside of the 10 × 20 ft internal sampling plot. Trees were planted by hand using dibble bars during early February 2022. Seedlings did not receive post-plant herbaceous weed control. Survival was evaluated at four, eight and 12 months after planting and trees were assessed for new, succulent stem growth at four- and eight-months post-planting. Results for both studies revealed no significant treatment or treatment interaction terms indicating that survival was not impacted by herbicides. In the 30 gpa study, survival did differ significantly by family and days since planting. Open-pollinated seedlings averaged 83.1% survival while closed-pollinated seedlings averaged 69.9% survival after one year. Survival decreased significantly from four to eight months after planting from 87.4 to 71.8% across families. No statistical differences were observed for new growth except for days after planting which showed significantly more seedlings had new growth at four months (74.4%) compared to eight months (29.0%). In the 20 gpa study, the only significant factor for survival was days after planting. Survival decreased significantly from four (99.7%), eight (84.4%), and 12 months (76.2%) after planting for both loblolly pine families. Similar to survival, new growth differed significantly from four (99.2%) to eight months (25.6%) after planting. Survival issues for the 30 gpa study may have been related to a droughty first spring (Feb–June) in the region and the 30 gpa study being located on a higher landscape position than the 20 gpa study. Herbicide soil persistence and planted pine seedling phytotoxicity with the tank mixtures, study area soils, and duration between herbicide application and planting do not appear to be an issue for open or closed pollinated loblolly pine seedlings.

Are Chemistry and Traits Staying Ahead of Palmer Amaranth? J. Norsworthy[1], L. Barber[2], B. Scott[2], L. Steckel[3]. [1]University of Arkansas System Division of Agriculture, Fayetteville, United States; [2]University of Arkansas System Division of Agriculture, Lonoke, United States; [3]University of Tennessee, Jackson, United States.

Palmer amaranth remains the most troublesome and difficult-to-control weed of agronomic crops in the Midsouth, primarily because of its herbicide resistance. Northeast Arkansas and west Tennessee appear to be the epicenter of the first documentation of resistance within this weed. Aside from resistance to WSSA Group 2 herbicides in the early 1990s, most notably glyphosate resistance (WSSA Group 9) in Palmer amaranth in the Midsouth was documented in 2007, and has since led to resistance to WSSA Groups 3, 4, 5, 10, 14, 15, and 27. Field trials over the past few years show that soil-residual herbicides are the most effective option for controlling Palmer amaranth in northeast Arkansas and west Tennessee. If some populations in this region emerge, effective control with labeled herbicide options in cotton and soybean is unlikely. Paraquat remains the most effective postemergence option for control of several of the most difficult-to-control populations evaluated. Axant Flex Technology is the next trait to become available in cotton, offering the option of soil-applied and over-the-top use of isoxaflutole, a Group 27 herbicide, in the crop. Subsequently, the HT4 trait in soybean will enable the use of mesotrione, another Group 27 herbicide, in the crop. Unfortunately, metabolic resistance to many Group 27 herbicides already exists today, meaning these traits will provide limited long-term help in the fight against resistant Palmer amaranth, especially if used alone. Moving forward, soybean growers fighting this weed are encouraged to plant early, overlap residual herbicides, use narrow row spacings, and prevent Palmer amaranth seed production using any necessary means. Cotton growers have even fewer options. Looking to the future, there is a desperate need for non-selective, postemergence chemistry that cannot be easily metabolized yet can be target applied to weeds within the crop, removing the need for new traits and use of chemistry already available in other crops.

Evolution of HPPD-Resistance Added to Palmer Amaranth Resistant to Group 2, 4, 9 and 14 in Tennessee. L. Steckel[1]. [1]University of Tennessee, Jackson, United States.

Areas along the Mississippi River in Tennessee have traditionally grown very little corn in favor of soybeans and cotton. Palmer amaranth in this region has developed resistance to dicamba (Group 4), ALS-inhibiting (Group 2) herbicides, PPO-inhibiting (Group 5) herbicides and glyphosate (Group 9) leaving growers with very limited success controlling Palmer amaranth in cotton or soybean. In 2023 some rotated to corn in hopes that HPPD-inhibiting herbicides mixed with atrazine would provide better control. After corn harvest in the fall of 2023 we noticed that some of these corn fields were severely infested with Palmer amaranth. We conducted a topramezone rate study at 2 sites in 2024 and included atrazine alone or with topramezone designed to evaluate if Palmer amaranth had evolved resistance to those herbicides. Field research was conducted on Palmer amaranth that was <10 cm tall at application. The topramezone rates evaluated were 1, 2, 4, 8, 12 g ha^{-1}. Atrazine at a rate of 1,121 g ha^{-1} was evaluated alone and in tank mixture with topramezone. MSO was added at 1%. Herbicides were applied with a pressurized CO_2 backpack sprayer calibrated to deliver 187 L ha^{-1} at 276 kPa using AIXR 11002 flat fan spray nozzles spaced 51 cm apart. Weed control was evaluated 21 days after application. At both sites only 30% control of Palmer amaranth was obtained using 12 g topramezone ha^{-1} (3× Armezon labeled rate). Atrazine at 1,121 g ha^{-1} provided less than 50% control 21 days after application. Tank mixture of atrazine at 367 g ha^{-1} and topramezone 4 g ha^{-1} provided 65% control. These results were consistent with grower observations in 2023. Further greenhouse screens of this Palmer amaranth population are being conducted. This preliminary field research suggests that HPPD-resistance has evolved in these populations independent of Group 27 herbicide selection pressure. If follow up research confirms HPPD-resistance then options are few for Palmer amaranth that is already resistant to herbicides in Groups 2, 4, 5, 9 and 14.

Introducing INTERLINE® MEGA Powered by L-tek™ for Optimized L-glufosinate Applications to Glufosinate-Tolerant Row and Specialty Crops. R. Bryant-Schlobohm[1], C. Gray[2], R. Henry[3], C. Antonio Koury D'arce Junior[4]. [1]UPL NA, Inc, Amarillo, TX, United States; [2]UPL NA, Inc, Peyton, CO, United States; [3]UPL NA, Inc, Fort Wayne, IN, United States; [4]UPL NA, Inc., Cary, NC, United States.

Glufosinate is a reliable tool for the integrated management of key weed species in glufosinate-tolerant soybean, corn, canola, cotton, and other crops. Glufosinate is a racemic mixture of D- and L-enantiomers, where the herbicidal activity is isolated to the L-enantiomer. Through formulation innovation, the D-enantiomer has been removed, offering a purified formulation of L-glufosinate. Upon EPA registration, UPL will provide L-glufosinate under the brand name INTERLINE MEGA, for use in glufosinate-tolerant soybean, corn, canola, cotton and other traditional glufosinate use sites. Replicated field trials have been conducted across the United States in all relevant crops. Results document comparable performance and crop safety profiles of L-glufosinate when compared to traditional glufosinate. This efficacy is achieved with a 45% reduction in field use rate, while maintaining the standard agronomics associated with glufosinate applications.

What's New in Industry. K. Russell[1], M. Kitt[2], E. Palmer[2]. [1]Syngenta, Beasley, United States; [2]Syngenta, Greensboro, United States.

(Abstract not needed for industry updates.)

Herbicide Response of Tropical Spiderwort (*Commelina benghalensis* L.) as Affected by CO_2 and Soil Moisture Levels. A. Ahlersmeyer[1], S. Prior[2], A. Price[2], A. Maity[1]. [1]Auburn University, Auburn, United States; [2]USDA-ARS, Auburn, United States.

Tropical spiderwort (*Commelina benghalensis* L.) is a federally noxious weed that has become increasingly problematic for Southeastern U.S. farmers, especially peanut growers in Alabama, Georgia, and Florida. It is a unique perennial species as it produces both above- and below-ground flowers, and is one of the few monocotyledonous broadleaf weeds. Due to its natural tolerance to glyphosate, along with limited herbicide options for management in peanuts, tropical spiderwort is a serious threat to optimal peanut production. Additionally, variations in environmental factors like soil moisture and CO_2 may influence its growth and sensitivity to commonly used peanut herbicides. This study aimed to evaluate the effects of reduced soil moisture and elevated CO_2 on the growth, physiology, and herbicide sensitivity of tropical spiderwort. A free air CO_2 enrichment (FACE) experiment was conducted during the late summer of 2024 at the USDA National Soil Dynamics Laboratory in Auburn, AL. Tropical spiderwort plants from a suspected resistant population from Northwest Florida were transplanted into pots with field soil and subject to different irrigation levels (low, medium, and high) and CO_2 levels (ambient and elevated). Treatments of glyphosate, MSMA, and flumioxazin were applied at 0.5× rates, and various measurements (visual injury, flower, branch, and leaf number, and branch length) were recorded weekly up to four weeks after application. At physiological maturity, dry biomass and lengths of roots and shoots were documented. Initial results demonstrated that all herbicides provided some level of tropical spiderwort growth suppression at all moisture levels, with MSMA providing near 100% control. However, under low moisture conditions, tropical spiderwort showed higher tolerance to both glyphosate and flumioxazin. Elevated CO_2 appeared to have no impact on tropical spiderwort herbicide tolerance. Further replications of these methods will provide improved understanding of the interactive effect of soil moisture and CO_2 on tropical spiderwort management.

From Cover to Crop: Integrating Cereal Grains for Sustainable Weed Management in Georgia Peanuts. H. Lindell[1], S. Bowen[2], C. Smith III[1], K. Eason[3], M. Bocz[1], T. Grey[2], N. Basinger[1]. [1]University of Georgia, Athens, United States; [2]University of Georgia, Tifton, United States; [3]US Department of Agriculture, Tifton, United States.

Georgia produces 53% of United States peanuts (*Arachis hypogaea*), with lucrative markets driving consistent production and regular herbicide use to maximize yields. Unfortunately, continual herbicide use has led to 11 recorded cases of herbicide-resistant weeds in the state. To slow the development of resistance, growers are exploring cover crops for their weed suppression benefits and improved herbicide efficacy, despite risks like herbicide carryover injury to peanuts. Field trials at Midville and Tifton, Georgia in 2023 and 2024, evaluated integrated practices on weed control and herbicide efficacy using three strategies: cover crop (cereal rye cover crop and no cover crop), planting arrangement (twin row and single row), and pre-emergence herbicides (no herbicide, flumioxazin @ 176.4 g ai ha^{-1} + diclosulam @ 25.2 g ai ha^{-1}, and fluridone @ 0.42 kg ai ha^{-1} + diclosulam). Cereal rye was planted at 56 kg ha^{-1} in Tifton 2023 and 2024, and Midville 2024. A cereal grain mix (70% cereal rye; 20% oat; 10% wheat) was planted at 78.5 kg ha^{-1} in Midville 2023. Cover crop biomass, visual weed species control and presence, crop injury, height and width, and pod yield data were collected. In Midville 2023, pre-emergence herbicides controlled >93% of weeds 4 weeks after planting (WAP), increasing to 99% at 8 WAP with post-emergence applications. In 2024, weed control reached 83% at 4 WAP and improved by 7% by 8 WAP. In Tifton, weed control improved by 16% at 8 WAP with 89% control in 2023 and consistently achieved >90% weed control throughout the entire season in 2024. Across locations in 2024, cereal rye cover crops enhanced weed control by 22% at 4 WAP and 11% at 6 WAP, suppressing up to 96% of weeds compared to no cover crop. Planting arrangement did not affect overall weed control. Pod yields generally exceeded the state average (4,550 kg ha^{-1}). Pre-emergence herbicide by cover crop choice affected yield for 2023 Tifton, where pod yields declined by 1,378 kg ha^{-1} in the flumioxazin + diclosulam + cover crop treatment. In Midville 2024, twin row planting arrangements achieved higher pod yields than single row. While pre-emergence herbicide programs are essential in mitigating weed suppression, cereal rye can be beneficial in providing additional control to troublesome weeds. Pre-emergence herbicide programs may also influence pod yields depending on the scenario and location. Producers may increase their chances of higher pod yields with a twin row planting arrangement.

Weed Management Programs for Control of Multiple Herbicide-Resistant *Amaranthus* Populations in Corn. B. D. Black[1], J. Nunes[1], J. Haarmann[1], M. Kitt[1], D. Belles[1], T. Beckett[1]. [1]Syngenta, Greensboro, United States.

Waterhemp (*Amaranthus tuberculatus* [Moq.] Sauer.) and Palmer amaranth (*Amaranthus palmeri* S. Watson) are troublesome weed species in corn production due to the selection of populations with multiple resistance to herbicides commonly adopted for their control. Field trials were conducted over several locations in 2024 both in crop and in bare-ground situations to evaluate herbicide programs for the control of multiple herbicide-resistant *Amaranthus* spp. populations on LibertyLink® and Roundup Ready® Corn 2. Results show that integrated weed management programs consisting of preemergence followed by postemergence herbicide applications provided effective multiple herbicide-resistant *Amaranthus* spp. control on LibertyLink and Roundup Ready Corn 2.

Timing Is Everything: Balancing Rye Planting Dates and Termination for Soybean Productivity and Weed Management. P. Campos[1], M. Bocz[1], H. Lindell[1], C. Smith[1], H. Ahlawat[1], F. Kamana[1], J. Wallace[2], N. Basinger[1]. [1]University of Georgia, Athens, United States; [2]Pennsylvania State University, University Park, United States.

Enhancing cover crop management may have the capacity to improve crop productivity, soil properties, and provide resiliency within no-till production systems. Increased interest in maximizing cover crop biomass by terminating cover crops after planting or “planting green” has been studied in other regions of the country. Research supporting this practice is lacking in the southeastern US. For this study, we evaluated cover crop planting and terminations timings for biomass production and weed suppression. The study was a randomized complete block design with a 3 by 2 by 2 factorial arrangement of treatments. The first factor was cereal rye planting timing: early (October) and late (November), or no cover crop. The second factor was cover crop termination timing: 14 to 21 days pre-plant (DPP), and 1–3 days after planting (DAP). The third factor was herbicide treatment: a two pass including a pre-emergent residual plus post-emergent applications or a one pass post-emergence system with no residuals. Rye biomass was collected at each termination timing to determine cover crop biomass production. Weed demography was collected using a 0.5 m^2 quadrant, weed counts were taken at three different timings, 28 DAP, R1 soybean growth stage, and after soybean defoliation. One small- [*Acalypha ostryifolia* (ACCOS)], and one large-seeded weed [*Senna obtusifolia* (CASOB)], were counted below and above the cover crop at each count. Soybean (*Glycine max*) was harvested for yield and adjusted to 13.5% moisture for comparison. Cover crop biomass was not different between cover crop planting, or between years. However, biomass was higher in 2024 than 2023 with 8,432 kg ha^{-1} and 4,061 kg ha^{-1}, respectively. For 2023 and 2024, early cover crop planting resulted in higher (4,767 and 9,138 kg ha^{-1}, respectively) rye biomass compared to late planting (7,727 and 3,356 kg ha^{-1}, respectively). Weed counts across cover crop treatment and timings were not different but were lower in 2024 due to the increase in rye biomass. Soybean yield for 2023 was greater (3,522 kg ha^{-1}) than 2024 (1,731 kg ha^{-1}). In 2023 cover crop planting and termination did not influence yield. However, in 2024 late-planted cover crops increased yield compared to early-planted cover crops, and yielded 2,000 kg ha^{-1} and 1,461 kg ha^{-1}, respectively. According to our results, cereal rye is an effective tool to use as cover crops regardless of specific management practices. It creates a large amount of biomass, regardless of termination timing, and reduces weed populations. Further research is needed to understand the interaction between cover crop management practices, weather patterns, soil health, and the long-term effects of cover crops on crop productivity and weed suppression. Therefore, cover crops can be a critical component to creating integrated weed management approaches for use in soybeans in the southeastern US.

Cereal Rye Cover Crop Inhibits Johnsongrass Rhizome Growth. G. Camargo Silva[1], M. Bagavathiannan[1]. [1]Texas A&M University, College Station, TX, United States.

Johnsongrass (*Sorghum halepense*) is a highly problematic perennial grass weed species in row-crop production across the southern United States. It reproduces vigorously through seeds and rhizomes. Control of this species is difficult in many situations, but it is especially challenging in organic systems due to a lack of effective weed control options. Tillage is a popular johnsongrass control strategy, but it has severe impacts on soil health and could cause the dispersal of rhizomes under certain conditions. Cover crops are known to suppress small-seeded, annual weeds, but their effect on the underground structures of perennial weeds, such as johnsongrass, are not as well documented. A field experiment was conducted in an area with heavy johnsongrass infestation at the Texas A&M research farm near College Station, TX, to determine the impact of a cereal rye cover crop on the overwintering survival and regrowth of johnsongrass rhizomes, as influenced by cover crop seeding rates. The treatments included cereal rye seeding rates of 20, 40, 80, and 120 kg ha^{-1}, as well as a fallow control. Cereal rye was planted in the fall and terminated with a roller-crimper in May. No other weed management strategies, chemical or mechanical, were employed after cereal rye termination. Johnsongrass above-ground density, above-ground biomass, and rhizome production were quantified at four different times during the summer. Johnsongrass above-ground biomass, rhizome biomass, and rhizome node number were consistently reduced by all seeding rates (68%, 84%, and 88%, respectively) by the following June. Cereal rye suppressed rhizome biomass all the way through July (86%) and August (75%), but its effect on above-ground biomass was not as consistent later in the season, as the survivors continued to tiller and grow. Overall, findings show that cereal rye effectively suppressed johnsongrass rhizomes and in turn shoot regrowth potential; integrating cereal rye with other management strategies is expected to provide more long-term control of this species.

Targeting Dallisgrass and Other Weeds in Warm-Season Turfgrass Systems Using the Ecorobotix ARA. J. McCurdy[1], A. Wilber[1], S. Askew[2], J. Romero Cubas[2], N. Godara[2], P. Le Naour Vernet[3]. [1]Mississippi State University, Starkville, MS, United States; [2]Virginia Tech, Blacksburg, VA, United States; [3]Ecorobotix, Yverdon-les-Bains, Switzerland.

The Ecorobotix ARA is a high-precision sprayer that enables ultra-targeted application of pesticides and fertilizers. The sprayer uses a proprietary artificial intelligence model to distinguish between turfgrass and target weed species in real time. The 2.0-m wide ARA features a 52-nozzle boom that delivers herbicide with 4 cm precision, using a 400 L ha^{-1} carrier volume. The ARA was evaluated for its ability to selectively apply various herbicides to dallisgrass (*Paspalum dilatatum*) and other weed species in warm-season turfgrass systems. Trials were conducted at the Mississippi State R.R. Foil Plant Science Research Center to assess the efficacy of both natural and synthetic herbicides. Two protocols were evaluated. The first protocol, demonstrated at an annual field day, assessed natural herbicide products on dallisgrass-infested bermudagrass (*Cynodon dactylon*) and smooth crabgrass (*Digitaria ischaemum*) and white clover (*Trifolium repens*) infested bermudagrass. Treatments included 25 fl oz of Fiesta Turf Weed Killer (Fe HEDTA) 1000 ft^{-2} and the following products applied at a 10% v v^{-1} spray solution: Axxe (ammonium nonanoate), Scythe (pelargonic acid), Suppress (caprylic acid and capric acid), and Prizefighter (ammonium nonanoate). All treatments included 0.5% v v^{-1} methylated seed oil. The second protocol compared targeted versus broadcast application of synthetic herbicides for dallisgrass control. Treatments included: 3.2 oz Tribute Total $acre^{-1}$ + 2 lbs ammonium sulfate $acre^{-1}$ + 0.5% v v^{-1} methylated seed oil, 22 fl oz Fusilade II $acre^{-1}$ + 0.25% v v^{-1} non-ionic surfactant, 0.134 lb ai NB40517 $acre^{-1}$ + 0.25% v v^{-1} non-ionic surfactant, and 19.2 fl oz Manuscript $acre^{-1}$ + 0.5% v v^{-1} Adigor. All treatments included a 2× rate of green marker dye. Evaluation criteria included dallisgrass control, turfgrass injury, non-target misapplication, on-target applications, treated vs. untreated dallisgrass plants, and herbicide volume per area. Results demonstrated the precision and potential of the Ecorobotix ARA to minimize non-target applications while providing effective weed control in warm-season turfgrass systems.

Evaluation of Sweetpotato (*Ipomoea batatas*) Variety Tolerance to Different Herbicide Treatments Under Controlled Conditions. A. Miller[1], T. M. Tseng[1], L. Harvey[1], A. Richardson[1], J. Argenta[1], N. Maphalala[1]. [1]Mississippi State University, Mississippi State, United States.

There are few herbicides approved for use in sweetpotato (*Ipomoea batatas*) production in the United States. Consequently, the registration of additional herbicides with diverse modes of action (MOA) would offer growers more weed control options, enhancing crop yield and fostering a more sustainable sweetpotato (SP) production system. As herbicide-resistant weed populations continue to rise and spread, effective weed control strategies must incorporate herbicides with different MOAs to ensure the long-term success of SP cultivation. This research aims to identify herbicides and optimal rates that could be approved for use in sweetpotato. The herbicide tolerance of four SP varieties (Beauregard, Orleans, Diane, and Covington) was assessed in a screening study. These varieties were chosen to represent sweetpotato production regions across the United States, including Arkansas, California, Louisiana, Mississippi, and North Carolina. The herbicides evaluated include fluridone, glyphosate, glufosinate, carfentrazone, saflufenacil, acifluorfen, and others. The study applied foliar herbicide treatments at 1× and 0.5× rates in a completely randomized design using a spray chamber on individual SP plants grown in 4 × 4 inch containers within the controlled environment of the Dorman Hall Greenhouse at Mississippi State University. Visual assessments of herbicide-induced injury were conducted at 7, 14, 21, and 28 days after treatment (DAT), along with measurements of vine length in centimeters. Additionally, dry root and shoot biomass were measured at 28 DAT to thoroughly evaluate the herbicide effects on SP growth and development. Data were analyzed using ANOVA, and means were separated by Fisher's protected LSD ($\alpha = 0.05$). The results show varying levels of tolerance among the SP varieties to specific herbicides and application rates. For instance, at the 1× rate, metribuzin treatment showed over 50% less injury for the Diane variety compared to all other varieties. Covington variety shows a notable root weight increase when treated with a 0.5× rate of fluridone, with a mean of 2.2 grams. The Beauregard variety shows consistent shoot weights across most herbicides, with average values ranging from 1 to 2.5 grams, indicating moderate tolerance. Significant trends in visual injury, vine length, and biomass measurements highlight the distinct responses of the cultivars to different herbicide chemistries.

Tolerance of Southern Crops to Tetflupyrolimet. D. Whitt[1], H. Edwards[1], L. Bell[1], G. Mangialardi[1], T. Eubank[1], J. Dodd[1], J. Bond[1]. [1]Mississippi State University, Stoneville, United States.

The utility of synthetic herbicides is threatened by the widespread evolution of resistance to most herbicide modes of action (MOA). Currently, effective chemical control options for barnyardgrass (*Echinochloa crus-galli* L.) in rice (*Oryza sativa* L.) are scarce due to selection for resistance to many commonly-applied herbicides. Additionally, a novel herbicide MOA has not been introduced for nearly 30 years. Considering this, agricultural companies have revamped their herbicide discovery efforts. FMC Corporation has developed tetflupyrolimet, also known as Dodhylex™ active, a new MOA classified as a Weed Science Society of America Group 28 herbicide inhibiting dihydroorotate dehydrogenase (DHODH). Understanding crop response to a new herbicide is critical for making proactive management decisions and minimizing injury potential. Research was conducted to evaluate tetflupyrolimet for midsouthern U.S. rice production. Multiple studies were conducted in 2023 and 2024 at the Delta Research and Extension Center in Stoneville, MS, to assess different aspects of tetflupyrolimet use in rice. Studies were designed as randomized complete blocks with four replications. The first study evaluated crop safety to tetflupyrolimet among eight rice cultivars. Factor A was cultivar, and included 'Ozark', 'Taurus', 'CLL19' (Clearfield®), 'PVLO3' (Provisia®), 'RT XP 753', 'RT 7331 MA' (MaxAce®), 'RT 7521 FP' (FullPage®), and 'DG 263L'. Hybrid and conventional cultivars were planted at 28 and 73 kg ha^{-1}, respectively, with DG 263L planted at 50 kg ha^{-1}. Factor B was tetflupyrolimet rates representing 1× and 2× rates applied preemergence (PRE) and a ½× rate applied PRE followed by (fb) postemergence (POST). The second study evaluated tolerance of four midsouthern U.S. row crops to sub-lethal concentrations of tetflupyrolimet and clomazone. Factor A was crop and included cotton (*Gossypium hirsutum* L.), soybean (*Glycine max* L.), grain sorghum (*Sorghum bicolor* L.), and corn (*Zea mays* L.). Factor B was tetflupyrolimet plus clomazone application timings at PRE and POST targeting V_3 crop stages. All data were analyzed with ANOVA, and estimates of Least Square Means at 5% significance level was utilized for mean separation. None of the crops exhibited injury consistent with tetflupyrolimet symptomology. Yields were not reduced in either study except for DG 263L and Ozark cultivars treated with the split application of tetflupyrolimet. The integration of tetflupyrolimet as a residual herbicide appears to offer a safe option for application to rice with no effect on common crops that might be planted in proximity to rice in the midsouthern U.S.

Evaluation of Soil Steaming as a Control Method for Yellow Nutsedge (*Cyperus esculentus* L.) Tubers Across Different Seedling Depths Under Controlled Conditions. A. Richardson[1], N. Maphalala[1], J. Arnold[1], A. Almashwali[1], B. Dal'pizol Novello[1], W. Segbefia[1], A. Miller[1], T. M. Tseng[1]. [1]Mississippi State University, Starkville, United States.

The mounting pressure around herbicide resistance requires that sustainable agriculture adopt long-running strategies that balance optimization and minimize ecological impacts. Integrative weed management strategies, or IWM, integrate mechanical and chemical means to look into effective weed management; the most promising methods of mechanical management include soil steaming. Hydraulic hooded steamers, tarp steaming, and direct steam injection are among the modern steamers that achieve optimum control at the temperature range of 77–82 °C. Soil steaming combined with herbicides enhances pre- and post-emergence weed control and reduces herbicide application, resistance development, and environmental impact. This method proves to be very effective in culling perennial weeds such as yellow nutsedge (*Cyperus esculentus* L.). This study aimed to evaluate the effectiveness of three steaming durations and various planting depths on the germination of yellow nutsedge tubers. The steaming durations tested were 1 minute, 5 minutes, and 45 minutes, while the tuber depths were 2 inches, 5 inches, and 8 inches below the soil surface. Pots were placed under a steam proof tarp and subjected to steaming for the designated durations, with a non-steamed group serving as the control. Comparative analysis revealed significant differences in weed suppression based on steaming duration, tuber depth, and germination outcomes, including initial and total germination rates. Tuber excavation was conducted 28 days after treatment to assess the effects. These findings highlight the interplay between steaming duration and tuber depth in suppressing yellow nutsedge germination. For 1-minute steaming, initial and total germination were reduced by 97% at a 2-inch depth, 99% at 5 inches, and 96% at 8 inches, with no additional germination after tuber excavation, indicating depth had no significant effect. For 5-minute steaming, reductions were 99% at 2 and 5 inches and 98% at 8 inches, with no further changes in total germination. With 45-minute steaming, germination was completely suppressed (100%) at all depths. In comparison, the non-steamed control showed the highest germination rates: 97% at 2 inches, 80% at 5 inches, and 53% at 8 inches. These results demonstrate that 45 minutes of steaming was most effective, while 1- and 5-minute steaming achieved similar reductions regardless of tuber depth. The study provides a practical framework for optimizing steaming duration and depth in field applications, enabling more sustainable and effective weed management strategies in agricultural systems. Soil steaming, yellow nutsedge, IWM, sustainable.

Postemergence Options for Management of Foxtail Species in Bermudagrass Pastures. N. Basinger[1], M. Bocz[1], H. Lindell[1], C. Smith III[1], H. Ahlawat[1]. [1]University of Georgia, Athens, United States.

Setaria spp. have become increasingly problematic in forages in the southern United States. These species reduce forage quality and can injure animals due to awns on the seed heads. Often, producers do not know there is a problem until seed heads emerge and nothing can be done for management. Therefore, two studies were conducted from 2022 to 2024 in Watkinsville, GA in mixed grass pastures to evaluate pre-emergent and post-emergent herbicide applications for the control of annual *Setaria* spp. In the first study, pre-emergent applications of pendimethalin, indaziflam, and hexazinone were made to each plot biweekly from February 1st through April 15th. A non-treated control (NTC) was included to evaluate foxtail emergence without herbicide. Results from this study indicated that an application of indaziflam or pendimethalin between February 15th and March 1st reduced foxtail emergence number 76% and 62%, and foxtail composition by 25% and 16% in 2022 and 2023 respectively. A second study was conducted to assess pre-emergent and post-emergent herbicides registered for pasture for foxtail control. Pendimethalin and indaziflam were applied as a pre-emergent application alone or as a tank mix partner with imazapyr, imazapic, nicosulfuron + metsulfuron, quinclorac, or hexazinone when foxtail reached four leaves. Post-emergent applications were also applied alone without a residual tank-mix partner and non-treated checks were included for comparison. Results showed that pendimethalin and indaziflam applied pre-emergent had greater yield with a similar yield to the NTC, but fescue and bermudagrass composition was greater than the NTC and any other postemergence treatment. Treatments including metsulfuron + nicosulfuron, and quinclorac postemergence were similar to the pre-emergent only treatments in forage yield, but had greater than 50% reduction in foxtail composition compared to the NTC. A well-timed pre-emergent application of indaziflam or pendimethalin, or nicosulfuron + metsulfuron or quinclorac plus indaziflam or pendimethalin as a tank-mix partner, applied when foxtail is at 4-leaf or less, could be a critical component of foxtail management in mixed grass forages.

Weed Suppression by Cover Crops in Southern Crop Production Systems: A Meta-Analysis.

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Research data on weed suppression by cover crops in crop production systems has accumulated for the past three decades, broadly indicating a contribution to suppressing annual weeds. An ongoing paradigm shift towards an integrated weed management approach has elevated the interest in cover crops. However, general observations suggest that the magnitude or, in some instances, direction of the effect of cover crops on weeds can be context-specific and influenced by various factors. A meta-analysis examined paired comparisons of weed control under cover crop and no cover crop conditions. The analysis utilized data on weed biomass, percent weed control, and weed density from studies conducted in the southern region. Data were extracted from 27 journal articles, resulting in 746 comparisons for weed control, with varied representations of moderators and the levels of those moderators. Overall, cover crops contributed 36% to weed control. The weed suppression effect of cover crops was positive across all levels of the following moderators: tillage (tilled–no-till), cover crop termination time, weed control evaluation time, cover crop type, weed group, and crop type. The effectiveness varied from 12% (brassica cover crop type) to 75% (cover crop termination at planting), depending on specific conditions. Weed control with cover crops was greater under no-till conditions than tilled conditions (43% vs. 26%). Additionally, mixtures of legumes and grasses provided greater suppression (69%) than brassica or legume cover crop types (15% and 31%, respectively). Two-way interaction analysis of moderators showed that cover crops did not suppress sedges under no-till conditions when evaluated late in the season. Late-season sedge control was also not significant in grass–legume mixtures. Brassica cover crops did not affect broadleaf weed control. Furthermore, cover crops did not impact mid-season weed control when evaluated for a composite of all weeds, under legume cover crops, or in soybean. No termination of cover crops or termination close to crop planting resulted in the greatest weed control when evaluated early (85%) or for grass weeds (77%). Results from this meta-analysis highlight the context-specific effects of cover crops on weed suppression, providing provisional insights for the strategic implementation of cover crops to enhance weed management outcomes in the southern region.

Determining the Critical Period for Weed Control in Short-Stature Corn System in Georgia.

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Short-stature corn hybrids, with heights less than 2.1 m, have been of interest in the midwestern US for their increased standability to wind, and potential need for reduced fertilizer and irrigation inputs. However, limited research has been conducted on these hybrids in the southeastern US. With wet weather and high weed pressure in this region, the competitiveness of these hybrids remains uncertain, raising questions about weed management in this cropping system. Understanding the critical period for weed control will help identify the susceptible stages of this hybrid to weed interference. Understanding this aspect of production can help to develop better management strategies for herbicide application or other interventions to minimize yield losses. Therefore, a study was conducted in 2024 at the J. Phil Campbell Sr. Research and Education Center in Watkinsville, GA, to determine the critical period of weed control in short-stature corn systems. The experiment was designed as a randomized block design using the PR112-20SSC short-stature corn, planted at a density of 49,280 seeds ha^{-1} on 91 cm rows. Weed establishment and removal timings were assessed at 0, 2, 4, 6, 8, and 10 weeks after planting (WAP), resulting in 12 treatments. Only POST herbicides without any residual activity were used, allowing weed establishment, with additional hoeing or hand weeding for weeds not controlled by chemical means. At each weed removal time, weed biomass was measured, and end-of-season weed biomass was collected from all plots. Leaf Area Index (LAI) was taken biweekly and averaged from four values taken from data rows. Stalk diameter of 10 plants was measured on the first internode above the brace roots using an electronic caliper at the silking stage. The average weed biomass for weedy treatments was 1,443 g m^{-2}, removal timings 2, 4, 6, 8, 10 WAP was 2, 11, 22.5, 30 and 91 g m^{-2}, respectively. For establishment timings 2, 4, 6, 8, 10 WAP weed biomass was 308, 55, 60, 21, 10 g m^{-2}, respectively. Corn stalk diameters were lower in the weedy (19 mm) plots compared to the weed-free plots with an average of 24.5 mm. The yield for each plot was expressed as a percentage of the yield from the weed-free check. The timing was converted to Growing Degree Days (GDD) to reliably determine the growth stage and ensure consistency. This data was then plotted against GDD for both establishment and removal trials. The results indicated that to maximize yield, short corn should remain weed-free from planting to 75 GDD to retain 95% of the weed-free yield. This indicates that short corn is relatively competitive, with a narrow window of control needed at the beginning of the season during corn establishment.

Effectiveness of See & Spray™ Ultimate as Influenced by Cover Crop and Preemergence Herbicide Program. D. Contreras[1], B. Pendleton[1], C. Bradshaw[1], J. Alsdorf[1], R. Argueta[1], L. Lazaro[2], C. Cahoon[1], W. Everman[3]. [1]North Carolina State University, Raleigh, United States; [2]Blue River Technology, Santa Clara, United States; [3]Iowa State University, Ames, United States.

Weeds are among the most detrimental pest groups in agricultural systems, causing significant yield losses and increasing management costs. To effectively combat weed pressure, a proactive approach that integrates multiple weed management strategies is essential. Preemergence herbicides play a critical role in mitigating early-season yield loss by providing effective residual weed control. When combined with multiple modes of action (MOAs), preemergence herbicides offer extended weed suppression. Additionally, cover crops can reduce weed germination by modifying environmental conditions, with cereal rye proving particularly effective in suppressing summer annual weeds like Palmer amaranth (*Amaranthus palmeri* S.). Precision agriculture technologies, such as See & Spray™ (S&S), provide new opportunities for targeted weed control. The S&S Ultimate platform, equipped with dual tanks, enables simultaneous broadcast residual application alongside targeted herbicide sprays, reducing herbicide usage and improving efficiency. A study was conducted to evaluate the effectiveness of weed control and herbicide savings of the S&S Ultimate system, considering the influence of cover crops and the strength of preemergence herbicide programs (single MOA or a premix of multiple MOAs). A 2 × 3 factorial design was used, consisting of Factor A (cover crop presence or absence) and Factor B (single MOA, premix, or no herbicide), with two untreated checks (cover crop and no cover crop). Herbicide applications were made using an Agronomy Test Machine (ATM), a condensed version of the S&S Ultimate platform, at preemergence, early postemergence, and mid-postemergence timings. Weed control data were collected at each postemergence application and 14 days after mid-postemergence. Results indicated that the presence of a cover crop suppressed Palmer amaranth emergence, with enhanced control when using preemergence herbicides. Preemergence herbicides significantly reduced herbicide output at early postemergence applications when using See & Spray technology, regardless of the herbicide strength or cover crop presence. No differences in Palmer amaranth control were found at mid-postemergence and 14 days after mid-postemergence applications, however there was a significant interaction of cover crop and preemergence treatment used in total volume sprayed. In the absence of a cover crop, spray volume increased where no preemergent herbicide was used. These results highlight the importance of preemergence herbicides for early-season weed control and importance of the use of cover crops, and emphasize how they can be integrated with See & Spray technology.

Herbicide Impregnated onto Dry Fertilizer: Efficacy and Concentrations in Mixed Loads. T. Mueller[1], L. Steckel[2], G. Stapleton[3], M. Inman[4]. [1]UTIA, Knoxville, United States; [2]UTIA, Jackson, United States; [3]BASF, Dyersburg, United States; [4]BASF, Research Triangle Park, United States.

Glyphosate resistant (GR) weeds continue to present challenges for weed control in cotton in the United States. The attempt to incorporate alternate modes of action into post-emergent systems has been challenging. This report details the use of the long-standing idea of impregnating herbicide onto dry fertilizer and spreading into emerged fields of cotton. Pyroxasulfone was examined for utility of control of GR Palmer amaranth in cotton in a Tennessee field situation. The study utilized small plot research techniques and a 2 × 3 factorial arrangement of treatments. Factors included pyroxasulfone rate (1× and 2×) and application timing (dry impregnated at two leaf, dry impregnated at six leaf, post-directed spray application at six leaf). Data collected included visual observations of cotton injury and Palmer amaranth control of various time intervals after application. There was no cotton response from any of the dry impregnated herbicide treatments. There was little crop response from the sprayed applications. Palmer amaranth control was essentially complete for many treatments. By 55 days after treatment only the 1× rate of residual applied to six leaf cotton had lower Palmer amaranth control (80%) compared with all other treatments. Fertilizer was impregnated with either dimethenamid or pyroxasulfone and a sample collected directly at the fertilizer retail outlet. Eight locations participated in the study, with locations in Tennessee and Missouri. Two types of samples were collected. The first to determine how much herbicide was in each impregnated load, and the second from the load immediately following to determine how much carry over residue was present. Samples were collected in 50 mL tubes, stored until lab analysis, and then extracted and analyzed to determine herbicide concentrations. The two locations that used dimethenamid had average recoveries of the target rate of 0.84 kg ha^{-1} of 74% in the treated load and 0.64% in the following. Results for pyroxasulfone were 86% recovery for treated load, and 0.19% in the following load. These results indicate herbicide loadings are within typical ranges, and the carryover of each herbicide would be < 5 g ha^{-1}, which would not be expected to cause injury to rotational crops, such as rice (*Oryza sativa*).

Full Season Weed Control with Oxyfluorfen in a Furrow Irrigated Rice Production System.

T. Eubank[1], J. Bond[1], G. Mangialardi[1], D. Whitt[1], T. King[1], J. Dodd[1]. [1]Mississippi State University, Starkville, United States.

Non-transgenic, herbicide-resistant rice cultivars have been utilized to combat certain weed species such as weedy rice. A new non-transgenic rice has been developed called ROXY, which is resistant to formulations of oxyfluorfen. Utilizing the ROXY rice production system in a furrow-irrigated system could help combat troublesome terrestrial weeds and be a viable option for producers. To evaluate the performance of oxyfluorfen in furrow-irrigated ROXY rice production system, two concurrent field studies were conducted at the Delta Research and Extension Center in Stoneville, MS, from 2022 to 2024. The first study evaluated residual grass and broadleaf weed control with oxyfluorfen applied delayed-preemergence (DPRE). The experimental design was a randomized complete block with a 3 × 4 factorial arrangement of treatments and four replications. Factor A was oxyfluorfen rates of 0, 700, and 981 g ai ha^{-1}. Factor B was herbicide mixture and included no mixture, clomazone at 560 g ai ha^{-1}, saflufenacil at 50 g ai ha^{-1}, and halosulfuron-methyl plus prosulfuron at 83 g ai ha^{-1}. The second study evaluated residual grass and broadleaf weed control with oxyfluorfen in a full-season herbicide program for furrow-irrigated rice. The experimental design for the second study was a randomized complete block design with a 4 × 2 × 2 factorial arrangement of treatments and four replications. Factor A was DPRE treatment and included no DPRE treatment, oxyfluorfen at 1,121 g ha^{-1}, oxyfluorfen 1,121 g ha^{-1} plus clomazone at 560 g ha^{-1}, and clomazone at 560 g ha^{-1} plus saflufenacil at 50 g ha^{-1}. Factor B was early postemergence (EPOST) treatment and included no EPOST, and propanil plus thiobencarb at 6,728 g ai ha^{-1} applied at the two- to three-leaf rice stage. Factor C was late postemergence (LPOST) and included no LPOST, and quinclorac at 421 g ai ha^{-1} plus halosulfuron plus prosulfuron at 83 g ha^{-1} plus petroleum oil surfactant at 1% (v/v) at the four-leaf to one-tiller rice stage. Rice injury and weed control were recorded at 14, 21, 28, 35, and 42 days after first application (DAA). Mean rice height was recorded 28 DAA and at maturity. Data were subjected to ANOVA using the PROC GLIMMIX procedure in SAS 9.4 with estimates of least square means at 5% significance level used for mean separation. In the first study, when oxyfluorfen was mixed with clomazone, saflufenacil, or halosulfuron plus prosulfuron, barnyardgrass (*Echinochloa crus-galli*) control was ≥ 78%. Oxyfluorfen at 981 g ha alone resulted in greater barnyardgrass and Palmer amaranth (*Amaranthus palmeri*) control 35 DAA than oxyfluorfen at 700 g ha. In the second study, barnyardgrass control 42 DAA never exceeded 89%. Oxyfluorfen, oxyfluorfen plus clomazone, and clomazone plus saflufenacil DPRE alone all provided comparable Palmer amaranth control 42 DAA. Oxyfluorfen-tolerant rice represents a viable option to be used in furrow-irrigated rice when combined with overlapping residual herbicides but will not be able to provide adequate control alone.

Strategies for Controlling Late-Season Vine Weeds in Field Corn. W. Phillips[1], T. Mueller[1], L. Steckel[2]. [1]UTIA, Knoxville, United States; [2]UTIA, Jackson, United States.

Warm-season climbing/vining weeds can be difficult to control in agronomic systems, especially later in the growing season. Two such weeds that are increasingly problematic in corn in the mid-south are burcucumber (*Sicyos angulatus* L.) and honeyvine milkweed (*Cynanchum laeve*). Burcucumber is an annual that germinates from May until a killing frost in fall. Burcucumber has several herbicidal control options for both PRE and POST early in the season, but later emerging plants are harder to manage. Burcucumber can germinate after the crop canopy has closed, and it can climb the crop stems to reach sunlight, making it more competitive than most late-summer weeds. Its vines can grow to 6 m long. For these reasons, late-germinating burcucumber can overtake corn in August and September. The prolific vines easily grow from row-to-row in the crop canopy, sometimes forming dense mats of vegetation which greatly interfere with harvest. In some cases, infestations are serious enough that fields become unharvestable. Honeyvine milkweed, on the other hand, is a perennial, returning each year from its extensive root system. In no-till situations in particular, it can be difficult to control. Its growth habit is similar to burcucumber (though its vines are shorter), so it is similarly troublesome in corn late in the summer. Because farmers have reported increasing difficulty controlling these weeds over the last several years, field trials were conducted in 2023 and 2024 at three locations in Tennessee to identify effective methods of control. Field research plots were 3 m by 6 m, and treatments were applied by CO_2 backpack hand booms. Visual efficacy evaluations were taken throughout the growing season. Field research proved difficult due to lack of uniformity in pest populations, difficult weather patterns, and the difficulty of measuring control of a vining weed that can grow into adjacent plots. Nonetheless, results were encouraging. Adequate control (80–90%) of burcucumber was achieved with late-POST applications of several ALS herbicides, including Accent Q and Peak. A treatment including bromoxynil (Maestro 4EC), acetochlor, clopyralid and topramezone (Kyro) also gave adequate control. The addition of a dicamba product labeled for corn (Status) improved late-season weed control. The best strategy was to make the last application as late as possible (as dictated by herbicide labels and equipment constraints) with tank mixes of products providing both POST activity and residual control. No treatment was completely effective, however, and further research is needed. These same treatments were less effective on honeyvine milkweed. At one research location, the ALS plus dicamba treatment provided fair control (60–70%). At the other location, most treatments gave visual control of <50%, so more research is needed here as well.

Preemergence Herbicide Programs for Mississippi Soybean. G. Mangialardi[1], J. Bond[1], L. Bell[1], D. Whitt[1], T. Eubank[1], M. Edwards[1], J. Dodd[1]. [1]Mississippi State University, Starkville, United States.

Palmer amaranth (*Amaranthus palmeri*) is the most competitive weed in row crop agriculture in the midsouthern U.S. In Mississippi, this weed is followed in severity by barnyardgrass (*Echinochloa crus-galli*) and *Ipomoea* spp. These problem weeds are often controlled at planting with paraquat applications and in-season applications of dicamba have successfully controlled Palmer amaranth and *Ipomoea* spp. As of 2024, dicamba no longer has a label for postemergence use, and due to paraquat's high mammalian toxicity, its future is uncertain. This necessitates evaluation of residual herbicides applied at different intervals before planting to prevent these weeds from emerging. A study was conducted at Mississippi State University's Delta Research and Extension Center in Stoneville, MS, from 2022 to 2024 to evaluate residual control of Palmer amaranth, barnyardgrass, and *Ipomoea* spp. with residual herbicide mixtures applied at different intervals preplant. The study was arranged with a two-factor factorial treatment structure within a randomized complete block with four replications. Factor A was herbicide treatment including a no preplant treatment, dimethenamid-P at 841 g ai ha^{-1}, sulfentazone plus S-metolachlor at 1,592 g ai ha^{-1}, and cloransulam-methyl plus metribuzin plus S-metolachlor at 1,760 g ai ha^{-1} applied at 14 or 28 days preplant (DPP). Factor B was preemergence (PRE) application at planting which included no PRE or pyroxasulfone plus flumioxazin plus sulfentrazone at 370 g ai ha^{-1}. Data were subjected to ANOVA using PROC GLIMMIX procedure obtaining the least squared means with an alpha level < 0.05. Palmer amaranth control was unaffected by PRE application following S-metolachlor plus sulfentrazone and S-metolachlor plus cloransulam plus metribuzin. Palmer amaranth control following all dimethenamid-P treatments was improved with the addition of an at planting PRE application. Control of Palmer amaranth with dimethenamid-P applied 14 DPP followed by an at-planting PRE was > 90% 21 days after planting. *Ipomoea* spp. were not controlled > 89% with dimethenamid-P treatments. Both S-metolachlor plus sulfentrazone and S-metolachlor plus cloransulam plus metribuzin controlled *Ipomoea* spp. > 89%. An at-planting PRE application increased barnyardgrass control following S-metolachlor plus sulfentrazone 28 DPP and both applications of dimethenamid-P. None of the three weed species were effectively controlled with only at-planting PRE applications. Overall soybean injury was more severe following PRE-only treatments. This work indicates that residual control of troublesome weeds can be achieved with herbicide mixtures applied prior to planting without utilizing a PRE treatment.

Sequential Application Timings for Glufosinate in Cotton and Soybean. T. King[1], G. Mangialardi[1], T. Eubank[1], D. Whitt[1], L. Bell[1], J. Bond[1]. [1]Mississippi State University, Stoneville, MS, United States.

Palmer amaranth (*Amaranthus palmeri*) and barnyardgrass (*Echinochloa crus-galli*) are among the top five most troublesome and common weeds of soybean (*Glycine max*) and cotton (*Gossypium hirsutum*) in the midsouthern U.S. Additionally, effective postemergence (POST) herbicide options in agronomic crops are limited due to herbicide-resistant weed species and legal challenges affecting the registration of herbicides such as dicamba. However, glufosinate has been applied as a POST herbicide in glufosinate-tolerant crops for nearly three decades and is still one of the few effective options providing broad-spectrum weed control. Therefore, in-season foliar applications of glufosinate will prove vital for controlling problematic weeds and preserving crop yields. Two separate field studies were conducted at the Delta Research and Extension Center in Stoneville, MS, in 2024 to evaluate Palmer amaranth and barnyardgrass control with herbicide programs containing sequential POST applications of glufosinate at various timings. One study evaluated glufosinate in cotton while the other assessed similar treatments in soybean. Treatments in both studies were arranged as a two-factor factorial in a randomized complete block design with four replications. Factor A was preemergence (PRE) treatment and included no PRE, dicamba at 560 g ae ha^{-1}, and fluometuron at 841 g ai ha^{-1} for the Cotton Study, and no PRE, dicamba at 560 g ha^{-1}, and metribuzin at 302 g ai ha^{-1} plus acetochlor at 1,267 g ai ha^{-1} for the Soybean Study. Factor B was sequential POST application timings and included no POST, 14 days after emergence (DAE) followed by (fb) 28 DAE, 28 fb 42 DAE, and 42 fb 56 DAE. For both studies, the sequential POST treatment included glyphosate at 1,267 g ae ha^{-1} plus glufosinate at 656 g ai ha^{-1} plus acetochlor at 1,267 g ha^{-1} fb glyphosate at 1,267 g ha^{-1} plus glufosinate at 656 g ha^{-1}. Data were subjected to ANOVA using the PROC GLIMMIX procedure and estimates of least squared means were utilized for mean separation ($p \leq 0.05$). In the Cotton Study, Palmer amaranth and barnyardgrass control was ≥ 79 and 81% 10 days after final treatment (DAFT), respectively, across all PRE treatments and timings for sequential POST applications of glufosinate. Cotton lint yield was greatest (1,765 kg ha^{-1}) following fluometuron PRE fb sequential applications of glufosinate at 14 and 28 DAE. In the Soybean Study, Palmer amaranth and barnyardgrass control was 90% in the absence of a PRE herbicide treatment and sequential applications of glufosinate at 42 and 56 DAE, respectively. For each PRE treatment, soybean grain yields were similar across all sequential POST application timings of glufosinate. These results demonstrate the ability of sequentially applied glufosinate to provide effective control of Palmer amaranth and barnyardgrass while preserving crop yields.

Identification of Weed Species that Act as Reservoirs for Confirmed and Emerging Vegetable Viruses. M. Cutulle[1], H. Campbell[2], K. Ling[3], S. Andreason[3], P. Wadl[3]. [1]Clemson University, Clemson University, United States; [2]Clemson University, Clemson, United States; [3]USDA ARS USVL, Charleston, United States.

South Carolina is an important vegetable growing region in North America. Many of the important vegetables grown in SC such as brassica stem and leafy green vegetables are significantly impacted by viral diseases. Minimal epidemiological studies have been conducted to evaluate the impact of weeds as reservoirs of virus infecting vegetable crops. In efforts to understand the role played by weed species as reservoirs, surveys have been conducted over the last several years by USDA and Clemson Scientists. Specifically, scientists focused on *Ipomoea* weed species as host for sweetpotato virus and brassicas weeds that could act as a host for brassica crop virus. Wild mustard (*Sinapis arvensis*) growing on the margins of broccoli and collard greens exhibited viral symptoms at many of the farms visited by the researchers in 2022. ELISA tests were used to identify TuMV, a potyvirus, and BWYV, a polerovirus transmitted by aphids. Experiments conducted at the USDA-USVL and Clemson Coastal Research and Education Center identified many biotypes of morningglory (*Ipomoea* spp.) as being hosts for sweetpotato leaf curl virus (SPLCV). Specifically *Ipomoea setosa* and *Ipomoea coptica* morningglory species were commonly associated as a host of SPLCV. Current and future work on this project is focused on evaluating the efficacy of multi-spectral cameras on drones for their ability to detect viral infections in weeds, map the area and then relay the information to a UAV spray drone to eliminate weedy virus reservoirs.

Are Residual Herbicides Applied Postemergence Safe for Soybean? J. Dodd[1], L. Bell[1], M. Edwards[1], T. Eubank[1], G. Mangialardi[1], D. Whitt[1], J. Bond[1]. [1]Mississippi State University, Stoneville, United States.

Following the introduction of glyphosate-resistant soybean (*Glycine max*) cultivars, postemergence (POST)-only herbicide programs became the most popular method of weed control. Due to POST-only herbicide programs, weeds have evolved resistance to some foliar-applied POST (POST foliar) herbicides in recent years. The evolution of these resistant weeds has influenced growers to incorporate residual herbicides into their weed control programs. Herbicides from groups 2 (ALS Inhibitors), 5 (PSII Inhibitors), 14 (PPO Inhibitors), and 15 (Long-Chain Fatty Acid Inhibitors) are often utilized for residual weed control in soybean. Some practitioners claim injury from these herbicides may cause stand reduction, chlorosis, necrosis, stunting, delays in canopy development, and ultimately yield loss. Research was conducted to evaluate soybean injury from POST foliar herbicide mixtures. This study was conducted in 2024 at the Delta Research and Extension Center in Stoneville, Mississippi. Treatments were arranged as a two-factor factorial in a randomized complete block with four replications. Factor A was herbicide rates applied at one (1×) and two (2×) times the suggested use rates. Factor B was herbicide mixtures and included no herbicide, fomesafen plus S-metolachlor, glyphosate plus fomesafen plus S-metolachlor, glyphosate plus dicamba plus fomesafen plus S-metolachlor, glufosinate plus fomesafen plus S-metolachlor, glyphosate plus glufosinate plus fomesafen plus S-metolachlor. Treatments were applied when soybean reached the V_3 growth stage. Soybean injury was evaluated 3, 7, 14, 21, and 28 days after treatment (DAT). Soybean yield was collected at crop maturity. Data were subjected to ANOVA and estimates of least square means were utilized for mean separation ($p < 0.05$). Soybean injury was similar when comparing treatments within the same rate at 7 DAT. Soybean injury was greater with 2× rates compared with 1× rates 7 and 28 DAT. Glyphosate plus dicamba plus fomesafen plus S-metolachlor, glyphosate plus glufosinate plus fomesafen plus S-metolachlor, and glufosinate plus fomesafen plus S-metolachlor applied at 2× rates produced greatest injury 7 and 28 DAT. By the end of the season, soybean had recovered from injury incurred during the vegetative stages, and yield was similar among all treatments. Herbicide mixtures including non-selective (glyphosate and glufosinate) and residual (fomesafen and S-metolachlor) herbicides produced visible injury after application, but yield indicated these treatments were safe for application to Mississippi soybean.

Herbicide Efficacy for Early Termination of Cover Crops in Tennessee. J. Ward[1], J. McNeal[1], L. Steckel[1], F. Yin[1], V. Sykes[1], N. Adotey[1]. [1]University of Tennessee, Knoxville, Tennessee, United States.

Cover crops are crops grown for the protection and enrichment of the soil. They are usually grown in fallow months and terminated prior to spring planting and provide a variety of benefits. However, cover crops may come with some challenges. Various methods for terminating cover crops prior to spring planting are utilized; however, chemical termination with herbicides is the most widely employed. Since many cover crops contain multiple species, optimal efficacy consists of a single herbicide application that effectively controls all plant species in the cover crop mix. However, the species diversity present in many cover crop mixes presents a challenge to this objective. A field experiment was initiated in 2023 at the West Tennessee AgResearch and Education Center in Jackson, Tennessee, and at the Milan AgResearch and Education Center in Milan, Tennessee, to evaluate the efficacy of various herbicides to control common cover crop species planted in Tennessee. Herbicide treatments included Clarity, Sharpen, Reviton, Elevore, Gramoxone SL 3.0, and an experimental product from BASF, BAS 851. With the exception of Gramoxone SL 3.0, each herbicide treatment included 32 fl oz of Roundup PowerMAX 3. Cover crop treatments included: (1) cereal rye + crimson clover + forage radish (2) cosaque oat + crimson clover + Austrian winter pea (3) cereal rye + crimson clover + Austrian winter pea (4) cereal rye + cosaque oat + Austrian winter pea + crimson clover + forage radish + jackpot turnip. Data were subjected to analyses of variance with a Repeated Measures Analyses utilizing a Generalized Linear Mixed Model in JMP PRO. Means were separated using Tukey's Honestly Significant Difference at an alpha-level of 0.05. Herbicide efficacy was evaluated separately for each cover crop at 21 and 28 DAT (days after treatment) and varied due to an interaction between herbicide and time post application. With the exception of Gramoxone SL 3.0, efficacy increased at each evaluation interval from 21 to 28 DAT for each cover crop. Furthermore, similar efficacy was observed 21 and 28 DAT, and efficacy 28 DAT was observed to be at least 90% and as much as 99%. These data indicate the efficacy of these herbicides for spring burndown of cover crops is primarily a function of time elapsed post application. With the exception of Gramoxone SL 3.0, all herbicides effectively controlled each cover crop after 28 days. Therefore, multiple herbicide options are available to effectively terminate cover crops if applied 4-weeks prior to spring planting.

Balancing Weed Control and Environmental Protection: Atrazine Mitigation Through See and Spray Technology. M. Dodde[1], J. Norsworthy[1], T. Avent[1], L. Pierce[1], R. Henry[2], B. Young[3], M. Zimmer[3], L. Steckel[4], J. Buck[4], W. Everman[5], D. Contreras[5]. [1]University of Arkansas System Division of Agriculture, Fayetteville, United States; [2]UPL NA Inc., Fort Wayne, United States; [3]Purdue University, West Lafayette, United States; [4]University of Tennessee, Jackson, United States; [5]North Carolina State University, Raleigh, United States.

Extensive use of atrazine has been a staple in corn herbicide programs for more than five decades because of its low cost and effective weed control. The Environmental Protection Agency has proposed new label restrictions aimed at reducing atrazine runoff from fields to combat environmental issues and comply with the Endangered Species Act. Therefore, research was conducted in 2024 at the Northeast Research and Extension Center near Keiser, AR, the West Tennessee Research and Education Center in Jackson, TN, the Agronomy Center for Research and Education in West Lafayette, IN, and the Lower Coastal Plain Research Station in Kinston, NC to determine if the use of John Deere's See and Spray™ technology could reduce atrazine use in corn while maintaining effective weed control. A randomized complete block design experiment was established with four replications. All treatments, except the nontreated check, contained a preemergence application of amicarbazone, metribuzin, S-metolachlor, and paraquat. Postemergence (POST) treatments included combinations of glyphosate, atrazine, and mesotrione applied with See and Spray technology or broadcast. Weed control data for multiple species were collected for four weeks after POST treatment as well as the amount of herbicide sprayed at the time of POST treatments. On average, the See and Spray treatments sprayed 33% less area than the broadcast treatments, ranging from 25% to 40% savings. Weed control differences were observed only with Palmer amaranth (*Amaranthus palmeri* [S.] Wats) 4 weeks after the POST application. Plots receiving a broadcast glyphosate with a targeted atrazine application had the least Palmer amaranth control at this timing (90% control). No differences were seen at any other evaluation or with the other weeds evaluated. These results suggest that See and Spray technology may effectively reduce atrazine use in corn while providing comparable levels of weed control.

The Effect of Preemergence Residual Herbicides on the Critical Time of Weed Removal in Soybean [*Glycine max* (L.) Merr.]. B. Stoker[1], D. Stephenson[2], C. Webster[1], R. Fritsche Neto[3], M. Hains[1], G. Sparks[1], W. Carr[1], E. Williams[1]. [1]LSU AgCenter, Baton Rouge, United States; [2]LSU AgCenter, Alexandria, United States; [3]LSU AgCenter, Crowley, United States.

Soybean [*Glycine max* (L.) Merr.] is a prominent and important crop globally and in the mid-southern region of the United States. Studies were conducted in 2024 at the LSU AgCenter Dean Lee Research and Extension Center near Alexandria, LA to evaluate the effect of preemergence residual herbicides (PRE) on the critical time of weed removal in Louisiana soybean. Plots were 9 m long with 4, 1 m rows on 96 cm beds seeded at 330,230 seed ha^{-1}. The experimental design of this study was a factorial arrangement of treatments within randomized complete block design with four replications. Factor A consisted of PRE herbicide treatments of flumioxazin at 71 g ai ha^{-1}, flumioxazin:pyroxasulfone at 71:90 g ha^{-1}, or flumioxazin:pyroxasulfone:metribuzin at 71:90:211 g ha^{-1}, respectively. Factor B consisted of weed removal timings at 14, 28, and 42 days after emergence (DAE) for each corresponding treatment of factor A. Full-season weedy and weed-free controls were implemented for comparative measures. Removal timings were prompted at each interval relative to soybean emergence. Initial weed removal was performed using mechanical measures and following initial weed removal, plots were maintained by implementing post-direct applications of non-selective herbicides. Weed spectrum consisted of barnyardgrass [*Echinochloa crus-galli* (L.) Beauv.], browntop millet [*Urochloa ramosa* (L.) Nguyen], goosegrass [*Eleusine indica* (L.) Gaertn.], hophornbeam copperleaf (*Acalypha ostryifolia* Riddell), Palmer amaranth (*Amaranthus palmeri* S. Watson), and prickly sida (*Sida spinosa* L.). Soybean yield was obtained and adjusted to 13% moisture content. In the absence of a PRE or following the three-way premix of flumioxazin, pyroxasulfone, and metribuzin, weeds competing with soybean reduced yield at least 10% 42 DAE. However, flumioxazin PRE prevented a soybean reduction via weed competition until 48 DAE. Nonlinear regression analysis was not able to detect a DAE following flumioxazin:pyroxasulfone indicating that this PRE prevented yield reductions of 10% longer than the 42 DAE removal interval. Reduction of soybean height was observed from weed competition when a PRE was absent at harvest. In the absence of a PRE or following application of flumioxazin:pyroxasulfone:metribuzin soybean node counts were reduced compared to application of flumioxazin or flumioxazin:pyroxasulfone at harvest. Preliminary data indicates the addition of herbicidal modes of action to flumioxazin increased the time period of reduced weed competition. Therefore, results support the use of PRE residual herbicides in Louisiana soybean production.

Influence of Application Method on Palmer Amaranth. C. Fuller[1], L. Steckel[1], T. Mueller[2]. [1]University of Tennessee, Jackson, United States; [2]University of Tennessee, Knoxville, TN, United States.

An experiment was conducted at Lauderdale, Gibson, and Madison Counties in Tennessee to determine the influence of application methods of post-applied herbicides on Palmer amaranth (*Amaranthus palmeri*) control. The experiment was conducted in fields with a naturally occurring, dense population of Palmer amaranth. The Palmer amaranth at Lauderdale County has been documented as having a higher level of dicamba resistance than the Gibson County population, which is more resistant than Madison. This trial aimed to examine Palmer amaranth control while utilizing a split-boom application method compared with a tank mixture of post-applied herbicides. Applications of herbicides were applied when Palmer amaranth plants were 5 to 10 cm in height. Applications were rated at 7, 14, and 21-day intervals. Following the 21-day interval of the initial application, a sequential application was made. The second application was also rated at similar intervals. Treatments utilized in this experiment included: dicamba at 560 g ha^{-1}, glufosinate at 655 g ha^{-1}, dicamba at 560 g ha^{-1} + glufosinate at 655 g ha^{-1} tank mixed, dicamba at 560 g ha^{-1} + glufosinate at 655 g ha^{-1} split-boom. Following the 21-day rating, the second application was made with only the dicamba + glufosinate tank mixture and split-boom application at the same rate as the initial spray. No single-ingredient herbicide was sprayed at this time. Split-boom provided significantly better Palmer amaranth control in Lauderdale County versus the tank mixture. We did not observe a difference in weed control in Gibson and Madison Counties. In conclusion, growers with populations of Palmer amaranth that are highly auxin-resistant may see increased control utilizing the split-boom application.

Strategies for Managing Glyphosate-Resistant Palmer Amaranth in Roundup Ready Alfalfa.

R. Furlan Jr[1], B. Pedreira[1], L. Steckel[1], R. Oakes[1], T. Mueller[1]. [1]University of Tennessee, Knoxville, United States.

Alfalfa (*Medicago sativa* L.), one of the most valuable forage crops, can be affected by boron deficiency in the soil. This study aimed to quantify the effects of boron fertilization and herbicide management on forage accumulation and weed mass in a Roundup Ready® alfalfa hayfield. The field had a history of Glyphosate-Resistant (GR) Palmer amaranth. The experiment was established in September 2023 at the University of Tennessee (Knoxville, TN). The experimental design was a randomized complete block design with four replicates (3-by-9 m each) in a 3 × 3 factorial arrangement, including three boron rates (0, 2.25, and 4.5 kg ha^{-1} applied at establishment and post-first harvest) and three herbicide management levels (no herbicide, 1300 g ai ha^{-1} of glyphosate only post-first harvest, and 1300 g ai ha^{-1} in the fall during establishment and post-first harvest). Forage was harvested in each plot inside two 0.25-m^2 quadrats with 10 cm of stubble height for the first time in May 2024 after the canopy achieved 10% bloom and twice again at 35-day intervals. The data collected included alfalfa, weed, and Palmer amaranth biomass at each harvest and visual ratings of the field at the end of the establishment year and before each of the three harvests. Forage accumulation was calculated at each harvest, and as the sum of the three harvests, weed biomass was calculated as the mean per treatment. Data were analyzed using the MIXED procedure in SAS, with blocks considered random and boron, herbicide, and harvest effects considered fixed. Means were compared using Tukey's test ($P < 0.05$). Herbicide treatment affected forage accumulation ($P = 0.015$) and weed biomass ($P = 0.0004$). The establishment-sprayed treatment resulted in 16,000 kg ha^{-1} of forage and 140 kg ha^{-1} of weed biomass, 2,100 kg ha^{-1} more forage mass, and 260 kg ha^{-1} less weed biomass than the other herbicide management levels. Boron × harvest interaction was significant ($P = 0.0096$), with boron-fertilized treatments producing 1,075 kg ha^{-1} more forage than the unfertilized in the third harvest. The field, which was uniformly infested with GR Palmer amaranth, had an average Palmer amaranth biomass of 45 kg ha^{-1} in the third harvest and was not observed in the previous two, regardless of treatment. Although glyphosate does not completely control GR Palmer amaranth, it suppresses its growth and also controls other weeds, allowing alfalfa to compete more effectively and establish better, leading to greater spring forage accumulation and cleaner stands. Once the alfalfa was established, Palmer amaranth's presence was minimal, indicating that rotation with alfalfa in infested areas can provide significant control.

Evaluating Hemp Dogbane (*Apocynum cannabinum* L.) and Green Antelopehorn Milkweed (*Asclepias viridis* Walter) Response to Auxins used in Pastures and ROWs. K. Broster[1], J. Byrd[1], C. Gregory[1], T. Duncan[1], J. Thorne[2]. [1]Mississippi State University, Starkville, MS, United States. [2]Mississippi DOT, Newton, MS, United States.

Green antelopehorn milkweed (*Asclepias viridis* W.) and hemp dogbane (*Apocynum cannabinum*) are perennials native to North America and can be problematic in forages due to possible toxicity for livestock but are habitat for the endangered monarch butterfly (*Danaus plexippus*). Auxin mimics are recommended for the control of broadleaf species, and triclopyr has two recent formulation additions for forages. Two studies were conducted in Mississippi. The milkweed field study included 4 locations in Oktibbeha County, MS; a hayfield (A) and pasture were used for the years of 2020, 2021, and 2022, a hayfield (B) location added in 2022 and 2023, and a hayfield (C) in 2023. The hemp dogbane study had 4 locations in Clay County, MS; a hayfield and fallow field were used in 2020, 2021, and 2022, a roadside (A) location added in 2022 and 2023, and roadside (B) in 2023. Population densities were measured at all locations through individual plant counts using a 1-m^2 area, with 2 subsamples per plot, repeated throughout the studies. Treatments were organized in a randomized complete block design (RCB) with four replications. Treatments included: Vastlan (triclopyr choline salt) at 4.67 and 2.34 L ha^{-1}, Remedy Ultra (triclopyr butoxy ester) at 4.67 and 2.34 L ha^{-1}, Garlon 3A (triclopyr triethylamine) at 6.23 and 3.12 L ha^{-1}, Trycera (triclopyr acid) at 6.52 and 3.26 L ha^{-1}, MezaVue (aminopyralid + picloram + fluroxypyr) at 2.34 and 1.17 L ha^{-1}, DuraCor (aminopyralid + florpyrauxifen-benzyl) at 1.46 and 0.73 L ha^{-1}, Grazon P+D (2,4-D + picloram) at 9.35 and 4.67 L ha^{-1} (milkweed), Method (aminocyclopyrachlor) at 1.32 and 0.66 L ha^{-1} (dogbane), Surmount (picloram + fluroxypyr) at 7.01 and 3.5 L ha^{-1} (dogbane), and Tordon K (picloram) at 4.67 and 2.34 L ha^{-1} (dogbane), making 14 treatments for milkweed and 18 treatments for dogbane. All applications were made using a CO_2 backpack sprayer set to deliver 280 L ha^{-1}, with applications made prior to pod for both species. Visual injury ratings were made 2 and 4 weeks after application (WAT). Data were analyzed using RStudio by ANOVA and means separated by Fisher's Protected LSD ($\alpha = 0.05$). Years and locations were analyzed separately when differences were observed. With milkweed, the lowest control was exhibited by the low rate of DuraCor, except for the high rates of DuraCor and Vastlan and the low rate of Grazon P+D in hayfield C. In the pasture, across all years, DuraCor at 0.73 L ha^{-1} provided the least milkweed control at 4 WAT, except DuraCor at 1.46 L ha^{-1} and Trycera 3.26 L ha^{-1} in 2022. For dogbane, fallow field was separated by year. Across all years, both rates of DuraCor and Method were less injurious than all treatments, except for Tordon K at 2.34 L ha^{-1} in 2021 at 4 WAT. The hayfield was similar, but in 2021 both DuraCor treatments provided the least control, and in 2022 the low rates of DuraCor and Garlon 3A resulted in less control compared to all treatments. Reduction in population of both species was observed after multiple consecutive applications.

Imazapyr tolerance in Clearfield Sunflower (*Helianthus annuus*). C. Gregory[1], J. Byrd[1], J. Thorne[2], K. Broster[1], T. Duncan[1]. [1]Mississippi State University, Starkville, United States. [2]Mississippi Department of Transportation, Jackson, United States.

Common sunflower (*Helianthus annuus*) is a warm-season annual found throughout North America. It has an erect, hairy, coarse stem with a deep tap root allowing the flower to survive in dry climates. Plants grow best in average moist, well-drained soils, but also tolerate poor, dry soils. Plant height varies depending on cultivar, from 0.6-3 m, with flowers 7.6-15 cm in diameter, producing ray florets of yellow, orange, and brown colorations. 'Clearfield' cultivars tolerant to imidazolinone herbicides have been developed. Field studies with Beyond Clearfield Sunflower seed, were conducted in three separate locations in Mississippi. One site located at the North Farm Agriculture Research facility at Mississippi State University (North Farm), another located on MS-82 highway right-of-way at the intersection of MS-82 and MS-12 also in Oktibbeha County, and the final location being on the right-of-way at the junction of MS-45 and MS-84 in Wayne County. Four pre-emergent treatments: Arsenal 4 SL (imazapyr) at 140, 280, 420 g ai per ha-1 plus Authority (sulfentrazone) at 320 g per ha-1, Beyond (imazamox) at 140 g ai per ha-1 plus Authority at 320 g ai per ha-1. Treatments were organized in a randomized complete block design with four replications per treatment. Nonionic surfactant (NIS) at 0.25% volume per volume (%V/V) was added to Arsenal treatments. Applications were applied June 11, 2024, at North Farm with a CO_2 backpack sprayer calibrated at 280 L per ha-1. Treatments applied on highway rights-of-way were: Beyond at 140 g ai per ha-1 plus Authority at 320 g ai per ha-1 as a broadcast treatment. Applications were applied June 10, 2024, and July 9, 2024, with a four-nozzle boom sprayer with a utility vehicle and calibrated to deliver 188 L per ha-1. Greenhouse evaluations of preemergence, postemergence, and sequential pre- and postemergence treatments were also conducted, included: Arsenal at 35, 70, 140, 280, 561 g ai per ha-1 with 0.25% %V/V NIS. Study with sequential applications were organized in a randomized complete block design with four replications per treatment. Studies with pre only and post only treatments were organized in a randomized complete block design with six replications per treatment. Sequential application study first application made September 2, 2024, and post application made September 18, 2024. Pre application only applied on October 9, 2024. Post application only applied on October 31, 2024. All treatments applied with CO_2 backpack sprayer calibrated as stated above. Greenhouse studies plant injury was observed incrementally at 2, 4, 6 and 8 weeks after treatment (WAT). Responses to treatments were analyzed using ARM (revision 2024.4 November 22, 2024 (B=29948)) comparing tolerance. In sequential study and pre only study no injury symptoms consistent with Arsenal was observed. Environmental injury such as rusting and fungal spots were present in each study. In the post only study, herbicide injury symptoms of red veins were observed only with plants receiving max rate of herbicide. Injury was visible 4 WAT and later. Each study will be repeated in 2025 at same or similar locations, along with additional roadside studies.

Performance of Targeted Applications with See & Spray™ in Cotton. T. Avent[1], J. Norsworthy[1], L. Pierce[1], M. Dodde[1], L. Lazaro[2]. [1]University of Arkansas, Fayetteville, AR, United States. [2]Blue River Technology, Santa Clara, CA, United States.

Integrated weed management strategies, such as cover crops, help mitigate herbicide resistance evolution, while precision sprayers reduce herbicide use by targeting weeds directly. However, combining cover crops and targeted spraying into a weed management program remains unexplored. To address this, a prototype See & Spray Ultimate (Agronomy Test Machine) was used to evaluate two cover crops and three application strategies: targeted applications alone, targeted + broadcast residual (BCR) applications, and a standard broadcast (BC) application. The study was conducted over three years in Keiser, AR, using dicamba-glyphosate-glufosinate-resistant cotton (*Gossypium hirsutum* L.) planted into fall fallow, hairy vetch (*Vicia villosa* Roth), or cereal rye (*Secale cereale* L.) following a spring broadcast preplant termination treatment. The herbicide program was consistent across treatments but differed by application method. A nontreated control was included for each cover crop. Targeted applications, performed at preemergence, early postemergence, and mid-postemergence using a medium spray sensitivity setting, were followed by a directed layby herbicide application for all plots. Targeted applications provided comparable weed control to BC applications by final evaluation, except for Palmer amaranth (*Amaranthus palmeri* S. Watson) in the winter fallow system at layby application timing. Cover crops enhanced Palmer amaranth control; however, incomplete termination (less than 100% kill) negatively impacted the effectiveness of targeted applications to reduce herbicide use. See & Spray technology demonstrated strong weed detection performance within cover crop residues. An economic analysis, accounting for herbicide, equipment, and subscription costs, indicated that See & Spray did not influence weed control costs by the end of the season. These findings suggest that targeted applications can be effectively integrated into cotton production systems with standing cover crop residues. However, producer success and cost savings depend on effective cover crop termination, application timing, and machine settings.

Optimal Application Rates of Tetflupyrolimet and Clomazone Mixtures on a Medium Soil. M. Hains[1], C. Webster[1], W. Carr[1], B. Stoker[1], G. Sparks[1], E. Williams[1]. [1]Louisiana State University, Baton Rouge, United States.

Tetflupyrolimet is selective for grass control in rice (*Oryza sativa* L.) and is the first herbicide that hinders de novo pyrimidine biosynthesis by inhibiting dihydroorotate dehydrogenase. A study was conducted in 2023 and 2024 at the H. Rouse Caffey Rice Research Station near Crowley, Louisiana, to evaluate the efficacy of different rates of tetflupyrolimet and clomazone applied alone and in mixtures on a Crowley silt loam soil. Plot size was 3 by 9.14 m2 with 16-19.5 cm drill-seeded rows of 'PVL03' at 78.4 kg ha-1. This study was a randomized complete block design with applications of tetflupyrolimet applied alone at 50, 75, 100, 125, and 150 g ai ha-1, clomazone applied alone at 125, 188, 250, 313, and 375 g ai ha-1, and mixtures of tetflupyrolimet and clomazone the respective rates mentioned previously. A nontreated check was added for comparison. Broadleaf and sedge species present were controlled using halosulfuron-containing products in both years. All herbicide applications were applied with a CO_2-pressurized backpack sprayer calibrated to deliver 93.5 L ha-1. Visual evaluations of percent control for this study included barnyardgrass [*Echinochloa crus-galli* (L.) P. Beauv.] and broadleaf signalgrass [*Urochloa platyphylla* (Munro ex C. Wright) R.D. Webster] at 21 and 56 days after treatment (DAT). Visual evaluations of percent control were also recorded for Amazon sprangletop [*Leptochloa panicoides* (J. Presl) Hitchc.] at 63 DAT. Rough rice yields were obtained and adjusted to 12% moisture.

At 21 DAT, barnyardgrass was controlled 63% when tetflupyrolimet and clomazone were applied alone at their lowest rates of 50 g ha-1 and 125 g ha-1, respectively; however, when tetflupyrolimet and clomazone were mixed at these same rates, 73% control of barnyardgrass was observed. At 56 DAT, 82 and 73% control of barnyardgrass was observed when tetflupyrolimet at 100 g ha-1 and clomazone at 250 g ha-1 were applied alone, respectively, while 88% control was observed from tetflupyrolimet mixed with clomazone at the same rates. Comparable results were observed for broadleaf signalgrass at 21 and 56 DAT. Tetflupyrolimet control of Amazon sprangletop at 63 DAT ranged from 68 to 95% across all rates, while clomazone control was observed at 25 to 62% control across all rates. All mixtures of clomazone and tetflupyrolimet controlled Amazon sprangletop 78 to 95%. Across all rates, rating dates, and weed species, 71-99% control was observed from the mixtures of tetflupyrolimet and clomazone. These results suggest that using a preemergence mixture of clomazone plus tetflupyrolimet increases grass control in rice compared to control observed when each herbicide is applied alone.

Measuring Length of Residual Control as Influenced by Cover Crop and Herbicide Using See & Spray™ Technology. B. Pendleton[1], D. Contreras[1], C. Bradshaw[1], J. Alsdorf[1], R. Argueta[1], C. Cahoon[1], W. Everman[2], L. Lazaro[3]. [1]North Carolina State University, Raleigh, United States. [2]Iowa State University, Ames, United States. [3]Blue River Technology, Santa Clara, United States.

Weed resistance to herbicides necessitates the adoption of new management strategies by growers. Advances in technology can effectively control weed populations. The objective of this study was to determine and compare the duration of residual control provided by various pre-emergence herbicides, both in the presence and absence of a cereal cover crop. The experiment was conducted at the Caswell Research Station in Kinston, North Carolina, where cereal rye (Wrens Abruzzi) was planted and terminated two weeks before planting soybeans. A total of five individual herbicides and five premix herbicides were applied to soybean fields, both with and without the cover crop. Utilizing an agronomy test machine and a John Deere 5100M tractor traveling at 8 mph, a total of 22 treatment combinations were evaluated. Weed density and size were measured at 2, 3, 4, 5, 6, and 7 weeks after treatment. The data was subjected to analysis using ANOVA with SAS® 9.4 software. This study aimed to determine and compare the duration of residual control of several pre-emergence herbicides with and without the presence of a cereal cover crop. The interaction between cover crops and herbicides was found to impact interactions for different weed control efficacy.

Dose-response analysis of a plant-derived allelochemical as a potential herbicide with a novel mechanism of action. B. Dal'Pizol Novello[1], F. Souza[2], L. Leite[3], T. Heck[4], L. Avila[2], T. M. Tseng[2], P. L. Da Costa Aguiar Alves[3]. [1]São Paulo State University, Jaboticabal, Brazil; Mississippi State University. [2]Mississippi State University, Starkville, United States. [3]São Paulo State University, Jaboticabal, Brazil. [4]Federal University of Pelotas, Pelotas, Brazil.

The limited options for new herbicide mechanisms are surprising, considering the vast number of molecular targets available in plants. Allelochemicals hold great promise as they explore a broader chemical spectrum and offer greater structural diversity than conventional synthetic compounds. As an initial step toward investigating new herbicide mechanisms of action, dose-response and IC50 (50% inhibitory concentration) experiments are essential to identify the optimal effective dose of the compound. The aim of this study was to evaluate the dose-response curve and IC50 of a plant derived allelochemical, PDA-24. The compound was tested at concentrations of 50, 100, 200, and 300 µM in agar. Plant germination, shoot and root lengths, and fresh and dry masses were measured. Data were analyzed using quadratic regression in R software with the expdes.pt package, and IC50 values were calculated. Results showed a dose-dependent inhibition of plant growth and germination. Germination decreased significantly at doses above 200 µM, while lower doses (50 and 100 µM) caused a 49.89% reduction compared to the control, with an IC50 of 104.08 µM. For shoot and root lengths, reductions of 49.8% and 51.21% were observed at lower doses, with IC50 values of 104.08 µM and 112.07 µM, respectively. Fresh and dry mass reductions were particularly notable, with IC50 values of 3.12 µM and 1.67 µM, respectively. These findings demonstrate PDA-24's potent herbicidal activity, characterized by a clear dose-dependent response. The compound's significant inhibitory effects, especially on biomass, suggest strong potential for development as a novel herbicide, warranting further exploration into its mechanism of action.

Planting Green: Does it work for weed management in cotton? H. Ahlawat[1], H. C. Lindell[1], C. E. Smith III[1], P. Campos[1], K. Pilania[1], M. C. Bocz[1], N. Basinger[1]. [1]University of Georgia, Athens, United States.

Cover crops are increasingly recognized in the United States for their valuable benefits, including reducing soil erosion, contributing to soil organic matter, conserving soil moisture, and suppressing weeds. Interest in maximizing biomass by planting early or delaying cover crop termination until after crop planting, referred to as “planting green”, has increased. Some research on planting green has been conducted in corn and soybean but is limited in cotton. Therefore, this study aims to compare the effects of different cover crop planting and termination timings on cotton yield and weed suppression. Studies were conducted in Watkinsville, and Midville, GA, which represent the two major soil types in the state for crop production. At each site, a randomized complete block design was implemented with a 2x3x2 factorial arrangement of treatments. The main plot factor represented cover crop planting time, which included early planting on October 30 and late planting on November 20. The second factor involved cover crop termination timing, with three treatments: no cover crop, standard termination (14 to 21 days before planting cotton), and planting green (terminating 0 to 3 days after planting cotton). The third factor was herbicide treatment which included a full season herbicide program (PRE fb two POST, and Layby applications), POST only program (two POST and Layby), and a weedy check. Results indicated that early-planted cereal rye produced 11,460 kg ha-1 of biomass at the Watkinsville site, and 3,145 kg ha-1 at the Midville site. In contrast, Watkinsville and Midville produced roughly 8,043 and 3,825 kg ha-1 of late-planted cereal rye biomass, respectively. Cotton planted into late-planted cereal rye in Watkinsville produced 2604 kg ha-1 which is 23% more when compared to early planting. However, cover crop planting timing at Midville did not affect cotton yield where the average yield was 4,262.7 kg ha-1. When no herbicides were used, regardless of cover crop treatment, cotton yield was reduced 85% and 45% at Watkinsville, GA and Midville, GA, respectively. Cover crop planting timing is more important for high biomass production than the need to plant green. However, integrated approaches including cover crops and herbicide applications positively contribute to weed management and increased cotton yield.

Investigating *Amaranthus* spp. Response to Glufosinate, Saflufenacil, and Trifludimoxazin. D. Smitherman[1], D. Russell[1], J. Patel[1], C. A. Landrum[1], A. Maity[1], I. Meiners[2], A. Porri[3], J. Lerchl[3], J. S. McElroy[1]. [1]Auburn University, Auburn, United States. [2]BASF, Raleigh, United States. [3]BASF, Ludwigshafen, Germany.

In Alabama, herbicide resistance in row crops, particularly in *Amaranthus* species, has been both under-reported and under-researched, with the most recent confirmations dating back to 2008. Alabama farmers are reporting a lack of control from previously effective herbicide treatments. A total of seventy putative resistant populations were collected with 42 populations having viable germplasm for testing. The collected populations represented 15 counties across the state and were sourced from peanut, soybean, cotton, corn, bahiagrass, and ryegrass pastures. These were subjected to an initial first-pass greenhouse herbicide screening at Auburn University Herbicide Resistance Lab during 2023 and the spring of 2024. The initial screening applied standard herbicide rates for eight herbicides using a pressurized CO_2 system delivering 280.5 L/ha: glufosinate (0.48 kg ai/ha), 2,4-D (2.5 kg ai/ha), dicamba (0.56 kg ai/ha), S-metolachlor (2.3 kg ai/ha), atrazine (2.8 kg ai/ha), glyphosate (2.5 kg ai/ha), saflufenacil (0.07 kg ai/ha), and trifludimoxazin (0.07 kg ai/ha). Putative resistant populations were assessed on a binary scale relative to a known susceptible population. Any increased survivability indicated potential tolerance, warranting further resistance screening through dose-response assays and RNA extractions for both phenotypic and genotypic evaluations. Ten populations were found to have increased survivability, prompting dose-response assays using rates of 0.125x, 0.25x, 0.5x, 1x, 2x, 4x, 8x, and 16x the initial screening rate for the respective herbicide, with results from six populations being reported. Each dose response was executed with the same pressurized CO_2 system with an output of 280.5 L/ha. The rates were calculated from the initial screening rates with the 1x being the label rate. For glufosinate, the dose-response went as 0.06 kg ai/ha, 0.12 kg ai/ha, 0.24 kg ai/ha, 0.48 kg ai/ha, 0.96 kg ai/ha, 1.92 kg ai/ha, 3.84 kg ai/ha, and 7.68 kg ai/ha. For saflufenacil, the dose response was 0.00875 kg ai/ha, 0.0175 kg ai/ha, 0.035 kg ai/ha, 0.07 kg ai/ha, 0.14 kg ai/ha, 0.28 kg ai/ha, 0.56 kg ai/ha, and 1.12 kg ai/ha. From these assays and differential responses, one population was determined to be resistant to glufosinate, and four populations were resistant to saflufenacil. Currently, work is being done to analyze the sequence data from these populations to search for mutations. This study not only updates the status of herbicide resistance in pigweed species in Alabama but highlights the importance of up-to-date resistance testing, as this can quickly become out of control. We are developing a baseline evaluations of trifludimoxazin to have for future reference if resistance ever occurs. This study confirms that resistance in Alabama has been grossly underreported, and further evaluations would likely identify herbicide resistance as a major contributor to weed management issues in the state. The findings will aid in developing informed weed management strategies, ensuring sustainable and economical agricultural practices in Alabama.

Distribution of Herbicide Resistant Palmer amaranth in North Carolina. J. Alsdorf[1], D. Contreras[1], R. Argueta[1], C. Bradshaw[1], C. Cahoon[1], K. Jennings[1], W. Everman[1]. [1]North Carolina State University, Raleigh, NC, United States.

North Carolina farmers are constantly dealing with competition from various weeds on a yearly basis. The most problematic of these weeds has become Palmer amaranth (*Amaranthus palmeri*), which has been proven to significantly reduce crop yield when gone uncontrolled. Another rising issue among growers is the evolution of herbicide-resistant weed populations. One statewide and two regional surveys for Palmer amaranth populations in 2010, 2005, and 2015, have been previously conducted. These historical surveys have been helpful in understanding the distribution of known herbicide-resistant weed populations. Updated surveys are needed to track the spread of these resistant populations, along with being used to detect putative-resistant populations previously unconfirmed in the state. In the fall of 2022, 137 samples of Palmer amaranth were collected from growers' fields and were screened to determine the efficacy of herbicides: 2,4-D (1064 g ae ha-1), dicamba (562 g ae ha-1), fomesafen (280 g ai ha-1), and glufosinate (596 g ai ha-1). No resistance was found in 2,4-D, dicamba, or glufosinate. Reduced control (<50% control) was found, with 40 populations with fomesafen. In a separate study, five populations were subject to a dose response to confirm resistance to fomesafen. Two susceptible (Bertie and Stanly) and two putative-resistant (Robeson 1 and Robeson 2) populations were selected from the statewide survey, as well as a third putative-resistant population (Nash) collected from a grower complaint. Applications were made to individual plants 5-10 cm tall, at rates of 1/16, 1/8, 1/4, 1/2, 3/4, 1, 2, 4 and 10 times the recommended rate (280 g ai ha-1). Plant injury 21 DAT revealed I50 values of 123 and 115 g ai for Bertie and Stanly populations respectively, and 613, 1213, and 2800 for Nash, Robeson 1, and Robeson 2 populations respectively. Ratios of resistance values to susceptible values confirm resistance of Palmer amaranth to fomesafen in North Carolina. Results will be used as extension tools to help growers and agents make informed decisions when choosing a weed control program.

Comparison of Tetflupyrolimet Application Methods as a Preemergence Herbicide in Rice (*Oryza sativa* L.). G. Sparks[1], C. Webster[1], M. Hains[1], B. Stoker[1], W. Carr[1], E. Williams[1]. [1]LSU Ag Center, Baton Rouge, United States.

Tetflupyrolimet will be classified as a group 28 herbicide and will belong to the first new mode of action released in decades. Tetflupyrolimet is a selective herbicide applied preemergence for grass control in rice. Over many years barnyardgrass [*Echinochloa crus-galli* (L.) Beauv.] has developed resistance to multiple herbicides making it important to preserve the options still available today. In Louisiana, herbicide impregnation on fertilizer is a common practice to reduce trips across the field. Therefore, in 2023 and 2024 experiments were conducted in Crowley, Louisiana on a Crowley silt loam soil to compare tetflupyrolimet and clomazone sprayed vs impregnated on fertilizer for the control of barnyardgrass and broadleaf signalgrass (*Urochloa platyphylla* (Munro ex C. Wright) R.D. Webster).

The study was organized as a randomized complete block with a two-factor factorial arrangement of treatments with four replications. Factor A consisted of two application types, either herbicides sprayed or impregnated on fertilizer. Factor B consisted of tetflupyrolimet applied at 90 or 125 g ai ha-1 and clomazone at 225 or 313 g ai ha-1 applied alone and in mixture at respective rates. Plot size was 1.5 by 5m. Treatments were applied at 4.8 kmh prior to weed and crop emergence using a CO_2-pressurized backpack sprayer calibrated to deliver 140 L ha-1. Visual ratings for barnyardgrass and broadleaf signalgrass control were observed at 14, 21, and 35 DAT. Fertilizer impregnation treatments were applied using a starter fertilizer 0-23-30 (N-P_2O_5-K_2O) at 280 kg ha-1. The results 35 DAT indicate 63 to 85% barnyardgrass control and 76 to 89% broadleaf signalgrass when treated through fertilizer impregnation across all herbicide treatments. When sprayed 65 to 83% barnyardgrass and 78 to 92% broadleaf signalgrass control was observed 35 DAT across all herbicide treatments. The results indicate applications made through fertilizer impregnation generate similar levels of barnyardgrass and broadleaf signalgrass control as spray applications. The results suggest fertilizer impregnation is an effective control method in Louisiana rice production.

Weather Related Crop Response to Quizalofop in the Provisia Rice System. W. Carr[1], C. Webster[1], B. Stoker[1], M. Hains[2], G. Sparks[1], E. Williams[1]. [1]LSU AgCenter, Baton Rouge, LA, United States. [2]LSU AgCenter, Baton Rouge, LA, United States.

Crop injury in herbicide-resistant rice (*Oryza sativa* L.) can be induced by decreased herbicide metabolism as a result of adverse growing conditions. In 2023 and previous growing seasons, crop injury has been observed when quizalofop was applied at the labeled rate in Provisia® rice during periods of low solar radiation and low temperatures. In 2023 and 2024, at the H. Rouse Caffey Rice Research Station near Crowley, Louisiana, three studies were conducted to evaluate overcast weather conditions before and after quizalofop applications in Provisia® rice. Shade cloths (The Shade Cloth Store, Mundelein, Illinois 60060) were used in these studies to simulate overcast growing conditions. Each study was set up as a three-factor factorial arrangement of treatments with three replications. Factor A consisted of overcast conditions simulated for a period of 7 days prior to quizalofop applications or overcast conditions simulated for a period of 7 days after quizalofop applications. Factor B consisted of either no shade cloths or shade cloths at 30, 60, or 90 percent shade. Factor C consisted of quizalofop applied at 0, 120, or 240 g ai ha^{-1} at the three- to four-leaf rice growth stage. Herbicide applications were made with a CO_2-pressurized backpack sprayer calibrated to deliver 140 L ha^{-1}. Visual evaluations for crop injury were recorded 14 days after treatment (DAT). In addition to crop injury, rice plant heights and stand counts were recorded at 14 DAT. Yield was obtained and adjusted to 12% moisture. At 14 DAT, crop injury was 1% following quizalofop applications when no overcast weather was simulated across both rates. Crop injury was observed at 5, 10, and 15% when quizalofop was applied at 120 g ha^{-1} following a period of 7 days of 30, 60, and 90% shade, respectively. Crop injury was observed at 5, 18, and 30% when quizalofop was applied at 120 g ha^{-1} followed by shade at 30, 60, and 90% for a period of 7 days. This research indicates that overcast growing conditions are playing a role in crop injury in the Provisia® rice production system.

Annual and Perennial Sandbur (*Cenchrus* spp.) Management Effects in Hayfield and Pastures with Indaziflam & Glyphosate. Z. Howard[1], S. Nolte[1], C. Medlin[2]. [1]Texas A&M AgriLife Extension, College Station, TX, United States. [2]Environmental Science US LLC, Cary, NC, United States.

In forage grasses, annual and perennial sandbur (*Cenchrus spinifex*) is a problematic plant that reduces forage production and quality. Herbicide programs that target sandbur management appear to be variable in their success, and limited research exists to better understand how pre- and post-emergent herbicides can work together to achieve control of both annual and perennial plants. It is hypothesized that 1) a multi-year program involving pre- (indaziflam) and non-selective post-emergent (glyphosate) herbicide programs targeting sandbur under a proper forage management regimen will decrease annual and perennial sandbur quantities, and 2) there will be a forage yield reduction in response to programs involving post-emergent herbicide treatments. Results from 2 site years indicate that a single year of any program (pre- only, post- only, or both) will reduce the number of sandbur plants. As expected, those that contain both pre- and post-emergent treatments resulted in a reduction of annual and perennial plants. When the pre-emergent herbicide was applied in a split application (before sandbur germination and after first hay cutting with post-emergent herbicide), a greater reduction of annual and perennial sandbur plants was observed compared to no post-emergent, or single applications of pre- with post-emergent herbicide. In the second year of each program the pre-emergent only treatment reduced perennial sandbur plants, suggesting that increasing forage competitiveness helps to reduce instances of these perennial plants. Any forage injury was transient, even in drought conditions. Forage yields were acceptable and comparable to untreated checks, suggesting that these programs will not reduce yields when performed in two successive years.

Evaluating the Efficacy of Drop Nozzles for Drift Reduction: A Multi-State Field Study in Cotton and Soybean. C. Ward[1], S. Nolte[1], G. Morgan[2], B. Fritz[3], J. Calhoun[4], P. Dotray[5], T. Baughman[6], M. Smith[7]. [1]Texas A&M University, College Station, TX, United States. [2]Cotton Incorporated, College Station, TX, United States. [3]United States Department of Agriculture, College Station, TX, United States. [4]University of Missouri, Columbia, MO, United States. [5]Texas A&M University, Texas Tech University, Lubbock, TX, United States. [6]Texas A&M University, Oklahoma State University, Lubbock, TX, United States. [7]Oklahoma State University, Altus, OK, United States.

Drift reduction technologies have grown in popularity due to the Environmental Protection Agency's (EPA) increased regulations on herbicide applications. The EPA's Herbicide Strategy requires pesticide applicators to use mitigation measures listed in their 'picklist' to spray specific products on specific areas. The picklist is included on particular herbicide product labels and contains measures to prevent spray drift, runoff, and erosion. Among the spray drift mitigation measures listed are hooded sprayers and drop nozzles, which can decrease the required downwind buffers. Our goal is to further support the use of drop nozzles as a viable method for reducing herbicide drift. Therefore, our objective of this study is to demonstrate through multi-state replicated research that a spray boom equipped with drop-nozzles, positioned at or just below the crop canopy, will have less downwind drift compared to a standard broadcast boom. Field studies were conducted across three states. Three sites ran the trial in cotton; Lubbock, TX, Altus, OK, and Portageville, MO, and two sites ran the trial in soybeans; College Station, TX, and Portageville, MO. The field trials consisted of two treatments: broadcast boom application and modified post-direct drop nozzle boom application, using a split-plot design. To collect the drift deposition, mylar sheets were placed horizontally at the height of the surrounding crop canopy along three transects at 30 m upwind, and 3, 5, 10, 20, 30, 40, and 50 m downwind. The target droplet size was ultra-coarse, and target crop heights were between 30 cm and 51 cm. A 1,3, 6, 8-pyrenetetrasulfonic acid, tetrasodium salt (PTSA) dye with a water carrier was used to trace the movement of the spray drift from the application to the intended target. A PTSA dye was used instead of an herbicide because it is inexpensive, readily available, easy to implement at multiple locations, and highly detectable through fluorometric analysis. Results from the first year of this study indicate that the usage of drop nozzles reduced downwind drift, particularly at the deposition collectors nearest to the spray application. There were no major differences in downwind drift deposition between cotton and soybean sites and environmental conditions varied greatly across all locations attributing to variability in deposition recorded.

Evaluating the Effect of Ground Speed on the Spray Patterns of Boomless Nozzles. T. Duncan[1], J. Byrd[1], K. Broster[1], C. Gregory[1], D. Chesser[1]. [1]Mississippi State University, Starkville, MS, United States.

Boomless nozzles appear to be a useful tool for making broadcast herbicide applications in non-crop areas like pastures, roadsides, and utility rights of way, where the use of a spray boom may be impeded or damaged by obstacles and rough terrain, as they can cover a wide swath without need for a boom. However, this application technology has been stated to perform poorly when compared to more conventional nozzle types and has largely been ignored in spray pattern studies, leaving applicators that are reliant on this technology with limited resources available to improve the performance of their sprayers. Two studies were conducted at Mississippi State University over two years to evaluate the effect of application speed on the spray patterns of four boomless nozzles. An indoor study was conducted at the Mississippi Horse Park during 2022 and 2023, with an outdoor study being conducted at the R.R. Foil Plant Science Research Center. Both studies were a 3 by 4 factorial arrangement of treatments, with nozzle and application speed treated as factors. The nozzles used were the Boominator 1870, Hamilton #10, and Boom Buster 187. All applications were made with a 3-point hitch tractor sprayer equipped with a Hypro roller pump operated at 1.6, 3.2, and 6.4 KPH, with a static total swath taken for comparison. The indoor studies consisted of applying a solution of water and FD&C Blue #1 food dye (Flavors and Color) over six replicate rows of 21.5 × 28 cm sheets of Kromekote (CutCardStock), with sheets placed at 0.3 m intervals in each row out to 0.6 m past the advertised swath of each nozzle. The sheets were then scanned at 600 DPI and analyzed with the USDA Automatic Paper Analysis tool in the DepositScan plug-in for ImageJ (Version 1.38X) to measure coverage. Coverage data were then used to develop deposition curves and measure the total and effective swaths of each nozzle at each speed. The outdoor studies were applied in the same manner, but with MSMA added to the dye solution at 10.5% v/v and applied over a stand of mixed grass and clover species. Applications were made August 8, 2022, and August 18, 2023. Treated swaths were measured immediately after applications based on visual detection of dye, and effective swath measured 3 days after treatment based on injured foliage. Data were analyzed with RStudio (Version 2023.12.0), using ANOVA with means separated by Fisher's Protected LSD ($\alpha = 0.05$). Nozzles were first evaluated individually for the effect of speed as each nozzle is designed to produce a different swath width, then evaluated together based on effective swath expressed as a ratio to static swath measurements. While spray patterns varied between each year, similar trends were observed. Both effective and total swath measurements tended to decrease as speed increased in both studies, but the impact on the effective swath of the Boom Buster 187 appeared to be less drastic than with other nozzles. This suggests that higher application speeds can distort the spray patterns of some boomless nozzles.

Influence of Rainfall Timing on the Efficacy of Hexazinone and Quinclorac for the Control of Knotroot Foxtail [*Setaria parviflora* (Poir.) Kerguélen]. T. Akanbi[1], F. Davis[1], D. Russell[1]. [1]Auburn University, Auburn, AL, United States.

Knotroot foxtail is a perennial grass found in pastures across the Southeastern US. For grazing livestock, young plants maintain desirable forage and grazing potential, however, prolific seed production and poor forage quality at maturity underscores this species' weedy nature. Herbicide active ingredients hexazinone and quinclorac have shown efficacy in controlling this weed, but their performance is influenced by soil moisture and rainfall activation. Knowledge of proper application before rainfall is essential for maximizing control and to manage for desirable forage species such as bermudagrass, bahiagrass, and tall fescue. Therefore, research was conducted in a controlled greenhouse in 2023 and 2024 at Auburn University to evaluate the response of knotroot foxtail to these herbicides under varied rainfall timings. Knotroot foxtail rhizomes were transplanted into pots and allowed to grow until foliage reached an average height of 28 cm before being treated with 0.42 kg ae ha^{-1} quinclorac and 0.85 kg ai ha^{-1} hexazinone. Overhead irrigation was calibrated to simulate 0.63 cm (0.25 in) of rainfall 0, 3, 6, 9, 12, and 15 days after herbicide treatment. Injury was visually estimated at 7, 14, and 51 days after each rainfall timing and dry weight biomass of rhizomes were recorded at 51 DAT. Statistical analysis was performed using R Studio (version 2023.03.0). Data were analyzed using ANOVA and the means were separated using Tukey's HSD test. In 2023 and 2024, herbicide selection was a significant factor affecting rhizome biomass of knotroot foxtail. In both 2023 and 2024, plants treated with hexazinone had lower rhizome dry weights (1.88 g at 51 DAT and 1.85 g at 88 DAT) compared to those treated with quinclorac (3.24 g and 2.33 g, respectively). Across both years, hexazinone consistently caused higher plant injury compared to quinclorac, with injury levels of 92.5% and 81.6% at 51 DAT in 2023, and 91.2% and 82.5% at 51 DAT in 2024, respectively. In 2023, the impact of irrigation timing on knotroot foxtail varied with respect to injury, and no significant differences were observed at 51 DAT for herbicide treatments, as potential drought or transplant stress affected the plant responses. In 2024, plants were established under optimal conditions, with each pot maintained at consistent soil moisture levels at field capacity. As a result, a significant interaction between rainfall timing and herbicide treatment was observed for knotroot foxtail injury at 51 DAT. For hexazinone and quinclorac, knotroot foxtail injury ranged from 98–100% when rainfall occurred within 0–9 days of application but declined significantly to 65.3–78.1% with rainfall delayed till 12–15 days. Early rainfall (0–6 days) ensured optimal herbicide efficacy, while late rainfall (12–15 days) reduced their effectiveness. Planning herbicide application with the knowledge of when rain is expected is crucial to ensure the activation of these herbicides to maximize herbicide performance and prevent poor weed control from delayed rainfall.

Integrated Weed Management Tactics in Organic Cotton in the Texas High Plains. M. Singletary[1], P. Dotray[2], K. Lewis[2], J. Burke[3], M. Bagavathiannan[4], M. Woolard[1], B. Rodriguez[3]. [1]Texas Tech University, Lubbock, TX, United States. [2]Texas A&M AgriLife Research and Extension Service, Texas Tech University, Lubbock, TX, United States. [3]Texas A&M AgriLife Research and Extension Service, Lubbock, TX, United States. [4]Texas A&M University, College Station, TX, United States.

Mechanical cultivation is a common and essential practice for organic cotton producers in their quest to minimize the presence of weeds. Although effective at suppressing weeds, intensive and frequent tillage can negatively impact soil health. A field study was conducted in 2024 at the Texas A&M AgriLife Research and Extension Center in Lubbock, TX to evaluate the effectiveness of reduced tillage programs on weed management and their impact on soil health. Treatments consisted of different cultivation programs ranging from three to seven events. A cereal rye plus hairy vetch cover crop mix (45 kg ha^{-1}) was established the previous winter in some of the programs that was terminated six days prior to cotton planting. No cover was evaluated in two of the programs to simulate a failed cover crop establishment. Unfortunately, this is common for producers in semi-arid Texas High Plains region with limited irrigation. All programs received in-season inter-row cultivation with one program exception, which utilized inter- and intra-row cultivation with a finger weeder. Weed densities from the three most predominant weed species (*Bassia scoparia* (L.) A.J. Scott, Salsola tragus L., and Amaranthus palmeri S. Wats.) were recorded prior to and after each tillage event, and weed biomass was collected at harvest. Thirteen days prior to cover crop termination, weed density ranged 6,616 to 8,858 plants ha^{-1} and 9,569 to 9,897 plants ha^{-1} from treatments with and without cover crops, respectively. After cover crop termination and prior to cotton planting, weed densities were least in the program where hand hoeing was practiced for preplant weed control (620 plants ha^{-1}) compared to mowing weeds followed by a bed preparation in another program (4,338 plants ha^{-1}), strip-tillage (3,099 plants ha^{-1}), and bed preparation rollers only in two programs (3,208 and 4,302 plants ha^{-1}). Weed density did not vary among treatments from 21 to 110 days after planting (DAP). Weed biomass within the cotton row (940 to 1,825 kg ha^{-1}) and furrow (343 to 493 kg ha^{-1}) did not vary between the five cultivated treatments. Cotton seed yield was greatest from treatments receiving intra-row cultivation (1,123 kg ha^{-1}) compared to treatments that only received inter-row cultivation (475 to 621 kg ha^{-1}). Fiber properties (micronaire, length, strength, uniformity, and leaf) were tested using a high volume instrument machine, of which fiber length ($P = 0.0013$) and leaf grade ($P = 0.0311$) were influenced by cultivation frequency. Results from year one of this study suggest weed densities can become unmanageable in an organic system if not properly controlled within the first couple of days post-planting. Future research is needed to assess weed control options for organic cotton producers practicing reduced tillage.

Evaluation of Tetflupyrolimet (Dodhylex™ Active) for Control of Herbicide-Resistant Poa annua and Quinclorac-Resistant Smooth Crabgrass. J. McCurdy[1], A. Wilber[1], K. Hutto[2]. [1]Mississippi State University, Starkville, MS, United States. [2]FMC, Philadelphia, PA, United States.

Dodhylex™ Active (tetflupyrolimet, FMC numbered compound TVE29) is a novel mode of action herbicide (HRAC Group 28) belonging to the aryl pyrrolidinone anilide class. It interferes with de novo pyrimidine biosynthesis by inhibiting the dihydroorotate dehydrogenase enzyme (DHODH). Primarily formulated for warm-season turfgrasses (with the exception of kikuyugrass), TVE29 also shows potential for use in tall fescue. Symptomology in treated turfgrasses is largely absent, with minimal visible effects other than plant growth regulation of targeted weeds. Trials were conducted at Lion Hills Golf Course in Columbus, MS, from fall to spring of 2021, 2022, and 2023 to evaluate the efficacy of TVE29 for control of a multiple-herbicide-resistant Poa annua population. TVE29 was applied alone at rates of 200–400 g ai ha^{-1} and in combination with other preemergence herbicides at varying rates and timings. Additional evaluations for control of quinclorac-resistant smooth crabgrass (*Digitaria sanguinalis*) were conducted at the Mississippi State University R.R. Foil Plant Science Research Center near Starkville, MS, from spring to summer of 2022 and 2023. Results demonstrated TVE29's utility in managing resistant Poa annua, with April control ranging from 50% to 80%, depending on rate, and performing comparably to commercial standards, including indaziflam alone or in combination with simazine and various ALS-inhibiting herbicides. Smooth crabgrass control was also comparable to industry-standard prodiamine. TVE29 effectively controls Poa annua and smooth crabgrass when applied preemergence and early postemergence. Post-application irrigation appears crucial for initial activation, presenting an important area for further research, along with formulation effects and tank-mix combinations.

Plant Sterols: A Broad-Spectrum Potential Pre-Emergent Non-Toxic Herbicide. K. Kumar[1]. [1]Griffing Biologics LLC, Texas, and Texas A&M University, College Station, TX, United States.

The unanticipated off-target effects of synthetic herbicides have suggested the urgent requirement for eco-friendly alternatives in both agriculture and home gardening. As awareness grows about the environmental and health impacts of chemically synthetic herbicides, plant-derived natural inhibitors present a promising solution for sustainable weed management. Utilizing plant-derived natural compounds can effectively suppress weed emergence while minimizing harm to human health and the ecosystems. Plant sterols (PS) are important constituents of cell membrane and biogenic precursor of the compounds which are essential for the growth and development. In the study of PS potential herbicidal activity, we explored its biosynthetic pathway, metabolism and genes that regulates these processes. To explore this strategy, we have focused on a natural (non-synthetic) way to change the metabolism and balance of plant sterols in the newly-germinating weed seed. Our model is that these sterols are important for weed emergence because mutants of the sterol biosynthetic pathway such as fackel, hydra1, smt1, smt2 and cvp1 in model plant systems such as Arabidopsis and tobacco have severe dwarfing phenotype and altered vascular development. The natural inhibitors of sterol metabolism that we have chosen are the sterols themselves. We have found that sterols exert an end-product inhibition of sterol content in plants when applied with an encapsulation agent that solubilizes the sterol and allows it to enter the plant. The encapsulation agent is a cyclodextrin in a formulation that has a specific molar ratio to sterol. Exogenous application of certain plant sterols in cyclodextrin leads to a reduction in endogenous sterols in plants and mimics the phenotype of sterol mutants. Our findings support the model that sterols are important for weed emergence because exogenous sterol application reduces root growth in the newly emerged seed and ultimately the total biomass. Greenhouse trials have shown a significant suppression of emergence of ragweed (*Ambrosia* spp.), large crabgrass (*Digitaria sanguinalis*), green foxtail (*Setaria viridis*), lambsquarters (*Chenopodium album*) and barnyardgrass (*Echinochloa* spp.). Overall, focusing on the sterol biosynthetic pathway provides a promising avenue for developing eco-friendly herbicides that can suppress weed emergence without harming beneficial plants or the environment. This approach aligns well with the growing emphasis on sustainable agricultural practices. To further evaluate this non-synthetic pre-emergent herbicide with a novel mode of action (MOA), greenhouse tests are continuing, and field tests are being planned.

Using Squash and Green Beans as Bioindicators for Aminopyralid Herbicide Carryover in Soil. C. E. Smith III[1], H. Carol Lindell[1], M. C. Bocz[1], H. Ahlawat[1], T. Coolong[1], K. Cassity-Duffey[1], N. Basinger[1]. [1]University of Georgia, Athens, GA, United States.

Aminopyralid, a synthetic auxin herbicide commonly used to control broadleaf weeds in pasturelands, is known for its persistence in soil, hay, and manure, which can lead to herbicide carryover and injury to sensitive crops, particularly broadleaf vegetables. This study evaluates the effectiveness of using green beans (*Phaseolus vulgaris*) and squash (*Cucurbita moschata*) as bioindicators for detecting aminopyralid residues in soil at low detection levels. Green beans and squash were grown in soil spiked with varying concentrations of aminopyralid (0–50 µg ai kg^{-1} of soil) to simulate carryover contamination. Over a 4-week period, plant growth was monitored, and injury symptoms such as epinasty, leaf cupping, crinkling, stretching, chlorosis, and plant death were assessed. Plant height, stem diameter, plant mortality, and biomass were also measured. Green beans were found to be highly sensitive at lower aminopyralid concentrations, showing early injury symptoms and reduced biomass at levels as low as 1 µg ai kg^{-1}. Squash exhibited more stretching at lower concentrations but experienced similar injury and biomass reduction at higher concentrations. The results show a strong correlation between aminopyralid concentration and plant injury ratings, confirming that both green beans and squash are reliable bioindicators of herbicide presence in soil. However, green beans were more sensitive to lower levels of aminopyralid, making them a better option for detecting contamination in real-world scenarios. This research highlights the potential for using these crops as a low-cost alternative to expensive laboratory tests ($150–$250) for aminopyralid detection, offering farmers a practical solution to mitigate crop injury risks.

Impacts of Saline Conditions on Organic Watermelon Production in the Southeastern US. J. Bazzle[1], M. Cutulle[2], B. Ward[2]. [1]Clemson University, Clemson, SC, United States. [2]Clemson University, Clemson, SC, United States.

Soil salinization remains a growing threat to vegetable production throughout the world. While each crop has a different level of tolerance for these conditions, even at levels within that tolerance farmers will likely see decreased yields and poor crop health. In addition to the direct relationship between high salinity levels and decreased plant vigor, there is also a possibility that pest species will express different behaviors under these conditions. This project explores both how the watermelon plants themselves react to saline conditions, as well as how this changes their crop-weed relationships. Since nutsedges remain one of the major weed species in Southeastern watermelon production, especially in plasticulture systems, yellow nutsedge (*Cyperus esculentus*) was chosen to be included in this research. The research was conducted using the seedless watermelon variety 'Melody' grafted onto two popular rootstock varieties, 'Carnivor' and 'Carolina Strongback', in addition to a grafted and non-grafted control. The experiment was conducted in the field over two years using an incomplete randomized block design, where plants were organized into rows receiving 0%, 10%, 20%, and 30% dilutions of seawater for their irrigation. The trial was conducted using organic techniques, and the seawater was obtained locally and mixed on site. Data from the first year of yellow nutsedge counts suggests that at elevated levels of salinity nutsedge populations can be up to 20% higher in the early season. Meanwhile post-harvest counts varied between seasons, and it was unclear if the salinity treatments had any long-term effects on nutsedge populations. Based on the results of this field trial, it is possible that areas affected by saline intrusion could see changes in yellow nutsedge numbers, but a long-term study would be needed to determine if there is a lasting impact on nutsedge populations. The yield data suggests that the rootstocks used in this trial did not have a significant impact on plant saline tolerance, and all plants had significantly lower production at all salinity levels. More work is needed to produce additional salinity-tolerant watermelon varieties, as those currently available will be unable to keep up with the rising salinity levels caused by a changing climate and intensive farming techniques.

Is Laser Energy Practical for Weed Management in Turfgrass? J. Romero[1], N. Godara[1], S. Askew[1]. [1]Virginia Tech, Blacksburg, VA, United States.

Recent advancements in artificial intelligence and robotics have enabled precise, non-chemical, plant-specific weed control methods, including laser weeding technology. While laser weeding has been applied primarily in specialty crops, no studies have yet evaluated its efficacy in turfgrass settings. Since 2023, Virginia Tech researchers have been investigating the response of bermudagrass, creeping bentgrass, smooth crabgrass, goosegrass, and annual bluegrass to diode laser treatments. The studies found that weed control varied with laser intensities of 3,000 J cm^{-2} and 6,000 J cm^{-2}, but performance improved when 4 mm spaced patterns were implemented compared to 1 or 2 mm patterns. The studies showed that although lasers show promise for turfgrass weed management, treatment speed and maximum treatable weed density may be constrained by the power available in consumer-grade lasers. Given a 10% weed infestation, one hectare of turf could be treated to effectively control weeds at an electrical cost of $107 to power the laser. Unfortunately, the time required for a 10 watt laser to deliver 6,000 J cm^{-2} at a 4 mm line spacing to treat one hectare is 7.6 years, working 24 hours per day. The most successful commercialized weeder is offered by Carbon Robotics and uses an array of 30 150 W CO_2 lasers. This machine can treat 1 ha of 10% weed-infested turf in just under one week, using the patterns elucidated in our research. Thus, the cost to power a laser device is well within the range of market competitors in turfgrass weed management, but the price and associated speed of consumer-grade lasers will likely relegate this technology to niche markets or to uses that supplement other weed management inputs.

How Our Discipline Began. J. Byrd[1], D. Russell[2], C. Gregory[1], K. Broster[1], H. Duncan[1].
[1]Mississippi State University, Mississippi State, MS, United States. [2]Auburn University, Auburn, AL, United States.

According to USDA Miscellaneous Publication 398 compiled by S. C. Stuntz and edited by E. B. Hawks, more than 3,750 agricultural periodicals were published in the United States and Canada in the hundred-year span 1810 to 1910. Frequently, letters submitted by readers to share experiences with crops, fertilizers, crops, tillage, livestock or livestock genetics, farm implements, and other farm experiences, etc. were printed in these periodicals. Occasionally, anecdotal weed control experiences were shared or queries of how to successfully control weeds were printed. In his 1843 address to the Agricultural Society of Newcastle County, Delaware, physician William Darlington expressed his concern of the misidentification of weeds and use of common names. He cited specific examples of the use of the name Herd's grass to identify timothy (*Phleum pratense* L.) in New England, but the same name Herd's grass was used for colonial bentgrass (*Agrostis capillaris* L.) in Pennsylvania and other states. Not only did it cause confusion among farmers, but sparked litigation between seedsmen. He cited other examples of stinking chamomile (*Anthemis cotula* L.) misidentified for oxeye daisy (*Leucanthemum vulgare* Lam.) and Fuller's teasel (*Dipsacus fullonum* L.) misidentified as Canada thistle (*Cirsium arvense* (L.) Scop.). He brought his address to a close with the suggestion that the characters of weeds be studied with the same enthusiasm as other agricultural pursuits and a cooperative attitude exist within the agricultural community to strive toward successful weed control for all. Four years later the first edition of his book *Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or Require the Attention of American Agriculturalists* was printed in which he listed and described 190 species of plants he considered weeds. In 1859, physician George Thurber revised Darlington's book, which included not only a title change to *American Weeds and Useful Plants: Being a Second and Illustrated Edition of Agricultural Botany: An Enumeration and Description of Useful Plants and Weeds, Which Merit the Notice, or Require the Attention of American Agriculturalists*, but included illustrations of several weeds or plant parts. In 1872 physician Ezra Michener, a student of Dr. Darlington, wrote the first book focused on weed management. This document was titled *A Manual of Weeds, or the Weed Exterminator; Being a Description, Botanical and Familiar of a Century of Weeds Injurious to the Farmer, with Practical Suggestions for Their Extermination.* Dr. Michener's stated objective was to provide young intelligent agriculturalists of crops and gardens a document to know which plants were weeds and how to control those plants. Identification has always been the primary foundational principle of pest management disciplines, including weed science.

Exploring Kelvin Combinations for Broadspectrum Weed Control in Warm-Season Turf. S. Hale[1], N. Godara[1], J. Romero[1], B. Corbett[1], S. Askew[1]. [1]Virginia Tech, Blacksburg, VA, United States.

Broadleaf weed control in warm-season turfgrass is estimated to represent 30–40% of the total herbicide market in turfgrass management. While products like Celsius are widely utilized for their effectiveness against broadleaf weeds, there remains a growing demand for herbicides that can simultaneously manage both broadleaf weeds and sedges while ensuring turfgrass safety. In this study, we evaluated combinations of dicamba, sulfosulfuron, and metsulfuron-methyl for broadleaf and sedge control in warm-season turfgrass. This experiment took place at two sites in Blacksburg, VA. One site was infested with false green kyllinga (*Kyllinga gracillima*); the second site contained zoysiagrass (*Zoysia japonica* 'Cavalier') infested with broadleaf plantain (*Plantago major*). Our results showed that the combination of dicamba, sulfosulfuron, and metsulfuron-methyl outperformed other market-leading herbicides for broadleaf plantain and kyllinga control, with reduced turfgrass injury. The combination of dicamba and metsulfuron alone had consistently poor control of broadleaf plantain and kyllinga, and slightly higher turfgrass injury. These findings indicate that the dicamba, sulfosulfuron, and metsulfuron-methyl combination could address the need for improved broadleaf weed and sedge management in warm-season turfgrass.

Development of Convintro™ Brand Herbicides for Managing Amaranthus Species in Corn and Soybean: Field Performance Update. J. Gander[1], K. Price[1], C. Coburn[1], R. Leitz[1], Z. Miao[1], E. Scholting[1]. [1]Bayer Crop Science, St. Louis, MO, United States.

The continued development and spread of herbicide resistance constitutes a major threat to corn and soybean producers. Weeds such as some Amaranthus species have developed resistance to multiple herbicide modes and sites of action and are among the most challenging broadleaf weeds to control. Bayer Crop Science is developing a herbicide technology that features diflufenican, an active ingredient that is a new site of action for control of Amaranthus spp. in corn and soybean production systems in North America, pending EPA approval. Given the increasing challenge of managing herbicide-resistant weeds, diflufenican is being evaluated in field trials in North America for residual activity on Amaranthus spp. and crop selectivity in soybean and corn. A preliminary update on diflufenican development will be given featuring performance data from field trials. Pending registration with the U.S. EPA, diflufenican would enable a new weed management tool that should be used in combination with other integrated weed management practices.

Management of Herbicide-Resistant Italian Ryegrass Utilizing Cover Crops and Fall Residual Herbicides. C. McKoin[1], D. Miller[1], P. Jha[1], A. Barfield[1], B. Dhaka[1], G. Bortolon[1]. [1]Louisiana State University AgCenter, Baton Rouge, LA, United States.

Italian ryegrass (*Lolium perenne* ssp. multiflorum) is a winter annual weed species and ranked among the most troublesome grass weeds in wheat, corn, cotton, and soybean in the Southern U.S., including Louisiana. Italian ryegrass biotypes with resistance to four different sites of action (ACCase-inhibitors, pinoxaden/clethodim; EPSPS inhibitor, glyphosate; ALS-inhibitor, nicosulfuron; and PS I inhibitor, paraquat) have been documented in this region. With very limited in-crop herbicide options to control multiple herbicide-resistant Italian ryegrass populations in soybean-based cropping systems, there is an urgent need to develop alternative integrated weed management (IWM) strategies. The objective of this research was to investigate the impact of cover crop in conjunction with fall residual herbicides to manage glyphosate- and ACCase-resistant Italian ryegrass. Field experiments were conducted in 2023–2024 at the LSU AgCenter Northeast Research Station in St. Joseph, Louisiana. The experimental design was a randomized complete block with a factorial arrangement of treatments that included: no cereal rye cover crop vs. cereal rye cover crop planted at 90 kg ha^{-1} on November 9, 2023 (factor A), no fall residual vs. S-metolachlor applied on November 20, 2023 (factor B), and cover crop termination timing in the spring of 2024 at 4 weeks before soybean planting (WBP), 2 WBP, and at soybean planting (factor C) with glufosinate or paraquat. Treatments were replicated four times. The termination timing of cover crop with glufosinate or paraquat and interactions with other factors had no effect on any of the variables measured (% visible control, tiller count, biomass, head count). The interaction of cover crop by fall residual herbicide was significant in controlling Italian ryegrass. Visible control at 67 days after application (DAA; spring 2024) was 40% in cover crop only plots vs. 95% in cover crop + S-metolachlor fall residual plots. Compared to the no-cover-crop and no-fall-residual control plots, Italian ryegrass tiller count in spring of 2024 was reduced by 42% with cover crop only compared with 56% reduction with only S-metolachlor applied in the fall. The combination of the two, however, resulted in 95% reduction in tillers by spring of 2024. Italian ryegrass head count was reduced by 28 and 55% in cover crop only and fall residual only plots, respectively. In contrast, head count was reduced by 92% with the combination of the two treatments. Similarly, the combination of cover crop and fall residual herbicide resulted in 96% reduction in Italian ryegrass biomass by late spring of 2024, irrespective of termination timing of cover crop with glufosinate or paraquat. In conclusion, cereal rye cover crop in conjunction with fall-applied S-metolachlor would be an effective ecological IWM strategy to manage multiple herbicide-resistant Italian ryegrass seedbanks in soybean-based cropping systems. This IWM strategy would also aid in reducing selection pressure on POST herbicides and preserving the utility of existing herbicide tools to manage Italian ryegrass.

Weed Size Impact on Post-Emergent Application Coverage Using See & Spray™ in Soybean.

W. Stutzman[1], T. Avent[2], J. Norsworthy[2], D. Contreras[3], W. Everman[3], M. Zimmer[4], B. Young[4], J. Buck[5], O. Ransenberg[5], L. Steckel[5], M. Houston[6], L. Lazaro[7], W. Patzoldt[7], M. Flessner[1]. [1]Virginia Tech, Blacksburg, VA, United States. [2]University of Arkansas, Fayetteville, AR, United States. [3]North Carolina State University, Raleigh, NC, United States. [4]Purdue University, West Lafayette, IN, United States. [5]University of Tennessee, Knoxville, TN, United States. [6]Stoneville R&D, Stoneville, MS, United States. [7]Blue River Technology, San Diego, CA, United States.

Weed sensing and application technology such as John Deere's See & Spray™ (S&S) operate in dynamic environments and are faced with a multitude of factors to result in effective weed control. Factors such as weed size, weed location in the furrow, nozzle, and spray boom height affect the spray contact with the target weeds, which is the most important factor in weed control. To evaluate these factors with the S&S, a trial was conducted in 5 locations: Blacksburg, Virginia (Virginia Tech); Raleigh, North Carolina (North Carolina State University); West Lafayette, Indiana (Purdue University); Knoxville, Tennessee (University of Tennessee Knoxville); and Fayetteville, Arkansas (University of Arkansas). The trial conducted contained 12 treatments with 4 replications at each location in randomized complete block designs. The treatments consisted of a weedy check, a pre-emergent only check, a weed-free check, and 9 treatment combinations of spray boom heights (25, 51, and 76 cm), application type [broadcast (BC) only and broadcast with S&S], and nozzles (PS3DQ0003, TP6503R4). Sub-plots containing at least 10 weeds and at least 3.048 m were placed in the center row of the plots. All weeds in the subplot were tagged, and data were recorded on weed height, width, and location (furrow or crop row). Applications were made at 12.875 KPH spraying 140 L ha^{-1}. Applications contained blue dye and were recorded whether blue dye was present or not on each tagged weed 30 minutes after application to measure spray contact. Herein, only results of the S&S treatments are reported (N = 2692). Data were analyzed using a generalized binomial logistic regression resulting in a probability curve for spray contact. There were no significant interactions with nozzles. Interactions were detected in boom height and between weed location and weed height. Data were analyzed by boom height and by weed location. Weed height had a significant effect ($P < 0.001$) on regression curves in all cases. In all curves, the probability of hitting the weed exceeded 80% at the smallest tagged weeds (0.635 cm tall). All boom heights had a probability of hitting the weeds >95% by 7.62 cm, and both weed locations had probabilities >95% by 12.7 cm.

Synergizing Cover Crops and Herbicides for Effective Weed Control in Peanut. G. Chahal[1], C. Bonnell[1], A. Price[2], S. Li[1], A. Gamble[1]. [1]Auburn University, Auburn, AL, United States. [2]USDA-ARS, Auburn, AL, United States.

As peanut is a cash crop with low canopy and a long growing period, weed control becomes crucial from the early stage. To figure out a sustainable way to control weed and maintain crop yield, a field study replicated in Alabama three times, once during the summer of 2023 and at two locations during this past summer, aimed to evaluate the combined effect of cover crop residue and herbicides for weed control and its effect on the yield of peanut. The experiment was conducted in split-plot design with main plots being six cover crop treatments: cereal rye, wheat, radish, mixture, disk + cultivator, and winter fallow. The subplots were four herbicide treatments: 1) preemergence (PRE) herbicide included flumioxazin + diclosulam, 2) postemergence (POST) herbicide included ammonium salt of imazapic, 3) PRE followed by POST, and 4) a non-treated check. We found that four weeks after planting (WAP) cover crops achieved 5–43% weed control, with cereal rye being the most effective at 43%. At eight WAP, PRE plus POST herbicide applications had provided adequate weed control of 69–93% as per visual weed control ratings, while there was no overall effect of cover crops and their interaction with herbicide on weed biomass. However, no significant effect of cover crops and their interaction with herbicide on yield was observed. Moreover, plots treated with both PRE plus POST herbicides had higher yields than all other treatments. In conclusion, integrating herbicides, along with the incorporation of cover crops, such as cereal rye, is an effective weed management approach to control problematic weeds and sustain peanut yield.

Evaluation of Different Herbicide Programs Incorporating Topramezone and Liberty ULTRA POST in Axant™ Flex Cotton. M. Woolard[1], P. Dotray[2], A. Hixson[3], B. Guice[4]. [1]Texas Tech University, Lubbock, TX, United States. [2]Texas Tech University, Texas A&M AgriLife Research and Extension Service, Lubbock, TX, United States. [3]BASF, Lubbock, TX, United States. [4]BASF, Winnsboro, LA, United States.

Cotton (*Gossypium hirsutum* L.) producers continue to face the problem of controlling problematic weeds such as Palmer amaranth [Amaranthus palmeri (S.) Wats]. BASF recently introduced Axant™ Flex Cotton, the first quadruple herbicide-resistant technology, and a new formulation of glufosinate (Liberty® ULTRA), which concentrates the herbicidally active L-isomer. Therefore, a research trial was conducted to evaluate season-long cotton herbicide programs that utilize L-glufosinate and topramezone postemergence (POST). Isoxaflutole at 105 g ai ha^{-1}, fluometuron at 1,120 g ai ha^{-1}, acetochlor at 1,260 g ai ha^{-1}, isoxaflutole at 105 g ai ha^{-1} + fluometuron at 1,120 g ai ha^{-1}, and fluridone at 170 g ai ha^{-1} + fluometuron at 1,120 g ai ha^{-1} were applied preemergence (PRE). Each PRE treatment was followed by topramezone at 25 g ai ha^{-1} and L-glufosinate at 450 g ai ha^{-1} alone or in combination early postemergence (B timing). Isoxaflutole + fluometuron elicited ≤10% crop response at the B timing and provided >95% control of Palmer amaranth. At 14 days after B (DAB), the combination of topramezone + L-glufosinate was the most injurious treatment (>20%) regardless of the PRE treatment, but by 28 DAB, <10% injury was observed. Palmer amaranth control ranged from 65% to 99% 14 DAB, with the addition of topramezone to L-glufosinate only improving control in one PRE treatment when compared to L-glufosinate alone. A similar trend was observed 28 DAB, with the combination of L-glufosinate and topramezone improving Palmer amaranth control in two PRE programs. Overall, WSSA Group 27 herbicides provide cotton producers with an alternative site of action that helps with the control of problematic weeds such as Palmer amaranth.

Evaluation of Axant™ Flex Cotton Systems Utilizing Topramezone. M. Smith[1], T. Baughman[2], J. Dudak[3], B. Guice[4]. [1]Oklahoma State University, Altus, OK, United States. [2]Texas A&M AgriLife Research, Lubbock, TX, United States. [3]Oklahoma State University, Stillwater, OK, United States. [4]BASF, Winnsboro, LA, United States.

Management of troublesome weeds in cotton has been complicated by herbicide resistance and regulatory issues. Several previously effective postemergence herbicide options have limited utility due to these issues. Palmer amaranth (*Amaranthus palmeri*), one of the most troublesome weeds in cotton production, has proven particularly difficult to manage. Axant™ Flex cotton from BASF introduces herbicide tolerance to certain group 27 herbicides [4-hydroxyphenyl-pyruvate dioxygenase (HPPD) enzyme inhibitor] potentially providing another postemergence herbicide option through the use of topramezone. A field study was established at the Southwest Research and Extension Center near Altus, OK during the 2024 cotton growing season. The objectives of this study were to evaluate crop response and weed control following applications of topramezone in Axant™ Flex cotton. Visual crop response and weed control evaluations were made following applications of topramezone. Crop response was highest seven days after application, 13 to 17%, with 36.8 or 49 g ai ha^{-1} of topramezone, 18.4 or 24.6 g ai ha^{-1} of topramezone plus 1,260 g ai ha^{-1} of glyphosate, and 24.6 g ai ha^{-1} of topramezone plus 447 g ai ha^{-1} of glufosinate. Palmer amaranth control 14 days after application was greater than 93% with topramezone alone at 18.4, 24.6, 36.8, or 49 g ai ha^{-1}, 18.4 or 24.6 g ai ha^{-1} of topramezone tank-mixed with 1,260 g ai ha^{-1} of glyphosate or tank-mixed with 447 g ai ha^{-1} of glufosinate, and with 447 g ai ha^{-1} of glufosinate alone. In an uncertain environment concerning effective postemergence herbicide options in cotton, the use of topramezone may be an effective tool for managing weeds in an Axant™ Flex cotton system.

Biochar–Herbicide Interactions Governing Control of Palmer Amaranth and Crowfoot Grass in the Light-Textured Soil of Alabama. R. Ghosh[1], N. Purohit[1], A. Price[2], S. Prior[3], A. Maity[1]. [1]Auburn University, Auburn, AL, United States. [2]USDA-ARS National Soil Dynamics Laboratory, Auburn, AL, United States. [3]USDA-ARS National Soil Dynamics Laboratory, Auburn, AL, United States.

The use of biochar as a soil amendment has garnered significant attention due to its potential to enhance various soil properties. However, the adsorption capacity of biochar may influence the weed control efficiency of pre-emergent herbicides applied to the soil. Therefore, understanding the interactions between biochar and herbicides is crucial for effectively controlling Palmer amaranth and crowfoot grass in the light-textured soils of Alabama.

Confirmation of Glyphosate Resistance in Annual Bluegrass via EPSPS Duplication in a Soybean and Rice Rotation. S. Sudhakar[1], J. Norsworthy[1], T. Avent[1], F. Gonzalez Torralva[2], S. McElroy[3], T. Butts[4]. [1]University of Arkansas, Fayetteville, AR, United States. [2]Texas A&M University, College Station, TX, United States. [3]Auburn University, Auburn, AL, United States. [4]Purdue University, West Lafayette, IN, United States.

Annual bluegrass (*Poa annua* L.) populations have exhibited resistance to several herbicides in turfgrass systems within the United States. However, no documented cases of resistance have been confirmed from agricultural fields. Recently, glyphosate was observed to be ineffective in controlling a P. annua population within a soybean [*Glycine max* (L.) Merr.] and rice (*Oryza sativa* L.) rotational system in Poinsett County, Arkansas. To investigate potential resistance to glyphosate, the sensitivity of a putatively resistant population (R1) was compared with two susceptible populations (S1 and S2). The susceptible populations were obtained from Alabama bermudagrass settings. The dose-response experiments revealed that R1 required 1,038 g ae ha^{-1} of glyphosate to achieve 50% biomass reduction compared to 148.2 g and 145.5 g ae ha^{-1} for S1 and S2, respectively, suggesting approximately seven-fold resistance index (RI). Real-time polymerase chain reaction results showed at least a 15-fold increase in EPSPS gene copy number and elevated gene expression in R1. Further, no mutations were detected in the 102 and 106 positions of the EPSPS sequence. Gene duplication was identified as a potential mechanism of resistance in R1. These findings provide the first evidence of confirmed glyphosate resistance in P. annua within an agronomic crop setting in the United States, underscoring the importance of implementing integrated weed management programs to reduce the evolution and spread of herbicide-resistant genes.

Common Ragweed (*Ambrosia artemisiifolia*) and Italian Ryegrass (*Lolium perenne* ssp. multiflorum) Density Following the Use of a Redekop Seed Control Unit. E. Russell[1], W. Greene[1], K. Bamber[1], M. Spoth[1], M. Flessner[1]. [1]Virginia Tech, Blacksburg, VA, United States.

Seed impact mills are machines that are mounted directly to the back of a combine and are one way to implement harvest weed seed control (HWSC). Seed impact mills kill weed seeds during harvest, preventing seeds from being added to the soil seedbank. Previous research has indicated that seed impact mills have high seed kill rates (>90%) for problematic weeds in soybean and wheat. While these mills are effective, there are many ways that seeds could bypass the seed impact mill, such as shattering and seed loss at the header during harvest, which could reduce the effectiveness of these mills. In the field, tracking weed density in the following seasons after harvest could indicate overall effectiveness of using a seed impact mill. The purpose of this experiment was to track emergence of common ragweed (*Ambrosia artemisiifolia*) and Italian ryegrass (*Lolium perenne* ssp. multiflorum) in soybean and wheat fields, respectively, after harvesting with a seed impact mill. Seven soybean fields and four wheat fields in commercial production were tracked for A. artemisiifolia and L. perenne ssp. multiflorum density, respectively. For testing, each field was divided into two sections: with and without the use of the seed impact mill. Weed emergence was recorded in the following seasons. Density reductions for *A. artemisiifolia* after one year of HWSC were 26% and 77% at the postemergence herbicide and harvest timings, respectively. There was also a 99% reduction after two harvests with HWSC, but a single HWSC harvest followed by a conventional harvest resulted in a 330% increase. The density reduction of L. perenne ssp. multiflorum after one harvest was 48%. These data indicate that seed impact mills can be an effective tool for reducing inputs into soil seedbank and weed densities in following seasons in systems under commercial production.

Is Glufosinate Resistance in Palmer Amaranth Spreading in Mississippi County, Arkansas? P. Carvalho-Moore[1], J. Norsworthy[1], A. Porri[2], C. Dos Santos[3], T. Barber[4], S. Sudhakar[1], I. Meiners[5], J. Lerchl[2]. [1]University of Arkansas System Division of Agriculture, Fayetteville, AR, United States. [2]BASF SE, Ludwigshafen, Germany. [3]Iowa State University, Ames, IA, United States. [4]University of Arkansas System Division of Agriculture, Lonoke, AR, United States. [5]BASF, Research Triangle Park, NC, United States.

Glufosinate is a foundational herbicide for postemergence control of glyphosate-resistant weeds in soybean systems across the USA. Glufosinate resistance was confirmed in three Palmer amaranth accessions in Arkansas, and it is paramount to evaluate the distribution of resistance. Therefore, this study aimed to collect Palmer amaranth accessions located around accession Glu-R (highly glufosinate-resistant) to analyze the mortality relationship with distance and direction relative to the initial point of resistance. Additionally, the amplification of the chloroplastic glutamine synthetase isoforms (GS2.1 and GS2.2) were quantified in selected accessions. In 2023, a total of 66 Palmer amaranth samples were collected within a 15-km radius from the initial collection site for Glu-R (referred to as the origin point). Following threshing, glufosinate screening was performed using 590 g ai ha^{-1}. Plant tissues were collected from survivors, and gene copy number assays were conducted with accessions showing less than 95% mortality. Most Palmer amaranth accessions collected around the origin point had mortality ≥ 80% (51 out of 66 samples) with a labeled rate of glufosinate under greenhouse conditions. Nonetheless, a few accessions showed low mortality rates, with values as low as 35%. The GS2.1 and GS2.2 copy numbers varied among accessions. Overall, there was no correlation between mortality and the number of GS2.1 ($r = -0.0402$) or GS2.2 ($r = 0.2335$) copies. The model provided no evidence that the distance between samples and the origin point impacted mortality or gene copy number. There is strong evidence that direction, relative to the origin point, affected both mortality and GS2.1 copies. Samples collected north from the origin point showed lower mortality rates (83%) with a higher number of GS2.1 copies (2.3). For comparison, average mortality ranged from 90% to 95% and GS2.1 copy number ranged from 1 to 1.2 in the other directions. Palmer amaranth accessions less susceptible to glufosinate are found in various locations in Mississippi County, Arkansas, and mitigation strategies will need to be implemented.

Determining Energy Requirements for Weed Seed Mortality with Mid-Infrared Radiation. R. Hamberg[1], S. Chu[1], M. Bagavathiannan[1]. [1]Department of Soil and Crop Sciences, Texas A&M University, College Station, TX, United States.

Mid-infrared (MIR; wavelength ≈ 3,200 nanometers) radiation may be a valuable non-chemical weed seed control option. However, no published research has investigated the response of weed seeds to MIR. This study aimed to determine the MIR thermal energy (joules cm^{-2}) required to reduce the viability of common lambsquarters (*Chenopodium album*), hemp sesbania (*Sesbania herbacea*), Italian ryegrass (*Lolium multiflorum*), and barnyardgrass (*Echinochloa crus-galli*) seeds. Individual Petri dishes containing 15 to 30 (depending on seed size) dry weed seeds were subjected to 12 MIR energy treatments (0 to 209 joules cm^{-2}) and placed in a seed incubator for 14 days. Germination was counted seven and 14 days after treatment, with a subsequent tetrazolium test conducted on any ungerminated seeds to determine seed viability. The experiment was arranged in a completely randomized design with four replications per species and energy level combination. A three-parameter Weibull-1 function was fit to determine the energy required to reduce population-level seed viability by 50% (ED_{50}) and 90% (ED_{90}). Large-seeded species required the most thermal energy to reduce viability, with ivyleaf morningglory and barnyardgrass requiring 46 and 56 joules cm^{-2}, respectively, for a 90% reduction. Italian ryegrass required 12 and 25 joules cm^{-2} of thermal energy for 50 and 90% viability reduction, respectively. Common lambsquarters seed was the most sensitive to thermal energy, with an ED_{90} value of 18 joules cm^{-2}. The results showcase the potential for using MIR to reduce the seed viability of some troublesome weed species, when integrated as a component of a harvest weed seed control strategy. Further research will test additional weed species and examine how MIR may fit into an integrated weed management program.

Effect of Rainfall Timing on Herbicide-Coated Fertilizer Efficacy. B. Dean[1], C. Cahoon[1], Z. Taylor[1], H. Lee[1], C. Roberts[1]. [1]North Carolina State University, Raleigh, NC, United States.

In recent years, residual herbicide-coated fertilizer has gained interest across many agricultural production systems. Among the few residual herbicides registered to be applied coated on fertilizer, pyroxasulfone and pendimethalin are two of the most commonly used. Although the efficacy of pyroxasulfone- and pendimethalin-coated fertilizer has been extensively studied, the effect of rainfall timing on these herbicides when applied coated on fertilizer compared to liquid broadcast application remains unstudied. To address this, a greenhouse study was conducted in 2024 at North Carolina State University. The treatment structure was a 2 × 2 × 5 factorial arranged in a randomized complete block design with five replications and two runs. Treatment factors included two herbicides: pyroxasulfone (118 g ai ha^{-1}) and pendimethalin (1,065 g ai ha^{-1}); two application methods: coated fertilizer or liquid broadcast; and five activating rainfall timings: 0 days after application (DAA), and 1, 2, 3, and 4 weeks after application (WAA). At each rainfall timing, 1.9 cm of rainfall was delivered in 0.6 cm increments to prevent flooding. After application, all pots were sub-irrigated to prevent herbicide leaching. Each herbicide was coated on granular ammonium sulfate (AMS) fertilizer and top-dressed at 280 kg ha^{-1} using a plastic container with 4 mm holes in the lid. Liquid broadcast applications were applied using a CO_2-pressurized backpack sprayer calibrated to deliver 140 L ha^{-1}, using AIXR 11002 nozzles. Herbicide-coated fertilizer treatments were compared to a check that received the equivalent rate of non-herbicide treated AMS (280 kg ha^{-1}), while liquid broadcast applications were compared to a completely non-treated check. Applications were made to 20 cm pots filled with a loamy sand soil containing 1% humic matter and pH 6.0. Each pot was planted with 30 Palmer amaranth (*Amaranthus palmeri* S. Watson) seeds then lightly dusted with soil. Preliminary germination tests estimated 70% germinability. Prior to treatment applications, all potting soil was kept dry to prevent premature seed germination. To replicate a field scenario, all pots for each treatment were randomized within a 28 m^2 area, with each treatment evenly distributed across the entire area. For data collection, emerged Palmer amaranth plants were counted 7, 14, 21, and 28 days after treatment (DAT). At 21 DAT, pyroxasulfone was more effective than pendimethalin, resulting in 74% and 56% fewer plants compared to the check, respectively. Each herbicide applied coated on granular AMS (74%) was more efficacious than when applied as a liquid broadcast application (55%). Averaged over herbicides and application methods, plant density reduction was less when treatments received activating rainfall 4 WAA (40%) compared to 0 (73%), 1 (79%), and 2 (69%) WAA. There was no evidence that herbicide-coated fertilizer improved density reduction when rainfall was delayed compared to liquid broadcast applications.

Development of a Threshold Model for Real-Time Weed Detection and Herbicide Application in Turfgrass. S. Kreinberg[1], J. Davis[2], M. Richardson[1], H. Wright-Smith[3], W. Hutchens[1]. [1]University of Arkansas, Fayetteville, AR, United States. [2]University of Arkansas, Batesville, AR, United States. [3]University of Arkansas, Little Rock, AR, United States.

Weed control in turfgrass is a continuous challenge for turfgrass managers. The development of weeds in turfgrass systems leads to reduced aesthetics, playability, and safety. Many turfgrass managers rely on the use of herbicides to provide weed control. While herbicide application is an effective method of eradicating weeds, there is often a negative stigma placed on herbicides due to their potential deleterious effects on the environment. Herbicide regulation and costs have also increased in recent years; therefore, the turfgrass community must develop ways to limit their herbicide usage while optimizing weed control. The goal of this study is to identify spray application methods that utilize less herbicide and achieve similar weed control. In this study, a pixel threshold model was developed that uses RGB imagery to spray based on a difference in color threshold. The sprayer consists of a one-meter-wide boom with three nozzles controlled by solenoids, which are influenced by a USB IMX415 camera collecting webcam footage. An NVIDIA Jetson Nano computer with a Python script utilizing the Dark Green Color Index (DGCI) relays the information to the solenoids. Early results show that a DGCI threshold of 205 can identify winter annual weeds of dormant bermudagrass (*Cynodon* spp.) and trigger individual solenoids upon weed detection in real time. An ongoing experiment on dormant bermudagrass at five centimeters tall compared different methods including a backpack sprayer for spot-spraying, a broadcast application, and the DGCI system for weed control. The DGCI system accurately sprayed winter annual weeds with moderately high accuracy, while utilizing 63.6% less product than a broadcast application.

Optimizing Weed Control Programs in Soybean Utilizing See & Spray™ Technology. S. Baker Holley[1], L. Avila[1], D. Dodds[1], A. A. Tavares[1], L. Rector[1], N. Cordero[1]. [1]Mississippi State University, Mississippi State, MS, United States.

Efficacy of Dodhylex™ Active (Tetflupyrolimet) for Annual Bluegrass Control in Virginia Turf. S. Askew[1], K. Hutto[2]. [1]Virginia Tech, Blacksburg, VA, United States. [2]FMC, Newark, DE, United States.

Tetflupyrolimet, marketed under the brand Dodhylex™, represents a novel herbicide within the aryl pyrrolidinone anilide class, targeting pyrimidine biosynthesis through the inhibition of dihydroorotate dehydrogenase. This herbicide introduces one of the few new modes of action seen in recent years, offering a promising solution to combat the escalating issue of herbicide resistance among key weed species. In turfgrass management, Dodhylex™ stands out as a potential new tool for controlling annual grassy weeds, specifically annual bluegrass in bermudagrass turf. Studies conducted in Blacksburg, VA, over three consecutive years (2021 to 2023) examined the effectiveness of Dodhylex™ for annual bluegrass control. Initiated each fall, these trials assessed control efficacy during the subsequent spring seasons. Application rates of Dodhylex™ ranged from 300 to 400 g of active ingredient (ai) per hectare, with control outcomes varying annually. Peak effectiveness was observed between 90 and 170 days post-treatment. In 2022 and 2023, Dodhylex™ at 400 g ai ha^{-1} controlled annual bluegrass 88 to 94% and was equivalent to indaziflam at 45 g ai ha^{-1}. Additionally, sustained performance of Dodhylex™ when in mixture with other herbicides such as rimsulfuron and mesotrione suggest the possibility for premixture products with an enhanced weed control spectrum. These results suggest that Dodhylex™ could be a valuable addition to the turfgrass management arsenal, particularly if it proves effective against resistant weed biotypes. The observed control levels in Virginia over the study period indicate that Dodhylex™ holds commercial promise for turfgrass markets, potentially offering a sustainable approach to weed management where resistance to other herbicides has become a challenge.

Making the Southern Weed Contest Replacement Trophy. S. Askew[1]. [1]Virginia Tech, Blacksburg, VA, United States.

The Southern Weed Contest was first held in 1980 at the University of Florida.

In tandem with this inaugural contest, two then-Associate Professors, David Teem and Wayne Currey, commissioned a plaque to serve as a traveling trophy, meant to reside at the university of each year's winning team. One professor ingeniously modified a hoe—commonly identified as a draw hoe or stirrup hoe—by cutting away most of the handle, allowing the head to be mounted on the trophy. This trophy was designed with a plaque where the front displayed the title "Southern Weed Contest," the mounted hoe head, and inscriptions detailing the year and university of the winning teams from 1980 to 2021. The rear of the trophy featured small, engraved plates listing the year and names of the winning team members. This trophy came to be known as the "Broken Hoe Trophy." As space for new winners ran out in 2021, the Southern Weed Science Society (SWSS) board approached Shawn Askew for suggestions on how to adapt the trophy to include future years. Askew's initial idea was to replace the front plate, which listed the winning universities, with a 3-dimensional book design allowing for pages to be turned to display a decade's worth of winners, with five years per page. However, the SWSS board decided to preserve the original trophy and instead auctioned it off, with the University of Arkansas securing it with a $7,000 bid at the 2024 SWSS meeting in San Antonio, TX. This move not only contributed significantly to the SWSS Endowment but also gave Askew the opportunity to design a new trophy. The new trophy maintained the essence of the original with its plaque design featuring a severed hoe. Yet, it incorporated Askew's book concept, an inlay of the SWSS logo made from wood from each state tree in the Southern region, and an inlaid title of black walnut letters within a curly maple frame surrounded by inlaid brass—smelted using brass spray tips from weed science research contributed by various Southern universities. All wood for the trophy was harvested from the Southern region by Shawn Askew, his father Donnie Askew, and John Brewer. The new "Broken Hoe Trophy" was awarded to the 2024 champions, the University of Arkansas, at a contest hosted by Shawn Askew, Michael Flessner, and Jacob Barney at Virginia Tech's Kentland Farm.

Optimization of a Yield Loss Prediction Model Based on Aerial Imagery. A. Goldsmith[1], R. Austin[1], C. Cahoon[1], R. Leon[1]. [1]North Carolina State University, Raleigh, United States

Within row crop agriculture, weeds can have a variable effect on end of season yield depending on their species composition and the crop they are competing with. Through a low cost and efficient weed induced yield loss prediction model, growers can make in season management and financial decisions for their operation. Our study aimed to evaluate the performance of a yield loss model based on aerial imagery derived weed and crop leaf cover ratios in maize (*Zea mays* subsp. *mexicana* (Schrad.) Iltis). Aerial imagery was captured with an unmanned aerial system (UAS) at 15-m and 30-m with RGB + four band multispectral imagery during the 2023 growing season at four locations in North Carolina. Herbicide and planting density treatments were used to generate a variety of crop-weed leaf cover ratios. Initial model performance was poor to moderate but was improved with the development of a correction factor. No differences in model performance based on UAS flight altitude or sensor type was observed. Through further model development and automation, growers may be able to predict their yield relative to a weed free condition, allowing them time and data to make financial and management decisions.

Impact of Blue Light Exposure on Weed Seed Viability. S. Chu[1], S. Kezar[2], S. Zhen[1], M. Bagavathiannan[1]. [1]Texas A&M University, College Station, United States, [2]Cornell University, Ithaca, United States

The use of blue light (320-490 nm) in agriculture, particularly in greenhouse production, has surged in recent years due to its ability to enhance anthocyanins, macronutrients, and micronutrients in plants. Plants perceive blue light through specialized photoreceptors known as phytochromes and cryptochromes. While the effects of blue light on plant growth and development have been extensively studied, its influence on seed germination remains relatively unexplored. Previous research has indicated that continuous exposure to blue light can maintain dormancy in barley and rigid ryegrass seeds. However, the impact of varying blue light intensities and exposure durations on other weed species remains unknown. This study aimed to investigate how blue light affects the germination rates of six common weed species: barnyardgrass, large crabgrass, johnsongrass, Palmer amaranth, hemp sesbania, and morningglory. A controlled environment experiment was conducted using a completely randomized design. Seeds were exposed to five different blue light intensities (435-1,887 µmol m-2 s-1) for seven different exposure durations (5-60 seconds). Germinated seeds were counted and removed every four days for 21 days. At the end of the experiment, the remaining seeds were tested for viability using the tetrazolium embryo staining method. While blue light intensity had minimal effect on seed viability for most species, prolonged exposure (60 seconds) significantly reduced germination in barnyardgrass. Further research is necessary to elucidate the mechanisms underlying blue light's influence on seed germination and viability. Understanding these processes could lead to novel applications of blue light in weed seed management, potentially providing a sustainable and environmentally friendly approach to controlling weed populations.

Investigating the Effects of Preemergence Herbicides on Spring Beauty (*Claytonia virginica*) Growth in Flowering Turfgrass Lawns. N. Minaev[1], J. McCurdy[1], E. de Castro[1]. [1]Mississippi State University, Mississippi State, United States

Urban expansion contributes to pollinator habitat loss and declines. Incorporation of flowering native forbs into turfgrass lawns may benefit insect pollinators. Spring beauty (*Claytonia virginica* L.) is a perennial wildflower native to the southeastern United States. Besides providing foraging habitat, spring beauty flowers make for attractive floral displays in urban lawns. However, the precise methods for integrating spring beauty into turfgrass lawns and the potential impacts of conventional turfgrass management practices, like applying preemergence herbicides, need to be investigated. The objective of the current study is to determine the effects of common preemergence herbicides on spring beauty growth and flowering. Field research was conducted in a randomized complete block design with 2 × 2 m experimental units at Mississippi State University and replicated twice in space. Treatments included an untreated check, preemergence herbicides Scotts® Bonus® S (atrazine; 168 kg ha-1), Bioadvanced® 3-in-1 South W&F (dicamba, penoxsulam, indaziflam; 122 kg ha-1), Scotts® Turf Builder® Halts® Crabgrass Preventer with Lawn Food (pendimethalin; 130 kg ha-1), Barricade® 4FL (prodiamine; 1.75 L ha-1), Specticle® FLO (indaziflam; 0.44 L ha-1), and the treated check Trimec® Classic (2,4-D, dicamba, MCPP; 4.7 L ha-1). At the first site, the products were applied on 6 April, 2022 followed by 15 March, 2023. A second site was initiated on 15 March, 2023; reapplication occurred on 21 March, 2024. Percentage plant density reduction and number of flowers present were assessed visually throughout the blooming period over two growing seasons. Data were subjected to analysis of variance ($\alpha = 0.05$) using Student-Newman-Keuls method in SAS (Version 9.4; SAS Institute Inc.) PROC GLM. Preliminary results suggest that 2,4-D + dicamba + MCPP and prodiamine might negatively affect spring beauty emergence compared to untreated check, whereas no other treatment showed any effect. Results might alter as the study is currently in progress.

Impact of Glufosinate on Sugarcane Yield and Yield Components when Applied Post-Directed and its Efficacy in Controlling Emerged Itchgrass (*Rottboellia cochinchinensis*). W. Simon[1], A. Orgeron[1], M. Foster[1], A. Wright[2]. [1]LSU AgCenter, Sugar Research Station, St. Gabriel, LA, United States, [2]USDA-ARS, Sugarcane Research Unit, Houma, LA, United States

Approximately three to four weeks following the layby herbicide application, glufosinate was applied as a post-directed application to the base (bottom 30.5 cm) of ratoon L 01-299 at 0.6 and 0.9 kg ai ha-1, respectively, to evaluate its impact on sugarcane yield and yield components in three locations throughout the Louisiana sugarcane industry in 2023. Glufosinate injury was evaluated 1 week after application and injury to the area of the stalk where the spray was applied was similar to that of the paraquat standard treatment. Both glufosinate and paraquat caused sugarcane leaf chlorosis within the treated area, but the leaves and growing point above the treated area were unaffected. When applied as a post-directed treatment, glufosinate did not negatively impact sugarcane yield and yield components as compared to the untreated check. Additionally, weed management studies conducted in 2024 have shown glufosinate at 0.6 and 0.9 kg ai ha-1 to be an effective option for post-emergence control of 2.5-5.1 cm tall itchgrass (*Rottboellia cochinchinensis*) and averaged > 90% control seven days after treatment.

Evaluating the Efficacy of Anaerobic Soil Disinfestation for Weed Management in Organic Watermelon Production. S. Chattha[1], B. Ward[1], M. Cutulle[1]. [1]Clemson University, Coastal Research and Education Center, Charleston, SC, United States

Weed and disease management in organic watermelon [*Citrullus lanatus* (Thunb.) Matsum. & Nakai] production is challenging. Yellow nutsedge (*Cyperus esculentus* L.) is a problematic weed in watermelon plasticulture production systems. Fusarium wilt caused by *Fusarium oxysporum* f.sp. *niveum* (FON), is a major soil-borne disease and is responsible for significant yield loss in watermelon. Inefficient non-chemical tactics are an impediment to curtail weeds and soil-borne disease in organic watermelon; and require the adaption of an integrated pest management technique. Anaerobic soil disinfestation (ASD) is an emerging preplant non-chemical approach, which requires incorporation of labile organic carbon (C) sources into the soil, followed by tarping the soil with polyethylene plastic mulch, and irrigating the soil to the saturation. Shifts in soil microbial communities, change in soil pH, and production of volatile organic compounds during ASD process are the main mechanisms that are believed to kill soil-borne pathogens and weed seeds. The objectives of this study were to 1) determine whether ASD decreases the emergence of yellow nutsedge, 2) compare the efficacy of locally available C sources, 3) evaluate if ASD affects grafted and non-grafted watermelon yield. A field trial was conducted at Clemson University's Coastal Research and Education Center in Charleston, South Carolina and was repeated in time during the summer/fall of 2023 and 2024. The study was arranged in a randomized complete block design with four replications. Main C sources were subjected to control (CT) with no C, chicken manure + molasses (CMM), and cotton seed meal (CSM). All treatments were assigned as ASD with nongrafted (Powerhouse) and grafted (Carolina strongback) rootstock grafted to scion Powerhouse. Indicators of reduction in soils (IRIS) tubes paint removal (%), yellow nutsedge shoot count, watermelon plant vigor, and crop yield data were recorded. Soil amended with C sources improved anaerobic conditions in the soil and yellow nutsedge control. Higher paint removal (%) in IRIS tubes were recorded in CMM 71%, CSM 66% compared to CT 14%. At the time of watermelon harvest, lower yellow nutsedge count were recorded as 24, 27, and 67 per plot in CMM, CSM and CT, respectively. Greater marketable fruit yield was recorded in nongrafted watermelon when soil treated with CMM and CSM, respectively. Based on weed control, watermelon plant vigor, and yield assessments, using CSM to facilitate ASD is an ideal practice for growing organic watermelon in South Carolina.

Long-term Impact of Integrated Weed Management Practices on Palmer Amaranth in Cotton. C. Ketchum[1], J. Norsworthy[1], T. Barber[1], R. Farr[2], T. Smith[3], T. Avent[1], L. Pierce[1]. [1]University of Arkansas System Division of Agriculture, Fayetteville, United States, [2]Bayer Crop Science, Wellfleet, United States, [3]Simplot Grower Solutions, Shallowater, United States

Integrated weed management strategies are considered a holistic approach to weed management. By combining cultural, mechanical, and chemical control methods, problematic weeds such as Palmer amaranth [*Amaranthus palmeri* (S.) Wats.] can be better controlled. Previous research has shown the effectiveness of deep tillage, cover crops, and zero-tolerance at depleting soil seedbanks and assisting with in-season Palmer amaranth control. To better understand how each strategy impacts weed management in cotton production, a long-term study was initiated in fall of 2018. The study evaluated the factorial combinations of zero tolerance, deep tillage (fall 2018 and fall 2021), a cereal rye cover crop, and a dicamba in-crop herbicide within a conventional glyphosate-glufosinate resistant cotton herbicide program (base program) for seasonal Palmer amaranth emergence, and average lint yield. By the final year, each management component, in isolation, reduced seasonal Palmer amaranth emergence by over 95% compared to the non-inclusive system (base program without any additional components). Due to the high efficacy of the base herbicide program and the significant impact of the individual components, the multicomponent effect was not distinguishable. In the sixth year, under no-crop conditions, the cover crop alone reduced emergence by 70%, whereas all other combinations reduced emergence by at least 89% compared to the non-inclusive system. While zero-tolerance did not affect cotton yield in any given year, the combination of cover crops and dicamba in-crop herbicide produced the greatest 5-year average cotton lint yield (5% more), whereas deep tillage combined with dicamba resulted in a lower yield (6% less) compared to the non-inclusive system and was the only interaction to experience a negative yield effect. Any additional management strategy utilized in conjunction with an effective chemical control program will reduce Palmer amaranth populations, and deplete the soil seedbank, while also predominately not impacting yields.

Integrated Weed Management Using Cover Crop and Herbicide in Alabama Cotton Production Systems. W. Ouedraogo[1], A. Maity[1], A. Ahlersmeyer[1]. [1]Auburn University, Auburn, United States

Integrated weed management is a sustainable approach to controlling weed populations by combining multiple strategies. This presentation examines the use of cereal rye cover crops alongside pre- and post-emergence herbicides in Alabama's cotton production systems. The study evaluates the synergistic effects of these methods on weed suppression, offering insights into sustainable and effective weed management practices.

Surtain™ Herbicide: Introduction of New Residual Premix for Corn Market. S. Bangarwa[1], J. Putman[1], R. Aldridge[2], M. A. Howard[2], H. Ferebee[2], C. Youmans[3], J. Guice[4], L. Newsom[5], D. Findley[1]. [1]BASF Corporation, Research Triangle Park, United States, [2]BASF Corporation, Pine Level, United States, [3]BASF Corporation, Dyersburg, United States, [4]BASF Corporation, Winnsboro, United States, [5]BASF Corporation, Tifton, United States

Surtain™ herbicide is a novel formulation that will be commercially introduced by BASF Corporation in 2025 offering a broad-spectrum residual premix with PRE and POST flexibility in corn. Surtain™ herbicide is a premix of saflufenacil (capsulated) and pyroxasulfone and is labelled for use in field corn grown for grain, seed, or silage. This combination gives Surtain™ herbicide remarkable residual endurance which delivers long-lasting activity on numerous small and large seeded broadleaf weeds and grasses. The combination of group 14 and 15 herbicides in Surtain™ herbicide delivers excellent residual activity on herbicide-resistant weeds, including HPPD-resistant *Amaranthus* spp. Furthermore, Surtain™ herbicide will offer flexibility to corn growers expanding the application window. The unique solid encapsulation technology enables the POST application of PPO chemistry (saflufenacil) in corn with reliable crop safety. Surtain™ herbicide can be applied as Preplant, Preemergence, and Early-Postemergence up to V3 stage of corn. Besides these benefits, Surtain™ herbicide will be a relatively low use rate herbicide (9.2 to 17 fl. oz/A depending on soil texture) with enhanced liquid fertilize compatibility. Surtain™ herbicide obtained Federal and State registrations earlier this year and is expected to be launched by BASF Corporation to the corn market for use in the 2025 season.

Comparison of Single and Sequential Applications of Quizalofop on TamArk™ and Double Team™ Grain Sorghum. W. Herrman[1], J. Norsworthy[1], L. Barber[2], T. Avent[1], P. Carvalho-Moore[1]. [1]University of Arkansas System Division of Agriculture, Fayetteville, AR, United States, [2]University of Arkansas System Division of Agriculture, Newport, AR, United States

The development of herbicide-resistant crops revolutionized weed control. Within the past half-decade, resistance traits have been incorporated into grain sorghum (*Sorghum bicolor* (L.) Moench] production. The Double TeamTM and ArkTamTM traits confer resistance to acetyl-coenzyme A carboxylase-inhibiting herbicides, particularly quizalofop-P-ethyl. In 2024, field research was conducted in Fayetteville, AR, to determine the effects of both single and sequential applications of quizalofop on sorghum hybrids with either resistance trait. A randomized complete block design experiment was established with four replications of four-row plots with either a Double Team or ArkTam hybrid. Quizalofop rates used were 87 g ai ha-1 and 73 g ai ha-1 for the single and sequential applications, respectively. Each single and sequential application was made at the V2, V4, V6, and V8 growth stages, with the subsequent application seven days later. Visible injury ratings were taken one week after the V2 applications and continued weekly until three weeks after the final application, which was applied one week after V8. The greatest injury from the initial application occurred at 1 week after treatment, with < 35% injury to both DoubleTeam and ArkTam sorghum. Sequential applications generally did not increase the risk for crop injury to either technology. The final assessment was taken three weeks after the final sequential application, which was the sequential application made after V8. Statistical differences in injury only existed by hybrid. Double Team displayed significantly higher injury at 3%, whereas ArkTam only displayed 1% injury. Overall, both ArkTam and Double Team grain sorghum have adequate tolerance to quizalofop and initial injury is transient with no differences between technologies. Based on differences in injury from the initial applications made from V2 to V8 growth stages, it is concluded that environmental conditions at application likely play a role in the extent of injury observed the first few weeks following treatment.

Does Preemergence Herbicide Strength Impact See & Spray™ Performance in Cotton? L. Pierce[1], J. Norsworthy[1], T. Avent[1], M. Dodde[1], P. Carvalho-Moore[1], G. Morgan[2]. [1]University of Arkansas System Division of Agriculture, Fayetteville, United States, [2]Cotton Incorporated, Cary, United States

John Deere See & SprayTM is available in three platforms to the public: See and Spray Ultimate, See and Spray Premium, and See & Spray Select. Ultimate is a dual-tank system that broadcasts the residual herbicide while targeted-spraying the postemergence herbicide. Premium is a single-tank system that can make targeted or broadcast sprays. Both sprayers are equipped with five sensitivity settings, applying various levels of herbicide based on the weed sizes and densities. This research aimed to determine if strong or weak cotton preemergence herbicides affect the amount of weed control and postemergence-targeted sprays. In 2024, a fifteen-treatment trial with four replications was conducted at the Northeast Research and Extension Center in Keiser, AR. All the plots were sprayed with a strong or weak preemergence (PRE) on the same day as planting. After emergence, broadcast, Ultimate and Premium applications were made at early postemergence (EPOST), mid-postemergence (MPOST), and late-postemergence (LPOST). These postemergence applications included glyphosate, glufosinate, and S-metolachlor, and were sprayed using various application methods and sensitivity levels. Weed control ratings were collected at all postemergence herbicide applications and 28 days after LPOST (DALPOST). Palmer amaranth (*Amaranthus palmeri*), prickly sida (*Sida spinosa*), and morningglory (*Ipomoea* spp.) control were comparable throughout all herbicide applications until 28 DALPOST. Herbicide savings were affected by the preemergence residual for all postemergence applications, with the strong preemergence decreasing the area sprayed by 4, 15 to 44, and 60 percentage points at the EPOST, MPOST, and LPOST application timings, respectively. However, at the EPOST timing, targeted sprays were applied to >96% of the area due to weed density, indicating little value in the See & Spray at this timing based on the conditions. Overall, See & Spray can provide herbicide savings and similar weed control compared to a broadcast application, and a stronger preemergence reduces the treated area with postemergence applications.

Does Cotton Response to Preemergence Herbicides Differ Between Bollgard® and ThryvOn™ Technologies? J. Malone[1], L. Barber[2], J. Norsworthy[2], B. Thrash[2]. [1]University of Arkansas System Division of Agriculture, Fayetteville, AR, United States, [2]University of Arkansas System Division of Agriculture, Fayetteville, United States

The use of preemergence (PRE) residual herbicides applied at planting is the foundation for a successful weed control program in cotton. However, under unfavorable environmental conditions applications of these residuals can often lead to seedling injury. This injury often aligns with thrips infestations, capable of causing maturity delays and potential stand loss. The objective of this experiment was to evaluate potential interactions between preemergence herbicide injury and thrips damage in ThryvOn™ and non-ThryvOn™ cotton. Research was conducted in 2024 at the Lon Mann Cotton Branch Experiment Station in Marianna, AR. The experiment was designed as a factorial arrangement of treatments with cotton technology, seed treatment, and PRE herbicides as the main factors. Plots were arranged in a randomized design with four replications. Three different PRE herbicide programs were applied to treated and untreated plots of both ThryvOn™ and non-ThryvOn™ cotton seed. Herbicide treatments included 1.12 kg ai/ha fluometuron (Cotoran) applied alone, 1.12 kg ai/ha fluometuron and 0.17 kg ai/ha fluridone (Brake) as a tank-mixture, and 0.56 lb ai/ha dicamba (XtendiMax) applied alone. The seed treatment evaluated was Gaucho at 0.375mg/seed. Necrosis, chlorosis, and thrip damage ratings were taken at 7, 14, 21, and 28 days after treatment (DAT). Node counts and plant heights were also recorded. No interaction was observed between herbicide injury and thrip populations. However, thrip damage and populations varied greatly between ThryvOn™ and non-ThryvOn™ technologies. Thrip damage in ThryvOn™ cotton was significantly lower in comparison to non-ThryvOn™ cotton. The lowest herbicide injury was recorded from an application of XtendiMax, with the highest resulting from a Brake and Cotoran tank-mix at 50% at the 3-4 leaf timing. The results observed in this experiment suggests that there is no increase in injury from PRE herbicides with the increase in thrips damage.

Evaluation of Anaerobic Soil Disinfestation with Different Carbon Sources to Manage Weeds and Nematodes in Sweetpotato. S. Singh[1], C. Khanal[2], B. Ward[1], M. Cutulle[1]. [1]Clemson University, Coastal Research and Education Center, Charleston, United States, [2]Clemson University, Clemson, United States

Yellow nutsedge (*Cyperus esculentus* L.) and Southern root-knot nematode management in organic plasticulture systems is challenging for growers. Yellow nutsedge has a strong midrib and sharp leaf tip, which allows it to puncture plastic mulch and creates favorable conditions for other weeds to grow, compete for resources with crop plants, and decrease crop yield. Lack of available pesticides options in specialty crops make pest management more challenging. Anaerobic soil disinfestation (ASD) is a technique that has shown potential to control weeds and diseases in organic production systems. ASD is facilitated by incorporating carbon sources into the soil, tarping the soil with plastic mulch, and irrigating to the soil saturation. A field study was conducted at Clemson University's Coastal Research and Education Center, Charleston, South Carolina, to evaluate the impact of various carbon sources in ASD on weed and nematode management in organic sweetpotato. The treatment structure for this study consisted of a factorial with four carbon source treatments (cotton seed meal, chicken manure + molasses, brassica waste, and non-amended control) and four sweetpotato cultivars (Bayyou Belle, Muraski, Monaco, and USDA 18-040). These sweetpotato cultivars exhibit two different growth habits, either bunch type (USDA 18-040 and Monaco) or spreading type (Bayyou Belle and Muraski). The primary purpose of using different plant architecture is to evaluate the impact of the sweetpotato vine growth habit on weed emergence. Experimental plots receiving chicken manure + molasses and cotton seed meal as carbon source resulted in the greatest cumulative anaerobic conditions (<200 mvh). Significantly lower individual weed counts of yellow nutsedge were observed in plots containing chicken manure + molasses (5/m-2) and cotton seed meal (10/m-2) as compared to brassica waste (18/m-2) and non-amended control (20/m-2). For individual weed count, no significant differences were observed among different sweetpotato cultivars. Significantly lower SRKN counts were recorded with chicken manure + molasses and cotton seed meal. Compared to the non-amended control, higher marketable sweetpotato yield was recorded with the chicken manure + molasses (33%) and cotton seed meal (23%) treatments.

Seedling Zoysiagrass Response to Fluazifop-butyl and Trifloxysulfuron-methyl with the Safener Metcamifen. D. Nistler[1], H. Wright Smith[1], M. Richardson[2], L. Tredway[3], J. McCalla[4]. [1]University of Arkansas Division of Agriculture Research & Education, Little Rock, United States, [2]University of Arkansas, Fayetteville, United States, [3]Syngenta Group, Greensboro, United States, [4]University of Arkansas Department of Horticulture, Fayetteville, United States

Managing grassy weeds in turfgrass can be challenging. In 2023 a new formulation of trifloxysulfuron-methyl containing the safener metcamifen, Recognition® Herbicide, was commercially available for use in established zoysiagrass. When applied as a mixture, this product safens zoysiagrass from the effects of the graminicide fluazifop-butyl (Fusilade® II Herbicide), allowing for higher application rates of fluazifop-butyl to manage difficult grass weeds such as bermudagrass. Previous research has demonstrated acceptable response following this herbicide mixture applied to established zoysiagrass, however no information is available evaluating seedling zoysiagrass response to these herbicides. Experiments were conducted at the Milo J. Schult Agricultural Research and Extension Center in Fayetteville, AR and the Southwest Research and Extension Center in Hope, AR in 2023 to evaluate seedling zoysiagrass injury from applications of fluazifop-butyl and trifloxysulfuron-methyl with metcamifen applied at two different rates. "Zenith" zoysiagrass was seeded in June and August in Fayetteville and Hope, respectively, with herbicide applications made 2-and 4-weeks after emergence. Similar response was observed from both 2- and 4- week after emergence herbicide application timings. When applied as a mixture to seedling zoysiagrass, treatments of fluazifop-butyl plus trifloxysulfuron-methyl with metcamifen resulted in a maximum of 20% visual injury 1-week after treatment. However, seedling recovery was observed at subsequent ratings with <5% visual injury 4-weeks after treatment. Results indicate trifloxysulfuron-methyl with metcamifen plus fluazifop-butyl can be safely applied to seedling zoysiagrass, providing a much-needed weed management tool during establishment.

Differentiation of Male and Female Plants of Palmer Amaranth (*Amaranthus palmeri*) Using an RGB Sensor and Machine Learning Models: Classification and Detection. B. Anokye[1], U. Torres[1], B. Gurjar[1], N. Singh[1], M. Bagavathiannan[1]. [1]Texas A&M University, COLLEGE STATION, United States

Palmer amaranth (*Amaranthus palmeri*) is a dioecious species with male and female plants resembling each other in appearance. This invasive weed has developed resistance to multiple herbicide modes of action, posing a significant challenge to crop producers. Differentiating between the two sexes allows for sex-specific control strategies to hinder reproductive development and reduce seedbank inputs. This research focuses on developing a recognition algorithm to identify male and female *A. palmeri* in digital images at the reproductive growth stage. Images of male and female *A. palmeri* were captured using a Sony Alpha a7R IVA Mirrorless Digital Camera (height = 3.5m, angles = 90°/65°) during late summer 2023 and spring 2024 at the Texas A&M Research Farm in College Station, Texas. A total of 1,730 images, each sized 1280 x 1280 pixels, were utilized for model training, validation, and testing. The YOLO (You Only Look Once) detection and classification models were employed to develop the recognition algorithm, testing nine different variants from YOLO v5, v8, and v9. Among the models, YOLOv5n achieved the highest precision score of 97%, outperforming YOLOv8m (90%) and YOLOv9-e (86%) for detection. The mean average precision (mAP@[0.5]) further confirmed YOLOv5n's superior performance, with a mAP of 98%, compared to 95% for YOLOv8m and 77% for YOLOv9-e. A high mAP indicates that YOLOv5n provides balanced performance in both precision and recall, ensuring accurate detections. Although YOLOv9-e had the highest recall (99.5%), indicating its effectiveness in identifying most instances of target classes, YOLOv5n's higher precision and mAP make it more suitable for applications requiring high accuracy in sex differentiation. The classification model utilized in this study was YOLOv8, and among its variants, YOLOv8l-cls achieved the highest accuracy of 98%, showcasing its exceptional capability in reliably differentiating between male and female *A. palmeri* plants. These results demonstrate the potential of using machine learning models, particularly YOLOv5n and YOLOv8l-cls, for sex differentiation and sex-specific targeted management of *A. palmeri*. Future work will focus on further enhancing the model robustness by increasing the size and diversity of the training dataset, as well as investigating the potential of machine learning algorithms in identifying *A. palmeri* sex prior to flowering.

Efficacy of Trinexapac-ethyl and Herbicide Mixtures on Grass Weeds Control. D. Rodriguez[1], J. C. Velasquez Rodriguez[1], D. Rodriguez[1], P. Dhaka[1], G. de Carvalho Silva[1], J. Zhang[1], N. Roma Burgos[1]. [1]University of Arkansas, Fayetteville, United States

Trinexapac-ethyl (TE) is a plant growth regulator (PGR) that inhibits gibberellin biosynthesis and has been reported to potentially enhance herbicide efficacy. This study aimed to assess the effect of TE on the efficacy of multiple herbicides on yellow foxtail (YF, *Setaria pumila*), broadleaf signalgrass (BS, *Brachiaria platyphylla*), southwestern cupgrass (SC, *Eriochloa acuminata*) and barnyardgrass (BG, *Echinochloa crus-galli*). A field study was conducted in the summer of 2024 at the SAREC research station at the University of Arkansas, where these grass species were sown in 11 m^2 plots. The experiment followed a split-plot design with four replications. The treatments included TE (0 or 0.534 lb a.i./A) in combination with the following herbicides: glyphosate (0.5 or 0.65 lb ae/A), glufosinate-ammonium (0.32 or 0.64 lb ae/A), flumioxazin (0.031 or 0.062 lb ae/A), topramezone (0.009 or 0.018 lb ae/A), clethodim (0.125 or 0.25 lb ae/A), quizalofop (0.031 or 0.063 lb ae/A), and prometryn (0.8 or 1.6 lb ae/A). Herbicides were applied at the near-reproductive stage of the weeds. Visible control (%) was assessed 21 days after treatment (DAT). TE did not increase the efficacy of clethodim. Both glufosinate-ammonium and glyphosate achieved 100% control of all species, making it difficult to assess any potential benefit from TE at the applied rates. Prometryn, without TE, controlled grass species by 5-25%. However, the addition of TE increased the efficacy of prometryn by 30 percentage points for BG and YF, and by 40-50 percentage points for SC and BS. TE also enhanced the activity of quizalofop, increasing control by 20-30% for BG, YF, and SC, and by 15 % for BS. Grass control with topramezone was improved by 35-40% for BG, YF, and SC, and by 40-50% for BS. The combination of TE with flumioxazin showed a synergistic effect, improving control by 50-60% across all species at 21 DAT. While glyphosate and glufosinate achieved 100% control of grasses, the increased control levels with TE mixtures would likely reduce seed input into the seedbank. These results suggest that trinexapac-ethyl enhances the activity of flumioxazin, topramezone, quizalofop, and prometryn against grass weeds.

Can Salt-Tolerant Rice Improve Weed Management in Organic Production Within Partial Saltwater Agroecosystems? G. Singh[1], B. Ward[1], S. White[2], R. Karthikeyan[2], J. Rohila[3], M. Marshall[4], P. Subudhi[5], M. Cutulle[1]. [1]Clemson University, Costal Research and Education Center, Charleston, United States, [2]Clemson University, Clemson, United States, [3]USDA ARS, Dale Bumpers National Rice Research Center, Stuttgart, AR, United States, [4]Clemson University, Edisto Research & Education Center, Blackville, United States, [5]Louisiana State University, Baton Rouge, United States

Rice (*Oryza sativa* L.), a globally essential staple crop feeding over half of the world's population, faces substantial threats from climate change in coastal regions, particularly rising sea levels and saltwater intrusion. In South Carolina (SC), rice production has been shaped by 'Carolina Gold,' a prized cultivar renowned for its quality, cultural significance, and role in the region's agricultural heritage. However, 'Carolina Gold,' like other current SC rice cultivars, is highly sensitive to salinity stress, making rice production increasingly difficult in partial saltwater agroecosystems. Weed infestation further increases yield losses, especially in organic production. Weeds are recognized as the primary constraint and top management priority in organic rice production systems. Addressing these challenges requires understanding the combined effects of salinity and weed interactions on rice cultivars to ensure sustainable and profitable production. A field experiment was conducted at Clemson University Coastal Research and Education Center, Charleston, SC to determine the effects of salinity on rice growth and weed dynamics in coastal SC. Six rice genotypes (Carolina Gold, Santee Gold, Doble Carolina, M202, Jupiter, and JN100) were evaluated under weed-free and weed-competition conditions across salinity treatments with electrical conductivity (EC) levels of 0, 0.8, 1.6, 3.2, and 6.4 dS m^{-1}. Three-week-old rice seedlings were transplanted and weed-free plots were hand-weeded at weekly intervals. Brackish water, collected from nearby saltwater river, and applied to treatment plots starting at late tillering stage to crop harvest. Salinity levels were monitored periodically using EC meters, alongside pH, total dissolved solids (TDS), temperature and precipitation. The results revealed significant impacts of salinity on both rice and weeds. M202, followed by Doble Carolina and JN100 showed lower tissue Na^+/K^+ ratios, higher photosynthesis rates, reduced grain sterility, and less yield reduction under saline conditions relative to Carolina Gold and Santee Gold. M202 showed most salt tolerance, with height, tillers, and yield remaining stable up to 3.2 dS m^{-1}, while these parameters began declining in Carolina Gold at 0.8 dS m-1. Weed competition significantly affected all rice genotypes, leading to reductions in plant height, tiller number, panicle count, biomass and yield; however, salt-tolerant genotypes were less impacted by weed competition. Salinity suppressed weed regrowth, leading to 3-5 times decrease in weeding time at 3.2 dS m^{-1} and 8-10 times decrease at 6.4 dS m^{-1} compared to the control (0 dS m^{-1}). Increasing salinity significantly reduced overall weed biomass (R^2 = 0.841), although some weed species exhibited differential responses and greater tolerance to salinity. Barnyardgrass (*Echinochloa crus-galli* [L.] P. Beauv.) populations decreased significantly at 6.4 dS m^{-1} salinity, *Cyperus* spp. (*Cyperus iria* L. and *Cyperus esculentus* L.) were less affected, showing greater tolerance to higher salinity levels. These findings contribute to the understanding of how salinity and weed competition rice production in coastal agroecosystems. Based on our findings, growing salt tolerant rice in a saltwater agroecosystem will likely improve the competition between rice and weeds. The outcomes of this research are contributing to the development of rice cultivars with improved tolerance to salt stress and enhanced competitiveness against weeds.

Memory Response of *Senecio madagascariensis* Plant Cohorts to Heat Stress

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Extreme climatic events, such as heat stress and droughts, pose significant challenges to ecosystems, particularly in the Pampa Biome of southern Brazil. This biome, vital for biodiversity conservation and livestock production, faces threats from invasive species like *Senecio madagascariensis*. *Senecio* spp. is the leading cause of cattle intoxication and death in southern Brazil. Native to Africa, this toxic plant produces pyrrolizidine alkaloids, causing cattle intoxication and economic losses. Its high reproductive capacity and adaptability exacerbate its spread. This study investigates the physiological responses and memory mechanisms of *S. madagascariensis* to heat stress and its influence on two different cohorts. Plants exhibit stress memory, or "priming," enabling faster and more efficient reactions to repeated stimuli. These responses involve metabolic shifts and secondary metabolite production, including alkaloids, which play crucial roles in defense. The experiment was conducted in a growth chamber in completely randomized design in a factorial arrangement with four replications. Factor A corresponds to the stage where the stress was performed (vegetative and reproductive stages). Factor B corresponds to stress regimes (1: recurrent heat; 2: one heat stress; 3: control without stress). The intensity and duration of heat stress was 40°C for 4 hours. Stress was applied on the same day, differing only by developmental stage vegetative or reproductive. The results showed that heat stress promoted an increase in glycine betaine, proline, total soluble sugar, phenolic compounds, SOD activity. Heat stress trigger biochemical memory in senecio, especially when occurred in the reproductive phase. Most importantly, heat stress promoted an increase on senecionine alkaloid concentrations compared to the untreated plants, independently on what stage the stress occurred. These results show that heat stress promote an increase on the biochemical defense mechanism and in the toxic compound senecionine, showing the adaptation capacity of this weed. And demonstrate that temperature raises and increase the frequency and severity of heat stress will result in plants with higher concentration of toxins and probably increase on the number of cattle lost by intoxication.

Impact of Pre-Emergent Residual Herbicide Activity on Soybean Systems in Oklahoma. K. Beneton[1], L. Galvin[1], T. Baughman[2]. [1]Oklahoma State University, Stillwater, Oklahoma, United States, [2]Texas A&M University, Lubbock, Texas, United States

As herbicide resistance becomes increasingly widespread across the United States, the use of preemergence (PRE) herbicides is considered a critical component of integrated weed management in soybean (*Glycine max* (L.) Merr.). This two-year study evaluated the residual weed control efficacy of four herbicide modes of action at Oklahoma State University research stations near Bixby and Fort Cobb, OK. Field trials were conducted in 2023 and 2024 using a randomized complete block design. Treatments included pyroxasulfone (89 g ai ha^{-1}), cloransulam-methyl (35 g ai ha^{-1}), sulfentrazone (89 g ai ha^{-1}), and metribuzin (420 g ai ha^{-1}), applied individually or in two-, three-, and four-way combinations. Preemergence applications were followed by a postemergence (POST) treatment of dicamba (1540 g ai ha^{-1}) + glyphosate (2100 g ai ha^{-1}) + s-metolachlor (1120 g ai ha^{-1}) + potassium carbonate (1400 g ai ha^{-1}). Palmer amaranth (*Amaranthus palmeri*) and large crabgrass (*Digitaria sanguinalis*) were the predominant weeds in these fields and are the focus of this presentation. Palmer amaranth control was at least 90% early season in Fort Cobb (2023), 88% in Bixby (2023) with all 3-way combinations. In 2024, at Fort Cobb at 4 WAPRE (weeks after PRE application), the control with pyroxasulfone + sulfentrazone + cloransulam-methyl reached 98%. In comparison, cloransulam-methyl alone had the lowest control at 60%. All-season long, control was t least 92% with all treatments. Large crabgrass control was at least 97.3% with pyroxasulfone + sulfentrazone in the early season in Fort Cobb (2024). Control was lower prior to POST applications at Bixby in 2023, but 99-100% with all treatments late season following POST application. In 2024, it was at least 93% season-long with all treatments applied. These findings emphasize the importance of using multiple modes of action to improve weed suppression, delay the development of resistance, and improve the overall effectiveness of herbicide programs in soybean systems. Additionally, the results suggest that environmental factors can pose challenges to weed management strategies, and combining residual herbicides can help address some of these difficulties.

Impact of Herbicides from Different Modes of Action on Weedy Flower Morphology and Pollinator Foraging in Turfgrass. N. Godara[1], S. Askew[1]. [1]Virginia Tech, Blacksburg, United States

The recent decline in pollinator abundance threatens global food production. Pollinators risk exposure to insecticide residue when visiting weedy flowers in urban landscapes. Several herbicide modes of action (MOAs) control white clover, but the effect on pollinator foraging behavior remains unaddressed. Research experiments were conducted at Blacksburg, VA, in 2023 to assess the effect of herbicides from different MOAs on honeybee foraging visitation, white clover floral density, and white clover floral quality. Treatments included a nontreated control, Trimec Classic® (a premix of 2,4-D; dicamba; and MCPP); Halo 75 WDG® (halosulfuron); Dismiss® (sulfentrazone); and Pylex® (topramezone). A subsequent study evaluated how synthetic auxin herbicide placement on white clover flowers affects honeybee visitation. The combination of 2,4-D + dicamba + MCPP and topramezone eliminated honeybee visitation completely but on differing temporal scales of 1 d for auxins and 14 d for topramezone. Halosulfuron and sulfentrazone transiently affected honeybee visitation, as they reduced <80% of honeybee foraging visits. Honeybee visitation on topramezone-treated flowers was least dependent on flower quality when compared to other herbicides. Synthetic auxins reduced white clover density to 100% at 14 DAT, but other treatments reduced floral density to <65%. Additionally, synthetic auxin placement on white clover flowers is essential to achieve rapid deterrent activity on pollinator visitation. Honeybee foraging behavior is temporally dependent on herbicide MOAs. Our research provides practitioners with transient, food-resource preserving, or long-term pollinator foraging deterrents to minimize pollinator exposure to insect-pest-management treatments. Future research will assess the temporal response of nectar production following herbicide treatment.

Competition Dynamics Between Early-emerging *Echinochloa colona* and Hybrid Rice. D. Rodriguez[1], J. Velasquez[2], G. Plaza[3], M. F. Alvarez[4], E. Graterol[5], N. Burgos[1]. [1]University of Arkansas, Fayetteville, United States, [2]University of Arkansas, Fayetteville, AR, United States, [3]Universidad Nacional de Colombia, Bogotá, Colombia, [4]International Center for Tropical Agriculture (CIAT), Cali, Colombia, [5]Latin American Fund for Irrigated Rice (FLAR), Cali, Colombia

Junglerice (*Echinochloa colona* L.) is one of the most problematic weeds in rice production. Fast emergence, phenotypic plasticity, and rapid growth rate make junglerice a successful competitor. Hybrid rice genotypes are deemed advantageous not only for high yield potential but also as a tool for weed suppression due to its vigorous growth and high tillering capacity. This study aimed to assess the effect of junglerice emergence timing on the competitive ability of hybrid rice with junglerice. Two replacement series studies with five junglerice:rice proportions (100:0, 75:25, 50:50, 25:75, and 0:100) were conducted in greenhouse conditions, following a completely randomized block design with four replications. The first experiment had junglerice emerging simultaneously with rice as both species were planted on the same day. In the second experiment, junglerice seeds were pregerminated for 3 days and transplanted 5 days before sowing the rice. Seeds were planted in pots filled with 1.5 kg field soil to establish a total density of 12 plants per pot. The junglerice used was multiple-resistant to quinclorac and propanil and cross-resistant to florpyrauxifen-benzyl. Height (H), tiller number (TN), leaf area (LA) and shoot biomass (SB) were assessed 35 days after rice emergence. Relative crowding coefficient (RCC) and aggressiveness index (AI) were calculated using LA and SB relative values for 50:50 proportion. Overall, junglerice was not negatively affected by the presence of hybrid rice in both experiments. In one-to-one competition, the simultaneous-emerging junglerice had 50% more LA and the plants were 2 times larger than rice. Early emerging junglerice showed 5 times more LA and plants were 8 times larger than rice. Junglerice RCC and AI were higher when it emerged ahead of rice compared to simultaneous emergence with rice. High junglerice density (75:25 proportion) reduced rice LA 70% and TN 100% when junglerice emerged ahead of rice. Junglerice emerging simultaneously with rice caused relatively less damage with 40% reduction in rice LA and TN. Intraspecific competition was more limiting for junglerice than interspecific competition since LA and SB increased 51% and 88% at high rice density (25:75 proportion) compared to the monoculture. For instance, junglerice plants were about 3 times bigger than rice when emerged simultaneously with the crop in high rice density proportion. Interspecific competition was more limiting to hybrid rice after being negatively affected by the presence of junglerice in both experiments. Monoculture values were similar between rice and junglerice for LA, TN and H, suggesting crop mimicry adaptation in the weed. These findings highlight the importance of the first-plant-to-emerge concept, the necessity for effective pre-emergence control of weeds and the need for breeding rice varieties with enhanced competitive ability against weeds.

Using Dew Retention Patterns for Bermudagrass (*Cynodon dactylon*) Detection in Zoysiagrass (*Zoysia* spp.). A. Wilber[1], J. McCurdy[1]. [1]Mississippi State University, Mississippi State, United States

Bermudagrass (*Cynodon dactylon*) readily contaminates zoysiagrass (*Zoysia* spp.) fields through both vegetative and seeded propagation. Once established, bermudagrass is challenging to eradicate. Differences in color, texture, and canopy structure between zoysiagrass and bermudagrass enable visual identification of bermudagrass infestations, particularly when dew is present. In 2024, field research quantified the dew volume retained within bermudagrass and zoysiagrass canopies. Aerial imagery, captured using a DJI Zenmuse X5S camera, was collected at three sites with varying levels of bermudagrass contamination in zoysiagrass. The imagery was analyzed using an artificial intelligence-based selection tool (Magic selection tool in PIX4Dfields) to assess its effectiveness in distinguishing bermudagrass from zoysiagrass under dewy conditions. Small-plot field research was initiated on June 24, 2024, to evaluate bermudagrass control using 1X, 2X, and 4X application rates of fluazifop + trifloxysulfuron + metcamifen, topramezone + triclopyr, fenoxaprop + triclopyr, and glyphosate. Dew volume and bermudagrass control data were subjected to analysis of variance in RStudio 7.1 with $\alpha = 0.05$. Time after sunrise and turfgrass species were significant with respect to dew volume. At 0, 15, 45, 60, 75, and 90 minutes after sunrise, bermudagrass retained more dew than zoysiagrass. The accuracy of the Magic selection tool in differentiating bermudagrass from zoysiagrass was influenced by turfgrass density, soil color, the presence of other grass species, clippings, and dew volume. Six weeks after treatment, bermudagrass control of 80% or greater was achieved with 2X and 4X rates of glyphosate and the 4X rate of fluazifop + trifloxysulfuron + metcamifen. Based on dew retention, the optimal time for scouting bermudagrass contamination is within 90 minutes after sunrise in areas with dense stands of both grass species. Effective control of bermudagrass with a single application requires high rates of glyphosate or fluazifop + trifloxysulfuron + metcamifen.

Evaluating the Efficacy of Cereal Rye Cover Crop on Weed Control in Peanut. E. Foote[1], D. Jordan[1]. [1]North Carolina State University, Raleigh, United States

Determining alternative methods for weed control in peanut (*Arachis hypogaea* L.) is becoming increasingly important with the increase of resistant weed species and the removal of herbicide products from the market. It is also important to determine interactions among pest management practices across disciplines for developing effective strategies for peanut production systems. Cereal rye (*Secale cereale* L.) has shown to reduce weed populations in peanut and other crops, as well as minimize injury from thrips and leaf spot diseases. The effectiveness of a cereal rye cover crop on varying pests has not been determined in North Carolina. Research was conducted in 2022 and 2023 at two locations (Lewiston-Woodville, NC and Rocky Mount, NC) to compare pest reaction, yield of the peanut cultivar Bailey II, and estimated financial return when peanut was grown with various levels of weed and other pest control methods in cereal rye cover with differing times of desiccation. Cereal rye was planted at 112 kg ac-1 on conventionally-prepared beds in October the year prior. Glyphosate (1.65 kg ai ha-1) was used to desiccate the cereal rye cover in April or May, and peanut planted in mid-May into the cover with no prior tillage. Weeds were managed with herbicides programs fit to the weed species at each location through June. Other treatments consisted of two levels of each insect, leaf spot disease, and weed management. The two levels of weed management were herbicides only or herbicides and hand-removal of escaped broadleaf weeds or clethodim (0.21 kg ai ha-1) to control escaped grass weeds. Data collected consisted of prominent weed species control ratings, timing and cost of escape weed removal, peanut row middle lap date, peanut insect damage, peanut leaf spot disease severity, and peanut yield. Only data related to weed control and peanut performance will be presented. At both locations in 2022 and 2033, there were no significant differences in Palmer amaranth (*Amaranthus palmeri* S. Wats) or yellow nutsedge (*Cyperus esculentus* L.) control due to cereal rye termination date. At Lewiston-Woodville in 2022 and 2023, there was an increase in control of common ragweed (*Ambrosia artemisiifolia* L.) and Texas millet [*Urochloa texana* (Buckley) R.] in the May terminated cereal rye cover compared to the April terminated cereal rye cover (13% and 14%, respectively). At Rocky Mount in 2022, large crabgrass [*Digitaria sanguinalis* (L.) Scop.] was not affected by cereal rye termination date. In 2023, sicklepod [*Senna obtusifolia* (L.) H.S. Irwin & Barneby] control increased by 41% in the May terminated cereal rye cover compared to the April terminated cereal rye cover. There were limited interactions among pest management strategies with respect to weed management. No differences in the time required for peanut to lap middles were noted between the two cereal rye termination dates. However, peanut pod yield was lower by an average of 779 kg ha-1 when cereal rye was terminated in May compared to the April terminated cereal rye cover regardless of pest management practices and disciplines (e.g., entomology, plant pathology, weed science).

Microclimate Influence on Home Lawn Weed Species Distribution. C. J. Wang[1], A. Novello[1], A. Young[1], G. Henry[1], J. McCurdy[2], D. Held[3]. [1]University of Georgia, Athens, United States, [2]Mississippi State University, Starkville, United States, [3]Auburn University, Auburn, United States

Plant and soil properties exhibit significant variability across landscapes, shaped by dynamic interactions among land use, management practices, climate, plant species composition, and edaphic factors. As urbanization continues to expand, home lawns have become a dominant feature of urban and suburban landscapes. Home lawns often host flowering weeds, which can serve as important habitats for pollinators. Despite their ecological significance, the spatial dynamics of flowering weeds within warm season turfgrass ecosystems remain poorly understood. The objective of this study was to characterize the spatial distribution of naturally occurring populations of flowering lawn weeds and examine possible associations with soil moisture and light availability. Ecological surveys were conducted in 12 home lawns in Athens, GA during the summer of 2024. A GPS unit was used to georeference flowering weed populations. Soil moisture (volumetric water content) and light intensity data were collected and spatially analyzed using the kriging method. Chi tests (χ^2 tests) were conducted to determine associations between weed distribution and microclimatic variables. Results indicated no significant correlation between common lespedeza (*Kummerowia striata*) distribution and soil moisture or light availability. These findings suggest that additional variables such as soil nutrient content, mowing practices, and additional weed species should be investigated in future research to better understand the factors influencing the spatial dynamics of flowering weeds in turfgrass systems.

Peanut Response to Repeated Organic Herbicide Applications. S. Bowen[1], K. Eason[2], T. Grey[1]. [1]University of Georgia, Tifton, United States, [2]USDA-ARS, Tifton, United States

The management of weeds in an organic peanut production system requires an integrated systems approach that prioritizes cultural and mechanical methods over chemical control. This is due to the limited availability of organic herbicides that comply with organic certification requirements. Even if compatible chemistries are determined and listed by OMRI (Organic Materials Review Institute), products still need to be evaluated for efficacy in organic production systems. Field experiments were conducted in Tifton, GA from 2022-2024 to determine if the timely application of organic herbicides could improve in-row weed control without reducing yield on runner-type peanut. Herbicide treatments consisted of plant oils [clove plus cinnamon (45 + 45% v/v) and d-limonene (70% v/v)] and acids [acetic acid (20% v/v) and caprylic plus caprice acid (47 + 32% v/v)]. Organic herbicide timings varied from a single application for each treatment, or sequentially two, three, or four times. Sequential applications for the two, three, and four timing events were made at seven-day intervals occurring prior to canopy closure (50 to 65 days after planting). Across the runner-type cultivars evaluated, peanuts demonstrated the ability to recover quickly from phytotoxicity or stunting caused by any of the organic herbicide single and sequential treatments. However, pod yield responses to sequential applications were inconsistent. This along with extremely high input costs associated with organic products will require future evaluations of how to utilize these products for organic peanut production.

Effect of Multiple Very-Long-Chain Fatty Acid-Inhibiting Herbicide Applications on Soybean Yield. W. Everman[1], D. Contreras[2], E. Jones[3], D. Vos[3], J. Alms[3]. [1]Iowa State University, Ames, United States, [2]North Carolina State University, Raleigh, United States, [3]South Dakota State University, Brookings, United States

Very-long-chain fatty acid-inhibiting herbicides (Group 15) are applied extensively to manage weeds preemergence. Group 15 herbicides are being applied post residual to reduce the amount of later germinating weeds. Minimal data is present to determine the influence of multiple applications of these herbicides on soybean yield. Field studies were conducted to determine the effect of multiple applications of Group 15 herbicides on soybean yield. Experiments were conducted at two locations in North Carolina (Kinston and Rocky Mount) and South Dakota (South Shore and Volga), respectively. S-metolachlor (1703 g ai ha-1) and encapsulated acetochlor (1261 g ai ha-1) were applied at three different timings: preemergence, early postemergence (V2-V3), and mid postemergence (V5-V6). All timings were applied in a factorial arrangement. These two herbicides were selected based on immediate plant availability (S-metolachlor) and delay availability (encapsulated acetochlor). Glufosinate (655 g ai ha-1) and glyphosate (1260 g ae ha-1) were applied between the early and mid postemergence application to manage weeds that could confound putative yield loss. Experiment location was considered random to increase the inference of the data. The main factor herbicide did not influence soybean yield. The main factor of timing influenced soybean yield where a loss occurred with the early and mid postemergence application. The interaction between herbicide and timing was not significant. These results suggest that multiple applications of Group 15 herbicides do not affect soybean yield.

Rye Cover Crop Termination Timing Effects on Weeds, Insects, and Seedling Disease in Florida Corn Production. S. Amissah[1], P. Aryal[1], D. Boakye[1], R. Matthiesen-Anderson[2], A. Robertson[2], J. Tooker[3], C. Chase[1]. [1]University of Florida, Gainesville, United States, [2]Iowa State University, Ames, United States, [3]Pennsylvania State University, University Park, United States

Cereal rye (*Secale cereale* L.) is a popular cool season cover crop because it is resilient during winter, easy to establish, and a range of cultivars are available that offer regional adaptability. A three-year multistate study was conducted in 16 states to examine the effects of cereal rye termination timing on weeds, arthropods and slugs, and plant pathogens that could influence the productivity of a subsequent corn (*Zea mays* L.) crop in a no-till system. However, only the results for the northcentral Florida location are reported. 'Wrens Abruzzi' rye was planted at 89.7 kg ha-1 on 10/29/2020, 10/20/2021, and 11/08/2022. Four treatments were evaluated: (a) control (No_rye), (b) early termination (ET) 21 days before planting corn, (c) late termination (LT) 7-8 days before planting corn, and (d) post-planting termination (PT) 3-5 days after planting corn, which is also known as "planting green". Cereal rye was terminated with glyphosate. The experimental design was a randomized complete block with five replications. Data were collected on cereal rye biomass and weed biomass at cereal rye termination, weed biomass at corn V4/V5, corn stand count, biomass and root rot severity in corn seedlings, insect damage probability, and corn yield. Although the PT treatment resulted in a 31% increase in cereal rye biomass, weed biomass at termination did not differ with termination time. However, by corn V4/V5, only the ET and LT had significantly lower weed biomass than the No-rye control. Delaying termination time increased the probability of insect pest damage with PT compared to ET. The PT treatment also caused an increase in root rot severity in all years compared to ET. While no significant effect of termination time was observed on the root and shoot biomass of corn seedlings, all cereal rye treatments significantly decreased corn stand count in an equivalent manner. However, there was no significant effect of the treatments on relative corn yield. Because cover crop performance is site-specific, evaluation of PT in additional locations in Florida is recommended and potential tradeoffs should be shared with growers.

StriCore Herbicide: Evaluating Turfgrass Safety and Residual Control of Annual Grass Weeds in Fairways and Putting Greens. K. Briscoe[1], J. Armstrong[2]. [1]SePRO Corporation, Southaven, MS, United States, [2]SePRO Corporation, Carmel, IN, United States

StriCore Herbicide, commercialized by SePRO Corporation in 2024, is the first preemergence product with a new active ingredient for use in turfgrass in over a decade. The active ingredient, pethoxamid, is an α-Chloroacetamide and classified as a very long-chain fatty acid inhibitor (HRAC Group 15). StriCore is registered for use on all major warm- and cool-season turfgrass species except annual bluegrass (*Poa annua*). Turfgrass selectivity results suggest no significant injury to warm- and cool-season turfgrass species at various heights of cut following labeled application rates (560 to 1680 g ai ha-1). Although not currently recommended for use on putting greens, StriCore was evaluated on putting green height ultra-dwarf bermudagrass (*Cynodon dactylon* x *C. transvaalensis*) and creeping bentgrass (*Agrostis stolonifera*) at three locations in 2024. No injury was observed following a single application of StriCore at 1680 g ai ha-1 or two applications of 840 g ai ha-1 applied in the summer. Efficacy results indicate StriCore can be used effectively as part of a residual herbicide program to control annual grass weeds. Goosegrass control across eight locations in 2024 was significantly influenced by the interval between residual herbicide applications and the number of residual herbicides applied in a single application. Results indicate StriCore at 1680 g ai ha-1 applied 30 or 60 days after dithiopyr at 560 g ai ha-1 provided greater goosegrass control than StriCore applied 90 days after dithiopyr. Further, goosegrass control provided by StriCore at 1680 g ai ha-1 + prodiamine at 730 g ai ha-1 was greater than StriCore at 1680 g ai ha-1. Future research will be designed to evaluate StriCore efficacy and selectivity when applied with postemergence products at various timings on fairways and putting greens.

Investigating a Multiple-resistant Palmer Amaranth Population from North Carolina. R. Argueta[1], D. Contreras[1], C. Bradshaw[1], J. Alsdorf[1], C. Cahoon[1], W. Everman[1]. [1]North Carolina State University, Raleigh, United States

In 2022, a North Carolina farmer failed to control a Palmer amaranth population in Duplin County, despite spraying glufosinate, dicamba, and glyphosate. Population samples were collected and transported to NC State University for herbicide resistance screening. With this, an experiment was conducted with the objective of evaluating the response of the putative-resistant population at different dicamba and glufosinate rates. Two susceptible populations from Rutherford County (S1) and Chatham County (S2) were used to determine differential susceptibility. Dicamba and glufosinate were tested a different rates to determine effectiveness. The lethal dose to control 50% of the plants (LD50) using dicamba was 512 g ai ha^{-1} and 203 g ai ha^{-1} using glufosinate for Duplin County. The R/S were 1.82 and 2.78 compared to the susceptible populations for dicamba. The R/S was 2.56 compared to the S1 population for glufosinate. The differential susceptibility to dicamba and glufosinate exhibited by the Duplin County population compared to the S1 and S2 populations suggests that the population is dicamba, glufosinate-resistant.

Identifying the Source of ALS-Inhibitor Resistance in White Margin Sedge and Discussing Possible Control Options. A. D. Ross1, J. Norsworthy1, S. Sudhakar1; 1University of Arkansas System Division of Agriculture, Fayetteville, United States

Rice (*Oryza sativa* L.) producers in the Mississippi Delta region have been increasingly troubled by a relatively new weed called white margin sedge (*Cyperus macrostachyos* Lam.). Despite its novelty, over thirty accessions from the region have been collected that survived herbicides typically known for sedge control including saflufenacil, propanil, halosulfuron-methyl, and bispyribac-sodium. Preliminary research on one accession validated the ability of the plants to survive applications of the acetolactate synthase (ALS)-inhibiting herbicides halosulfuron-methyl and bispyribac-sodium. This prompted further exploration into the cause and characterization of apparent resistance, focusing on genetics due to the known high frequency of resistance-conferring mutations across other weed species with resistance to ALS-inhibitors (WSSA Group 2). The full transcriptomes of three white margin sedge accessions were sequenced and aligned to a standardized *Arabidopsis thaliana* (L.) Heynh ALS-encoding region with that of white margin sedge, within which an aspartate-376-glutamate mutation was identified in each of the three accessions; a mutation well understood to confer resistance to ALS-inhibiting herbicides in other weed species with the same mutation. A pair of primers was designed to capture the region surrounding the Asp-376-Glu mutation, and additional accessions were analyzed. Every accession sequenced had the Asp-376-Glu mutation except for one of the individuals from accession WMS-23-43. The variable resistance of mutant white margin sedge accessions to each of the chemical families within WSSA Group 2 is being characterized in ongoing research, with the families being the sulfonylureas (SU), imidazolinones (IMI), pyrimidinyl thiobenzoates (PTB), triazolopyrimidines (TP), and triazolinones (TN). The following treatments were applied to 5- to 15-cm tall plants: the SU halosulfuron-methyl at 66 g ai ha-1; the IMIs imazethapyr at 105 g ai ha-1, imazamox at 52.5 g ai ha-1, and imazaquin at 137 g ai ha-1; the PTB bispyribac-sodium at 32 g ai ha-1; the TP penoxsulam at 49 g ai ha-1; the TN thiencarbazone-methyl at 15 g ai ha-1; and a nontreated control. The resistance trait appears to segregate within accession WMS-24-221, with imazaquin being the most effective of the ALS-inhibitors tested on mutant and non-mutant plants.

Elucidating Competitive Interactions Between Cotton and Multiple Weed Species in Diverse Mixes. P. Gyawali1, C. V. Redwitz2, M. Bagavathiannan1; 1Department of Soil and Crop Sciences, Texas A&M University, College Station, TX, United States, 2Julius Kühn-Institut (JKI), Federal Research Centre for Cultivated Plants, Institute for Plant Protection in Field Crops and Grassland, Messeweg 11-12, D-38104 Braunschweig, Germany

Crop-weed competition is a critical ecological process influencing crop yields. While much research has focused on cotton (*Gossypium hirsutum*) interactions with individual weed species, studies examining competition involving multi-species weed mixtures are limited. This study investigates the competitive dynamics between cotton and two major weed species, Palmer amaranth (*Amaranthus palmeri*) and barnyardgrass (*Echinochloa crus-galli*), with a focus on understanding the effects of mixed-species weed communities. We hypothesized that the competitive impact of these mixed-species communities would be more detrimental to cotton growth, phenological development, and yield than the effects of individual weed species. Additionally, we predicted that these competitive effects would be magnified at higher weed densities, leading to delays in cotton phenological development and substantial reductions in yield. A greenhouse experiment was conducted using a Completely Randomized Factorial Design to assess two primary factors: weed species combinations and weed density at multiple levels. Results indicated that interspecific competition between cotton and the weed species was more detrimental than intraspecific competition. Cotton exhibited moderate competitive ability against barnyardgrass but showed a significantly weaker competitive response to Palmer amaranth. The combination of both weed species intensified competition, resulting in further reductions in cotton growth and yield. Overall, the combined effect of multiple weed species on cotton was much more detrimental than the presence of a single weed species. These findings underscore the complexity of crop-weed interactions in multi-species mixes and highlight the need for considering multi-species competitive outcomes in simulation models. Future research should expand these findings to field conditions, where environmental factors may further influence competitive outcomes.

Bambara Nut (*Vigna subterranea*) Response to PRE and POST Herbicides in Greenhouse and Field Studies. S. Crawford1, K. Jennings1, D. Monks1, D. Jordan1, J. Schultheis1, L. Moore1, S. Ippolito1; 1North Carolina State University, Raleigh, United States

Bambara nut is a legume that is native to West Sub-Sahara Africa. It is the third most popular legume that is grown on the continent. This food is mainly grown by subsistence farmers and plays a vital role in food security for people across the region. Greenhouse and field studies were conducted to evaluate the safety of PRE and POST herbicides to bambara nut. Bambara nut was planted in a greenhouse at the Horticultural Field Laboratory at NC State University and then PRE herbicide treatments consisting of fluridone at 168 g ai ha-1, flumioxazin at 91 g ai ha-1, S-metolachlor at 800 g ai ha-1, and clomazone at 840 g ai ha-1 were applied. Bambara nut was also planted in the Method Road Greenhouse 1 at NC State University and then allowed to grow to the 8 to 13 cm growth stage before being treated with the POST Herbicide treatments of tolpyralate at 29.2 g ai ha-1, metribuzin at 210 g ai ha-1, S-metolachlor at 800 g ai ha-1, clomazone, 840 g ai ha-1, and rimsulfuron at 17.5 g ai ha-1. Flumioxazin, fluridone, clomazone and S-metolachlor applied PRE and tolpyralate and S-metolachlor applied Post showed potential in the greenhouse studies to be safe to bambara nut. Therefore, bambara nut was planted in the field at the Horticultural Crops Research Station in Clinton North Carolina and then treated with fluridone at 168 g ai ha-1, flumioxazin at 91 g ai ha-1, S-metolachlor at 800 g ai ha-1, and clomazone at 840 g ai ha-1 applied PRE and tolpyralate at 29.2 g ai ha-1 and S-metolachlor at 800 g ai ha-1 applied POST at the 8 to 13 cm growth stage.

Sweetpotato Varietal Response to Pre- and Post-Planting Herbicides. P. Dhaka1, J. C. Velasquez1, G. de Carvalho Silva1, T. M. Tseng2, N. Roma-Burgos1; 1University of Arkansas, Fayetteville, United States, 2Mississippi State University, Mississippi, United States

A field study was conducted at the Vegetable Research Station, Kibler, Arkansas in 2024, to evaluate the response of sweetpotato [*Ipomoea batatas* (L.) Lam.] varieties to different pre- and post-planting herbicide treatments. This was a split-plot experiment with three factors (1) sweetpotato variety (whole plot), (2) herbicide (subplot) and (3) application timing (sub-subplot). Sweetpotato varieties were Beauregard 14 and Orleans. The herbicides were Brake, Linex, Tricor, Spartan, Strongarm, Pursuit, Ultra Blazer, Shieldex, Basagran, and Armezon. The herbicides were applied either 1 day before planting (DBP), 2 days after planting (DAP), or 7 DAP. The dominant weed species were: Palmer amaranth, Texas panicum, *Echinochloa colona*, and goosegrass. Data collected included weed control, vinelength, visible injury, and yield. After weed control evaluation, supplemental handweeding was conducted. The sweetpotato varieties had no effect on weed control, indicating similar interference ability with weeds. On the other hand, herbicide treatment and timing of herbicide application significantly affected weed control. Regardless of application timing, Tricor had the highest weed control (>80%) across varieties. Linex applied 1 DBP and Armezon applied 7 DAP had the lowest weed control at 4% and 5%, respectively. Herbicide application at 7 DAP was generally less effective than pre-planting application. Orleans showed the highest injury across all herbicide treatments. Pursuit, Strongarm, and Shieldex caused the highest visible injury, exceeding 90%, averaged across both varieties. Beauregard 14 had longer vines (111 cm) than Orleans (91 cm) across herbicide treatments. Basagran applied 7 DAP resulted in 23% points longer vines of Orleans as compared to its non-treated check but had no effect on Beauregard 14. The shortest vines were observed with Pursuit (20 cm) and Strongarm (23 cm) applied 1 DBP. Herbicides had a highly significant effect on sweetpotato yield, the highest being with Brake for both varieties. Averaged across herbicides and application timings, the total yield of Beauregard 14 (1257 g) was higher than that of Orleans (899 g). Pursuit and Shieldex resulted in zero yield regardless of application timing and variety. Averaged across varieties and herbicide application timings, Brake and Tricor had the highest marketable yields at 1580 and 1406 g, respectively. Sweetpotato yield was positively correlated with vine length, with a correlation coefficient (r) of 0.725. In conclusion, at least two herbicides are strong candidates for use in sweetpotato production.

Evaluation of Herbicide-Coated Fertilizer Spread Over the Top of Late Season Soybeans for Italian Ryegrass Control. C. Bradshaw1, B. Dean1, Z. Taylor1, C. Cahoon1; 1North Carolina State University, Raleigh, United States

Multiple-resistant Italian ryegrass (*Lolium multiflorum* Lam.) has made spring burndown for the planting of summer crops a challenge. Farmers in North Carolina are facing four-way resistant populations of Italian ryegrass that leave no effective method of postemergence control. The lack of effective post-emergent control means we must shift our focus to effective pre-emergent control options. However, Italian ryegrass can emerge before soybeans are harvested, which notes the importance of establishing residual control before soybean harvest. A field study was conducted to determine the effectiveness of residual herbicide-coated ammonium sulfate applied over the top of late-season soybeans to control Italian ryegrass. While ammonium sulfate was not important agronomically, this was used as proof of concept and applications have since been made with muriate of potash. Seven different residual herbicides were applied over the top of soybeans at R6 or R8 growth stage. Clomazone, pyroxasulfone, pyroxasuflone + carfentrazone, and S-metolachlor were most effective at controlling fall emerging Italian ryegrass. Clomazone was most effective for controlling spring emerging Italian ryegrass. There was no difference in control between the two application timings. Results indicate that residual herbicide-coated ammonium sulfate applied in late-season soybeans can be an effective method of controlling Italian ryegrass, while some herbicides are more effective than others.

Transcriptome and Phenotype of Junglerice After Iterative Exposure to Florpyrauxifen-Benzyl and Heat Stress. J. Velasquez1, P. Dhaka1, G. De Carvalho1, D. Rodriguez1, G. Rangani1, N. Roma-Burgos1; 1University of Arkansas, Fayetteville, United States

The adaptation of *Echinochloa colona* L. (junglerice) to adverse conditions, such as environmental stress and herbicide exposure, makes it one of the most problematic rice weeds. Florpyrauxifen-benzyl (FPB, HRAC#4) is a synthetic-auxin capable of controlling junglerice resistant to other rice herbicides. This project aims to: (1) produce and characterize junglerice seed-lines (SLs) exposed to five iterative cycles of FPB and heat stress (HS), (2) identify differentially expressed genes (DEGs) of the SLs after FPB application compared to the population not exposed to FPB and HS (F0); and (3) determine whether genes and biological processes are significantly differentially expressed between F5-SLs against F0. Three experiments were conducted. (1) Susceptible junglerice from Arkansas was exposed to five iterative cycles of FPB treatment (non-treated and 3.7 g ai ha-1) and HS (normal 30C and HS 45C), totaling four SLs. (2) Seedlings (V2-V3) from each F5-SL were sprayed with FPB at doses of 0.9, 1.8, 3.7, 7.5, 15, 30, and 90 g a.i. ha-1; injury, height, and shoot-biomass (SB) were assessed 21d after treatment. (3) Junglerice from each SL were grown under normal and HS conditions and sprayed with FPB (3.7 g ai ha-1). Leaf tissue was collected before and after FPB application (24h) for RNA extraction and sequencing. Sequences were mapped to the reference genome and genes with >2-fold change and p-value <0.05 were considered DEGs. GO-term enrichment was performed on the DEGs to explore the associated biological processes. None of the F5-SLs were resistant to FPB; however, the level of tolerance increased. The SL subjected only to FPB exhibited a 1.2-fold increase in tolerance index (TI) to FPB based on injury compared to F0 (ED50: 1.9 g a.i. ha-1). However, this SL did not show increased TI based on height and SB (1.1 and 0.9, respectively). The SL subjected to both FPB, and HS showed elevated tolerance of 1.9-, 1.8- and 2.0-fold based on injury, height, and SB, respectively, compared to the SL subjected only to HS (ED50: 1.6 g ai ha-1, GR50: 2.3 and 2.2 g ai ha-1 for height and SB, respectively). The SL subjected only to HS had greater number of upregulated DEGs in response to FPB application followed by the SL subjected to both FPB and HS and the SL only subjected to FPB (240, 217, and 189 DEGs, respectively) compared to F0. Xyloglucan-transferase activity and metabolism, and cell wall biogenesis processes were commonly upregulated in the three SLs after FPB treatment compared to F0. Unfolding protein binding, protein folding processes, sequence-specific DNA binding and heat-shock protein binding (9, 9, 7 and 3 genes, respectively) were only upregulated in the SL subjected to both stresses FPB and HS. In conclusion, the joint effect of FPB and HS during five cycles caused an increase in tolerance in junglerice compared to F0. Selection of genes associated to HS response could be associated to elevated FPB tolerance. Further studies should validate these genes. These results underscore the effect of climate change on the selection of genes associated with weed resistance.

Combining Cover Crops and Preemergence Herbicides to Extend Weed Suppression in Soybeans. F. Davis1, D. Russell1; 1Auburn University, Auburn, United States

Challenges of weed control in soybean production require strategies which integrate multiple agronomic practices to decrease weed populations and extend periods of control further into the growing season. A trial evaluating the ability of cover crops combined with preemergence herbicides to extend weed control farther into the growing season was established in 2023 at two locations, Gulf Coast Research and Extension Center (GCREC) in Fairhope, AL and E.V. Smith Research Center (EVS) in Shorter, AL. Using a randomized complete block design (RCB) main plot treatments were cover crop species and subplot treatments were preemergence herbicides. The cover crop treatments included: Elbon cereal rye (*Secale cereale* L.) at 56.14 kg ha-1; Cosaque black oats (*Avena sativa* L.) at 56.14 kg ha-1; cereal rye at 28.07 kg ha-1 and black oats at 28.07 kg ha-1; winter fallow. Preemergence herbicide treatments included: S-metolachlor (DualMagnum) at 1.55 L ha-1 (1.43 kg a.i. ha-1); S-metolachlor + metribuzin (Boundary) at 2.10 L ha-1 (1.33 kg S-metolachlor ha-1 + 0.31 kg metribuzin ha-1); flumioxazin + metribuzin + pyroxasulfone (Fierce MTZ) at 1.75 L ha-1 (0.10 kg flumioxazin ha-1 + 0.31 kg metribuzin ha-1 + 0.14 kg pyroxasulfone ha-1); non-treated (check). Cover crops were broadcast into previous crop residue at GCREC and a prepared seedbed at EVS in November 2023. Cover crop biomass was collected 2 weeks prior to soybean planting then chemically terminated. Preemergence herbicide treatments were applied within 24 hours of soybean planting using a CO2 powered handheld sprayer with an output of 140.23 L ha-1 using four AIXR 11002 nozzles. Weed counts per square meter by species and coverage percentage ratings were collected at 6.5 weeks after planting to determine weed control. Weed counts at EVS revealed that preemergence herbicide applications were significant (P=<0.0001) in controlling crabgrass (*Digitaria sanguinalis* L.), Fierece MTZ having the highest level of control (19.875 plants m-2) compared to the non-treated control (53.208 plants m-2). Control of morningglory (*Ipomoea hederacea* L.) and Palmer amaranth (*Amaranthus palmeri*) were not significantly different between cover crop or herbicide treatments. At GCREC counts of morningglory (P=0.005), purslane (P=<0.0001), and broadleaf coverage (P=0.002) were significantly lower in all cover crop treatments compared to winter fallow. A significant interaction (P=0.0001) between cover crop and preemergence herbicide treatments was observed in control of purple nutsedge (*Cyperus rotundus*) with this combination resulting in lower population counts compared to winter fallow and non-treated treatments. These results show the utility in weed management that cover crops provide in late-season no-till soybeans. A second year of observations will be carried out and include chemical analysis of soil and cover crop residues to determine efficacy of residual herbicides within a system utilizing cover crops and preemergence herbicides.

Weed Proliferation in Fields: The Unseen Impact of Poultry Litter Application in Alabama.

A. Singh1, D. Russell1, R. Prasad1, A. Maity1; 1Auburn University, Auburn, United States

Poultry litter (PL), a byproduct of Alabama's largescale broiler production, is known to boost crop yield and soil health. However, its impact on weed growth is less clear. This research aimed to explore any potential stimulatory effects of PL on weed emergence in Alabama corn fields, considering both north AL clay soil and south AL loamy soil. PL aged less than 6-month, 12-24-month, and 36-48-month-old was applied to corn fields at a rate of 2 tons/acre, with varying nitrogen doses compared to untreated plots. Weed density and biomass data were collected monthly from three 0.25 m2 quadrats per plot, and soil samples were taken post-harvest at three depths across the plots. The findings suggest that PL application progressively increased weed density with the increasing age of PL, showing greatest weed density under 36–48-month-old PL and least under unfertilized and full fertilized plots. An initial greenhouse investigation indicated that the PL used in this study did not contain viable weed seeds, suggesting that PL might have stimulated weed seed emergence during the crop growing season due to additional nutrient availability from PL. More research is required to fully comprehend these relationships and their implications for farming practices in Alabama. Future studies will include greenhouse experiments and the examination of different doses and sources of poultry litter.

Developing Weed Control Strategies for Edamame (*Glycine max* (L.)): The Role of Cover Crops and Cultivar Selection. A. S. Brar1, M. Flessner2, B. Zhang2, M. Reiter1, V. Singh1; 1Eastern Shore Agricultural Research and Extension Center, Virginia Tech, Painter, United States, 2School of Plant and Environmental Sciences, Virginia Tech, Blacksburg, United States

The demand for edamame (*Glycine max* (L.)) is rising in the United States' owing to its several nutritional benefits. However, majority of the demand is met through imports from Asian countries. Large-scale edamame adoption by farmers has been hindered by several production and marketing issues. Compared to grain soybeans, there are fewer choices for weed management, which is one of the major productivity constraints. Moreover, edamame currently has no herbicide-resistant characteristics and only a few herbicides are approved for use in the crop. Thus, it is essential to develop integrated weed control strategies that combine the use of chemicals with non-chemical techniques like cover crops. Five cover crops: cereal rye (*Secale cereale*), black oats (*Avena strigosa*), crimson clover (*Trifolium incarnatum*), hairy vetch (*Vicia villosa*), and rapeseed (*Brassica napus*), were compared for their capacity to suppress weeds in a split-split plot design at Virginia Tech's Eastern Shore Agricultural Research and Extension Center. Additionally, two distinct cover crop termination schedules were tested; an early termination four weeks prior to edamame planting and a late termination one week prior to edamame planting. Two edamame cultivars with varying maturity groups—VT Sweet, a late maturity cultivar, and Midori Giant, an early maturity cultivar—were compared. With an average biomass of 7,560 kg ha-1, crimson clover was the greatest biomass-producing cover crop. It was very effective at controlling weeds, but it also prevented edamame from emerging, which resulted in a lower pod production. Throughout the season, black oats completely suppressed weeds at both early and late termination timings. When compared to early termination, late termination provided a 49% increase in biomass for all cover crop species, which resulted in a 29% improvement in weed suppression. For Midori giant, the impact of cover crops and the timing of their termination was not significant; however, late termination treatments of hairy vetch and crimson clover significantly decreased VT Sweet output. The results of this study will provide base line information to farmers interested in pursuing large scale edamame production in Virginia.

Enhancing the Applicability of Precision Ag Technologies. V. Singh1, A. S. Brar1, F. Esmaeilbeiki1, R. Wamanse1, M. Viric1, R. Cooley1, D. Martin2; 1Virginia Tech, Painter, United States, 2United States Department of Agriculture, College Station, United States

Unmanned Aerial System (UAS)-based ag technologies have the potential to revolutionize agriculture sector. UAS-based herbicide applications are beneficial even to small landholders as it is expected to be effective across scales. As this novel spray technology continues to advance, new challenges, such as environmental safety and drift issues have emerged as the major concerns. Studies were conducted to evaluate the efficacy of herbicides in different cropping systems, and the drift potential of UAS in comparison with tractor sprayers. Studies have indicated spray drift up to 15 m at 13-19 kph wind speed when medium droplet size was used. The key factors that can affect drift potential of UAS are wind speed, application height, and droplet size. New techniques and machine learning models are being implemented to predict drift potential and enhance the applicability of UAS-based spray operations.

Peanut Response to Postemergence Applications of Brake (Fluridone). E. Prostko1, N. Shay1, C. Abbott2; 1University of Georgia, Tifton, United States, 2SePRO, Tifton, United States

Brake® (fluridone) was recently registered for use in peanut in 2023. Brake® was a welcome addition to the peanut herbicide arsenal because of its unique mode of action (WSSA/HRAC #12, phytoene desaturase inhibitor). The current label permits preplant surface or preemergence applications (up to 36 hours after planting). Limited research has been conducted on the tolerance of peanut to postemergence (POST) applications. Therefore, the objective of this research was to evaluate the response of peanut to POST applications of Brake®. A small-plot, irrigated, replicated field trial was conducted in 2024 at the University of Georgia Ponder Research Farm near Ty Ty, Georgia. 'GA-06G' peanuts were planted in twin rows on April 30. Plots were arranged in a randomized complete block design with four replications in a three rate (Brake® 1.2SC @ 0, 16, and 32 oz/A) by four timing (13, 29, 36, and 52 days after planting [DAP]) factorial treatment arrangement. Peanut stages of growth at the time of application were as follows: 13 DAP = V2-3; 29 DAP = V5-7; 36 DAP = R1 (beginning bloom); and 52 DAP = R2 (beginning peg). All treatments were applied using a CO2-powered, backpack sprayer calibrated to deliver 15 GPA @ 37 PSI and 3.5 MPH using 11002AIXR nozzles. The plot area was maintained weed-free using a combination of hand-weeding and labeled herbicides (clethodim, diclosulam, imazapic, lactofen, pendimethalin, and s-metolachlor). Data collected included visual estimates of peanut injury (stunting, necrosis, bleaching), plant height, and yield. All data were subjected to ANOVA and means separated using Tukey's HSD Test (P=0.10). All POST applications of Brake® caused significant leaf injury in the form of bleaching and necrosis. However, the crop recovered from these symptoms later in the season. Plant height data obtained 91 DAP indicated the following: a) no interaction between rate and timing was observed (P=0.1440); b) peanut height was significantly reduced by 5% (16 oz/A) and 9% (32 oz/A); and c) timing had no effect on peanut height (P=0.3794). Peanut yield data indicated the following: a) no interaction between rate and timing was observed (P=0.1299); b) peanut yield was significantly reduced by 14% (16 oz/A) and 25% (32 oz/A); and c) timing had no effect on peanut yield (P=0.4508). These results suggest that Brake® should not be applied POST in peanut.

How Do Cover Crop Mixtures Influence Weed Diversity in Southern Crop Rotations? A. Ahlersmeyer1, A. Gamble1, A. Price2, A. Maity1; 1Auburn University, Auburn, United States, 2USDA-ARS, Auburn, United States

Cover crops have been widely documented to provide numerous benefits for cropping systems, including non-chemical weed control. Existing studies have largely emphasized the competitive nature of cover crops, such as their ability to shade weed seedlings or produce ample biomass to inhibit weed germination. However, more research is needed to understand how different winter cover crop mixtures alter weed species diversity and soil seedbank dynamics. To address this, irrigated field trials were established in 2017 at two unique sites in Alabama: the Wiregrass Research and Extension Center (WREC) in Headland, and the Tennessee Valley Research and Extension Center (TVREC) in Belle Mina. The WREC trial was a cotton-peanut rotation on a loamy sand, and the TVREC trial was a cotton-soybean rotation on a silt loam. Each trial was conducted as a single-factor randomized complete block design with 4 replications. Eight cover crop treatments (two- and three-way mixtures of cereal rye, crimson clover, and radish, plus a fallow control) were seeded each fall, and then chemically terminated in the spring prior to planting the cash crop. Weed ecology measurements were collected during the 2023 and 2024 growing seasons, including weed germination densities and seedbank content via soil sampling. Various weed diversity indices were applied to the data measure cover crop mixture effects on species richness, evenness, and dominance. Initial results demonstrated that cover crops coupled with herbicide programs provided satisfactory weed control, with only a few exceptionally persistent species (nutsedges [*Cyperus* spp.], pigweeds [*Amaranthus* spp.], and morningglories [*Ipomoea* spp.]). Across both years, weed pressure was higher at WREC than TVREC. However, there were no significant differences among cover crop treatments. Ongoing analysis of soil samples to evaluate the germinable seedbank will hopefully improve our understanding of cover crops on weed ecology beneath the soil surface.

Real-Time Weed Species Detection and Classification. A. Almashwali1, T. M. Tseng1, A. Kassim2; 1Mississippi State University, Starkville, United States, 2Universiti Teknikal Malaysia Melaka, Malacca, Malaysia

Weeds pose a significant threat to agriculture by reducing crop yields, acting as hosts for pests, and depleting essential nutrients. Traditional herbicide application methods are inefficient and often result in excessive usage. This paper presents an advanced weed detection and classification system utilizing YOLOv8 (You Only Look Once version 8) to improve the precision and efficiency of weed control. The model was trained using 3000 datasets, representing three different classes of weeds, and achieved a mean average precision (mAP) of 97%. The proposed system employs rigorous data collection, augmentation, and preprocessing techniques to enhance model performance in detecting and classifying various weed species. To ensure real-time detection capabilities in agricultural fields, we designed the system to run on a Raspberry Pi equipped with an ArduCam 4K RGB camera. The hardware selection, image processing pipeline, and model optimization techniques were meticulously developed to balance accuracy and computational efficiency. Our experimental results show that the model effectively identifies and classifies weeds with high precision, offering a promising solution for integrated weed management. The implementation of edge computing on a Raspberry Pi enables practical deployment in remote agricultural settings, providing a scalable and cost-effective alternative to traditional methods. This research demonstrates that YOLOv8, when optimized for real-time applications, can significantly enhance the reliability of weed detection systems, contributing to more sustainable agricultural practices by reducing herbicide dependency and improving overall crop health.

Allelopathic Effects of Cover Crops on Yellow Nutsedge (*Cyperus esculentus*) Suppression: A Stair-Step Assay. A. Richardson1, N. Maphalala1, A. Miller1, W. Segbefia1, T. M. Tseng1; 1Mississippi State University, Starkville, United States

The sweet potato (*Ipomoea batatas* (L.) Lam.) has flexible uses as food, feed, and industrial product usage. Mississippi has over 27,000 acres across one hundred and fifty farms, and the state ranks second and third in the nation in acreage and production. Farmers have used cover crops to suppress weed species, enhance biodiversity, improve soil health, and minimize pests and diseases in plants for a long time. Weed interference is a major issue in sweet potato cultivation, potentially reducing yields by up to 80%. While chemical control methods are commonly used, they pose significant challenges, including potential impacts on crop quality, intolerance in some varieties, and, in severe cases, environmental toxicity. To overcome limited weed control options and preserve or improve sweet potato quality and yield for Mississippi growers, there is a great need to find a supplemental weed control strategy that can effectively reduce the weed pressure around the crop and, at the same time, protect the yield and quality of the storage roots. One solution is the utilization of cover crop allelopathy, an alternative method that is environmentally friendly and organically favored. This study aimed to assess the efficacy of five cover crop species (crimson clover, cereal rye, hairy vetch, wheat, and buckwheat) in controlling a troublesome weed species in sweet potato cultivation, namely yellow nutsedge. A comparative analysis with the control group revealed significant differences in weed suppression. Over the course of 42 days, wheat exhibited the highest reduction in yellow nutsedge height (24%), followed by crimson clover (18.4%), while rye had a modest impact (7%). Vetch and buckwheat showed the least reduction. Cereal rye showed the greatest effectiveness in suppressing yellow nutsedge biomass, reducing shoot biomass by 24% and root biomass by 22%. Clover achieved a 7% reduction in shoot biomass, while vetch and wheat both reduced shoot biomass by 4%. For root biomass, rye, wheat, and vetch each demonstrated a 15% reduction, whereas clover showed a 5% reduction. Buckwheat had no measurable impact on either root or shoot biomass of yellow nutsedge. These results highlight that wheat is the most effective cover crop in reducing yellow nutsedge, while cereal rye was most effective in suppressing both root and shoot biomass. Overall, wheat, rye, clover, and vetch emerge as highly effective, with buckwheat displaying the least efficacy against this specific weed species.

Wheat–Soybean Relay Intercropping: System Yield and Palmer Amaranth Suppression. A. Godar1, J. Norsworthy1; 1University of Arkansas-Fayetteville, Fayetteville, United States

The prevalence of herbicide-resistant weeds is escalating, raising concerns about potential catastrophic weed management failures under the current herbicide development landscape. Managing Palmer amaranth remains a major challenge in soybean production in the southern region, necessitating a more integrated approach to weed management. A large-plot (6 m by 30 m) field experiment was conducted at the Pine Tree Research Station near Colt, Arkansas, during the 2023-24 growing season to explore the potential for Palmer amaranth suppression and crop yields in a wheat-soybean relay intercropping system. Three cropping systems were compared: full-season soybean, wheat-soybean double crop (soybean planted after wheat harvest), and the relay intercropping system (soybean planted into standing wheat). Weed control in the full-season and double-crop soybean systems was managed conventionally with a three-pass herbicide program. The intercropped soybean received a single application of glyphosate (1255 g ae ha-1) and 2,4-D (1065 g ae ha-1) with or without S-metolachlor (1404 g ai ha-1) immediately after wheat harvest. Both the full-season and relay intercrop systems included untreated checks. By mid-August, the nontreated relay intercrop system provided 85% suppression of Palmer amaranth weed density, comparable to the double crop system. The one-pass herbicide application in the relay intercrop systems reduced Palmer amaranth density by 93-97%, similar to the 97% reduction in the full-season soybean system. Wheat yield in the intercropped system was 70% of that in the double-crop system (3,870 kg ha-1), while soybean yield was 56-60% of the full-season soybean yield (4,010 kg ha-1) in the double-crop and intercropped systems, respectively. With minimal wheat harvest damage (clipping off the soybean tops), the intercropped system could enhance soybean yield by 5-10 percentage points. This preliminary study provides initial insights into the potential of the wheat-soybean relay intercropping system for Palmer amaranth suppression and crop yields in the southern region. This system could be a viable alternative where traditional herbicidal solutions are limited for Palmer amaranth control, or it could reduce herbicide selection pressure, thereby extending the effectiveness and utility of existing herbicides for soybean production systems.

Varietal Responses to Imazethapyr Carryover in Medium and Long Grain Rice (*Oryza sativa* L.). B. Stoker1, C. Webster1, M. Hains1, G. Sparks1, W. Carr1, E. Williams1; 1LSU AgCenter, Baton Rouge, United States

Imazethapyr is labeled for use in the imidazolinone resistant (Clearfield®) rice production system. Imazethapyr inhibits acetolactate synthase in susceptible plant species, and expresses selective action against various grass, broadleaf, and sedge species commonly found in Louisiana. Extended soil persistence of imazethapyr has been reported under anerobic soil conditions. Current rice/crawfish rotations practices cause anerobic soil conditions that inhibit degradation of imazethapyr. The residual soil persistence of imazethapyr impacts rice growth and development in non-imidazolinone resistant rice varieties. Rice yield losses have been observed when conventional rice varieties are planted subsequently to Clearfield® rice and crawfish rotation. Three studies were conducted in 2024 at the H. Rouse Caffey Rice Research Station near Crowley, Louisiana. This research was implemented to evaluate the varietal response of non-Clearfield® medium and long grain rice cultivars to residual imazethapyr in the soil profile. Plot size was 1.5 by 5.2m-2 and seeded with ‘PVL03’, ‘Avant’, or ‘Jupiter’ at 79 kg ha-1. The experimental design for each study was structured as a randomized complete block design with four replications. Pre-plant imazethapyr treatments were applied at 5, 9, 13, 18, 22, 26, 30, 35 g ai ha-1. All applications were made with a CO2-pressurized backpack sprayer calibrated to deliver 140 L ha-1. Timely rainfall allowed for sufficient incorporation of imazethapyr treatments, subsequently rice was planted after the soil dried. Data collection consisted of visual crop injury, stand count collections, plant heights, and percent rice heading at maturity. Rice yield was obtained and adjusted to 12 % moisture content. At 70 DAE, imazethapyr treatments caused differences of 34 and 12% in panicle development in Avant and PVL03, respectively, when compared to the nontreated. Panicle development was delayed among PVL03, Jupiter, and Avant by 25, 22, and 27% when compared to the nontreated at 77 DAE, respectively. Results suggest delayed maturity in both medium and long grain rice varieties when imazethapyr was applied compared to nontreated rice.

Application Timing and Its Role in Corn Tolerance to an Amicarbazone–Metribuzin Premixture. M. Dodde1, J. Norsworthy1, R. Henry2, L. Barber3, P. Carvalho-Moore1, R. Baxley1; 1University of Arkansas System Division of Agriculture, Fayetteville, United States, 2UPL NA Inc., Fort Wayne, United States, 3University of Arkansas System Division of Agriculture, Newport, United States

Amicarbazone and metribuzin are currently being evaluated as an alternative for preemergence (PRE) applications of atrazine in corn for reasons including enhanced soil degradation of atrazine, increasing regulatory scrutiny on atrazine rate limits and application parameters, and to provide growers with a new herbicide offering to manage resistant weeds. Amicarbazone is a new active ingredient for use in the US corn market, while metribuzin has historically has been under-utilized in corn. Therefore, research was conducted in 2024 at the Milo J. Shult Agricultural Research and Extension Center in Fayetteville, AR, to determine if application timing influences corn tolerance to an amicarbazone-metribuzin premixture. A randomized complete block design experiment was established with two factors and four replications. The first factor, amicarbazone-metribuzin premixture rate, had two levels: 328 g ha-1 amicarbazone + 187 g ha-1 metribuzin and 656 g ha-1 amicarbazone + 374 g ha-1 metribuzin. The second factor, application timing had 4 levels: 14 days pre plant (DPP), 7 DPP, PRE, and 3 days after planting (DAP). A nontreated check was included for comparison. Visible crop injury ratings were collected weekly, and yield was collected at crop maturity. Both main effects, application timing and rate, were significant. However, the interaction was not. At each evaluation timing, the 3 DAP application and the higher rate of amicarbazone + metribuzin induced the highest level of corn injury. On average, the 656 g ha-1 amicarbazone + 374 g ha-1 metribuzin treatment caused 34% injury to corn at the 3 WAE evaluation. The 328 g ha-1 amicarbazone + 187 g ha-1 metribuzin treatment only caused 8% injury. At 3 WAE, the application of amicarbazone + metribuzin 3 DAP resulted in 45% corn injury. By 7 WAE, injury had decreased to 23%. Treatments applied at 7 DPP and 14 DPP resulted in the least injury to corn and showed comparable results across all evaluation timings. When amicarbazone + metribuzin were applied PRE, corn exhibited 23% injury 3 WAE and by 5 WAE, injury had reduced to only 6%. There were no differences in yield. Overall, the timing of application and herbicide rate had a significant impact on visible corn injury but not yield from the amicarbazone-metribuzin premixture and further research should be conducted to identify the primary factors affecting tolerance.

Management of Italian Ryegrass (*Lolium perenne* ssp. *multiflorum*) Using a Seed Control Unit at Winter Wheat Harvest in Kentucky. H. Love1, T. Legleiter2; 1University of Tennessee, Knoxville, United States, 2University of Kentucky, Princeton, United States

The continuous use of herbicides to control Italian ryegrass (*Lolium perenne* L. ssp. *multiflorum* (Lam.) Husnot.) has led to an increase in the number of herbicide-resistant populations in Kentucky. Due to herbicide resistance, producers are seeking new weed control options for Italian ryegrass in winter wheat (*Triticum aestivum* L.) in Kentucky. The integration of a seed control unit, a form of harvest weed seed control, could be an option due to its ability to destroy weed seed at winter wheat harvest by impacting it enough to render it devitalized.

A study was conducted in Logan County, Kentucky, over two growing seasons at two adjacent field sites with known Italian ryegrass infestations. This study included two treatments: seed control unit engaged and seed control unit disengaged; each treatment was replicated four times. Each study used a randomized complete block design, with individual plots measuring 24 m by 168 m in size. Prior to harvest, fresh weights and seedhead densities were collected using four one-m2 quadrats in each block to determine the density of Italian ryegrass within each plot. Each seedhead was threshed and counted to estimate how many Italian ryegrass seeds were present in each plot. In determining the distribution of Italian ryegrass seed at winter wheat harvest, ryegrass seed that had shattered at the header of the combine, within the thresher chaff, and in the grain tank was collected. Additionally, to determine the effectiveness of the Redekop seed control unit and loss of seed in the straw portion of the chaff, chaff samples were caught directly from the straw chopper and seed control unit during winter wheat harvest. Experiment years were analyzed separately if there was an interaction between the fixed effect and year. In both years, there was no difference in the amount of Italian ryegrass seed shattering at the combine header, within the thresher chaff, and in the grain tank. However, when the seed found in the grain tank and chaff were combined, more Italian ryegrass seed entered the combine than shattered at the combine header during winter wheat harvest. In this study, the integrated impact mill engagement did not decrease the number of intact Italian ryegrass contained within the straw and fine chaff. However, significantly more Italian ryegrass exited through the integrated impact mill than the straw chopper during harvest. Additionally, the use of the integrated impact did not result in a decrease of Italian ryegrass being contributed to the seedbank when considering the amount of header shatter.

Herbicide Programs with Sequential Treatments of Tetflupyrolimet in Flooded Rice. L. Bell1, J. Bond1, G. Mangialardi1, D. Whitt1, T. Eubank1, J. Dodd1, M. Edwards1; 1Mississippi State University, Starkville, United States

Grass species such as barnyardgrass [*Echinochloa crus-galli* (L.) Beauv.] and *Deplachne* spp. such as Amazon sprangletop (*Diplachne panicoides*) and bearded sprangletop (*Diplachne fusca* ssp. *fascicularis*) are some of the most yield-limiting weed species in rice (*Oryza sativa* L.) production. Each of these have developed resistance to or have a natural tolerance to many of the postemergence (POST) herbicides utilized in Mississippi rice production. This has led producers to heavily utilize residual herbicides, especially clomazone, for season-long control of these troublesome grass species. Tetflupyrolimet is a new residual herbicide that will be labeled for future use in rice production. It is the first new mode of action in over 30 years and will target these grass species. Research is needed to how determine how tetflupyrolimet best fits into a Mississippi rice production system. A study was conducted at Mississippi State University's Delta Research and Extension Center in Stoneville, MS, in 2024 to evaluate different rates and timings of tetflupyrolimet mixed with several herbicide products common to Mississippi rice production. The experimental site included a rice-fallow rotation where rice was seeded every other year for establishment of grass species. Rice plots were seeded with Clearfield 'CLL18' in May. The study was designed as a randomized complete block with four replications. The study included tetflufyrolimet applied at different rates and timings along with various herbicide mixtures targeting grass species. A treated check was included for comparison and included a halosulfuron plus prosulfuron at 55 g ai ha-1. Herbicide application timings included preemergence (PRE), early-postemergence (EPOST; rice with two to three leaves), and late-postemergence (LPOST; rice with four leaves to one tiller). Rates of tetflupyrolimet were confidential. Data collected included rice injury, chlorosis, necrosis, growth inhibition, leaf roll, and weed control 14, 28, 42, and 56 d after the first application, and rough rice yield.

No injury was detected with any of the PRE or POST herbicide applications. No differences in barnyardgrass control were observed among PRE treatments 14 DAT, and all PRE treatments provided > 91% control of barnyardgrass at this evaluation. Barnyardgrass control was not improved by increasing the rate or number of treatments of tetflupyrolimet. Barnyardgrass control with these same treatments 30 d after LPOST application was < 85%. Control was only > 90% with programs which included bispyribac-sodium at 33 g ai ha-1 applied LPOST. Rough rice yields were similar and > 9,234 kg ha-1 following all herbicide programs. Research indicates that within the range of tetflupyrolimet rates evaluated in this study, there was no benefit to increasing the application rate or splitting the application. For optimal barnyardgrass control, an additional LPOST application of a foliar herbicide product such as bispyribac-sodium would be needed.

Evaluation of Sulfentrazone Safety in Bell and Banana Pepper. T. Campbell1, M. Cutulle1; 1Clemson University, Charleston, United States

The objective of these research field trials is to determine if sulfentrazone is safe on pepper. The trials took place at a grower field in Cameron, South Carolina (SC) (33.490403° N, -80.658640° W) from April 22 to July 18, 2024. The trials were conducted as a randomized complete block design (RCBD) with 3 replications and were repeated 3 times in adjacent space. The site featured course soils with organic matter (OM) less than 1.5 percent and a pH of 6.8. Each trial was conducted on the following two banana type pepper and two bell type pepper varieties: 414 (banana), 21123 (banana), Procraft (bell), and Shogun (bell). Treatments consisted of the following: untreated weed-free check, sulfentrazone at 87 g ai ha-1 (pre-transplant soil applied and shielded to row middles shortly after weed germination), sulfentrazone at 174 g ai ha-1 (with the same two timings as the previous treatment), sulfentrazone at 87 g ai ha-1 (shielded to row middles shortly after weed germination, only), sulfentrazone at 174 g ai ha-1 (with the same method and timing as the previous treatment), and fomesafen at 267 g ai ha-1 plus trifluralin at 500 g ai ha-1 (both pre-transplant soil applied) plus paraquat at 704 g ai ha-1 (shielded to row middles shortly after weed germination) as a local grower standard treatment. Each plot consisted of two rows of a single pepper variety spaced approximately 1 meter apart with approximately 30 cm in-row spacing. The whole plot length was 4.5 m. Crop injury and weed control data were gathered for each plot at 14, 28, and 42 days after the row middle applications and crop yield data was gathered at the end of the growing season. The highest single injury rating observed for any plot was 20 percent and resulted from the higher rate of sulfentrazone at the pre-transplant application. Generally, crop injury was low for all treatments across all varieties and trials. Yields were numerically greater in treatments containing the lower rates of sulfentrazone when compared to treatments containing the higher rates, but these differences were not statistically significant. Some variability in yield was observed due to the presence of southern blight (*Athelia rolfsii* Sacc.) in portions of the site.

Comparing Velpar to Glyphosate + Rezilon for Smutgrass (*Sporobolus indicus* L.) Control. K. Broster1, J. Byrd1, C. Gregory1, T. Duncan1; 1Mississippi State University, Starkville, MS, United States

Smutgrass is an invasive perennial grass species from Asia problematic in pastures, right-of-ways, and other non-croplands. Although cattle graze new growth foliage, as plants mature palatability decreases. Selective control options are limited. Thorough yearly tillage of established populations, followed by emergence of annual ryegrass (*Lolium perenne* L. spp. *multiflorum* (Lam.) Husnot) has been advocated as an effective management system, although soil conservation and federal support programs may be jeopardized. It is known that glyphosate effectively controls smutgrass, but damages desirable forages and doesn't provide residual control. Glyphosate could have a fit for spot applications to control less dense populations. Hexazinone has been recommended for control as it is less detrimental to warm-season forages and provides residual control. Recently registered for application to warm-season forages, indaziflam (Rezilon™) may extend control of in conjunction with spot applications of glyphosate. A study was initiated in 2022 across three locations in Oktibbeha County Mississippi. Before herbicide application initial smutgrass densities were determined by counting individual clumps within 2 1-m2 subsamples per plot, with plots measuring 8 x 15 m. All applications were made, as labels recommend, prior to a rainfall event. Two herbicide treatments, broadcast hexazinone at 982 g ai/ha-1 and spot application of glyphosate at 2 % (v/v) with broadcast indaziflam at 88 g ai/ha-1, were applied to plots of established smutgrass populations. Broadcast applications were made with a CO2 pressurized backpack sprayer with four nozzles calibrated to deliver 280 L ha-1. General plant injury for smutgrass was evaluated 2 and 4 weeks after treatment (WAT). Counts were of individual smutgrass clumps were collected 1 and 2 years after treatment (YAT), as well as percent clover recovery 1 YAT using a 1-m2 grid with 2 subsamples per plot. Data were subjected to ANOVA in RStudio using the Agricolae package, with count data analyzed as percent change. Means were separated by Fisher's protected LSD with α = 0.05 where differences were observed. Differences between treatments for smutgrass injury were observed only at 2 WAT with the glyphosate plus indaziflam treatment having greater injury at 55% and hexazinone at 41%. When using an α = 0.1, injury differences at 4 WAT were observed with glyphosate plus indaziflam having greater injury at 71% than hexazinone at 44%. White clover (*Trifolium repens* L.) recovery was greater in the hexazinone treatment at 60% in comparison to 20% with the glyphosate plus indaziflam. No differences were observed in percent change of counts of smutgrass clumps with both being reduced by 43%. The limited differences between treatments in population changes or injury to smutgrass may mean that producers' selection for control need to factor in other elements such as injury to surrounding forages and overall recovery of other desirable forages like clover. Glyphosate applications can injure desirable forages, and the spot applications leave patches that may lend opportunities for other weedy establishments. Broadcast hexazinone may initially have a larger injury area but had quicker recovery of clover. Depending on the species in the application area either treatment may be utilized.

Weed Population Changes Over Three Years with Single-Tank See & Spray™ Programs in Soybean. T. Avent1, J. Norsworthy1, M. Dodde1, L. Pierce2, L. Lazaro3; 1University of Arkansas, Fayetteville, AR, United States, 2University of Arkansas, Santa Clara, CA, United States, 3Blue River Technology, Santa Clara, CA, United States

The growing interest in precision pesticide applications, driven by environmental and economic considerations, highlights the need for research into the weed seedbank impacts of targeted application technologies. Over three years, weed scientists from the University of Arkansas System Division of Agriculture evaluated the long-term effects of John Deere's See & Spray™ prototype on weed control in soybean. The study compared traditional broadcast applications to targeted applications using two detection sensitivity settings for postemergence and residual herbicides. All treatments followed a standard herbicide program with a broadcast preemergence application, followed by early-postemergence (EPOST) and mid-postemergence (MPOST) applications of glufosinate. Plots remained static throughout the study to monitor weed population dynamics. In-crop weed counts primarily consisted of Palmer amaranth (*Amaranthus palmeri* S. Watson). Across EPOST and MPOST timings in 2022, an average of 689 weeds ha^{-1} (70% Palmer amaranth) was observed. Targeted applications at the low detection sensitivity setting resulted in a progressive increase in weed density over three years at the time of application, with 650 weeds ha^{-1} in year 1, 2767 weeds ha^{-1} in year 2, and 9562 weeds ha^{-1} in year 3. Palmer amaranth present at soybean harvest also increased annually for the low detection setting. Targeted applications achieved 42–59% savings in postemergence-applied herbicide use and yielded a 270 kg ha^{-1} advantage over broadcast applications at the lowest sensitivity setting. However, these low-sensitivity applications also contributed to an expanding soil seedbank and heightened herbicide resistance risk. While See & Spray technology offers potential for herbicide savings, caution regarding detection sensitivity settings to prevent long-term weed management challenges is warranted.

Drought Stress Does Not Alter the Allelopathic Potential of *Cosmos sulphureus*. B. Dal`pizol Novello1, L. Leite2, T. M. Tseng3, P. L. Da Costa Aguiar Alves2; 1São Paulo State University, Mississippi State University, Jaboticabal, Brazil, 2São Paulo State University, Jaboticabal, Brazil, 3Mississippi State University, Starkville, United States

Research conducted by LAPDA/UNESP, Brazil, and Allelopathy Group Cadiz, Spain with *Cosmos sulphureus* isolated 26 compounds from its leaves and roots, three of which were described for the first time. These compounds demonstrated weed inhibition. Allelopathic weed management faces challenges due to the low concentration of allelochemicals released, and studying stress factors may provide a strategy to enhance the production and/or release of these compounds. This study evaluated the effect of drought stress at 40% field capacity for 15 days during the initial reproductive stage on the allelopathic potential of *C. sulphureus*. Drought stress was induced in *C. sulphureus* seedlings at the beginning of the reproductive stage, maintaining the plants at 40% of field capacity for 15 days. The dried and crushed leaves were subjected to extraction using dichloromethane. To assess the cytotoxicity of the extracts obtained from the described treatments, a wheat coleoptile (*Triticum aestivum* L.) elongation bioassay was conducted at concentrations of 800, 400, 200, 100, and 50 ppm. As controls, a pure buffer solution with added Tween 20 (negative control) and a buffer solution containing a reference herbicide (0.6% metsulfuron – positive control) were used. A phytotoxicity bioassay was also performed with *Portulaca oleracea* (purslane), evaluating germination rates as well as shoot and root length. The data were statistically analyzed using the F-test for variance analysis, and when significant, the means were compared using Tukey's test at a 5% significance level. All concentrations inhibited coleoptile elongation, regardless of the extract used. No significant differences were observed between the extracts from plants subjected to drought stress and those from the control plants. The extracts, both without and with drought stress, decreased by 29.6% and 30.2%, respectively, regardless of the concentration. Similarly, the concentrations 50, 100, 200, 400 and 800 ppm, regardless of the extracts, decreased by 25.8, 28.3, 32.3, 32.2, 29.6, 32.1%, respectively. The treatments demonstrated greater activity compared to the reference herbicide which decreased by 13.6%, regardless of the concentration or extract used. All extracts and concentrations reduced purslane germination; however, no interaction between factors was observed, nor was there a significant difference between treatments, for the extract, regardless of the concentration, without and with drought stress the decreased by 9.3 and 16.9% respectively, when the concentration were analyzed, regardless of the extract, the concentration of 50, 100, 200, 400 and 800 ppm decreased by 9.69, 11.2, 4.1, 18.3, 22.4, respectively. There was no reduction in shoot length. For root length, no interaction between factors was observed. Extracts from plants without drought stress caused greater reduction (36.0%), compared to those with stress (32.6%) and no differences were detected among the concentrations tested. The concentration of 50, 100, 200, 400 and 800 ppm decreased by 25.7, 31.0, 27.0, 44.2 and 43.2% respectively, regardless of the extract. In conclusion, the conditions of imposed drought stress did not enhance the allelopathic potential of *C. sulphureus*.

Evaluating Interactions of Tetflupyrolimet Mixed with Other Preemergence Herbicides. M. Hains[1], C. Webster[1], B. Stoker[1], G. Sparks[1], E. Williams[1], W. Carr[1]. [1]Louisiana State University, Baton Rouge, United States.

Tetflupyrolimet, a novel herbicide of aryl pyrrolidinone anilides, is a narrow-spectrum preemergence herbicide that is labeled for grass control in rice (*Oryza sativa* L.). A study was conducted in 2023 and 2024 at the H. Rouse Caffey Rice Research Station near Crowley, Louisiana, to evaluate tetflupyrolimet mixtures to broaden the weed control spectrum. Plot size was 3 by 9.14 m^2 with 16-19.5 cm drill-seeded rows of 'PVL03' at 78.4 kg ha^{-1}. This study was a randomized complete block with a two-factor factorial arrangement of treatments with three replications. Factor A consisted of applications of either no grass residual herbicide, tetflupyrolimet at 125 g ai ha^{-1}, clomazone at 313 g ai ha^{-1}, or clomazone at 313 g ha^{-1} mixed with tetflupyrolimet at 125 g ha^{-1}. Factor B consisted of either no broadleaf residual herbicide, quinclorac at 2242 g ai ha^{-1}, a prepackaged mixture of halosulfuron plus prosulfuron at 70 g ai ha^{-1}, or saflufenacil at 70 g ai ha^{-1}. All herbicide applications were applied with a CO_2-pressurized backpack sprayer calibrated to deliver 93.5 L ha^{-1}. Visual evaluations of percent control for this study included barnyardgrass [*Echinochloa crus-galli* (L.) P. Beauv.] and broadleaf signalgrass [*Urochloa platyphylla* (Munro ex C. Wright) R.D. Webster] control at 21 and 56 days after treatment (DAT). Visual evaluations of percent control were also recorded for spreading dayflower [*Commelina diffusa* Burm. f.] at 21 DAT. Rough rice yields were obtained and adjusted to 12% moisture. At 21 DAT, all herbicide mixtures except tetflupyrolimet and halosulfuron plus prosulfuron controlled barnyardgrass 86 to 96%. When tetflupyrolimet was mixed with any of the broadleaf residual herbicides, 85-91% control of broadleaf signalgrass was observed at 21 DAT compared to 93-96% control when mixed with clomazone. At 56 DAT, control of broadleaf signalgrass was 77% when clomazone and saflufenacil were applied together. When tetflupyrolimet was added to the mixture of clomazone and saflufenacil, control was 88%. At 21 DAT, saflufenacil applied alone controlled spreading dayflower 95%, whereas when tetflupyrolimet was mixed with saflufenacil, control observed was 76%. This study suggests that applying tetflupyrolimet with various preemergence grass and broadleaf herbicides can allow for a broadened control spectrum.

The Benefits of Overlapping Residual Herbicides in Weed Management Programs for Multiple Herbicide-Resistant *Amaranthus* Populations in Corn. J. Holloway[1], M. Hay[2], M. Kitt[3], D. Belles[3], T. Beckett[3], E. Palmer[3], J. Haarmann[4]. [1]Syngenta Crop Protection, LLC, Jackson, United States. [2]Syngenta Crop Protection, LLC, Garden Plains, United States. [3]Syngenta Crop Protection, LLC, Greensboro, United States. [4]Syngenta Crop Protection, LLC, Rochester, United States.

Multiple herbicide-resistant waterhemp (*Amaranthus tuberculatus* [Moq.] Sauer.) and Palmer amaranth (*Amaranthus palmeri* S. Watson) have become difficult to control with traditional herbicide programs in corn. Field trials across multiple sites were implemented during 2024 to evaluate herbicide programs consisting of robust residual herbicide rates and overlapping residuals for the control of multiple herbicide-resistant *Amaranthus* spp. populations on LibertyLink® and Roundup Ready© 2 Corn. Data concluded that robust rates of overlapping residuals applied as a PRE fb early POST provided effective control of multiple herbicide-resistant *Amaranthus* spp. on LibertyLink® and Roundup Ready© 2 Corn.

Occurrence and Characterization of Newly Evolved Glyphosate-Resistant Grass Weeds in Louisiana Cropping Systems. P. Jha[1], G. Bortolon[1], B. Dhaka[1], F. Rontani[2], M. Foster[3], C. Webster[1], D. Miller[1], D. Stephenson[4], J. Norsworthy[5]. [1]Louisiana State University AgCenter, Baton Rouge, United States. [2]Louisiana State University, Baton Rouge, United States. [3]Louisiana State University AgCenter, St. Gabriel, United States. [4]Louisiana State University AgCenter, Alexandria, United States. [5]University of Arkansas, Fayetteville, United States.

Seeds of putative glyphosate-resistant junglerice (*Echinochloa colona*) and goosegrass (*Eleusine indica*) biotypes were collected from cotton/soybean production fields in Central Louisiana in the fall of 2023 after plants escaped multiple glyphosate applications. For each weed species, separate whole plant dose-response experiments were conducted in 2024 at the LSU AgCenter greenhouse with 10 different doses of glyphosate ranging from 1/8 to 12-times the recommended field-use rate (840 g ae ha^{-1}). Untreated controls for both putative glyphosate-resistant and susceptible biotypes of each weed species were included. All plants were grown in pots filled with potting soil in the greenhouse at the LSU AgCenter greenhouse maintained at 25/20°C day/night temperatures, 16-h photoperiod with light intensity of 500 µmol m^{-2} s^{-1} and 70% relative humidity (RH). A commercial chamber track sprayer (DeVries Manufacturing, Hollandale, MN, USA) equipped with 8002EVS flat-fan nozzles (TeeJet®, Spraying Systems, Denver, CO, USA) was used and calibrated to deliver 20 GPA of spray solution at the level of the plant canopy. Visual control ratings on a scale of 0-100% were taken at 7, 14, and 21 days after application of glyphosate and above ground biomass was collected at 21 days after application to determine dry weight (% of nontreated). All experiments were repeated in time. Putative glyphosate-resistant goosegrass biotypes survived two times the field use rate of glyphosate. A putative glyphosate-resistant junglerice population survived six times the field-use rate of glyphosate, indicating high levels of resistance to glyphosate. Survivors produced seeds, which were used for subsequent experiments. Clethodim, quizalofop, glufosinate, and paraquat were effective in controlling those glyphosate-resistant junglerice and goosegrass biotypes. This is the first report of the occurrence of junglerice and goosegrass biotypes with reduced sensitivity to glyphosate in Louisiana.

Field Assessment of Herbicide Tolerance in the Beauregard Sweetpotato (*Ipomoea batatas*) to Various Herbicidal Chemistries. A. Miller[1], T. M. Tseng[1], L. Harvey[1], A. Richardson[1], J. Argenta[1], N. Maphalala[1]. [1]Mississippi State University, Mississippi State, United States.

The limited number of herbicides labeled for use in sweetpotato (*Ipomoea batatas*) production in the United States creates a need for registration of additional herbicides with various modes of action (MOA) to enhance weed control, improve yields, and promote a more sustainable sweetpotato (SP) production system. This field study aims to evaluate the efficacy and tolerance of selected herbicides applied at a single rate on the Beauragard SP variety in the field environment. The study is organized using a randomized complete block design with three replications per treatment, including a control. Herbicide treatments consist of both pre-emergence (PRE) and post-emergence (POST) applications, applied using a CO_2-pressurized backpack sprayer calibrated to deliver 20 gallons per acre (GPA) with XR8002 flat fan nozzles. Herbicides evaluated include both PRE and POST applied applications, including: fluridone, glyphosate, glufosinate, carfentrazone, saflufenacil, and acifluorfen, among others. Sweetpotato injury will be assessed visually by recording injury percentages at 7, 14, 21, and 28 days after treatment (DAT). Harvestable yields were evaluated at the end of the growing season, with yield grades determined for US No. 1, Canner, Cull, and Jumbo categories. The total marketable yield was calculated as the sum of US No. 1, Canner, and Jumbo grades. Overall, metribuzin applied POST transplant showed low crop injury and high yields. This research will provide insights into the practical application of herbicides under field conditions, contributing to improved weed management strategies for sweetpotato production.

Assessing Effective Germination Methods of *Amaranthus* Species: A Greenhouse Study. D. Smitherman[1], D. Russell[1], J. S. McElroy[1]. [1]Auburn University, Auburn, United States.

Weeds are notorious for their resilience in field conditions, where they infest crops and reduce yields; however, under controlled greenhouse conditions germination and establishment often falters which complicates research efforts including herbicide resistance screenings. Germination problems in turn slows down research efforts and causes inconsistencies in the establishment of experiments. This study aimed to develop an improved germination protocol for *Amaranthus* species to address these challenges. Seeds were collected from various locations across Alabama, threshed, cleaned, and stored at 8°C in a seed storage refrigerator. Initial attempts to germinate seeds by directly planting them in potting soil in the greenhouse were unsuccessful, indicating the need for seed treatments. Three seed treatments and two stratification treatments were evaluated in a randomized complete block design with three replicates, using 25 seeds per treatment: nontreated seeds (control), seeds soaked in warm tap water (40–49°C) for 30 minutes, and seeds soaked in a 1% bleach solution for 30 minutes. Each treatment was paired with a 96-hour stratification period at 8°C to after seed treatment to assess its impact on germination success. After stratification, treatments were applied to non-stratified seeds and all six treatment groups were placed in the greenhouse simultaneously. Pots (15 cm x 10 cm) were filled with Miracle-Gro potting soil, and seeds were sown 1 cm deep and watered to saturation. Seedlings were monitored for four weeks, with emerging seedlings counted weekly. Results indicated that the warm water soak combined with stratification significantly (alpha < 0.05) enhanced germination with up to 76% germination. The warm water soak without stratification was the next most effective treatment with up to 68% germination. These findings underscore the critical role of seed pre-treatment and stratification in improving germination rates, providing valuable insights for optimizing greenhouse studies involving pigweed species. By overcoming the germination challenges typically encountered in greenhouse settings, these results lay the foundation for more consistent and reliable research outcomes.

Impact of Cover Cropping and Tillage Practices on Weed Seed Bank Dynamics. M. Rady[1], M. Cutulle[1], B. Ward[1]. [1]Plant and Environmental Sciences Department, Coastal Research and Education Center, Clemson University, Charleston, SC, United States.

Utilizing cover cropping and reduced tillage as climate-smart agricultural practices is essential for addressing climate change, enhancing weed management, and optimizing leafy greens production. Cover crops play a critical role by sequestering carbon while suppressing weeds through competition for environmental and soil resources. Furthermore, many cover crops release allelopathic compounds that inhibit weed seed germination. Reduced tillage complements these efforts by preserving soil structure, minimizing disturbances, and fostering conditions that enhance weed seed dormancy and predation. Together, these practices not only mitigate weed pressure but also promote long-term environmental sustainability and climate resilience. To maximize the effectiveness of these practices, understanding the dynamics of the weed seed bank is crucial. This study aims to determine the optimal combination of winter cover crops, including legumes and cereals, and tillage practices to effectively reduce the soil seed bank. This study was conducted in the winter of 2023 at the Coastal Research and Education Center, Charleston, SC, using a split-split plot design with three replications.

- Main factor: Ten legume species: Regal Graze, Companion, Advantage, Durana, Renovation, and Will Ladino clovers (*Trifolium repens*), Balansa and Ocoee clovers (Trifolium michelianum), Crimson clover (*Trifolium incarnatum*), and Hairy vetch (*Vicia villosa*).

- Subfactor: Six cereals and three controls: Florida 401 and Wrens Abruzzi ryes (Secale cereale), Jumbo tetraploid annual ryegrass (*Lolium multiflorum*), Eagle buck monster forage wheat (*Triticum aestivum*), Coker 227 oats (*Avena sativa*), 324 Triticale (*Triticum x Secale*), legume control, fallow control, and bare control.

- Sub-subfactor: Tillage management with two levels (tillage and no-tillage) assessed via greenhouse bioassay.

Cover crops were planted in mid-November 2023 and terminated in late May 2024, and the soil seed bank was evaluated at a depth of 10 cm immediately after termination. Soil samples were collected by combining three subsamples per plot (37.3 cm^2), thoroughly mixed, and divided into two subsamples for tillage treatments. Each subsample was placed into a 330-ml plastic cell in 18-cell trays and maintained in a greenhouse for 84 days, starting on June 28, 2024. Weed seedling emergence was recorded biweekly, and the total soil seed bank was calculated from cumulative germinated weed seeds. The dominant weed species observed were Virginia buttonweed (Diodia virginiana L.), common purslane (Portulaca oleracea L.), corn spurry (Spergula arvensis L.), and yellow nutsedge (Cyperus esculentus L.) at 35%, 24%, 20%, and 13%, respectively. A significant negative relationship was found between the seed bank and time, with a significant steeper decline under no-till (-159 seeds m^{-2}) compared to tillage (-139 seeds m^{-2}) for total weed flora. The lowest total seed bank was recorded in plots with hairy vetch and Coker 227 oats under tillage (13,113 seeds m^{-2}) and Advantage ladino clover under no-tillage (13,590 seeds m^{-2}), representing reductions of 39% and 38%, respectively, compared to bare controls. Virginia buttonweed had its lowest seed bank (3,457 seeds m^{-2}) in plots with hairy vetch, Eagle buck monster forage wheat, and no-till management. These findings highlight the effectiveness of cover cropping and no-till practices in suppressing weed infestation.

Determining Pre-Emergent Herbicide Options for North Carolina Pollinator Species. H. Lee[1], C. Cahoon[1], Z. Taylor[1], B. Dean[1], J. de Sanctis[1]. [1]North Carolina State University, Raleigh, United States.

During the summer of 2024, a study was conducted to evaluate wildflower species tolerance to various herbicides applied PRE-transplant and POST-transplant. The wildflower species evaluated were black-eyed Susan (*Rudbeckia hirta*), purple coneflower (*Echinacea purpurea*), Scarlet bee-balm (*Monarda didyma*), and Shasta daisy (*Leucanthemum superbum*). These species were transplanted and treated on May 30, 2024, at the Central Crops Research Station in Clayton, NC. Treatments were replicated 4 times with a randomized strip plot design. The following herbicides were applied PRE-T (rate in g ai ha^{-1}): pyrithiobac (76), mesotrione (140), fluometuron (1212), sulfentrazone (140), indaziflam (58), a premix of pyroxasulfone and flumioxazin (46 + 34), and fluridone (168). The following herbicides were applied POST-T: pendimethalin (1064), pendimethalin (2128), S-metolachlor (1092), and pendimethalin + S-metolachlor (2156). An untreated check was included for comparison. When required by label, crop oil concentrate, methylated seed oil, and non-ionic surfactant were added at a one-half percent, one percent, and one-quarter percent volume-per-volume basis, respectively. Plots were 3 m wide by 9 m long with two treated transplant rows. Treatments were applied using a CO_2 backpack sprayer equipped with Teejet flat-fan AIXR 11002 nozzles, calibrated to deliver 140 L ha^{-1}. Wildflower injury was visually estimated one, two, four, and eight weeks after treatment, and plot density was recorded 8 weeks after treatment. When pendimethalin and S-metolachlor were applied POST-T, minimal injury and reductions in plant density were observed across all species. For black-eyed Susan, acceptable (0-15% injury) PRE-T treatments were indaziflam, sulfentrazone, pyrithiobac, fluridone, and mesotrione. Those herbicides caused little to no injury and minimal reductions in plant density. For Scarlet bee-balm, indaziflam, sulfentrazone, and mesotrione caused little to no injury and minimal reductions in plant density compared to the untreated check. For purple coneflower, indaziflam, sulfentrazone, pyrithiobac, fluridone, mesotrione, and fluometuron caused little to no injury and minimal plot density reduction compared to the untreated check. For Shasta daisy, indaziflam, sulfentrazone, fluridone, mesotrione, and fluometuron caused little to no injury and minimal plot density reduction compared to the untreated check. In conclusion, this data suggests that several herbicide options have the potential to be safely integrated over the top of these wildflower species. Herbicides that appear safe will be recommended for further replicated testing. After further testing, 24(c) labels can be pursued so that these products may be incorporated into weed management plans by the NC DOT wildflower program.

Cover Crop and Sprayer Sensitivity Setting Influence on See & Spray™ Ultimate vs See & Spray™ Premium. D. Contreras[1], B. Pendleton[1], C. Bradshaw[1], J. Alsdorf[1], R. Argueta[1], L. Lazaro[2], C. Cahoon[1], W. Everman[3]. [1]North Carolina State University, Raleigh, United States. [2]Blue River Technology, Santa Clara, United States. [3]Iowa State University, Ames, United States.

See & Spray™ (S&S) technology is a precision agriculture sprayer system that utilizes computer vision and machine learning to target weeds. Among its commercial platforms, both S&S Premium and S&S Ultimate provide the ability to target weeds within crops. However, a key difference between the two platforms is that S&S Premium features a single tank, while S&S Ultimate has dual tanks, allowing for simultaneous broadcast residual application alongside targeted spray application. S&S operators can adjust the sprayer sensitivity setting depending on their goals; a lower sensitivity setting requires higher confidence to identify a weed, whereas confidence increases with weed size, while higher sensitivity settings reduce the confidence needed for spraying. Cover crops are commonly used as a weed suppression tactic. Integrating multiple weed management strategies can enhance weed control, therefore a study was conducted with the objective of assessing the efficacy of See & Spray Premium and See & Spray Ultimate as influenced by cover crop and sprayer sensitivity settings. The experiment treatments followed a factorial design with Factor A: cover crop vs. no cover crop, Factor B: low, medium, or high sensitivity, and Factor C: S&S Premium or S&S Ultimate platform, along with two untreated treatments (with and without a cover crop) for comparison. Herbicide applications were made with an Agronomy Test Machine (ATM), a condensed version of the S&S Ultimate platform adapted for small plot research, at preemergence, early postemergence and mid-postemergence timings. Weed control data were collected at the time of each postemergence application and 14 days after mid postemergence. Cover crop provided significant suppression of Palmer amaranth (*Amaranthus palmeri* S.) and goosegrass (*Eleusine indica* G.) at all rating dates. Sprayer sensitivity and S&S platform did not significantly impact weed control. This study demonstrated that the efficacy of See & Spray Premium and See & Spray Ultimate was not significantly influenced by sprayer sensitivity settings. However, cover crop presence did have an impact on their effectiveness, highlighting the importance of integrating cover crops into weed management strategies. These findings suggest that combining multiple approaches, such as targeted spraying systems and cover crops, can enhance overall weed control.

Fluridone Application Timings in Louisiana Rice. W. Carr[1], C. Webster[1], B. Stoker[1], M. Hains[1], G. Sparks[1], E. Williams[1]. [1]LSU AgCenter, Baton Rouge, United States.

A herbicide containing fluridone has been labeled in rice (*Oryza sativa* L.) for Palmer amaranth (*Amaranthus palmeri*) control due to a new farming practice that uses furrow irrigation with the absence of a permanent flood. Traditional preemergence herbicides used in rice have little control of Palmer amaranth. Over the past growing seasons, Palmer amaranth has become an issue in furrow irrigated rice. In 2023, at the H. Rouse Caffey Rice Research Station in Crowley, Louisiana, four studies were conducted to evaluate crop response to fluridone on Louisiana rice varieties. Rice varieties PVL03, Avant, and Jupiter were seeded at 78.5 kg ha^{-1}, and RT7321 was seeded at 33.63 kg ha^{-1}. All varieties were seeded on Crowley silt loam. For each study the experimental design consisted of a two-factor factorial arrangement of treatments within a randomized complete block design replicated four times. Factor A consisted of rates of fluridone at 0, 84, 126, or 168 g ha^{-1}. Factor B consisted of five application timings targeting pre-emergence, delayed pre-emergence, 1-2 leaf rice, 3-4 leaf rice, and preflood. Plot sizes were 1.5 by 5.2 m^2. Trials were kept weed-free for the duration of the study. Applications were made with a backpack sprayer calibrated to deliver 140 L ha^{-1}. Injury was evaluated visually at 14 and 28 days after treatment (DAT) on each timing as a percentage. Percent heading and plant heights were collected at harvest. Yield was obtained and adjusted to 12% moisture. At 14 DAT, crop injury of 13% was observed when 84 g ha^{-1} of fluridone was applied at the preflood timing and 42% at the delayed pre-emergence timing in Avant. In Jupiter, crop injury of 8% was observed when 126 g ha^{-1} of fluridone was applied at the pre-flood timing and 20% at the 1-2 leaf rice timing. In PVL03, crop injury of 15% was observed when 168 g ha^{-1} of fluridone was applied at the pre-flood timing and 32% at the 1-2 leaf rice timing. Rice response to fluridone varies by variety as well as application timing and rate.

Southeasternflora.com a resource weed scientists need. J. Byrd[1], J. Gwaltney[2], C. Bryson[3]. [1]Mississippi State University, Mississippi State, United States. [2]CEO Forestry Suppliers, Inc., Jackson, United States. [3]USDA-ARS, Retired, Starkville, United States.

In his address to the annual meeting of the Agricultural Society of Newcastle, DE on September 14, 1843 published in Volume VIII of *The Farmers' Cabinet and American Herd-Book*, Physician William Darlington suggested practical American agriculturalists maintain a herbarium of prepared pressed mature and immature plant specimens with common and scientific names, habitat, date collected and other anecdotal information as a resource to know the plants on their farm. He went on to state more than ¾ of the plants on farms in his area of Chester County, Pennsylvania were worthless or harmful. Since it is doubtful many farmers followed this advice, the task of plant identification frequently falls on agrichemical retailers and sales personnel, crop consultants, and Extension personnel. Relatively few weed scientists are proficient plant taxonomists or keep abreast of ongoing changes in the disciplines of plant systematics and nomenclature. Serious students of our discipline typically learn to recognize a few hundred weeds. Since the late 1800's, weed identification resources have evolved from leaflets and books filled with pages of line drawings to books of color photographs, many too bulky or cumbersome to keep on the dashboard of a pickup. Advances in electronic technology eliminated the need to own a weed identification book. Smartphone apps and advances in artificial intelligence (AI) will improve identification accuracy over time. However, accuracy of these tools will be dictated by the botanical knowledge of those providing the input reference materials. *Southeasternflora.com* is a website developed to assist with electronic plant identification. The brainchild of Forestry Suppliers, Inc. CEO, John Gwaltney, who also serves as photographer, teamed with retired USDA-ARS Botanist Charles Bryson to create the website. As of 01/02/2024, the site contains over 65,000 photographs of 2,749 herbs, vines, shrubs, and trees found throughout the southeastern U.S. Plants are alphabetized by current scientific and USDA Plants Database common names and grouped by family. Identification is facilitated by user providing information on flower color, plant morphology, leaf type and arrangement to narrow the selection. Users can also search by family if family characteristics are known. The site contains a glossary of terms as a reminder of morphology, leaf type, and leaf arrangement as well as basic characteristics of monocots and dicots. *Southeasternflora.com* is a user-friendly website for plant identification links from a smartphone or computer when plant identification is requested.

Exploring Weed-Suppression Potential Using Different Cotton Cultivars. M. Singletary[1], P. Dotray[2], C. Kelly[3], M. Bagavathiannan[4], M. Woolard[1], B. Rodriguez[3]. [1]Texas Tech University, Lubbock, United States. [2]Texas A&M AgriLife Research and Extension Service, Texas Tech University, Lubbock, United States. [3]Texas A&M AgriLife Research and Extension Service, Lubbock, United States. [4]Texas A&M University, College Station, United States.

Weed management remains a significant concern for organic cotton producers. Cover-crop establishment in a semi-arid region with low rainfall and limited irrigation is a challenge and poor control from commercially available organically- approved herbicides has led many producers in the Southern High Plains to rely heavily on mechanical cultivation for season-long weed control. Integrating various weed management tactics throughout the season is important for the sustainability of organic cotton production. In 2024, a study was conducted at the Texas A&M AgriLife Research and Extension Center in Lubbock to evaluate the weed suppressive potential of ten advanced cotton breeding lines (‘LBB 7’, ‘LBB 8’, ‘LBB 9’, ‘LBB 10’, ‘LBB 11’, ‘LBB 12’, ‘LBB 13’, ‘LBB 14’, ‘LBB 15’, ‘LBB 16’), three recently released cultivars (‘CA 4019’, ‘CA 4014’, ‘CA 4015’), and three commercial varieties (FiberMax ‘FM 958’, FiberMax ‘FM 989’, Deltapine ‘DP 491’) for use in organic production. This study was replicated once and repeated across three field sites with varying soil types: furrow irrigated without weed interference (Olton clay loam), rain-fed without weed interference (Acuff loam), and furrow irrigated with weed interference (Acuff loam). Weekly evaluations consisted of cotton stand emergence, canopy height and green canopy cover, and Palmer amaranth density and height within eight centimeters of the cotton row. When comparing cotton canopy height across the three field sites, stunting by Palmer amaranth was not observed until 40 days after cotton emergence (DAE). By 50 DAE, overall cotton height from the weed interference field was reduced by 33% and 11% when compared to cultivar heights from the rain-fed and irrigated fields without weed interference, respectively. Palmer amaranth densities did not vary among the 16 cultivars from 3 to 50 DAE. Conversely, Palmer amaranth height did vary among cultivars. The cultivar ‘CA 4014’ reduced Palmer amaranth height up to 4 and 11 cm in relation to heights observed from the commercial variety plots at 18 and 37 DAE, respectively. At 43 DAE, Palmer amaranth height ranged 33 to 47 cm with the shortest weeds measured from plots sown to ‘LBB 12’. Of the 16 cultivars, three had okra shaped leaves and 11 had normal upland shaped leaves. Leaf shape did not affect green canopy cover or Palmer amaranth density. Results from year one of this study infer certain cotton cultivars may have the potential to reduce the canopy height of weeds such as Palmer amaranth. Further research is needed to confirm the weed suppressive abilities of cotton cultivars.

Evaluation of Pyroxasulfone + Carfentrazone Coated Fertilizer Applications in Cotton. C. Wayhs Backes[1], Z. Howard[1], S. Nolte[1]. [1]Texas A&M University, College Station, United States.

Palmer amaranth is a challenge across multiple modes of action. Pyroxasulfone is a root and shoot growth inhibitor herbicide. In comparison, carfentrazone promotes the inhibition of protoporphyrinogen oxidase. The premix of carfentrazone + sulfentrazone is labeled as Anthem Flex and controls problematic weeds in cotton. The recent approval by the EPA allowing impregnated fertilizer applications expands the use of this herbicide. Therefore, 2019, 2023, and 2024 experiments were conducted in College Station to evaluate the control of Palmer amaranth and problematic grasses in cotton. The experiment was designed with randomized blocks with five and six treatments, depending on the year. All years included treatments of post direct carfentrazone + sulfentrazone and 90 kg/ha AMS coated with carfentrazone + sulfentrazone, as well as treatments of glyphosate with either dicamba or 2,4-D, with and without S-metolachlor or acetochlor. Palmer amaranth control was greater compared to grasses across years and treatments. Adequate rainfall (> 1 inch) was found to be crucial to activating the premix for both AMS coated and post direct applications. At 14 days after treatment, no differences among treatments and years were detected. Not considering 2023 (drought), all treatments maintained satisfactory control of Palmer amaranth and grasses (>90%) up to 56 days after treatment. The post direct application of carfentrazone + sulfentrazone showed the lowest control across years, but maintained adequate control (>85%), excluding 2023 (drought). Overall, carfentrazone + sulfentrazone is an effective pre-emergent herbicide premix for use in cotton in East Central Texas when adequate incorporation is achieved.

Effect of Low Rate of 2,4-D on Tomato at Different Growth Stages. T. Bararpour[1], T. M. Tseng[2]. [1]Mississippi State University, Delta Research & Extension Center, Stoneville, United States. [2]Mississippi State University, Starkville, United States.

Tomatoes (*Lycopersicon esculentum*) are an important vegetable crop that is grown commercially and in local gardens in Mississippi. A greenhouse study was conducted in 2023-2024 at the Delta Research and Extension Center, in Stoneville, Mississippi, to determine the effect of low rate (simulated drift rate) of 2,4-D on tomato at different growth stages and possible contamination of the fruit. Tomato (cherry tomato) seeds were planted in the small pots (2.5" x 2.5" x 3") containing potting-mix on September 19, 2023. Tomatoes emerged on September 25. Tomato seedlings were transplanted in a bigger pot (6" in diameter by 7" in height) on October 4. The experiment was designed as three (growth stage) by five (treatments) factorial arrangement in a randomized complete block and replicated four times. Treatments were as follows: 1) untreated control; 2) 2,4-D at 1/16X rate + Non-ionic surfactant (NIS) at 0.25% (v/v); 3) 2,4-D at 1/32X rate + NIS; 4) 2,4-D at 1/64X rate + NIS; and 5) 2,4-D at 1/128X rate + NIS. The 1X rate of 2,4-D was 32 fl oz/A. The three growth stages of tomato (application timing) were: A) vegetative stage (before flowering); B) at flowering; and C) at fruiting. Three weeks post-application (WAA), tomato injury from 2,4-D varied significantly by growth stage (averaged across 2,4-D rates). Vegetative-stage tomatoes showed the highest sensitivity, followed by flowering and fruiting stages. Seedlings at the vegetative stage (applied on October 17, 2023) showed no fruit at 1/16 X 2,4-D, while those at flowering (applied on November 2) and fruiting (applied on November 20) stages still produced fruits at 1/16 X. Tomato fruits from different 2,4-D rates and untreated checks were planted on January 9, 2024, emerging on January 25, and transplanted on January 30. The F1 progeny, evaluated four times, exhibited no visible 2,4-D symptoms. The results of HPLC analysis indicate that: The study investigated the presence of 2,4-D in tomato plants at different growth stages. At the flowering stage, no 2,4-D was detected in any of the samples, indicating that the herbicide was not present in the plants during this stage. During the fruiting stage, 2,4-D was detected in some samples, with an average concentration of 0.1844 µg/g. These levels are relatively low and well below the tolerance level established by the EPA for 2,4-D residues in tomatoes, which is 10 ppm (equivalent to 10,000 µg/g). Therefore, the detected levels are unlikely to pose immediate health risks to consumers, as they are significantly below the threshold considered harmful to human health. However, continued monitoring of herbicide residues in food products is important to ensure that they remain within safe limits and to minimize potential health risks associated with long-term exposure to pesticides. These findings suggest potential implications for 2,4-D on tomato crops, warranting further investigation into its effects on yield and food safety.

Annual Bluegrass Response to Liquid Nitrogen Applied via Individual-Plant-Treatment System. J. Romero1, N. Godara1, S. Hale1, S. Askew1 1Virginia Tech, Blacksburg, United States.

Innovative approaches to weed management using cryogenic fluids, specifically liquid nitrogen (LN) at its boiling point of –196 °C, have been explored for their ability to eradicate weeds through cellular destruction. Despite its proven effectiveness in agricultural settings, the widespread use of LN has been hindered by its cost and the need for targeted application. However, the integration of artificial intelligence (AI) with precision agriculture technologies has opened new avenues for its application in turfgrass management. This investigation had dual aims: to refine a technique for precise LN application on turfgrass weeds and to assess how different LN doses impact the control of annual bluegrass (*Poa annua*). The field tests, carried out in two locations, utilized a randomized complete block design (RCBD) with seven LN treatment levels, each replicated ten times. The study focused on annual bluegrass at the developmental stage of 4–6 tillers, treated with LN volumes ranging from 0.64 mL to 5.12 mL per plant via a specially crafted LN applicator. Treatment effectiveness was monitored through digital imaging at 3, 7, 14, and 28 days after treatment (DAT). Findings indicated that LN volumes between 2.2 mL and 5.16 mL per plant significantly reduced annual bluegrass green cover compared to non-treated controls, with clear signs of damage by 3 DAT and sustained reduction up to 28 days, especially at the higher doses. Doses under 2 mL showed only brief effects, with visible regrowth by day 7. An economic assessment revealed that LN could be cost-competitive with existing herbicides such as Tribute™ Total, Fusilade® II, and Pylex™, depending on production scale. The cost ranged from \$39 ha^{-1} for large-scale LN production to \$229 ha^{-1} for smaller operations, targeting a 1 % goosegrass infestation per hectare, assuming each plat will be treated with 2ml of LN. This study underscores the promise of LN as a selective and eco-friendly method for weed control in turfgrass, especially when combined with AI for precision application. Future studies aim to assess the impact of such treatments on overall turf health and appearance.

Weed Management Programs in Mississippi Peanut. T. Bararpour1, B. Zurweller2 1Mississippi State University, stoneville, United States, 2Mississippi State University, Starkville, United States.

A field study was conducted in 2024 at the Delta Research and Extension Center, in Stoneville, Mississippi, to evaluate one-pass, two-pass, and three-pass herbicide applications for broad-spectrum weed management program in Mississippi peanut (*Arachis hypogaea*). Peanut (Georgia-06G) was planted at a seeding rate of eight seeds ft-1 on May 30, 2024, and emerged on June 9. Plot size was 13 ft wide by 20 ft long. The plot area contained glyphosate-resistant Palmer amaranth (*Amaranthus palmeri*), entireleaf morningglory (*Ipomoea hederacea* var. integriuscula), prickly sida (*Sida spinosa*), broadleaf signalgrass (*Urochloa platyphylla*), and hemp sesbania (*Sesbania herbacea*). The study was designed as a randomized complete block with 16 treatments and four replications. Herbicide treatments were as follows (rate in oz/a): 1) Valor (flumioxazin) at 3 + Dual Magnum (S-metolachlor) at 32 + Strongarm (diclosulam) at 0.45 Preemergence (PRE); 2) Valor + Dual Magnum + Strongarm + Grounded (soil adjuvant) at 16 PRE (application A); 3) Brake at 16 + Dual Magnum + Strongarm PRE; 4) Brake + Dual Magnum + Strongarm + Grounded PRE; 5) Valor + Dual Magnum + Strongarm + Brake PRE; 6) Valor + Dual Magnum + Strongarm + Brake + Grounded PRE; 7) Valor + Dual Magnum + Strongarm PRE followed by (fb) Storm (bentazon + acifluorfen) at 24 + Zidua (pyroxasulfone) at 3.3 + COC at 1% v/v (application B) fb Select (clethodim) at 10 + COC (application C); 8) Valor + Dual Magnum + Strongarm + Grounded PRE fb Storm + Zidua + COC (B) fb Select + COC (C); 9) Brake + Dual Magnum + Strongarm PRE fb Storm + Zidua + COC (B) fb Select + COC (C); 10) Brake + Dual Magnum + Strongarm + Grounded PRE fb Storm + Zidua + COC (B) fb Select + COC (C); 11) Valor + Dual Magnum + Strongarm PRE fb Storm + Zidua + COC (B) fb Select + COC (C); 12) Valor + Dual Magnum + Strongarm + Brake + Grounded PRE fb Storm + Zidua + COC (B) fb Select + COC (C); 13) Gramoxone (paraquat) at 12 + NIS at 0.25% (B) fb Storm + Zidua + COC + Grounded (C) fb Select + COC (application D); 14) Dual Magnum + Cadre (imazapic) at 4 + NIS (B) fb Select + COC (D); 15) Dual Magnum + Cadre + NIS Grounded (B) fb Select + COC (D); and 16) nontreated check. Glyphosate-resistant Palmer amaranth control was 81, 85, 80, 78, 82, 82, 98, 98, 95, 97, 98, 99, 95, 74, and 74% from treatment 1 through 15 at 7-weeks after emergence (WAE), respectively. Entireleaf morningglory, prickly sida, and hemp sesbania control were 98 to 100% from the application of treatment 1 through 15. Treatment 1 through 15 provided 86, 88, 86, 90, 82, 83, 100, 98, 100, 98, 99, 100, 97, 100, and 100% control of broadleaf signalgrass at 7 WAE, respectively.

Influence of Late-Season Herbicides on Survival, Fecundity and Progeny Fitness of Glyphosate-Resistant Italian Ryegrass. B. Dhaka1, P. Jha1, D. Miller1, C. McKoin1, F. Rontani1, G. Bortolon1 1Louisiana State University AgCenter, Baton Rouge, United States.

Italian ryegrass (*Lolium perenne* ssp. multiflorum) poses a significant challenge to soybean, cotton, wheat, and corn producers in the Midsouth, particularly with the evolution of resistance to multiple herbicide sites of action (glyphosate, ALS- and ACCase-inhibitors). Field, laboratory, and greenhouse experiments were conducted in Louisiana in 2024 to investigate the effect of nine different herbicides (different sites of action typically used in spring burndown programs prior to planting soybean, cotton, or corn) applied at three different reproductive stages (anthesis stage; soft dough stage, and late grain filling stage) on seed reduction, seed quality (percent germination/viability, 100-seed weight) and progeny seeding fitness (plant height, leaf/tiller count, and biomass) of glyphosate-resistant Italian ryegrasss. A non-treated control was included for comparison at each reproductive stage (late-season timing). Herbicides were applied at their field-use rates along with recommended adjuvants to glyphosate-resistant Italian ryegrass plants at each late-season timing (April 19, April 26, and May 7) in a field at the LSU AgCenter Northeast Research Station in St. Joseph, LA. All experiments were conducted in a randomized complete block design with a factorial arrangement of treatments (3 late-season timings by 10 herbicide treatments) and three replications. Late-season herbicides differed in their efficacy to reduce percent seed germination, 100-seed weight, and progeny seedling vigor and biomass of GR Italian ryegrass plants. Paraquat and glufosinate were the most effective treatments in reducing seed quality and progeny seedling vigor or competing ability of Italian ryegrass. Progeny seed germination was as low as 41% when herbicides were applied at anthesis or soft dough compared to the late grain filling stage (66 to 94%), with the greatest suppression in seed germination obtained with clethodim, paraquat, and glufosinate. Progeny seedlings from plants treated at the anthesis or soft dough stage had lower plant height (17 to 25 cm compared with 24 to 30 cm) and leaf counts (8 to 14 compared with 19 to 21) at 50 d after transplanting (DAT) in greenhouse experiments. Progeny seedling biomass at 50 DAT was also lower when herbicides were applied at the anthesis or soft dough timing (0.8 to 2.5 g plant-1) compared with the late grain filling timing (up to 4.26 g plant-1). Delaying the late-season timing to the grain filling stage was mostly ineffective in reducing seed quality or progeny fitness traits, irrespective of the herbicide used. In conclusion, clethodim, paraquat, and glufosinate should be targeted at anthesis to soft dough stages in the spring/summer to reduce the seed quality traits and likelihood of successful establishment of glyphosate-resistant Italian ryegrass in the following crop.

Overview of *Fimbristylis littoralis* Identification and Control in Louisiana Rice. G. Sparks1, C. Webster1, B. Stoker1, M. Hains1, W. Carr1, E. Williams1 1LSU Ag Center, Baton Rouge, United States.

Over the past several years (*Fimbristylis littoralis* G.) has become a prevalent issue throughout southwestern Louisiana rice production. Although Fimbristylis belongs to the sedge family, control options differ compared to the typical sedge species that infest rice fields in Louisiana. Fimbristylis is commonly misidentified as rice flatsedge (*Cyperus iria* L.), which can be problematic due to differing control options. Due to the recent introduction to rice production in the U.S., there is little evidence of effective control options for Fimbristylis. Therefore, in 2022 an on-farm trial was conducted near Abbeville, Louisiana on a Crowley silt loam soil to determine post emergence control options for Fimbristylis. The experiment was organized as a randomized complete block comparing common systemic and contact herbicides used in Louisiana rice production. The study consisted of four replications including 15 herbicide treatments and a nontreated added for comparison. The plots were 1.5 by 5m in size. Treatments were applied postflood using a CO2-pressurized backpack sprayer calibrated to deliver 140 L ha-1. The application was made at 4.8 kmh when the Fimbristylis was 15 to 20 cm in height with a population ranging from 15 to 20 per m^{-2}. Visual ratings for Fimbristylis control were observed at 7, 14, and 28 DAT. Applications of 2,4-D at 798 g ai ha-1 and 1065 g ai ha-1 controlled Fimbristylis 90 and 99% at 14 DAT, and 91 and 98% at 28 DAT, respectively. Triclopyr applied at 315 g ai ha-1 controlled Fimbristylis 98% at 14 DAT and 93% at 28 DAT. When byspiribac was applied at 33.6 g ai ha-1 19, 79, and 83% control of Fimbristylis was observed at 7, 14, and 28 DAT, respectively. The results of this experiment indicate that an application of 2,4-D and triclopyr are effective options for Fimbristylis control. Additionally, byspiribac is an effective control option although control is achieved at a slower rate than 2,4-D and triclopyr. Supplemental research is needed to determine additional control options due to 2,4-D restrictions.

Cover Crop Termination Timing and Herbicide Interactions to Mitigate Herbicide-Resistant Palmer Amaranth Seedbank in the Southern U.S. Soybean Production. G. Bortolon1, P. Jha1, D. Stephenson2, M. Foster3, B. Dhaka1, F. Rontani1, C. McKoin1 1Louisiana State University AgCenter, Baton Rouge, United States, 2Louisiana State University AgCenter, Dean Lee Research Station, Alexandria, United States, 3Louisiana State University AgCenter, St. Gabriel, United States.

Palmer amaranth (*Amaranthus palmeri* L.) is one of the most aggressive weeds in soybean production in the Midsouth, characterized by its rapid growth, high genetic diversity, high fecundity, and resistance to multiple herbicide sites of action. Field experiments were conducted in 2023-2024 at the LSU AgCenter Doyle Chambers Central Research Station in Baton Rouge, Louisiana to study the effect of a cereal rye cover crop, termination timing, and herbicide program on glyphosate-resistant Palmer amaranth population dynamics and seed bank reductions in Enlist E3™ soybean. Experiments were conducted in a strip split-plot design with four replications. Strip plot included cereal rye cover crop (planted in the fall of 2023 at a seeding rate of 73 kg ha-1) presence or absence; main plot included three different timings of cover crop termination with glyphosate (5 weeks before soybean planting, 3 weeks before soybean planting, and 2 weeks before soybean planting); and split plot included three different herbicide programs (S-metolachlor plus fomesafen PRE only applied at planting, glufosinate plus 2,4-D choline POST only and S-metolachlor plus fomesafen PRE applied at planting followed by glufosinate plus 2,4-D choline POST). Data were collected on cover crop biomass at termination, Palmer amaranth density at biweekly intervals in permanent 0.25 m-2 quadrats, biomass, seed production, and soybean yield at harvest. Results indicated that the presence of a cereal rye cover crop significantly suppressed Palmer amaranth density compared to no cover crop plots, with a cumulative density of 544 plants m-2 in no cover crop plots compared to 136 plants m-2 in cover crop plots during the growing season. In the presence of cover crop, the PRE only program had 72% lower Palmer amaranth cumulative density than the POST only program; however, it did not differ from the PRE followed by POST program, irrespective of termination timing. Delaying the cover crop termination timing to 2 to 3 weeks before soybean planting eliminated Palmer amaranth seed production, especially with the PRE followed by POST program. Overall, the POST only program was least effective in reducing Palmer amaranth density, biomass and seed production. In conclusion, a cereal rye cover crop terminated 2 to 3 weeks before soybean planting in conjunction with a PRE soil residual program (WSSA HG 15 + 14) would be an effective integrated weed management (IWM) strategy to mitigate herbicide-resistant Palmer amaranth seed bank and reduce selection pressure on POST herbicides.

Can spray volume and nozzle selection reduce early-season cotton injury from herbicide tank mixes? J. de Sanctis1, C. Cahoon1, Z. Taylor1, J. Forehand1, B. Dean1, H. Lee1 1North Carolina State University, Raleigh, United States.

In cotton, Group 15 herbicides, such as Warrant, Outlook, and Dual II Magnum, are routinely used POST for residual control of Palmer amaranth (*Amaranthus palmeri* S. Watson). However, the influence of spray volume and nozzle selection on cotton injury from these herbicides, in combination with other common POST herbicides, is less understood. The objectives of these studies were to determine how spray volume and nozzle influence cotton response to Warrant, Outlook, and Dual II Magnum when applied in combination with Roundup Powermax3 + Liberty. Two separate studies (Spray Volume and Nozzle) were conducted at Rocky Mount and Lewiston, NC during 2021 and 2022. Cotton variety DP 2012 B3XF was planted in early May at each location in both years. Treatments consisted of 3 spray volumes (10, 15, and 25 GPA) or 3 nozzles (TTI 110015, AIXR 11002, and DG 11002) in combination with 3 POST residual herbicides (Warrant, Outlook, and Dual II Magnum). Treatments were applied to 4-leaf cotton (POST 1) and 14 days after POST 1 (POST 2). All plots, including a treated control, received Roundup PowerMAX3 plus Liberty. Data collected included visual estimates of injury and percent injury area was obtained by measuring the necrotic area from leaf samples. Although, no differences in cotton yield were observed across treatments, cotton injury from Group 15 herbicide tank mixtures was minimized at higher GPA and using nozzles that produces smaller droplets. Cotton growers can use these results to reduce the risk for foliar cotton injury resulting from herbicide tank mixtures including Group 15 herbicides.

Influence of Adjuvants with Topramezone and Liberty ULTRA on Axant™ Flex Cotton Response. M. Woolard1, P. Dotray2, A. Hixson3, M. Singletary1, B. Guice4 1Texas Tech University, Lubbock, United States, 2Texas Tech University, Texas A&M AgirLife Research and Extension Service, Lubbock, United States, 3BASF, Lubbock, United States, 4BASF, Winnsboro, United States.

BASF released Axant™ Flex Cotton in 2024, marking the first quadruple herbicide-resistant cotton (*Gossypium hirsutum* L.) technology. With this technology, producers will be able to utilize glyphosate, glufosinate, select dicamba formulations (pending registration), and select WSSA Group 27 herbicides (isoxaflutole and topramezone pending registration). In addition, a new formulation of glufosinate (Liberty® ULTRA) was recently commercialized, concentrating the herbicidally active L-isomer. Therefore, a research trial was established to evaluate cotton response under weed-free conditions following topramezone + L-glufosinate tank-mixtures with various adjuvants. Treatments included topramezone at 25 g ai ha-1 + L-glufosinate at 450 g ai ha-1 alone or in combination with ammonium sulfate (AMS) at 3,000 g ha-1, non-ionic surfactant (NIS) at 0.25% v/v, crop oil concentrate (COC) at 1% v/v, and methylated seed oil (MSO) at 1% v/v. Applications were made to cotton at the 4- and 8-lf growth stage. At the 4-lf application timing, injury ranged from 7% to 27% 3 days after treatments (DAT), with topramezone + L-glufosinate + AMS + MSO being the most injurious treatment. A similar trend was observed at the 8-lf application timing, with topramezone + L-glufosinate + AMS + MSO being the most injurious treatment 3 DAT. By 28 DAT, injury was <5% for all treatments regardless of application timing. Additionally, seedcotton yields were not reduced relative to the nontreated check. Overall, producers should anticipate an initial increase in cotton response if an adjuvant such as MSO is tank-mixed with topramezone + L-glufosinate.

Effect of poultry litter on the weed control efficiency of two pre-emergent herbicides (S-metolachlor and metribuzin) in diverse soil textures of Alabama. R. Ghosh1, A. Maity1, A. Price2 1Auburn University, Auburn, United States, 2USDA-ARS National Soil Dynamics Laboratory, Auburn, United States.

The application of poultry litter as a soil amendment is gaining traction in several U.S. states, including Alabama. This nutrient-rich material not only provides essential nutrients but also enhances organic matter content and affects soil microbial populations. Therefore, understanding how applied poultry litter impacts the weed control efficiency of pre-emergent herbicides—by influencing herbicide dynamics in amended soil—holds practical significance.

Glufosinate Sensitivity of Palmer Amaranth Accessions Collected in 2001 and 2023. S. Sudhakar1, J. Norsworthy1, P. Carvalho-Moore1, J. Bond2, M. Marshall3, L. Steckel4, M. Bagavathiannan5, A. Porri6, I. Meiners7 1University of Arkansas, Fayetteville, United States, 2Mississippi State University, Stoneville, United States, 3Clemson University, Blackville, United States, 4University of Tennessee, Jackson, United States, 5Texas A&M University, College Station, United States, 6BASF SE, Limburgerhof, Germany, 7BASF, Research Triangle Park, United States.

Glufosinate Sensitivity of Palmer Amaranth Accessions Collected in 2001 and 2023
Palmer amaranth (*Amaranthus palmeri* S. Wats) first demonstrated resistance to glyphosate in 2004 in the United States, triggering widespread concerns as resistance cases continued to emerge. By 2020, this resilient weed had evolved resistance to glufosinate, another non-selective, broad-spectrum herbicide, further complicating weed management strategies. This study examined the evolution of herbicide tolerance in Palmer amaranth by analyzing populations collected in 2001 and 2023. A total of ten populations; five from Arkansas (A1–A5), four from South Carolina (SC2–SC5), and one from Tennessee (TN) were obtained, providing a broad regional perspective. The objective was to assess whether shifts in herbicide tolerance had occurred over a 22-year period, with a particular focus on the evolution of resistance to glufosinate and to better understand the dynamics of herbicide resistance in these regions. Three glufosinate-ammonium doses—0.25X, 0.5X, and 1X (656 g ai ha^{-1})—were applied, and survival percentages of Palmer amaranth were recorded 3 weeks after treatment. The experiment was repeated five times in the greenhouse. As previous studies have shown an increase in copy number in resistant populations, this analysis was also conducted to assess the genetic basis of herbicide resistance in these populations. Results indicated shifts in herbicide tolerance in 2023 for five populations: A1, A2, A4, SC3, and SC5. Significant differences in survival percentages were observed in A1, A2, A4, and SC3 at the 0.5X dose. In SC5, enhanced tolerance was observed at 0.25X in 2023. The survival percentages for these populations were as follows: A1 (2001 - 12%, 2023 - 39%), A2 (2001 - 0%, 2023 - 72%), A4 (2001 - 5%, 2023 - 44%), SC3 (2001 - 2%, 2023 – 22%), and SC5 (2001 - 3%, 2023 - 27%). Real-time PCR analysis showed no variation in gene copy number across any of the 2001 and 2023 populations. While these populations do not exhibit an exponential increase in tolerance due to the absence of copy number involvement, the increasing tolerance to glufosinate remains concerning. Even without a significant increase in copy number, continued adaptation over the years could result in greater tolerance in the future. As glufosinate is a heavily relied-upon herbicide, these findings emphasize the urgent need to explore alternative herbicide options to manage herbicide resistance effectively and a need to understand why sensitivity to herbicides is decline within some populations over herbicide.

Integrating Herbicide Treatments and Prescribed Burning for Yellow Foxtail (*Setaria pumila*) Suppression in Bermudagrass Hayfield. T. Akanbi1, F. Davis1, D. Smitherman1, D. Russell1
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Yellow foxtail is a fast-growing summer annual grass weed whose aggressive growth generally reduces forage quality and yield. Research has proven that utilizing an integrated weed management approach is effective in minimizing weed occurrence, especially in forage systems. Burning, specifically can reduce the weed seedbank in dormant pastures and hayfields and timely herbicide applications has shown efficacy in controlling yellow foxtail. However, data is lacking on the effectiveness of combining prescribed burning and herbicides for yellow foxtail management. Therefore, a field study was conducted in a foxtail-infested hayfield at Munford, Alabama, to evaluate the effectiveness of prescribed burning combined with herbicides for yellow foxtail suppression. In February 2023, a split plot design was established in a dormant bermudagrass hayfield that included two main plots (burned and non-burned) and seven sub-plots (herbicide treatments). Preemergence herbicides applied on February 27, 2023, included pendimethalin (9.82 kg ai ha^{-1}), indaziflam (0.37 kg ai ha^{-1}), and split rates of pendimethalin (4.91 kg ai ha^{-1}) and indaziflam (0.22 kg ai ha^{-1}), all tank-mixed with paraquat 3SL (1.56 kg ai ha^{-1}) and InterLock 100 SL (kg ai ha-1). On May 29, 2023, additional split applications of pendimethalin (4.91 kg ai ha-1) and indaziflam (0.22 kg ai ha-1) were applied to the same plots that received the initial split rate. Postemergence treatments included hexazinone (3.51 kg ai ha-1) and quinclorac (2.34 kg ae ha-1). All treatments were compared to a non-treated control. Foxtail emergence, foxtail density, and bermudagrass forage yield were recorded on August 15. Data collected were analyzed using a linear mixed-effects model in R (v4.3.0), with treatment means compared using Tukey's HSD test (α = 0.05). Prescribed burning ($P < 0.001$) and herbicide treatments ($P < 0.001$) independently affected foxtail emergence and foxtail density. The effect of herbicide was consistent across both burned and non-burned plots for foxtail emergence (P=0.92) or foxtail density (P=0.34). Yellow foxtail emergence and density were lower in non-burned plots (31.2%, 192.52 plants/ m^2) compared to burned plots (50.5%, 361.67 plants/m^2). Pendimethalin at 9.82 kg ai ha^{-1} significantly reduced yellow foxtail emergence and density by 76.3% and 88% respectively compared to the control plot. Bermudagrass forage yield was significantly affected by interaction between prescribed burning and herbicide treatments ($P < 0.001$) with non-burned plots producing higher yields (1117 kg ha-1) than burned plots (627 kg ha-1). This data suggests that herbicide options are available for yellow foxtail suppression in bermudagrass forage production, and this should be done earlier during the season to target seeds from the previous years. The increased foxtail emergence in burned plots may be a result from enhanced sunlight exposure due to thatch removal or insufficient heat to kill foxtail seeds. This experiment will be repeated in 2025 to further assess if the combination of prescribed burning and herbicide application can synergistically suppress yellow foxtail more effectively.

Effect of Chaff Moisture on Italian Ryegrass (*Lolium perenne* ssp. multiflorum) Seed Kill with Impact Mills. E. Russell1, M. Flessner1 1Virginia Tech, Blacksburg, United States.

Seed impact mills, like the Redekop Seed Control Unit (SCU) and the integrated Harrington Seed Destructor (iHSD), have the potential to fit within the US wheat production system. Italian ryegrass (*Lolium perenne* L. ssp. multiflorum (Lam.)) is a problematic weed in wheat production in the US and would be an ideal candidate for control with seed impact mills. Seed kill for other species of ryegrass has indicated that ryegrass seeds are much harder to kill than other problematic weeds. Additionally, wheat residue contains more moisture during harvest in the US than in Australia, where seed impact mills originated. This extra moisture in the harvest residues could affect seed kill of Italian ryegrass. This research aimed to determine the seed kill of L. perenne ssp. multiflorum at a low baseline chaff moisture rate and how increasing chaff moisture rates affect seed kill for the Redekop SCU and the iHSD. This research also evaluated seed kill with the Redekop SCU in a production system at a general moisture rate. Four chaff moisture contents were tested at 10.7%, 16.4%, 22.1%, and 27.8%, which span and exceed typical harvest conditions. Results indicated that >91% of weed seeds were killed by either mill in our baseline testing. Increasing chaff moisture resulted in seed kill decreasing by 0.43% for every 1% increase in chaff moisture with the Redekop SCU. In the field, the Redekop SCU delivered an 89% seed kill at ~12% chaff moisture. This research indicates that seed impact mills like the Redekop SCU and the iHSD can deliver high seed kill rates (>91%) at low chaff moisture levels (<6%); however, as chaff moisture increases in less-than-ideal harvest conditions, seed kill of L. perenne ssp. multiflorum decreased. However, seed kill rates were still >74%, even at 27.8% chaff moisture, indicating that these mills can still reduce soil seed bank inputs of this problematic weed even in challenging harvest conditions.

Chemical Options to Manage Glufosinate-Resistant Palmer amaranth. P. Carvalho-Moore1, J. Norsworthy1, T. Barber2, I. Meiners3 1University of Arkansas System Division of Agriculture, Fayetteville, United States, 2University of Arkansas System Division of Agriculture, Lonoke, United States, 3BASF, Research Triangle Park, United States.

Palmer amaranth is ranked as the most troublesome weed in row crops across the southern USA, and its control is challenging due to its propensity for evolving resistance. Palmer amaranth accession (Glu-R), highly resistant to glufosinate (R/S: 24- to 27-fold), was identified in Arkansas, and chemical options to manage this accession are needed. Field experiments were conducted in Fayetteville (Arkansas) to evaluate Glu-R control with different preemergence (PRE) and postemergence (POST) herbicides. The PRE and POST field experiments with MSR2 evaluated fifteen and sixteen single active ingredients, respectively. All herbicides were sprayed at the recommended rate for corn, cotton, or soybean. The PRE herbicides were: acetochlor, atrazine, diuron, flumioxazin, fluridone, fomesafen, imazaquin, isoxaflutole, mesotrione, metribuzin, pendimethalin, pyroxasulfone, saflufenacil, S-metolachlor, and trifludimoxazin. The POST herbicides were: 2,4-D, atrazine, carfentrazone, dicamba, diuron, flumioxazin, fomesafen, glufosinate, glyphosate, isoxaflutole, mesotrione, paraquat, saflufenacil, tembotrione, trifloxysulfuron, and trifludimoxazin. Palmer amaranth control and counts were collected at 3 and 6 weeks after (WAT) treatment in the PRE experiment. For the POST, control was evaluated at 1 and 4 WAT, while Palmer amaranth plants were counted at 4 WAT. Overall, field PRE treatments with atrazine, pyroxasulfone, or trifludimoxazin obtained the highest Glu-R control levels at all evaluation times and the lowest number of seedlings emerging at 3 and 6 weeks after treatment. In the POST experiment, paraquat obtained the highest control at both evaluation timings. The lowest number of alive Glu-R plants was obtained in POST treatments with paraquat or trifludimoxazin. Fields near where glufosinate resistance has been confirmed in Palmer amaranth will likely demand a more diverse and proactive management strategy relying on combinations of chemical, cultural, and mechanical control tactics. Future efforts should focus on sequential applications and mixtures.

Mid-infrared radiation-mediated thermal weed control is influenced by species and growth stage. R. Hamberg[1], M. Bagavathiannan[1] [1]Department of Soil and Crop Sciences, Texas A&M University, College Station, United States.

The rising prevalence of herbicide-resistant weed populations has renewed interest in non-chemical weed management alternatives. Previous research using mid-infrared (MIR; wavelength ~3,200 nanometers) radiation has been shown to damage plant tissues. However, no published research has determined the minimal thermal energy (joules cm-2) required for weed control and how it varies across weed species and growth stages. This research aimed to determine the energy needed to control three problematic weeds. Palmer amaranth (*Amaranthus palmeri*), ivyleaf morningglory (*Ipomoea hederacea*), and common lambsquarters (*Chenopodium album*) plants at two different growth stages (~three- and ~six-leaf) were subjected to nine MIR energy treatments (0 to 109 joules cm-2) using a thermal MIR emitter calibrated to deliver 1.33 joules cm-2 per second. The greenhouse experiment was arranged in a completely randomized design with eight replications (one plant pot-1). The aboveground biomass of all plants was harvested, dried, and weighed 14 days after treatment. A three-parameter log-logistic regression determined the energy exposure required to reduce 50% (ED50) and 90% (ED90) of aboveground weed biomass. Ivyleaf morningglory was the least sensitive to MIR treatments, with an ED90 value of 121 joules cm-2 at the six-leaf growth stage. Palmer amaranth was highly sensitive to MIR radiation, with ED90 values of 12 and 66 joules cm-2 at the three-leaf and six-leaf growth stages, respectively. Common lambsquarters required 39 and 107 for ED90 biomass reduction at three- and six-leaf growth stages. Results reveal that weeds are sensitive to MIR exposure; however, the energy requirement varies by weed species and growth stage. Continued studies using MIR in combination with other light wavelengths will be conducted in the field on a range of species that vary in morphology.

Optimizing anaerobic soil disinfestation with biosolids and novel plasticulture for weed management. P. Gupta1, B. Jatana2, M. Cutulle3, C. S. Kousik4, B. Ward3, T. G. Sanders2, A. Sah2 1Clemson University, Clemson, South Carolina, United States, 2Edisto Research and Education Centre, Clemson University, Blackville, South Carolina, United States, 3Coastal Research and Education Center, Clemson University, Charleston, South Carolina, United States, 4USDA-ARS Clemson University, Charleston, South Carolina, United States.

Anaerobic soil disinfestation (ASD) is a promising non-chemical soil treatment strategy that has the potential to suppress weeds and soil-borne pathogens in organic production systems. ASD is facilitated by the use of locally available carbon sources, irrigation and impermeable plastic films. Greenhouse studies were conducted at Clemson University, South Carolina, to optimize ASD with slow-release organic nutrient source (biosolids) treatments including meat and bone meal (MBM), Dissolved air flotation (DAF) manure, MBM + Sulphur, DAF + neem oil compared with non-amended control. Three types of plasticulture were evaluated for their effectiveness to facilitate ASD via flex barrier (black side up), black solar shrink and conventional black plastic mulch. Four replications were maintained for each treatment under ASD over a period of 4 weeks followed by planting of watermelon seedlings. Over the six weeks of study, weed counts, fresh and dry biomass, soil pH and nutrient analysis data were collected. Experimental units under ASD had lower weed cover percentage as compared to non-amended control. MBM and MBM + Sulfur had the highest weed suppression as compared to non-amended control and DAF while DAF combined with neem oil performed on par with MBM and MBM + Sulfur in weed suppression. These studies should be validated under field conditions with future ASD studies in different organic crop production systems.

Effect of Dicamba in Glyphosate Tank Mixtures on Grass Control. B. Dean1, C. Cahoon1, Z. Taylor1, J. de Sanctis1, H. Lee1 1North Carolina State University, Raleigh, United States.

Over the past couple years, numerous complaints have surfaced regarding poor grass control with glyphosate. However, some of these complaints have involved glyphosate applied in combination with dicamba to Texas millet (*Urochloa texana* R. Webster). In 2024, a field study was conducted near Rocky Mount, NC, to evaluate the effect of dicamba in glyphosate tank mixtures on Texas millet (*Urochloa texana* R. Webster) control. The field was prepared using conventional tillage and then bedded into 91-cm rows, with plots measuring 4 rows wide by 9.1-m long. The treatment structure was a 2×3×3 factorial, comprising two glyphosate rates (Roundup PowerMAX® 3 at 840 and 1,260 g ae ha-1), three dicamba rates (Engenia® at 525 and 1,095 g ae ha-1, and no-dicamba), and three acetyl-CoA carboxylase (ACCase)-inhibiting herbicides: quizalofop P-ethyl (Assure II) at 62 g ai ha-1, clethodim (Intensity) at 140 g ai ha-1, and no ACCase-inhibiting herbicide. Weed control was visually estimated 7, 14, and 21 days after treatment. Applications were made on June 20th, 2024. Pooled across glyphosate and dicamba rates, the addition of quizalofop P-ethyl (74%) or clethodim (76%) did not improve Texas millet control, with 76% control achieved without an ACCase herbicide. Without dicamba, Texas millet was controlled 82%; however, control decreased to 74 and 69% with the inclusion of 525 and 1,095 g ae ha-1 of dicamba, respectively. Although not statistically significant, the lowest control was observed when glyphosate was applied at 840 g ae ha-1 in combination with 1,095 g ae ha-1 of dicamba (63%). However, control improved to 75% when glyphosate was applied at 1,260 g ae ha-1 in combination with 1,095 g ae ha-1 of dicamba. The greatest control was achieved when glyphosate was applied alone at 1,260 g ae ha-1 (86%). Overall, this research provides evidence that dicamba has potential to reduce Texas millet control when used in glyphosate tank mixtures. However, control can be improved if glyphosate is applied at 1,260 g ae ha-1.

Exploring the role of pesticides in establishing habitat for sensitive species on agricultural lands. T. Randell-Singleton1, N. McGhee2, R. Barrett2 1University of Georgia, Tifton, United States, 2USDA - NRCS Jimmy Carter Plant Materials Center, Americus, United States.

Many farmers are interested in exploring ways to continue supporting the environment and natural species (including endangered and threatened species) by installing pollinator habitats on unproductive areas of the farm. Once established, a successful pollinator habitat will persist for years, however a common challenge with initial establishment is controlling weeds. Many suitable pollinator plant species are not competitive with common weeds found in agronomic scenarios; therefore, research was conducted to 1) investigate flower tolerance to preemergence residual herbicides for use during establishment, 2) understand optimum establishment methods for these species and 3) compare mixtures of commercialized annual species to native mixtures recommended by state NRCS. First, studies were conducted from 2022-2024 at the University of Georgia Ponder Research Farm in TyTy, GA (UGA-Ponder) to investigate preemergence residual herbicide tolerance of four commercialized pollinator-preferred annual flower species (zinnias, cosmos, marigolds, Mexican sunflowers) for use during establishment. Preliminary screening treatments included preemergence (PRE) applications of acetochlor, clomazone, EPTC, flumioxazin, fluridone, fomesafen, imazapic, imazethapyr, isoxaflutole, metribuzin + flufenacet, napropamide, oxyfluorfen, pendimethalin, prometryn, pyrithiobac, S-metolachlor, sulfentrazone, and trifluralin. All treatments were replicated 3-4 times (study dependent) and were followed with 0.8 cm of overhead irrigation within 1 d of application. Treatments were assessed over 21 days for visual plant injury (stunting, necrosis) and plant growth (height, fresh-weight biomass). Herbicides which exhibited less than 30% visual injury were reevaluated in a systems-based study in fall 2024, which focused on herbicide tank mix combinations that would provide residual control of a broad-spectrum of weeds during habitat establishment. PRE applications of acetochlor (420 g ai ha-1), pendimethalin (800 g ai ha-1), metribuzin + flufenacet premix (at two rates, 14+57 g ai ha-1 and 29+114 g ai ha-1), and S-metolachlor (670 g ai ha-1 PRE and 1070 g ai ha-1 postemergence) were applied alone or in tank-mix combinations. Results from one location indicated that along with solitary applications of PRE herbicides, pendimethalin plus acetochlor and acetochlor plus metribuzin/flufenacet premix (low rate) exhibited acceptable flower tolerance (2 to 24%), reductions in stand and biomass (1 to 26%) for zinnia, cosmos, and Mexican sunflower, indicating these may be suitable options to continue exploring for weed control during habitat establishment. Additional studies investigated establishment methods, including seeding methods and seeding ratios of each species, and how this commercial annual mix establishes compared to a native mixture recommended by local NRCS. Studies were conducted at UGA-Ponder and the USDA NRCS Jimmy Carter Plant Materials Center in Americus, GA (species mix comparison only) during 2024. Preliminary results indicate that when planted using a grain drill, the annual flower mixture establishes, covers the ground, and bloom up to 25% faster, compared to broadcast spreading the same species. When comparing the annual mixture to a NRCS native mixture, the commercialized mix covers the ground, suppresses weeds, and blooms 99% greater than the native species, potentially providing a suitable habitat to serve pollinators and other wildlife species in a short amount of time.

Targeting Weed Seeds in Cotton Cropping Systems. S. Chu[1], E. Russell[2], G. Morgan[3], M. Walsh[4], B. McKnight[1], R. Hardin[1], P. Dotray[5], M. Flessner[2], M. Bagavathiannan[1] [1]Texas A&M University, College Station, United States, [2]Virginia Tech, Blacksburg, United States, [3]Cotton Incorporated, Cary, United States, [4]Charles Sturt University, Bathurst, Australia, [5]Texas Tech University, Lubbock, United States.

Cotton gin trash, when used as a soil amendment, can contribute to the spread of weed seeds, as previous research reports 4,070 germinable Amaranthus palmeri seeds per metric ton of gin trash. A proportion of the weed seeds are moved with the seed cotton during harvest, which then can be targeted at the cotton gin to prevent the re-introduction of the seeds into farmers' fields. Impact mills have been shown to destroy weed seeds during the harvest of soybean, wheat, canola, and rice, but their effectiveness in destroying weed seeds mixed in cotton gin trash is yet to be tested. This study examined the effectiveness of an impact mill in destroying the seed of various problematic weed species (2,000 seed/species), ran at a flow rate of 1kg-1 sec-2. A PTO-powered stationary impact mill was used. The moisture content of the cotton trash was recorded immediately prior to testing. Each species treated with the impact mill demonstrated a remarkable seed kill rate of approximately 99%, and the mill effectively handled the gin trash material without clogging when it was sufficiently dry. These findings suggest that impact mills can play a significant role in preventing the dissemination of weed seeds associated with cotton gin trash. Further research is needed to evaluate the long-term durability and maintenance requirements of impact mills, as well as the optimal location for integration within the cotton gin system.

National Weed Survey: Problematic Weeds in Aquatic and Non-Crop Areas. S. Chu1, J. Miranda2, L. Van Wychen3 1Texas A&M University, College Station, United States, 2Oregon State University, Corvallis, United States, 3Weed Science Society of America, Westminster, United States.

The 2024 Weed Survey for the US and Canada surveyed the most troublesome weeds in aquatics (ponds, lakes, and irrigation areas), ornamentals, public lands (parks and forests), and right-of-way areas. Common weeds are the most frequently seen in the respective areas, while troublesome weeds are the most difficult to control in these areas and may not be widespread. There were 139 survey respondents in the US, with 62 respondents from the SWSS region. Within the aquatic areas, the most common weeds were Elodea canadensis in irrigation, Myriophyllum spicatum in lakes and rivers, and Najas guadalupensis in ponds. The most troublesome weed was Hydrilla verticillate in irrigation, lakes, and rivers and Najas guadalupensis in ponds. For right-of-way areas, the most common weed was Sorghum halepense, and the most troublesome was Bassia scoparia. In ornamental areas, the most common and troublesome weed was the Cardamine spp. The most troublesome weed for public lands was Mircostegium vimineum and Bromus tectorum for forests and parks, respectively. The most common weed in the forest was Ligustrum spp. and in parks it was Cirsium arvense.

Determination of Crop Safety of Herbicide Programs for Brassica carinata A. Braun Production. A. Goldsmith1, E. Almeida2, A. Dobbs1, R. Leon1 1North Carolina State University, Raleigh, United States, 2The Federal University of Maranhão, São Luís, Brazil.

Brassica carinata, a winter-grown oilseed crop, shows promise as a new rotational alternative in the southeastern united states if it can fit into existing herbicide programs. To evaluate this, the crop safety of brassica carinata to herbicides must be elucidated. The objective of this study was to evaluate the performance of carinata with PRE applications of, s-metolachlor, and clomazone, and a POST application of clopyralid at a "standard" and double dose as determined from previous studies. The study took place in the fall-spring season of 2023-2024 at two locations in North Carolina with four visual injury and weed control ratings occurring at 4,6,8 and 12 weeks after treatment. The standard rate of S-metolachlor of 935 g ai ha-1 was less effective than the "double" dose of 1,870 g ai ha-1 at weed control, while the high dose of clomazone caused crop injury that the standard rate did not, reducing yield by up to 33%. No effect was observed from POST applications of clopyralid at either rate. It can be concluded that both S-metolachlor and clomazone can be effective PRE herbicides in brassica carinata production, but a more detailed dose response study is necessary for clomazone.

Field Validation of Minimized-Rate Topramezone and Metribuzin Programs for Goosegrass Control in Florida. K. Gawron1, P. McLoughlin2, M. M. Joseph1, S. A. Gallo2, M. Schiavon2, P. Petelewicz1 1University of Florida, Gainesville, United States, 2University of Florida, Davie, United States.

Goosegrass [*Eleusine indica* (L.) Gaertn.], an annual warm-season grassy weed, poses significant challenges across southern United States. Currently, control options are severely limited. Previous studies found topramezone effective against mature goosegrass. However, reports from Florida indicate that persistent removal may depend on depleting the plants' recuperative capacity from roots over time. Greenhouse research has demonstrated promising results from split application programs using reduced topramezone base rate, but validation under field conditions is required. Moreover, topramezone is often combined with metribuzin for improved control and safety. Therefore, this study evaluated standalone or combined topramezone and metribuzin at effective rates of 6.13 g ai ha-1 and 210.16 g ai ha-1, respectively, applied once or equally divided into 2, 4 or 6 biweekly applications for the control of mature goosegrass populations and safety to bermudagrass [*Cynodon dactylon* (L.) Pers. × *C. transvaalensis* Burtt Davy] turf. Topramezone alone and in combination with metribuzin yielded higher goosegrass control (GC) area under progress curve (AUPC) and days over threshold (DOT) >80% GC (DOT80 GC) compared to metribuzin alone. Generally, programs with more applications at lower rates increased DOT80 GC while causing lower and less persistent turfgrass injury. Six applications at 0.167× base rate provided the most persistent goosegrass control with optimal turfgrass safety. No safening effect was observed with the addition of metribuzin to topramezone, and plots treated with split topramezone + metribuzin programs showed increased goosegrass presence. These findings suggest that split-rate programs of standalone topramezone may be effectively integrated into goosegrass management; however, further research is required for validation. Future studies will investigate alternative tank-mix components for these topramezone programs and explore alternative approaches for incorporating metribuzin to minimize turfgrass injury potential.

Weed Management Programs in Mississippi Corn. T. Bararpour1, J. Bond1, C. Bryant1
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A field study was conducted in 2024 at the Delta Research and Extension Center, in Stoneville, Mississippi, to evaluate herbicide application programs for weed management programs in Mississippi corn (*Zea mays*). Herbicide treatments were as follows: 1) Halex GT at 3.6 pt/a + AAtrex at 1.5 qt/a + COC at 1% v/v at V3-V4; 2) ImpactZ at 8 fl oz/a + AAtrex at 2 qt/a + Roundup PowerMax3 at 32 fl oz/a + MSO at 0.25% v/v at V3-V4; 3) Impact 1.25 oz/a + AAtrex at 1 qt/a + Dual II Magnum at 1.3 pt/a + NIS at 0.25% v/v + AMS at 0.25% v/v at V3-V4; 4) Impact Core 32 oz oz/a + AAtrex at 1.5 qt/a + Roundup PowerMax + NIS + AMS at V3-V4; 5) Sinate at 24 oz/a + AAtrex at 1 qt/a + Dual II Magnum + NIS + AMS at V3-V4; 6) Resicore XL 3 qt/a + AAtrex at 1 qt/a Preemergence (PRE); 7) Acuron at 1.5 qt/a PRE followed by (fb) Resicore XL at 1.5 qt/a + AAtrex at 1 qt/a + Durango DMA at 32 oz/a + NIS at V3-V4; 8) Acuron at 2.5 qt/a PRE; 9) Acuron at 1.5 qt/a PRE fb Roundup PowerMax3 at 25 oz/a + Acuron at 1.25 qt/a + AMS at V3-V4; 10) Zidua SC at 4.64 fl oz/a + Callisto at 5.8 oz/a + Stinger at 0.31 pt/a + AAtrex at 1.25 pt/a PRE; 11) Acuron at 1.25 qt/a PRE fb Roundup PowerMax3 at 25 oz/a + Acuron at 1.25 qt/a + AMS at V4-V5; 12) Resicore at 1.25 qt/a + AAtrex at 0.624 pt/a PRE fb Resicore + AAtrex at 0.624 pt/a + Roundup PowerMax3 at 25 oz/a + AMS at V3-V4; 13) Surestart II at 1.25 pt/a + AAtrex at 0.624 pt/a PRE fb Resicore + AAtrex at 0.624 pt/a + Roundup PowerMax3 at 25 oz/a + AMS at V3-V4; 14) Dual II Magnum PRE fb + Roundup PowerMax at 32 fl oz/a + Tough at 8 oz/a + AMS at V3-V4; 15) Acuron at 1.25 qt/a PRE fb Halex GT + AAtrex at 1.5 qt/a + COC at V4-V5; 16) Acuron at 1.25 qt/a PRE fb Liberty at 32 oz/a + Dual II Magnum at V4-V5. All herbicide application programs except treatment 14 (88%) provided 91 to 100% control of glyphosate-resistant Palmer amaranth (*Amaranthus palmeri*) by 9-weeks after emergence (WAE). Treatment 14 provided only 88% control of entireleaf morningglory (*Ipomoea hederacea* var. integriuscula). All other treatments provided 95 to 100% control. All treatments provided 96 to 100% control of hemp sesbania (*Sesbania herbacea*) and prickly sida (*Sida spinosa*). Broadleaf signalgrass (*Urochloa platyphylla*) control ranged from 95 to 100% from all herbicide treatments by 9 WAE. Corn yield was 199, 197, 187, 178, 206, 203, 189, 193, 215, 218, 200, 205, 196, 211, 196, and 199 bu/a from treatment 1 through 16, respectively. Weed interference (weedy check) reduced corn yield 57% as compared to the treatment with the highest corn yield.

Anaerobic Soil Disinfestation: A Catalyst for Weed Management in Organic Watermelon Production in South Carolina. S. Chattha1, B. Ward1, M. Cutulle1 1Clemson University, Coastal Research and Education Center, Charleston, SC, United States.

Weed and disease management in organic watermelon [*Citrullus lanatus* (Thunb.) Matsum. & Nakai] production is a daunting task. Yellow nutsedge (*Cyperus esculentus* L.) and Palmer amaranth (*Amaranthus palmeri* S. Watts) are two problematic weeds in Southeastern United States organic watermelon plasticulture production system. Anaerobic soil disinfestation (ASD) is an emerging non-chemical approach to control weeds and soilborne plant pathogens especially in organic farming. The effect of ASD treatments on weeds and soilborne diseases are being documented on different specialty crops. However, the impact of ASD treatments on the crop and crop genotypes; specifically, watermelon has not been elucidated. Therefore, the impact of chicken manure and molasses (CMM) induced ASD on twenty commercially available watermelon genotypes/rootstocks and major weed species was evaluated in a high tunnel. Soil treated with carbon CMM demonstrated significantly greater cumulative anaerobicity (mV/hr) activity relative to non-treated control (CT). Under anaerobic conditions, CMM achieved 91% weed control compared to CT. Among watermelon genotypes, 'Extazy', 'Powerhouse', 'Sangria', and 'Exclamation' had greater vigor 8.5, 8.4, 8.4, and 8.3 respectively at 28 days after transplanting in CMM-treated soil. This study demonstrates the mixed response of watermelon genotypes to ASD treatments and provide guide for rootstock germplasm in organic watermelon production.

Regrowth from mown winter cover crops as a termination method extends ground cover. G. Camargo Silva1, M. Bagavathiannan1 1Texas A&M University, College Station, TX, United States.

Cover crops have become one of the main conservation practices in recent years. Cereal cover crops such as oat and cereal rye provide great benefits for soil, water, and weed suppression. Cereal cover crops are generally planted in the fall and terminated in the spring with herbicides or through mechanical means such as tillage or roller crimping. Mowing is another termination strategy that may allow for cover crop regrowth and may offer extended weed suppression into the growing season. Since cotton is a slow-growing crop during establishment, the cover crop re-growth can act as a short-term living mulch, providing early-season weed suppression. Additionally, the residue from mowed cover crops serves as mulch, further aiding in weed suppression. This project seeks to determine the potential of oat and cereal rye cover crops for regrowth after termination with mowing, and its influence on the seedling emergence of problematic weeds in cotton. Oats and cereal rye were planted in the fall of 2022 and 2023, with the treatments implemented in the subsequent spring seasons. Cover crop biomass production was determined at termination. The specific treatments included mowing, mowing + PRE herbicides, mowing + clean cotton rows, mowing + clean cotton rows + PRE herbicide, a chemical termination control, and a fallow control. The clean cotton row treatments were included to avoid the competitive impact of cover crop regrowth on cotton, and was accomplished by either not planting the cover crops on cotton rows or by eliminating the strip of the cover crops using a herbicide immediately after emergence. Cotton was planted into the cover crop residues or the open-strip areas with a no-till planter. Cover crop regrowth potential, ground coverage, and light interception were measured in the early-growing season; weed density was assessed throughout the summer; and cotton yield was determined at harvest. Results indicate that oat and rye produced 2,800 and 1,200 kg ha-1 of biomass at termination, respectively. Rye produced 1,400 kg ha-1 more biomass after mowing (110% increase), while oats produced 1,100 kg ha-1 (40% increase). Weed density was reduced by both cover crop species compared to a fallow control (66% decrease), but there were no differences among treatments. Cotton yield was reduced by both cover crop species in the dry year, but not in the wet year. The mowed cover crops show the potential to reduce weed pressure between the cotton rows compared to fallow ground and can be an effective aid to herbicide resistance management in cotton production.

SurtainTM Herbicide: A New Residual Herbicide for Weed Control in Corn from BASF Corporation. S. Bangarwa1, S. Ethridge1, J. Putman1 1BASF Corporation, Research Triangle Park, United States.

SurtainTM herbicide is a novel formulation that will be commercially introduced by BASF Corporation in 2025 offering a broad-spectrum residual premix with PRE and POST flexibility in corn. SurtainTM herbicide is a premix of saflufenacil (capsulated) and pyroxasulfone and is labelled for use in field corn grown for grain, seed, or silage. This combination gives SurtainTM herbicide remarkable residual endurance which delivers long-lasting activity on numerous small and large seeded broadleaf weeds and grasses. The combination of group 14 and 15 herbicides in Surtain™ herbicide delivers excellent residual activity on herbicide-resistant weeds, including HPPD-resistant Amaranthus spp. Furthermore, Surtain™ herbicide will offer flexibility to corn growers expanding the application window. The unique solid encapsulation technology enables the POST application of PPO chemistry (saflufenacil) in corn with reliable crop safety. Surtain™ herbicide can be applied as Preplant, Preemergence, and Early-Postemergence up to V3 stage of corn. Besides these benefits, Surtain™ herbicide will be a relatively low use rate herbicide (9.2 to 17 fl. oz/A depending on soil texture) with enhanced liquid fertilize compatibility. Surtain™ herbicide obtained Federal and State registrations earlier this year and is expected to be launched by BASF Corporation to the corn market for use in the 2025 season.

Application Placement of Endothal for *Poa annua* Control. L. Smith1, J. Vargas1, J. Brosnan1
1University of Tennessee, Knoxville, TN, United States.

Endothal is an herbicidal inhibitor of serine-threonine protein phosphatase (STPP) used for aquatic weed control and defoliation of terrestrial crops. Endothal offers selective postemergence activity on Poa annua L. in turfgrass systems as well. Glasshouse trials were conducted at the University of Tennessee (Knoxville, TN) evaluating the effect of application placement on endothal efficacy for Poa annua control. Experiments were arranged in randomized complete block designs with four replications and repeated in separate glasshouse bays during October 2024. Treatments included soil-only, foliar-only, and soil + foliar placements of endothal (Poachek®. Campbell Chemicals. NSW Australia) at 263 g ha-1. A non-treated check was included in each replication for comparison. Herbicides were applied to mature Poa annua plants (3-tiller) established in pots (591cm3) filled with sand that conformed to United States Golf Association specifications. For each placement, herbicides were applied twice on a 27-day interval. Efficacy was evaluated using visual assessments of Poa annua control 49 days after initial treatment. Additionally, plants were destructively harvested with leaf tissue separated into two groups: leaves exhibiting necrosis following treatment and those that were devoid of symptoms. These groups were used to calculate the percentage of leaf tissue exhibiting necrosis from each endothal placement. Overall, soil-only applications resulted in the greatest control (63%) and greatest percentage of necrotic tissue (57%). Comparatively, foliar-only placement only controlled P. annua 11% and resulted in only 15% necrotic tissue, similar to the non-treated check. These results highlight the importance of soil exposure and limiting foliage interception of the spray solution prior to soil contact when endothal is used for postemergence Poa annua control.

Does Adjuvant Selection Impact the Risk of Quizalofop Injuring TamArkTM and DoubleTeamTM Grain Sorghum? W. Herrman1, J. Norsworthy1, L. Barber2, T. Avent1, P. Carvalho-Moore1 1University of Arkansas System Division of Agriculture, Fayetteville, AR, United States, 2University of Arkansas System Division of Agriculture, Newport, AR, United States.

The Double TeamTM and ArkTamTM traits in grain sorghum [*Sorghum bicolor* (L.) Moench] confer resistance to acetyl-coenzyme A carboxylase-inhibiting herbicides, particularly quizalofop-P-ethyl. Quizalofop product labels recommend using an adjuvant, particularly COC or NIS. In the summer of 2024, research was conducted in Fayetteville, AR, to determine the effect of adjuvant selection with quizalofop on crop injury to both ArkTam and Double Team grain sorghum. The experiment utilized a randomized complete block design with four replications of four-row plots 3.7 x 7.6 m. Only the center two rows were treated. Each treatment included quizalofop at 87 g ai ha-1 and differing adjuvants. Adjuvants included nonionic surfactant at 0.25% v/v, crop oil concentrate at 1% v/v, methylated seed oil at 1% v/v, and adjuvant blend (Dyne-A-Pak) at 1% v/v along with a 'no adjuvant' treatment. The herbicide application was made sequentially at the 2-leaf and 8-leaf stages. Weekly visible injury ratings were collected starting 1 week after the first application and continued to 4 weeks after the second application. The effect of adjuvant selection of injury to grain sorghum was not significant at any of the evaluations. Averaged over adjuvants, there was 5% injury to ArkTam 1 week after the second application compared to 3% injury to Double Team. By the final assessment 4 weeks after the sequential application, less than 1% injury was observed on both Double Team and ArkTam. This research needs to be repeated over multiple environments, but the single year of data collected thus far indicates that adjuvant selection will not increase the risk of injury to ArkTam or Double Team grain sorghum.

Impact of Reduced Rates of BAS 851 on Soybean Growth and Yield. D. Miller1, P. Jha2, A. Barfield1, F. Rontani2, B. Dhaka2, G. Bortolon2, C. McKoin2 1LSU AgCenter, St. Joseph, LA, United States, 2LSU AgCenter, Baton Rouge, LA, United States.

Research was conducted in 2024 at the LSU AgCenter Northeast Research Station near St. Joseph, LA and the Ben Hur Research Station in Baton Rouge, LA to evaluate impacts of reduced rates of BAS 851 (Saflufenacil + Trifludimoxazin) on soybean growth and yield. The study was conducted in a randomized complete block design replicated three times. Treatments included reduced rates of BAS 851 at 0x, 1/8x, 1/16x, 1/32x, 1/64x, 1/128x, and 1/256x rate applied at the V1-2 growth stage. The 1x rate basis for reduced rate calculation was 1.4 oz/A. MSO was added at 1% v/v to all treatments. An MSO alone treatment was included but excluded from analysis due to no impacts compared to the 0 rate. Application was made to P48Z70BLX soybean on May 20 in St. Joseph and P48A14E soybean on May 6 in Baton Rouge. Parameter measurements included visual injury 7, 14, and 28 d after treatment (DAT); plant height at 14 and 28 DAT; and yield. At 7 DAT, at St. Joseph injury of 49 and 42% was observed at the 1/8 and 1/16x rates, respectively, which was greater than all other treatments. The 1/32 and 1/64x rates resulted in equivalent injury of 23 and 19%, respectively. The 1/128x rate resulted in 13% injury, which was equivalent to that for the 1/64 x rate but greater than the lowest rate applied (3%). At Baton Rouge at 7 DAT, a significant stepwise reduction in injury was observed from the 1/8 to 1/128x rate (30, 23, 17, 12, 5%). At 14 DAT at St. Joseph, the highest BAS 851 rate applied resulted in 30% injury, which was equivalent to the 25% observed for the 1/16x rate, and greater than the 1/32 to 1/128x rates (22 to 23%). The lowest significant injury of 13% was observed at the lowest rate. At Baton Rouge at 14 DAT, a significant stepwise reduction in injury was observed from the 1/8x to 1/128x rate (23, 17, 12, 7, 2%). At 28 DAT at St. Joseph, injury was equivalent among all treatments and the 0 rate. At Baton Rouge at 28 DAT, the highest BAS 851 rate resulted in 20% injury, which was equivalent to the 16% for the 1/16x rate and the 10% for the 1/32x rate, and greater than all other rates (0 to 6%). At St. Joseph, soybean height was significantly and equivalently reduced 14 d following application of BAS 851 at all rates except the lowest (10 to 21%). At St. Joseph, soybean height was significantly and equivalently reduced 28 d following application of the 1/8 to 1/64x rate (13 to 27%). At Baton Rouge, soybean height was not significantly reduced at either evaluation interval. At both locations, a significant soybean yield reduction was not observed following BAS 851 application.

Preemergence Herbicide Strategies affecting Postemergence Targeted Herbicide Sprays. L. Pierce1, J. Norsworthy1, T. Avent1, M. Dodde1, P. Carvalho-Moore1, G. Morgan2 1University of Arkansas System Division of Agriculture, Fayetteville, United States, 2Cotton Incorporated, Cary, United States.

John Deere See & SprayTM utilizes machine vision to target applications specifically to weeds detected. This research aimed to determine if the strength of cotton preemergence herbicides affected the number of postemergence-targeted sprays with See & Spray. In 2024, a five-treatment trial with four replications was conducted at the Northeast Research and Extension Center in Keiser, AR. All plots were sprayed with various preemergence (PRE) herbicides. The PRE herbicides included fluridone, diuron, fomesafen, and fluridone plus fomesafen, and a nontreated control for comparison. Water was applied with the See and Spray Agronomy Test Machine 21 and 28 days after preemergence (DAPRE) applications. This provided an estimate of potential postemergence herbicide savings. Densities of Palmer amaranth (*Amaranthus palmeri* P.) and common purslane (Portulaca oleracea L.) were collected from the entire plot weekly following the PRE application. Treatments containing fluridone provided 46% savings during the 21 DAPRE application. Treatments containing diuron alone and the diuron plus fomesafen provided comparable herbicide savings at 34 and 38%, respectively. Fluridone and Direx were similar providing > 98% reduction in the Palmer amaranth density at 21 DAPRE. At the 28 DAPRE application, all treatments provided less than 7% savings. Fluridone, diuron plus fomesafen provided the highest Palmer amaranth control at the 28 DAPRE application, with < 7% of the nontreated density. At the 28 DAPRE application, fluridone, diuron, and fluridone plus fomesafen provided comparable control from 18-12%. The most herbicide savings and best weed control at the 21 DAPRE application were seen when fluridone was applied PRE. At the 28 DAPRE application, treatments with diuron plus fomesafen PRE had the greatest herbicide savings and weed control.

Impact of Reduced Rates of BAS 851 on Corn Growth and Yield. D. Miller1, P. Jha2, A. Barfield1, F. Rontani2, B. Dhaka2, G. Bortolon2, C. McKoin2 1LSU AgCenter, St. Joseph, LA, United States, 2LSU AgCenter, Baton Rouge, LA, United States.

Research was conducted in 2024 at the LSU AgCenter Northeast Research Station near St. Joseph, LA and the Ben Hur Research Station in Baton Rouge, LA to evaluate impacts of reduced rates of BAS 851 (Saflufenacil + Trifludimoxazin) on corn growth and yield. The study was conducted in a randomized complete block design with a factorial treatment arrangement replicated three times. Treatments were applied via compressed air sprayer at 15 GPA. Treatments included reduced rates of BAS 851 at 0x, 1/8x, 1/16x, 1/32x, 1/64x, 1/128x, and 1/256x rate applied at the V2 or V4 growth stage. The 1x rate basis for reduced rate calculation was 1.4 oz/A. MSO was added at 1% v/v to all treatments. A comparison 1% MSO alone treatment was included. Application was made to P13777PCUE corn on April 19 or May 1 in St. Joseph and April 24 or May 9 in Baton Rouge. Parameter measurements included visual injury 7, 14, and 28 d after treatment (DAT); plant height at 14 and 28 DAT; and yield. Interactions between reduced rate treatments and application timings were not observed for any parameter measured. At 7 DAT, at St. Joseph injury averaged across both application timings was equivalent between the 1/8 to 1/128 x reduced rate (23 to 16%) and greater than the 0 rate (0%) and MSO alone (2%). The lowest rate applied resulted in 6% injury, which was equivalent to that for the 1/128x reduced rate (16%) and MSO alone and greater than the 0 rate. At Baton Rouge, all rates applied resulted in equivalent injury (4 to 14%) which was greater than the 0 rate and MSO alone (0%). At 14 DAT, at St. Joseph, averaged across both application timings the 1/128x reduced rate resulted in 9% injury, which was greater than all other rates and MSO alone (equal injury of 4 to 5%). At 28 DAT a St. Joseph and at 14 DAT and 28 DAT at Baton Rouge, injury was no greater than 0% and 3 and 2%, respectively, and equivalent to the 0 rate. At St. Joseph, averaged across application timings, corn height was reduced only at the 14 DAT evaluation interval following application of the four highest BAS 851 rates when compared to the 0 rate (13.7 to 17% equivalent reduction). At Baton Rouge, corn height was not reduced at either evaluation interval following application. At both locations, a significant corn yield reduction was not observed following BAS 851 applied at either timing.

A Novel Approach to Estimating Weed Cover in Turfgrass Research Using Deep Learning.

M. M. Joseph1, K. Gawron1, P. Petelewicz1 1University of Florida, Gainesville, United States.

Weed cover is conventionally measured using visual rating or grid point intercept in turfgrass research. However, these methods have limitations, as visual ratings are prone to human error as judgment can vary over time, while point intercept methods are labor-intensive and time-consuming. Recent advances in computer vision and deep learning algorithms have resulted in highly accurate weed recognition across various crops, which offers promising solutions to minimize time and judgment bias in weed cover assessment. This study evaluated the effectiveness of a deep learning pipeline for estimating weed cover in plot research. Images of spotted spurge [Chamaesyce maculata (L.) Small] infestations in Latitude 36' bermudagrass [Cynodon dactylon (L.) Pers. × C. transvaalensis Burtt-Davy] fairways were collected, processed, and trained using the YOLOv8 medium segmentation model. The model was trained and validated on 1,500 images, with an additional 100 images used for weed cover prediction. After prediction, an algorithm was developed to calculate weed surface area using annotation normalization and binary mask filtering. Three individuals conducted visual ratings and grid intercept counts (with a 2 × 2 cm grid) on the same 100 images. The YOLOv8 model achieved a precision of 0.63, recall of 0.60, and a mean average precision of 0.61 at an intersection over union (IoU) threshold of 0.50. There is a significant difference between the visual ratings model predictions and grid intercept counts. However, no significant difference was found between the model predictions and grid intercept counts, with a correlation of 0.87 at a model confidence level of 0.25. The model tended to underestimate cover at confidence levels above 0.60, suggesting lower confidence values may reduce missed weed targets. Overall, the deep learning pipeline provides a consistent, time-saving alternative to traditional weed cover assessment methods. Further research will focus on improving the model by incorporating additional weed species and deploying it as an open-source web-based application.

Response of Yellow (*Cyperus esculentus* L.) and Purple (*Cyperus rotundus* L.) Nutsedge Growth Stage to Post Emergence Herbicides. V. Varanasi[1], T. Bararpour[2], P. Mubvumba[1], R. Fletcher[1], K. Reddy[1]; [1]USDA-ARS-Crop Production Systems Research Unit, Stoneville, United States, [2]Mississippi State University, Stoneville, United States.

Yellow and purple nutsedges are highly competitive and persistent perennial weeds in agronomic and horticultural crops of the Southeastern United States. Yellow and purple nutsedge management has been challenging during the growing season due to their ability to propagate vegetatively through underground rhizomes and tubers. Therefore, there is a need to develop effective herbicide programs that could check the spread of sedges and protect crop yields. Greenhouse experiments were conducted in 2024 to evaluate the response of yellow and purple nutsedges at two different growth stages; 10 to 15 and 15 to 20 cm height, to postemergence herbicides currently labeled for use in Mississippi cropping systems. Herbicides tested were glyphosate (1261 g ai ha^{-1}), glufosinate (672 g ai ha^{-1}), bentazon (1681 g ai ha^{-1}), halosufuron (69.5 g ai ha^{-1}), and trifloxysulfuron (6.9 g ai ha^{-1}), respectively. Herbicides were sprayed using an automated research track spray chamber. Glyphosate was found to be the most effective for purple nutsedge control (> 90%), whereas halosulfuron was the most effective in controlling yellow nutsedge (> 90%), at 10–15 cm growth stage 28 days after treatment. Emergence of new shoots for both species was highest for glufosinate and bentazon and zero for glyphosate and halosulfuron treatments. More new shoots were observed when glufosinate and bentazon were applied at 15–20 cm compared to 10–15 cm in height. Shoot regrowth at 21 days after cutting the above ground shoots indicated similar trends, with regrowth even with glyphosate application in yellow nutsedge. Overall, shoot and root biomass reduction for both species were highest (> 90%) with glyphosate, halosulfuron, and trifloxysulfuron treatments, with less biomass reduction (71%) when glyphosate was applied to yellow nutsedge at 15–20 cm height. Results indicate glyphosate and halosulfuron as effective control options for purple and yellow nutsedges, especially when applied at 10–15 cm tall plants.

Assessing the Safety of S-Metolachlor as an Over-the-Top Pre-Emergent Herbicide on 'Denver Daisy' Black-eyed Susan (*Rudbeckia hirta* 'Denver Daisy'). D. Nistler[1], A. Bowden[1], H. Wright Smith[1], D. Rivera[2]; [1]University of Arkansas Division of Agriculture Research & Education, Little Rock, United States, [2]University of Arkansas Division of Agriculture SWREC, Hope, United States.

Preemergence herbicides play a critical role in weed management but can pose challenges for ornamental plant safety during establishment. Black-eyed Susan (*Rudbeckia hirta*) cv "Denver Daisy" is a popular ornamental cultivar valued for its vibrant blooms and adaptability. An experiment was conducted in 2024 at the Southwest Research and Extension Center in Hope, AR to evaluate transplanted Black-eyed Susan tolerance to topically applied S-metolachlor. S-metolachlor was applied as a broadcast application at 0, 2.8, 5.6, and 11.2 kg ai ha^{-1} two weeks after Black-eyed Susan plants were transplanted into raised beds. Visual injury, plant heights, and plant widths were collected at 2- and 4-weeks after application. There was no visual injury at any rating, however, some damage from deer feeding on plants was observed so only plant widths are reported. Plant widths ranged from 9 to 10.5 cm at 2-weeks after treatment and 15.7 to 17.3 cm at 4-weeks after treatment, with no differences between treatment at either data collection timing. Data from this study suggests that topically-applied S-metolachlor may be a viable residual weed control option for ornamental Black-eyed Susan.

CO_2 and Temperature Influence Palmer Amaranth Populations' Growth, Development, ^{14}C Translocation, and Epicuticular Waxes Composition. J. de Souza Rodrigues[1], D. Shilling[2], N. Basinger[2], T. Grey[1]; [1]University of Georgia, Tifton, United States, [2]University of Georgia, Athens, United States.

Palmer amaranth *(Amaranthus palmeri* S. Watson) is a highly problematic weed due to its rapid growth, adaptability, and widespread herbicide resistance. This study investigated the effects of elevated CO_2 and temperature on morphological development, glyphosate absorption and translocation, and epicuticular wax composition of glyphosate-resistant (GA2017 and GA2020) and susceptible (GA2005) biotypes. Morphological development was assessed under four CO_2 and temperature scenarios: low temperature (23/33°C) and CO_2 (410 ± 25 ppm), low temperature and high CO_2 (750 ± 25 ppm), high temperature (26/36°C) and low CO_2, and high temperature and high CO_2. Glyphosate absorption, translocation, and epicuticular wax composition were evaluated under current (23/33°C; 410 ± 30 ppm) and elevated (26/36°C; 800 ± 30 ppm) temperature and CO_2 levels. The biotypes were initially grown in trays in a greenhouse and thinned to one plant per cell. After two weeks, uniform seedlings were selected based on height and leaf number, transplanted into pots with potting media, and moved to growth chambers with a 16/8-hour light cycle, 60–70% humidity, and twice-daily irrigation. Morphological evaluations revealed that elevated CO_2 significantly enhanced Palmer amaranth growth, with increased height, leaf area, stem dry matter, and plant volume compared to current CO_2 levels. Among biotypes, the glyphosate-susceptible GA2005 displayed superior growth, including greater height, number of leaves, and shoot development, compared to glyphosate-resistant biotypes GA2017 and GA2020. Shoot-to-root allometry was largely isometric across biotypes, with temporal variations in shoot growth observed at 14 and 28 days after transplanting. Glyphosate absorption and translocation studies showed that elevated CO_2 and temperature enhanced glyphosate absorption in the susceptible GA2005 biotype. Under elevated conditions, GA2005 exhibited increased translocation of ^{14}C-glyphosate to above-ground tissues and a marked rise in the shoot-to-root ratio (Bq mg^{-1}). In contrast, resistant biotypes exhibited minimal changes, with only a slight increase in root translocation of glyphosate observed in GA2017. Epicuticular wax composition was also altered under elevated CO_2 and temperature. n-alkanes were more predominant in the current CO_2/T scenario, while alcohols were more abundant under the elevated CO_2/T scenario. A total of 64 compounds from nine chemical groups were identified, including n-alkanes, fatty acids, ω-hydroxy acids, alcohols, diterpenoids, triterpenoids, tocopherols, sterols, and ketones. Elevated CO_2/T increased total wax content by 40% across all biotypes compared to the current CO_2/T scenario. Elevated CO_2 significantly enhanced morphological development, particularly in the glyphosate-susceptible GA2005 biotype, which exhibited superior growth, greater glyphosate absorption, and increased shoot-to-root translocation compared to resistant biotypes. In contrast, resistant biotypes demonstrated only slight increases in root translocation. The alterations in epicuticular wax composition under elevated conditions suggest that potential changes in herbicide absorption can occur. These results highlight the need for integrated weed management strategies that consider climate-induced changes in weed biology and herbicide interactions to ensure effective and sustainable control of Palmer amaranth in future agricultural systems.

Lettuce Tolerance to Pendimethalin on Organic Soil. W. Wong[1], C. Odero[1]; [1]University of Florida, Everglades Research & Education Center, Belle Glade, United States.

The proposed project will focus on developing an integrated management program for common purslane using the herbicide pendimethalin and other weed control strategies. Common purslane is the most problematic and difficult to control broadleaf weed in leafy vegetables cultivated in the Everglades Agricultural Area of southern Florida. Common purslane poses a challenge to growers because it reduces yield and requires expensive hand weeding to supplement herbicide control. Leafy vegetables production in the region is heavily reliant on imazethapyr, the only herbicide for broadleaf weed management. Despite extensive use of imazethapyr, common purslane persistence and resulting leafy vegetables yield reduction from its interference is widespread. Preliminary data indicate that pendimethalin can potentially be safely used to mitigate negative effects of common purslane on leafy vegetables. We propose further evaluation of pendimethalin use in leafy vegetables and develop an economically effective integrated management system using the herbicide in combination with other strategies to allow for sustenance and expansion of production to meet growing regional demand. An effective common purslane management program will mitigate its impact and significantly reduce the need for hand labor for weeding while improving leafy vegetables yield and quality. The proposed project will be conducted in southern Florida over two years under supervision of a weed scientist at the University of Florida. Leafy vegetables growers will directly benefit from this project and the outcome of the research will be disseminated directly to them and at extension and professional meetings locally and regionally.

Rindé™ Use in Rice Weed Control Programs Targeting Barnyardgrass. J. Malone[1], J. Norsworthy[1], L. Barber[1]; [1]University of Arkansas System Division of Agriculture, Fayetteville, United States.

Arkansas has historically been the leading rice-producing state, accounting for nearly 50% of total rice production in the United States. Rice weed control has been made difficult for producers due to the lack of effective herbicides, with the most notable weed being barnyardgrass (*Echinochloa crus-galli*). Herbicide resistance has contributed heavily to the difficulty in controlling barnyardgrass, showing resistance to 5 different modes of action. This has resulted in the need for new herbicide products. Rinde is a mixture of quinclorac and bispyribac-sodium, two herbicides commonly used in rice to control barnyardgrass. The objective of this experiment was to determine the effectiveness of Rinde in a herbicide program for drill-seeded rice production. The research was conducted in 2023 in Keiser, AR, on Sharkey clay soil. Rice injury and barnyardgrass control ratings were taken at 7, 14, 21, 28, and 40 days after post-flood application (DAA). At 7 DAA, treatments containing fenoxaprop-p-ethyl (Ricestar HT) were the only applications resulting in significant injury; however, the injury never exceeded 13% throughout the experiment. All other Rinde-containing treatments never caused more than 4% injury. At 14 DAA, programs containing a delayed preemergence application of pendimethalin (Prowl H_2O) or imazethapyr (Newpath) resulted in significantly greater barnyardgrass control, exceeding 90%. Barnyardgrass control in treatments that did not contain a delayed preemergence application ranged from 65–75%. At the final evaluation, all Rinde-containing treatments provided at least 98% control. These findings illustrate the effectiveness of rice weed control programs containing a quinclorac plus bispyribac-sodium premixture.

Dose-Response and Shikimic Acid Accumulation on Palmer Amaranth Biotypes from Georgia. P. A. Silva Martins[1], H. Lemos Martins[2], S. Bowen[1], P. L. Da Costa Aguiar Alves[2], T. Grey[1], J. de Souza Rodrigues[1]; [1]University of Georgia, Tifton, United States, [2]Sao Paulo State University, Jaboticabal, Brazil.

Palmer amaranth *(Amaranthus palmeri* S. Watson) is one of the most troublesome weeds, and due to its high level of phenotypic and phenological plasticity, this species can adapt quickly to new environmental conditions. Palmer amaranth is one of the most economically damaging glyphosate-resistant weeds in the U.S. Glyphosate-resistant Palmer amaranth was first identified in Georgia in 2004 and subsequently reported in Arkansas, North and South Carolina, and Tennessee. It is widespread across the South and spreading rapidly, with new reports from Illinois in 2010 and Michigan and Virginia in 2011. This study aimed to evaluate the ED_{50} values and shikimic acid accumulation of four Palmer amaranth biotypes (LJ08, LJ23, J08, and J23) collected 15 years apart from two locations in Georgia, U.S. For the dose-response and shikimic acid trials, plants were grown in a greenhouse until they reached 8–12 cm in height with 8–10 leaves. The plants were placed under a 16/8 h (day/night) photoperiod with supplemental lights providing 600 $\mu mol \cdot m^{-2} \cdot s^{-1}$ and temperature at 30°C ± 5°C. Plants were treated with eight glyphosate concentrations: 265.9, 531.9, 1063.7, 2127.5, 4255.0, 8510.0, and 17020.0 g a.e. ha^{-1}. Twenty-one days after application (DAA) of the glyphosate treatments, plants were cut at soil level, placed in paper bags, and dried at 60°C to quantify dry biomass. For the shikimic acid assay, 4 mm leaf disks of the populations were excised and exposed to glyphosate for 24 hours under 120 $\mu mol \cdot m^{-2} \cdot s^{-1}$ LED lights. Absorbance was determined spectrophotometrically at 380 nm. Both assays were repeated twice. The ED_{50}'s are 432.72 and 5646.3 g a.e. ha^{-1} for LJ08 and LJ23 and 422.2 and 4920.7 g a.e. ha^{-1} for J08 and J23. Between LJ08 and LJ23, there was a 12-fold increase in the ED_{50} while an 11-fold increase was recorded J08 and J23, comparing this 15-year gap between the biotypes. Based on these results, LJ08 and J08 biotypes can be considered glyphosate-susceptible, and LJ23 and J23 biotypes, are glyphosate-resistant. LJ23 accumulated less shikimate than LJ08. Similar results were observed for J08 and J23, except for doses 75 and 700 mM where no differences in shikimate accumulations were observed. Shikimic acid accumulation in resistant populations was previously recorded in other Palmer amaranth populations from Georgia.

Lettuce Tolerance to Pendimethalin on Organic Soil. W. Wong[1], C. Odero[1]; [1]University of Florida, Everglades Research & Education Center, Belle Glade, United States.

Lettuce is an important crop cultivated on organic soils (Histosols) in southern Florida. Broadleaf weed management, particularly common purslane (*Portulaca oleracea*) poses significant challenge to growers. Weeds reduce yield and require expensive hand weeding to supplement herbicide control. Currently, lettuce production in the region relies exclusively on imazethapyr for broadleaf weed control. Despite its widespread use, weed persistence and yield reductions due to interference from species like common purslane remain prevalent. In 2024, research was conducted to evaluate the tolerance of various direct-seeded lettuce types to preemergence-applied pendimethalin on organic soil. The experiment was a randomized complete block design with a split-plot arrangement and four replications. The main plot was pendimethalin rate (0, 1060, 1600, and 2130 g ai ha^{-1}), while the subplot was the lettuce type (two varieties each of three types). Lettuce types included iceberg ('Flagler', 'Cooper'), green romaine ('Sawgrass', 'Homestead'), and greenleaf ('3SX722, '3SX4906'). Pendimethalin caused lettuce injury, primarily observed as stunting. Greenleaf '3SX4906' exhibited > 90% injury and stand reduction at all pendimethalin rates at 14 days after treatment (DAT). For the remaining varieties, injury ranged from 15% to 40%, with no significant stand loss. Most lettuce varieties, except '3SX4906', showed significant recovery from injury by 42 DAT, particularly at the lower pendimethalin rates. Lettuce yield at the lowest rate of pendimethalin was not significantly different from the nontreated control except for greenleaf '3SX4906', which had > 90% yield loss. At the highest pendimethalin rate, yields were reduced up to 30% compared to the nontreated control for all varieties except greenleaf '3SX4906' which had > 90% yield loss. This study demonstrates that direct-seeded lettuce has tolerate pendimethalin, especially at the lowest rate tested. Ongoing research is being conducted to confirm these findings and to evaluate broadleaf weed control in lettuce when pendimethalin is applied alone or in combination with imazethapyr.

Waterhemp Seedling Emergence Pattern Is Influenced by Tillage and Cereal Rye Cover Across a Latitudinal Gradient. P. Gyawali[1], P. Pavlovic[1], D. Kerr[2], A. Mobli[3], R. Werle[3], J. Norsworthy[4], M. Williams[5], M. Bagavathiannan[1]; [1]Department of Soil and Crop Sciences, Texas A&M University, College Station, TX, United States, [2]Department of Crop Sciences, University of Illinois at Urbana-Champaign, Urbana, IL, United States, [3]Department of Agronomy, University of Wisconsin–Madison, Madison, WI, United States, [4]Department of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, AR, United States, [5]Global Change and Photosynthesis Research Unit, USDA-ARS, Urbana, IL, United States.

Weed seedling emergence plays a crucial role in shaping weed population dynamics and guiding effective management strategies. Predicting emergence timing is key to targeting control measures during the most vulnerable growth stages. This is especially important for managing common waterhemp (*Amaranthus tuberculatus*), a troublesome weed with extended emergence throughout the growing season. This study examines the influence of tillage practices and cover crop integration on waterhemp seedling emergence across a latitudinal gradient (Wisconsin, Illinois, Arkansas, and Texas). The study, conducted from fall 2022 to late fall 2024, employed a split-plot design with three primary tillage treatments: 1) fall tillage followed by spring tillage, 2) fall tillage only, and 3) no-tillage, combined with subplot treatments of cereal rye versus fallow. Results indicated that fall tillage followed by spring tillage led to earlier and more rapid emergence, while cereal rye extended the emergence period. Regional variations were observed: in northern regions (Wisconsin and Illinois), fall tillage resulted in gradual and consistent emergence, whereas in southern regions (Arkansas and Texas), it delayed emergence, concentrating it into a shorter period, particularly in the absence of rye. No-tillage combined with rye significantly delayed emergence, expanding the emergence window across a wider range of GDD, especially in southern locations. Cereal rye suppressed waterhemp emergence in most locations, except Wisconsin. These findings suggest that while rye is effective in controlling waterhemp emergence, tillage practices play a significant role in regulating emergence timing. By examining how tillage, cover crops, and regional factors influence waterhemp emergence, this study provides novel insights into site-specific management decision making. Further research should explore the long-term effects of these strategies on waterhemp seeding emergence dynamics.

Response of Yellow (*Cyperus esculentus* L.) and Purple (*Cyperus rotundus* L.) Nutsedge Growth Stage to Post Emergence Herbicides. V. Varanasi[1], T. Bararpour[2], P. Mubvumba[1], R. Fletcher[1], K. Reddy[1]; [1]USDA-ARS-Crop Production Systems Research Unit, Stoneville, United States, [2]Mississippi State University, Stoneville, United States.

Yellow and purple nutsedges are highly competitive and persistent perennial weeds in agronomic and horticultural crops of the Southeastern United States. Yellow and purple nutsedge management has been challenging during the growing season due to their ability to propagate vegetatively through underground rhizomes and tubers. Therefore, there is a need to develop effective herbicide programs that could check the spread of sedges and protect crop yields. Greenhouse experiments were conducted in 2024 to evaluate the response of yellow and purple nutsedges at two different growth stages; 10 to 15 and 15 to 20 cm height, to postemergence herbicides currently labeled for use in Mississippi cropping systems. Herbicides tested were glyphosate (1261 g ai ha^{-1}), glufosinate (672 g ai ha^{-1}), bentazon (1681 g ai ha^{-1}), halosufuron (69.5 g ai ha^{-1}), and trifloxysulfuron (6.9 g ai ha^{-1}), respectively. Herbicides were sprayed using an automated research track spray chamber. Glyphosate was found to be the most effective for purple nutsedge control (> 90%), whereas halosulfuron was the most effective in controlling yellow nutsedge (> 90%), at 10–15 cm growth stage 28 days after treatment. Emergence of new shoots for both species was highest for glufosinate and bentazon and zero for glyphosate and halosulfuron treatments. More new shoots were observed when glufosinate and bentazon were applied at 15–20 cm compared to 10–15 cm in height. Shoot regrowth at 21 days after cutting the above ground shoots indicated similar trends, with regrowth even with glyphosate application in yellow nutsedge. Overall, shoot and root biomass reduction for both species were highest (> 90%) with glyphosate, halosulfuron, and trifloxysulfuron treatments, with less biomass reduction (71%) when glyphosate was applied to yellow nutsedge at 15–20 cm height. Results indicate glyphosate and halosulfuron as effective control options for purple and yellow nutsedges, especially when applied at 10–15 cm tall plants.

Assessing the Safety of S-Metolachlor as an Over-the-Top Pre-Emergent Herbicide on 'Denver Daisy' Black-eyed Susan (*Rudbeckia hirta* 'Denver Daisy'). D. Nistler[1], A. Bowden[1], H. Wright Smith[1], D. Rivera[2]; [1]University of Arkansas Division of Agriculture Research & Education, Little Rock, United States, [2]University of Arkansas Division of Agriculture SWREC, Hope, United States.

Preemergence herbicides play a critical role in weed management but can pose challenges for ornamental plant safety during establishment. Black-eyed Susan (*Rudbeckia hirta*) cv "Denver Daisy" is a popular ornamental cultivar valued for its vibrant blooms and adaptability. An experiment was conducted in 2024 at the Southwest Research and Extension Center in Hope, AR to evaluate transplanted Black-eyed Susan tolerance to topically applied S-metolachlor. S-metolachlor was applied as a broadcast application at 0, 2.8, 5.6, and 11.2 kg ai ha^{-1} two weeks after Black-eyed Susan plants were transplanted into raised beds. Visual injury, plant heights, and plant widths were collected at 2- and 4-weeks after application. There was no visual injury at any rating, however, some damage from deer feeding on plants was observed so only plant widths are reported. Plant widths ranged from 9 to 10.5 cm at 2-weeks after treatment and 15.7 to 17.3 cm at 4-weeks after treatment, with no differences between treatment at either data collection timing. Data from this study suggests that topically-applied S-metolachlor may be a viable residual weed control option for ornamental Black-eyed Susan.

CO_2 and Temperature Influence Palmer Amaranth Populations' Growth, Development, ^{14}C Translocation, and Epicuticular Waxes Composition. J. de Souza Rodrigues[1], D. Shilling[2], N. Basinger[2], T. Grey[1]; [1]University of Georgia, Tifton, United States, [2]University of Georgia, Athens, United States.

Palmer amaranth *(Amaranthus palmeri* S. Watson) is a highly problematic weed due to its rapid growth, adaptability, and widespread herbicide resistance. This study investigated the effects of elevated CO_2 and temperature on morphological development, glyphosate absorption and translocation, and epicuticular wax composition of glyphosate-resistant (GA2017 and GA2020) and susceptible (GA2005) biotypes. Morphological development was assessed under four CO_2 and temperature scenarios: low temperature (23/33°C) and CO_2 (410 ± 25 ppm), low temperature and high CO_2 (750 ± 25 ppm), high temperature (26/36°C) and low CO_2, and high temperature and high CO_2. Glyphosate absorption, translocation, and epicuticular wax composition were evaluated under current (23/33°C; 410 ± 30 ppm) and elevated (26/36°C; 800 ± 30 ppm) temperature and CO_2 levels. The biotypes were initially grown in trays in a greenhouse and thinned to one plant per cell. After two weeks, uniform seedlings were selected based on height and leaf number, transplanted into pots with potting media, and moved to growth chambers with a 16/8-hour light cycle, 60–70% humidity, and twice-daily irrigation. Morphological evaluations revealed that elevated CO_2 significantly enhanced Palmer amaranth growth, with increased height, leaf area, stem dry matter, and plant volume compared to current CO_2 levels. Among biotypes, the glyphosate-susceptible GA2005 displayed superior growth, including greater height, number of leaves, and shoot development, compared to glyphosate-resistant biotypes GA2017 and GA2020. Shoot-to-root allometry was largely isometric across biotypes, with temporal variations in shoot growth observed at 14 and 28 days after transplanting. Glyphosate absorption and translocation studies showed that elevated CO_2 and temperature enhanced glyphosate absorption in the susceptible GA2005 biotype. Under elevated conditions, GA2005 exhibited increased translocation of ^{14}C-glyphosate to above-ground tissues and a marked rise in the shoot-to-root ratio (Bq mg^{-1}). In contrast, resistant biotypes exhibited minimal changes, with only a slight increase in root translocation of glyphosate observed in GA2017. Epicuticular wax composition was also altered under elevated CO_2 and temperature. n-alkanes were more predominant in the current CO_2/T scenario, while alcohols were more abundant under the elevated CO_2/T scenario. A total of 64 compounds from nine chemical groups were identified, including n-alkanes, fatty acids, ω-hydroxy acids, alcohols, diterpenoids, triterpenoids, tocopherols, sterols, and ketones. Elevated CO_2/T increased total wax content by 40% across all biotypes compared to the current CO_2/T scenario. Elevated CO_2 significantly enhanced morphological development, particularly in the glyphosate-susceptible GA2005 biotype, which exhibited superior growth, greater glyphosate absorption, and increased shoot-to-root translocation compared to resistant biotypes. In contrast, resistant biotypes demonstrated only slight increases in root translocation. The alterations in epicuticular wax composition under elevated conditions suggest that potential changes in herbicide absorption can occur. These results highlight the need for integrated weed management strategies that consider climate-induced changes in weed biology and herbicide interactions to ensure effective and sustainable control of Palmer amaranth in future agricultural systems.

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The proposed project will focus on developing an integrated management program for common purslane using the herbicide pendimethalin and other weed control strategies. Common purslane is the most problematic and difficult to control broadleaf weed in leafy vegetables cultivated in the Everglades Agricultural Area of southern Florida. Common purslane poses a challenge to growers because it reduces yield and requires expensive hand weeding to supplement herbicide control. Leafy vegetables production in the region is heavily reliant on imazethapyr, the only herbicide for broadleaf weed management. Despite extensive use of imazethapyr, common purslane persistence and resulting leafy vegetables yield reduction from its interference is widespread. Preliminary data indicate that pendimethalin can potentially be safely used to mitigate negative effects of common purslane on leafy vegetables. We propose further evaluation of pendimethalin use in leafy vegetables and develop an economically effective integrated management system using the herbicide in combination with other strategies to allow for sustenance and expansion of production to meet growing regional demand. An effective common purslane management program will mitigate its impact and significantly reduce the need for hand labor for weeding while improving leafy vegetables yield and quality. The proposed project will be conducted in southern Florida over two years under supervision of a weed scientist at the University of Florida. Leafy vegetables growers will directly benefit from this project and the outcome of the research will be disseminated directly to them and at extension and professional meetings locally and regionally.

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Waterhemp Seedling Emergence Pattern Is Influenced by Tillage and Cereal Rye Cover Across a Latitudinal Gradient. P. Gyawali[1], P. Pavlovic[1], D. Kerr[2], A. Mobli[3], R. Werle[3], J. Norsworthy[4], M. Williams[5], M. Bagavathiannan[1]; [1]Department of Soil and Crop Sciences, Texas A&M University, College Station, TX, United States, [2]Department of Crop Sciences, University of Illinois at Urbana-Champaign, Urbana, IL, United States, [3]Department of Agronomy, University of Wisconsin–Madison, Madison, WI, United States, [4]Department of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, AR, United States, [5]Global Change and Photosynthesis Research Unit, USDA-ARS, Urbana, IL, United States.

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Exploration of Sweetpotato Germplasm Response to Anaerobic Soil Disinfestation, Weed Competition and Southern Root-Knot Nematode Resistance. S. Singh[1], C. Khanal[2], M. Cutulle[1]; [1]Clemson University, Coastal Research and Education Center, Charleston, United States, [2]Clemson University, Clemson, United States.

Anaerobic soil disinfestation (ASD) is a promising organic pest management strategy and is an alternative to chemical-led approaches that has shown potential to manage weeds and soil-borne pathogens in organic vegetable production systems. ASD is facilitated by incorporating carbon sources into the soil, tarping the soil with plastic mulch, and irrigating to the soil saturation. To evaluate the impact of ASD on weed and nematode management in organic-grown sweetpotato, greenhouse studies were conducted at Clemson University, Clemson, South Carolina. Experiments were laid out in a randomized complete block design in 2-gallon microcosms with two carbon sources [ASD (soil amended with chicken manure + molasses as carbon source) and non-ASD (non-amended control)] in the main plot and twenty sweetpotato genotypes in subplots. Three week old seedlings of tomato were planted in each microcosm followed by inoculation with 10,000 eggs of the southern root-knot nematode (*Meloidogyne incognita*). ASD was initiated one month post inoculation to allow nematodes to complete one life cycle. At the time of the ASD initiation, each microcosm was also inoculated with weed seeds [yellow nutsedge (10 tubers) and carpet weed (100 seeds)]. ASD was conducted for three weeks, followed by the transplantation of sweetpotato slips after one week of ASD termination. Weed counts, nematode reproduction (number of second stage juveniles (J2) and number of eggs/g of root system), and sweetpotato above and below ground biomass data were collected. Our results suggested that the microcosms receiving the carbon amendment spent the most time under anaerobic conditions (< 200 mvh). ASD lowered weed cover percentage (78%), individual weed count of yellow nutsedge (75%), and carpet weed (70%) as compared to non-ASD. The abundance of nematode second-stage juveniles (J2) varied among the sweetpotato lines, with the lowest number observed in sweetpotato cultivar Ruddy (03 J2/100 cm^3 of soil) under ASD treatment. However, commercial cultivar Beauregard supporting the greatest population under non-amended treatment (163/100 cm^3 of soil). ASD treatment had significantly higher above-ground biomass (9.1 g) of sweetpotato compared to the Non-ASD controls (4.2 g). The results of this greenhouse studies will be validated under field conditions.

Memory Induced by Recurrent Water Stress in Chirca (*Acanthostyles buniifolius*). T. Heck[1], G. Maia Sousa[2], R. Antonio Polito[2], A. Balbinot[3], M. Vinicius Fipke[2], E. Rabaioli Camargo[2], L. Avila[4]; [1]Federal University of Pelotas, Mississippi State University, Pelotas/RS, Brazil, [2]Federal University of Pelotas, Pelotas/RS, Brazil, [3]Syngenta, Lucas do Rio Verde, Brazil, [4]Mississippi State University, Starkville, United States.

To thrive as a successful weed in natural pastures, a plant must have not only a highly competitive ability but also the resilience to endure environmental stresses and rapidly reclaim space once those stressors diminish and the other non-stress-tolerant plants die. *Acanthostyles buniifolius*, known as chirca, is a widely spread weed in South American natural pastures. It is acclaimed for its remarkable ability to withstand environmental stresses and flourish in environments with prevalent stressors. The study evaluated the memory effect of drought stress in chirca plants. The experiment was conducted in a greenhouse arranged in a randomized block design with three replications. Treatments included: T1 = control plants without any period of water deficit; T2 = Recurrent Stress, plants that experienced recurrent water deficit at 141 and 164 DAE; T3 = plants that only experienced a water deficit at 164 DAE. Water restriction was set as 15% of pot capacity, and plants without water restriction were set as pot capacity. The results showed that plants exposed to recurrent drought stress showed better maintenance of water status than plants that received only one stress at 164 DAE. Chirca plants exposed to recurrent stress show better maintenance of water status when compared to plants that received only one stress. Plants that were not exposed to pre-treatment with water deficit exhibited a higher concentration of proline, indicating a greater protection against oxidative damage and osmotic regulation. Based in our results we can conclude that water deficit in the vegetative stage can prepare chirca plants for future drought events. These results show that chirca is a very adaptative weed and may become a bigger problem to pastures in South America if drought becomes more frequent and severe.

Differential Germination and Seedling Growth Response of Weed Species to Allelochemical Toxicity *In Vitro*. A. Warris[1], J. Holland[2], V. Moore[3], C. Reberg-Horton[4], S. Mirsky[5], R. Leon[1]; [1]North Carolina State University, Raleigh, United States, [2]North Carolina State University, U.S. Department of Agriculture, Agricultural Research Service, Raleigh, United States, [3]Cornell University, Ithaca, United States, [4]North Carolina State University, Ithaca, United States, [5]U.S. Department of Agriculture, Agricultural Research Service, Beltsville, United States.

Cereal rye (*Secale cereale* L.) is widely used as a cover crop due to its capacity to enhance soil health and suppress weeds through allelopathy. Nevertheless, the effects of allelopathic compounds on the germination of weed seeds with varying vigor have not been fully explored. This study investigated the allelopathic influence of cereal rye on the germination of *Amaranthus palmeri* L., *Digitaria sanguinalis* L., *Setaria faberi* Herrm., and *Lactuca sativa* L. Seeds were germinated *in vitro* on media containing allelochemicals from cereal rye roots with differing allelopathic activity, ranging from high to low. Additionally, seeds underwent accelerated aging to alter their vigor. The results revealed a 31% decrease in total germination for aged seeds compared to non-aged seeds. Germination suppression due to allelochemicals varied by species. *Setaria faberi* showed a hormetic response to low allelopathy treatment, with germination increasing by over 20% compared to the untreated control. *Digitaria sanguinalis* exhibited no response to seed aging, and the high allelopathy treatment led to a slight (less than 10%) decrease in germination. *Amaranthus palmeri* demonstrated the highest germination and was unaffected by both aging and allelopathy treatments. Seed aging negatively affected the germination rate, with allelopathy having a lesser effect. These findings suggest that using allelopathic varieties of *S. cereale* in cover crop rotations could be a valuable strategy for weed suppression. However, the age composition of the seed bank may influence the effectiveness of allelochemicals in preventing weed emergence.

Status of *Amaranthus* spp. Resistance to S-Metolachlor. N. Cordero[1], L. Avila[1], J. Saavedra Avila[1], A. Ulrich[1], G. Posser[1], T. M. Tseng[1], T. Bararpour[1], J. Bond[1]; [1]Mississippi State University, Starkville, United States.

Palmer amaranth is one of the most troublesome and competitive weed species in Mississippi. It is a dioecious summer annual weed that causes significant losses to row crops in the state. Palmer amaranth is one of the few weeds in the United States that have evolved resistance to multiple modes of action herbicides (e.g. microtubule, photosystem (PS) II, acetolactate synthase (ALS), 5-enol-pyruvylshikimate-3-phosphate synthase (EPSPS), and hydroxyphenylpyruvate dioxygenase (HPPD) inhibitors). In 2019, resistance to Group 15 Herbicides (S-metolachlor) was reported in Arkansas. S-metolachlor is a foundation herbicide for many crops and is a vital tool for weed management. Therefore, there is a critical need to monitor S-metolachlor resistance evolution in Mississippi. This study aimed to monitor pigweed's resistance to S-metolachlor in Mississippi by collecting over 440 samples throughout Mississippi, primarily focusing on the highest cotton producing counties, mainly in the Mississippi Delta. A collection of 440 accessions of pigweed were sampled in the 2023 growing season. The samples were taken at row crop harvest in 40 counties around the state. After collecting the samples, the seedheads were dried, manually threshed, and then stored for four months under cold temperature to overcome dormancy for further testing. The test was performed in a randomized block design with three replications. A silty clay loam soil was collected, sieved and placed in a 72-cell gridded tray, where 50 seeds per cell were planted, each cell corresponded to one accession. S-metolachlor was applied at 1.9 kg ai/ha, the maximum field rate to confirm resistance. Weed control and weed emergence were recorded at 14 DAE. The average germination rates on the untreated checks accessions varied from 42 to 80%, and on the treated weed control varied from 95 to 100%, showing that all populations were controlled by the herbicide. All the 440 pigweed accessions sampled in 2023 growing season were susceptible to S-metolachlor.

Biochar Herbicide Protection Pods for Mitigating Herbicide Sensitivity in Tomato Plants. S. Sil[1], F. Souza[1], T. M. Tseng[1]; [1]Mississippi State University, Mississippi State, United States.

The importance of tomato as a crop is substantial, and much work is being done to make it resilient to biotic and abiotic stresses. Plant management in crops is still a major challenge, and sustainable alternatives have been sought that interfere as little as possible in the dynamics of the production environment and that can be used as an alternative to herbicides historically used for this purpose. Biochar appears to be a promising alternative since it can enrich the soil, improve its water retention capacity, promote soil regeneration, and increase fertility. It can also help reduce nutrient leaching, improving fertilizer use efficiency. This study aimed to investigate the efficiency of using biochar in mitigating stress caused by different herbicides. Two different compounds, Douglas fir and Rice husk, were used. Tomato seeds were sown in pots and arranged in a randomized design. At stage 4V (28 days after sowing), the herbicides s-metolachlor, metribuzin, and halosulfuron were applied. The evaluations of plant length, injury, activity of antioxidant enzymes (ascorbate peroxidase, catalase, guaiacol peroxidase, glutathione reductase), and peroxide content, were evaluated were performed 7 and 14 days after herbicide application. Plants treated with biochar had an increase in length when compared to the control, even after herbicide application. Also, plants without biochar showed more injury compared to plants exposed to herbicides. The enzymes demonstrated significantly decreased activity in plants with biochar and without herbicides. However, the herbicide metribuzin increased the activity of all enzymes. H_2O_2 accumulation was seen more in plants without biochar, and the same trend was followed even when herbicides were applied. From these results, it can be concluded that Douglas fir and Rice husk biochar attenuates oxidative stress caused by herbicides, minimizing injury while maintaining and stimulating the growth of tomato plants.

Warrant Use in Roxy Rice Herbicide Programs with and without a Fenclorim Seed Treatment. R. Baxley[1], J. Norsworthy[1], T. Avent[1], M. Dodde[1], C. Ketchum[1]; [1]University of Arkansas System Division of Agriculture, Fayetteville, United States.

The evolution of herbicide resistance within problematic weed species such as barnyardgrass and weedy rice has profoundly limited the number of effective conventional rice herbicides that are currently available. Consequently, rice producers need new options for herbicides as well as new rice technologies with herbicide-resistant traits. The Roxy rice production system is a technology being developed for producers in the Mid-south. Roxy rice enables using a protoporphyrinogen oxidase inhibitor, oxyfluorfen, to provide broad-spectrum control of grasses and broadleaves. A field study established in the summer of 2024 at the Rice Research and Extension Center near Stuttgart, AR, focused on herbicide programs containing sequential applications of oxyfluorfen with and without delayed preemergence applications of microencapsulated acetochlor. A nontreated check was present in the study, as well as a weak standard treatment containing clomazone preemergence followed by sequential applications of quinclorac and propanil at the 2-leaf and pre-flood timings, respectively. Preemergence applications of either clomazone or quinclorac were made in combination with oxyfluorfen. Additionally, rice seed was treated with fenclorim at 2.5 g kg-1 to protect from the possible injury induced by applications of acetochlor. At 1 week following rice emergence, it was observed that oxyfluorfen applied preemergence in combination with either clomazone or quinclorac provided superior weed control when compared to the weak standard of clomazone alone. However, no differences were seen in terms of late-season barnyardgrass control, ranging from 93-99%, meaning that the standard was just as effective as the sequential applications of oxyfluorfen with or without acetochlor. Despite the lack of differences for barnyardgrass control, sequential applications of oxyfluorfen with or without acetochlor provided acceptable control of weedy rice, ranging from 93-98% control, compared to the weak standard that only provided 52% control. At harvest, there were no differences in rough rice yield, which may be attributed to the low weedy rice density at the test site.

Dicamba Cotton Technology Provides Flexibility Georgia Growers Value. J. Vance[1], T. Randell-Singleton[1], S. Culpepper[1]; [1]University of Georgia, Tifton, United States.

Over 90% of Georgia's cotton (*Gossypium hirsutum*) hectares are planted to dicamba-resistant varieties. During 2023, 85% of 1313 growers surveyed in-person confirmed that having access to dicamba for the control of Palmer amaranth (*Amaranthus palmeri* S. Watson) was critical and that 24, 24, 5, 20, and 27% of them believed the dicamba program returned 0-63, 64-125, 126-188, 189-250, and over $250 per ha-1 to their operation. Seventy-two percent of these growers reported the dicamba program improved control of this weed by more than 50%, a 21% increase from a 2020 survey. Survey results led to the hypothesis that Palmer amaranth could be controlled more effectively with a dicamba-based versus a glufosinate-based program due to greater application timing flexibility. To test this hypothesis, a field experiment was conducted during 2022 and 2023 and included five treatments replicated four times: 1) timely dicamba-based program, 2) timely glufosinate-based program, 3) delayed dicamba-based program, 4) delayed glufosinate-based program, and 5) a non-treated control arranged in a randomized complete block design. Each herbicide program included sequential postemergence applications applied 10 days apart with the respective herbicide (dicamba 0.56 kg ae ha-1 or glufosinate 0.60 kg ai ha-1) mixed with glyphosate (1.27 kg ae ha-1) followed by glyphosate plus diuron (1.13 kg ai ha-1) layby directed 14 days later. Palmer amaranth and pitted morningglory (*Ipomoea lacunosa* L.) were 8 to 13 cm tall when timely programs were initiated; delayed programs were initiated 9 days later, with the first application occurring when both weeds were 15 to 25 cm. Dicamba mixtures (Teejet TTI 110015 nozzles, ultra-coarse droplets) and glufosinate mixtures (Teejet AIXR 11002 nozzles, coarse droplets) were applied at 142 L ha-1. Plots were 5.48 m wide by 15.24 m in length. Combined over years, both timely programs recorded similar statistical results when comparing late-season values for Palmer amaranth control (100% dicamba, 99% glufosinate), Palmer amaranth population (dicamba 0 plants ha-1; glufosinate 30 plants ha-1), morningglory control (99%, both systems), cotton growth (82 cm, both systems), and seed yield (dicamba 4224 kg ha-1; glufosinate 4260 kg ha-1). For delayed programs, variables measured for cotton development and Palmer amaranth control were negatively influenced, while morningglory control was not. For Palmer amaranth control and population counts, the delayed dicamba program had 90% control with 589 plants ha-1 providing less control than the timely dicamba program, but this program was more effective than the delayed glufosinate program where 65% Palmer amaranth control and 7339 plants ha-1 were observed. Cotton growth was influenced by early-season weed competition similarly within each delayed program as heights were 37% less than those in the timely programs. Yield in the delayed dicamba program (3132 kg ha-1) was less than that observed in the timely dicamba program, but greater than the delayed glufosinate program (2329 kg ha-1). Growers can achieve greater flexibility in application timeliness for controlling Palmer amaranth with a dicamba-based versus a glufosinate-based program, although less weed control and lower yields are to be expected when programs are not implemented in a timely fashion.

Effect of Biochar as a Soil Amendment and Seed Inoculant on Mitigating Herbicide Effect on Soybean Nodulation. A. Ulrich[1], N. Cordero[1], L. Avila[1], A. Barbosa Evaristo[2], J. Barbosa Dos Santos[3], G. Posser[1], E. Cassanego[1], F. D. De La Silva[1]; [1]Mississippi State University, Starkville, United States, [2]Federal University of Jequitinhonha and Mucuri Valleys, City Unai, MG, Brazil, Unai, MG, Brazil, Brazil, [3]Federal University of Jequitinhonha and Mucuri Valleys, Diamantina, MG, Brazil, Brazil.

Herbicides are essential in modern agriculture, ensuring effective weed control and supporting sustainable crop development. However, some herbicides, even selective herbicides, can affect soybean nodulation (*Glycine max* L.), a crucial process for biological nitrogen fixation that supports soybean growth and productivity. It is essential to evaluate the impact of different herbicides on soybean nodulation and find strategies to reduce this problem. This study aimed to assess the effect of biochar on the symbiosis between the inoculant (*Bradyrhizobium japonicum*) and soybean plants in the presence of herbicides that can negatively affect soybean nodulation. The experiment was conducted in a greenhouse in a randomized block design (DBC), with four replications in a factorial arrangement and repeated in time. Factor A included the addition of inoculant in the seeds and/or biochar as a soil treatment (inoculant; biochar, inoculant + biochar), and Factor B the herbicide treatments (atrazine, diclosulam, glyphosate, sulfentrazone, and an untreated check). The inoculant was applied as a seed treatment using a commercial inoculant formulation in the amount recommended by the manufacturer. The biochar treatments were performed using rice husk biochar mixed in the top 2 cm layer of the soil at a rate of 2% w/w. The experiment was conducted in 10 dm^3 capacity pots that received five soybean seeds. Five days after emergence (DAE), the plants were tinner, living one plant per experimental unit, and conducted for 32 DAE. Herbicide treatments were performed using a spray chamber calibrated to deliver 187 L/ha of the spray solution, and the herbicide rates were the full labeled rate for soybeans. The morphological variables evaluated were plant height, culm diameter, number of nodules, root volume, root length, leaf area, dry leaf mass, dry mass of stem+ petiole+ reproductive parts, dry mass of nodules, root dry mass, and total dry mass. With a multi-pigment meter, it was determined the evaluations of chlorophyll (ChlM), anthocyanin (AnthM), Flavonoids (FlvM), and nitrogen content (NFI). The data were subjected to the ANOVA and Tukey ($p \leq 0.05$). The results showed that the herbicides glyphosate and sulfentrazone caused the most significant reduction in soybean nodulation. The number of nodules was reduced by 35.5% with glyphosate and 26.2% with sulfentrazone. The other treatments did not affect the nodulation. It can be concluded that sulfentrazone and glyphosate caused a greater reduction in the soybean nodulation. At the same time, biochar and the mixture of biochar and inoculant reduced these injuries, favoring the development and growth of soybeans.

Newly Sprigged Hybrid Bermudagrass Tolerance to Postemergence Herbicides. N. Godara[1], D. Koo[1], H. Wright-Smith[2], S. Askew[1]; [1]Virginia Tech, Blacksburg, United States, [2]University of Arkansas, Little Rock, United States.

Research conducted in 2023 across locations in Blacksburg, VA, and Hope, AR, explored the effects of various postemergence herbicides on the establishment of hybrid bermudagrass types 'Latitude 36', 'Tahoma 31', and 'TifTuf' from sprigs. The study specifically examined herbicide applications made 4 to 5 weeks after planting to assess their impact on the growth and health of the grass. The herbicide combination of thiencarbazone, foramsulfuron, and halosulfuron was found to be the least harmful, causing injury levels below 6% across all three cultivars over the course of seven study periods. In contrast, the mixture of topramezone and metribuzin led to significant harm, with injury rates as high as 25% observed two weeks after treatment. However, when this mix was combined with thiencarbazone, foramsulfuron, and halosulfuron, the damage was reduced, with injury rates dropping to between 5% and 22%. Quinclorac, on the other hand, demonstrated a higher variance in damage, with some cultivars showing up to 58% injury, highlighting a differential cultivar sensitivity. Despite the initial setbacks in terms of injury and reduced green cover, dark green color index, and normalized difference vegetation index, the bermudagrass sprigs generally showed signs of recovery by four weeks post-treatment. This recovery indicates a resilience in the grass's ability to overcome the initial herbicide stress. The study's findings suggest that while topramezone or mesotrione mixed with metribuzin can cause initial damage to newly sprigged bermudagrass, this damage varies by cultivar and is sometimes less severe than that caused by quinclorac. These herbicide combinations could potentially offer an alternative approach to managing troublesome grassy weeds during the critical establishment phase of bermudagrass from sprigs, providing a balance between weed control and turfgrass health

Amicarbazone as an Alternative Photosystem II Inhibitor Herbicide in Corn. C. Ketchum[1], J. Norsworthy[1], R. Henry[2], M. Dodde[1], J. Smith[1], R. Baxley[1], T. Barber[1]; [1]University of Arkansas System Division of Agriculture, Fayetteville, United States, [2]UPL NA Inc., Fort Wayne, United States.

With the increased scrutiny of atrazine usage, mitigation strategies are being evaluated to reduce off-target movement. The efficacy of atrazine alternatives is also being tested in United States corn production. With the EPA recommending lower use rates of atrazine, amicarbazone is being evaluated as an alternative preemergence herbicide in corn. Experiments were conducted in 2024 to determine if amicarbazone would be an effective alternative to atrazine on silt loam soils. This experiment was a single-factor design comparing applications of atrazine alone and tank mixed with other herbicides at the EPA proposed use rates (560 and 1344 g ai ha-1) to amicarbazone (328 g ai ha-1). Additionally, metribuzin and S-metolachlor were evaluated as a tank mix partner with amicarbazone, and both rates of atrazine. Injury and weed control ratings were taken over six weeks, with Palmer amaranth [*Amaranthus palmeri* (S.) Wats.] and large crabgrass [*Digitaria sanguinalis* (L.) Scop.] evaluated. Across all treatments, the highest injury was less than 4% at 1 week after emergence (WAE) with the atrazine high rate plus metribuzin mix. At 5 WAE, the high rate of atrazine and metribuzin mix provided similar Palmer amaranth control at 68% when compared to amicarbazone and metribuzin mix at 60% control. Amicarbazone provided similar Palmer amaranth control at 5 WAE as the high and low rates of atrazine. At 5 WAE, amicarbazone provided 66% control of large crabgrass, similar to the low rate of atrazine at 52% and the high rate of atrazine at 67% control. Corn in treatments with amicarbazone plus metribuzin yielded 11,300 kg ha-1, which was a 35% increase compared to the untreated check (8,370 kg ha-1). Corn in atrazine-treated plots produced similar yields at 9,570 kg ha-1 at the high rate and 9,303 kg ha-1 at the low rate, both were similar compared to the amicarbazone-treated plots, which yielded 11,229 kg ha-1. Overall, amicarbazone provided similar levels of Palmer amaranth control and similar large crabgrass control compared to atrazine alone, as well as similar yields to atrazine-treated plots.

Effective Late-Season Doveweed Control in Bermudagrass Turf Using Mesotrione and Simazine-Based Tank-Mixes. P. Petelewicz[1], K. Gawron[1], J. Ging[2], C. McKeithen[2], P. A. Boeri[3], J. B. Unruh[2]; [1]University of Florida, Gainesville, United States, [2]University of Florida, West Florida Research and Education Center, Jay, United States, [3]Texas A&M University, Dallas, United States.

In recent years, doveweed [*Murdannia nudiflora* (L.) Brenan] has become a pressing concern in Florida and nearby regions due to its rapid expansion and challenging eradication. Despite being considered a warm-season annual broadleaf, its grass-like foliage often enables it going unnoticed within the canopy, especially at early growth stages. Such camouflage allows for quick proliferation and rapid invasion leading to dense mats outcompeting desired turfgrass sward. Limited reliable herbicides exist, and their efficacy declines once the plants get established. Hence, there is a demand for options capable of controlling mature populations. This study assessed the efficacy of mesotrione at 0.37 L ha-1 or 0.58 L ha-1, simazine at 1.10 L ha-1 or 1.83 L ha-1, and their combinations for the late-season control of established doveweed in bermudagrass 'CR-01' maintained as a golf course fairway or athletic field at West Florida Research and Education Center in Jay, FL. When used independently, mesotrione alone provided inconsistent control, never surpassing 50%, whereas simazine alone yielded a maximum control of <30%, regardless of rate. However, when employed as a tank-mix, a synergistic effect was noted and satisfactory control (>80%) was achieved within 2 to 6 weeks after the initial treatment, contingent upon the rate, with higher rates yielding a more rapid response. Moreover, the control remained persistent until the conclusion of the study. Severe phytotoxicity was evident in all mesotrione-containing treatments, yet the turf recovered to acceptable levels within 4 weeks following each application.

Turf and Weed Response to Organic Herbicides Applied by Machine Vision Sprayer. A. Jakhar[1], S. Askew[1], A. Wilber[2], J. McCurdy[2], S. Hale[1], N. Godara[1], J. Romero[1], P. Le Naour Vernet[3]; [1]Virginia Tech, Blacksburg, United States, [2]Mississippi State University, Starkville, United States, [3]Ecorobotix, Yverdon-les-Bains, United States.

Advancements in machine learning have facilitated on-demand weed identification and targeted treatment, leading to the commercialization of "see and spray" agricultural sprayers globally. Although machine-vision technology has been extensively explored in production agriculture, its application in turfgrass management is underexplored. The ARA, a machine-vision sprayer from Ecorobotix, initially developed primarily for vegetable crops, is now being adapted for use in ornamental turf. This study investigates the performance of the vegetable-crops version of the ARA, which has limited training on athletic-height Kentucky bluegrass turf, in controlling thin paspalum (*Paspalum setaceum*) on both creeping bentgrass golf fairways and adjacent tall fescue and Kentucky bluegrass golf roughs. Two randomized complete block experiments were conducted to evaluate the ARA's accuracy and its impact on pesticide use reduction. The results demonstrated significant reductions in herbicide application, with over 90% less chemical used on creeping bentgrass fairways and more than 70% reduction on tall fescue roughs, translating to potential savings of up to $500 per hectare. Digital analysis via drone imagery revealed that the machine vision sprayer treated 4.5% of the total area on creeping bentgrass and 25.7% on tall fescue. The machine-vision sprayer accurately treated 88% of the 238 thin paspalum plants encountered on the golf rough and 100% of broadleaf weeds. Of over 1000 goosegrass plants assessed in the rough, only 20% were treated, possibly due to the sprayer's limited turf-specific training and the similarity between goosegrass leaf blades and the surrounding turf. The weed-targeting accuracy was notably lower on the creeping bentgrass fairway than on the rough, underscoring the influence of training data on performance. These findings align with previous studies showing that while machine vision sprayers can offer commercially viable accuracy, their effectiveness largely depends on the quality and specificity of the training data. This suggests there is considerable potential for enhancing weed management practices in turfgrass settings through further development and training of such technologies.

Simulated Foot Traffic Affects Athlete Biomechanics on Weedy Hybrid Bermudagrass Sports Fields. E. Begitschke[1], A. Young[1], C. J. Wang[1], A. Novello[1], R. Lynall[1], G. Henry[1]; [1]University of Georgia, Athens, United States.

Weed presence on athletic fields affects aesthetics and alters ball- and athlete-surface interactions. Research indicates that common weeds, such as large crabgrass, do not tolerate the foot traffic typical of athletic fields, further diminishing field quality and potentially increasing injury risk. Increased vertical tibial acceleration during athlete-surface interaction has been linked to a higher risk of injury. Athletes are trained to land with increased knee flexion to reduce strain on the lower extremities and prevent injury; however, surface characteristics, including weed presence, can influence knee flexion angles and vertical tibial accelerations of athletes. Therefore, research was conducted to determine how weed presence and traffic stress impact athlete biomechanics and overall field quality. Running lanes (1.5 × 25 m) of three surfaces ('IronCutter' hybrid bermudagrass [*Cynodon dactylon* (L.) Pers. × *C. transvaalensis* Burtt-Davy], large crabgrass (*Digitaria sanguinalis*), and a 50–50% mixed stand of both species) were established at the Athens Turfgrass Research and Education Center at the University of Georgia in Athens, GA during the spring of 2024. Adjacent non-trafficked plots (1.5 × 3 m) of hybrid bermudagrass and large crabgrass were included for comparison. Simulated traffic stress was applied to each running lane weekly for six weeks using a similar device as Kowalewski et al. (2013) beginning August 28, 2024. Eleven college-aged active participants (seven males and four females) were recruited to perform four trials of two athletic maneuvers [jump landing (JL), and single-leg cut landing (SLD)] and three trials of a modified acceleration/deceleration (DEC) maneuver on each surface both before traffic was applied and after the final traffic event. Athletes were fitted with inertial measurement unit (IMU) sensors placed on the pelvis, thigh, and shank of their dominant leg. Peak tibial vertical and horizontal accelerations were determined using the IMU aligned with the tibia of each athlete. Knee flexion angles were calculated by importing the aligned IMU data into the OpenSense® executable function of OpenSim®. Field performance testing matrices [percent visual cover, normalized difference vegetative index (NDVI), soil moisture, shear strength, and surface hardness] were recorded for each surface weekly and immediately before each participant performed the assigned athletic maneuvers. Simulated traffic caused a 22%, 25%, and 85% decrease in percentage visual turfgrass cover for the hybrid bermudagrass, 50–50% mix, and large crabgrass running lanes, respectively, but did not significantly increase surface hardness (Gmax) for any of the three trafficked surfaces. Simulated traffic decreased the shear strength of large crabgrass by 70%; however, it did not reduce shear strength for either hybrid bermudagrass or the 50–50% mix running lanes. While significant differences in peak knee flexion angles, vertical tibial accelerations, and/or horizontal tibial accelerations were detected for some participants, no clear trends were evident between surfaces. Therefore, results suggest that although simulated traffic significantly reduced the quality of the field, the effects on athlete biomechanics were highly variable and specific to each athlete. Future research should evaluate the effects of traffic stress on other weed populations commonly found on hybrid bermudagrass on sports fields.

Effect of Novel Nanocellulose-Based Adjuvant (BioGrip™) on Dicamba Volatilization. D. Rodriguez[1], J. C. Velasquez[1], T. Butts[2], J. Batta-Mpouma[3], G. Kandhola[3], N. Roma-Burgos[1]; [1]University of Arkansas, Fayetteville, United States, [2]Purdue University, Lafayette, IN, United States, [3]Celludot, LLC, Fayetteville, AR, United States.

Dicamba is a synthetic auxin herbicide (HRAC #4) commonly used for broadleaf weed control in monocot crops and in genetically modified (GM) crops such as dicamba-resistant soybean and cotton. However, dicamba use in GM crops has caused widespread injury to non-target plants due to particle drift, and herbicide vapor drift. While most volatility-reducing agents (VRAs) reduce dicamba volatilization, most are petroleum-derived solvents and surfactants with a negative effect on the environment and human health. This study aimed to assess the effect of a nanocellulose-based adjuvant (BioGrip™) on dicamba volatilization and spray droplet size. A low tunnel-based study arranged in a randomized complete block design with four replications was conducted with a dicamba-sensitive soybean variety to test herbicide volatilization. When soybean was at V6 stage, low tunnels (4.5 m long) were placed over two rows of soybean. Before being moved under the low tunnel, plastic trays with soil were sprayed with two dicamba formulations (Enginia and XtendiMax with VaporGrip) and two volatilization reducing agents: a nanocellulose-based (BioGrip™ EC, 0.5% v/v) and a commercial standard (Intact®, 0.5% v/v). One air sampler was placed 0.3 m above ground in each tunnel, directly above the treated soil. Each air sampler was connected to an electric pump (3 L/min) to collect air samples for 48 hours. The soybean injury level was evaluated 14 days after the trays were placed in the low tunnels. Droplet size characterization was performed using a VisiSize P15 Droplet Image Analysis System (Oxford Lasers, Imaging Division) in a laboratory, spray chamber setting. Water alone and mixtures with the two adjuvants were evaluated. The average droplet size (Dv0.5) and velocity of spray mixtures were evaluated through multiple nozzle types (XR110015, AIXR110015, TTI110015). Droplet relative span (RS) and driftable fines (DF; droplets with diameters less than 200 µm) were calculated. Overall, the volatilization of XtendiMax was not statistically different between BioGrip™ (12.51 ng m-3) and Intact (12.04 ng m-3). However, Engenia volatilization was reduced by 45% with the addition of BioGrip™ (10.38 ng m-3), compared to that with the commercial standard Intact (18.77 ng m-3). After 14 days of exposure to volatilized dicamba, soybean injury from Engenia was lower with BioGrip™ (33.7%) than with Intact (40.8%). Conversely, soybean injury from XtendiMax was greater with BioGrip™ (35.0%) compared to that with Intact (22%). Droplet characterization showed that overall, regardless of the nozzle type, BioGrip™ adjuvant tended to produce a smaller droplet size (Dv0.5) and reduced relative span compared to Intact. Additionally, BioGrip™ reduced DF for TTI110015, and DF for AIXR110015 was equal to that of Intact and water alone, suggesting a reduced drift potential of the mixture. These findings suggest that BioGrip™ adjuvant performs equally, or better, than the commercial VRA in reducing dicamba volatilization, and highlight the utility of nanocellulose-based adjuvants as an environmentally sustainable option to reduce off-site movement of herbicides.

Common Turfgrass Weeds Affect Sports Field Performance and Athlete Biomechanics. A. Young[1], E. Begitschke[1], C. J. Wang[1], K. Tucker[1], R. Lynall[2], G. Henry[1]; [1]Crop and Soil Sciences, University of Georgia, Athens, GA, United States, [2]Kinesiology, University of Georgia, Athens, GA, United States.

Athletic injuries will always exist, but a better understanding of player/surface interactions with respect to weed presence, profile construction, and field conditions may help guide future decision-making and reduce injury risk. Athletes are trained to land with increased knee flexion to decrease knee strain and prevent injuries, but surface characteristics are known to influence knee flexion angles. Combining knee flexion angles and tibial acceleration data may be a new way to evaluate playing surface safety. Running lanes (1.5 × 25 m) of five surfaces (hybrid bermudagrass, perennial ryegrass, large crabgrass, white clover, and synthetic turf) were established at the Athens Turfgrass Research and Education Center at the University of Georgia in Athens, GA during the spring of 2023. Three males and five females were recruited to participate in three trials of three athletic maneuvers [modified acceleration/deceleration (DEC), jump landing (JL), and single-leg cut landing (SLD)] on each surface. Athletes were fitted with inertial measurement unit (IMU) sensors placed on the pelvis, thigh, and shank of their dominant leg. Peak tibial vertical and horizontal accelerations were determined using the IMUs. Knee flexion angles were calculated using the OpenSense executable function of OpenSim. Performance testing matrices [normalized difference vegetative index (NDVI), soil moisture, shear strength, surface hardness, and infill depth (synthetic turf only)] were recorded for each surface before each participant performed assigned athletic maneuvers. Minimal significant differences in peak tibial accelerations were detected between surfaces for the three athletic maneuvers. Among female participants, knee flexion was greatest on the bermudagrass surface (63°) and smallest in response to synthetic turf (48°). Similar trends were observed in individual participants for the JL maneuver. Therefore, IMU-generated knee flexion angle data provides a new way of evaluating athletic field performance and safety. Further research is needed relating measured field conditions to athlete biomechanics.

Environmental Factors Affecting Khakiweed (*Alternanthera pungens*) Germination. A. McEachin[1], T. Grey[1], N. Basinger[1], J. de Souza Rodrigues[1]; [1]University of Georgia, Tifton, United States.

Khakiweed, *Alternanthera pungens*, is a perennial broadleaf weed difficult to control because of its multiple means of reproduction, vigorous growth, and deep tap root. It reduces the quality of pasture, pecan, and turf areas by choking out desirable grass species. Seed burs attach to clothing, equipment, and animal fur aiding in dispersal and causing injury. While several herbicides, including metsulfuron, have proven effective in controlling khakiweed, none of these products are registered for use in pecan. Studies were conducted in the greenhouse to determine the effect of application timing, herbicide, and rate on khakiweed growth. In the PRE study, metsulfuron, indaziflam, or pendimethalin was sprinkled onto the plot surface to prevent contact with plant tissue. All rates of PRE herbicides significantly inhibited plant growth compared to the control. However, no significant difference was found between rates. The efficacy of metsulfuron, indaziflam, and 2,4-D amine were examined in the POST study. For metsulfuron and indaziflam, necrosis rate increased with application rate. Only the greatest rate of 2,4-D caused necrosis significantly different from the control. Metsulfuron at the highest application rate provided the greatest rate of control (76%).

Weed Control with Fluridone in Peanut in North Carolina. E. Foote[1], D. Jordan[1]; [1]North Carolina State University, Raleigh, United States.

Minimizing weed interference during the first 4–6 weeks of the season is important for optimizing yield of peanut (*Arachis hypogaea* L.). Presence of ALS-resistant and PPO-resistant Palmer amaranth (*Amaranthus palmeri* S. Watts.) and common ragweed (*Ambrosia artemisiifolia* L.) has made weed management in peanut more challenging. Fluridone offers a unique mode of action not previously available for use in this crop. Research was conducted to compare the efficacy of fluridone (0.17 kg ai ha-1) applied with acetochlor (1.26 kg ai ha-1), dimethenamid-P (0.84 kg ai ha-1), flumioxazin (0.11 kg ai ha-1), pendimethalin (1.06 kg ai ha-1), or S-metolachlor (1.07 kg ai ha-1) compared with S-metolachlor plus flumioxazin. Herbicides were applied immediately after planting and received rainfall of at least 1.5 cm within five days after planting. The experiment was conducted at two locations in North Carolina in 2023 and 2024. Little to no peanut injury was noted due to any of the herbicide combinations. All herbicide combinations improved weed control compared to a non-treated control. Carpetweed (*Mullugo verticillata* L.), common ragweed, entireleaf morningglory [*Ipomoea purpurea* L.], large crabgrass (*Digitaria sanguinalis* L.), and Texas millet [*Urochloa texana* (Buckley) R. Webster] control by S-metolachlor plus flumioxazin was equal to or greater than control by fluridone regardless of the herbicide co-applied with fluridone. Common ragweed and Palmer amaranth were not resistant to PPO-inhibiting herbicides at these locations. Although fluridone treatments were no more effective than S-metolachlor plus flumioxazin, using fluridone provides a tool for herbicide resistance management in peanut. Research is currently underway to determine the feasibility of applying fluridone with S-metolachlor and flumioxazin in order to decrease selection pressure on weed populations and extend weed control further into the cropping cycle.

Purple Nutsedge Growth Regulation in Response to Postemergence Herbicides. A. Novello[1], K. Tucker[1], G. Henry[1]; [1]University of Georgia, Athens, United States.

Research was conducted at the Athens Turfgrass Research and Education Center greenhouse complex during the summer/fall of 2024. Five purple nutsedge tubers were pre-germinated and planted evenly apart from each other into 1-liter pots containing a 2:1 mixture of a Cecil clay loam and a Wakulla sand. Plants were allowed to mature in the greenhouse for 6 weeks before treatment application. Herbicides were applied with a CO_2-powered sprayer calibrated to deliver 375 L ha-1 at 241 kPa. Treatments consisted of pyrimisulfan at 49 or 68 g ai ha-1, carfentrazone + sulfentrazone at 307 g ai ha-1, and halosulfuron at 70 g ai ha-1. Herbicides were applied to plants prior to flowering (Application A – August 19, 2024) or applied to plants following flowering (Application B – September 10, 2024). A non-treated check was included for comparison. Just prior to herbicide application, all pots were trimmed to 10 cm. Purple nutsedge % phytotoxicity was recorded 2, 4 and 8 weeks after treatment (WAT) A and B. Plant heights (cm) were obtained 2, 4, and 8 WAT. Heights were compared to the non-treated check in each replication in order to calculate % growth regulation (GR). Purple nutsedge phytotoxicity was greater 2, 4, and 8 WATA than 2, 4, and 8 WATB, regardless of herbicide or rate. Carfentrazone + sulfentrazone resulted in 98% phytotoxicity 2 WATA but only 45% 2 WATB. All other herbicides resulted in 64 to 73% phytotoxicity 2 WATA and 9 to 10% 2 WATB. Phytotoxicity was ≥ 86% 4 WATA, regardless of herbicide or rate, while phytotoxicity was 78% 4 WATB in response to carfentrazone + sulfentrazone. All other treatments resulted in 21 to 39% phytotoxicity 4 WATB. All treatments resulted in ≥ 98% phytotoxicity 8 WATA, regardless of herbicide or rate, while phytotoxicity in response to carfentrazone + sulfentrazone increased to 90% 8 WATB. All other treatments resulted in 63 to 76% phytotoxicity 8 WATB. Growth regulation was 65 to 73%, regardless of treatment or rating date, when treatments were applied to purple nutsedge plants following flowering. Growth regulation was greatest in response to carfentrazone + sulfentrazone following application A, regardless of rating date. Growth regulation following application A steadily increased from 2 to 8 WAT with regulation ranging from 86 to 96% 8 WAT, regardless of herbicide or rate. Purple nutsedge phytotoxicity and growth regulation was greater when herbicides were applied to plants before flowering. This may be associated with herbicide translocation in response to vegetative versus reproductive growth.

Efficacy and Economic Impacts of Weed Control and Fertility Management Practices in Texas Pastures. K. Crawford[1], S. Nolte[2], Z. Howard[2]; [1]Texas A&M University, College Station, United States, [2]Texas A&M AgriLife Extension Service, College Station, United States.

Many livestock operations in the southeastern United States utilize warm-season perennial forages as their pasture foundation, directly influencing livestock productivity and profitability. The objectives of this study were to evaluate the most effective options for increasing warm-season forage biomass and nutritional value to enhance the financial benefit for the producer. In 2023 and 2024, herbicide treatments made in early and late spring, and shredding treatments made in late spring, were all applied with and without fertilizer at 3 locations in Brazos and Williamson County, TX. Weed heights were 10–15 and 30–46 cm tall for early and late spring treatments, respectively. Fertilizer treatments followed recommendations based on soil tests. In perennial pastureland management, forage can be quantified by both quantity and quality. The quantity of forage was measured as forage dry weight harvested and dried in a dryer at 55°C for 72 hours. Quality was measured as Total Digestible Nutrient (TDN)% and Crude Protein (CP)% using near-infrared reflectance spectroscopy (NIRS) analysis. Forage analysis, percent weed control, and forage dry weight were all collected approximately 3 months after late treatments. Treatments of dicamba + 2,4-D applied early with fertilizer saw the highest production of dry forage biomass yields going from a dry to a wet year and the highest total yields in year two. At Thrall 1 (TH1) fertilizer treatments observed the highest weed competition and the lowest dry forage biomass yields over both years. Dicamba + 2,4-D applied early and late had the highest observed weed control at TH1 and Thrall 2 (TH2). College Station (CS) and TH1 treatments that received fertilizer applications had higher CP than treatments that did not, while shredding treatments observed the highest TDN percents. Economically dicamba + 2,4-D with fertilizer applied early and over sequential years appeared to show the highest potential for a financial return. Environmental conditions appeared to be a major limiting factor. To achieve a profitable forage operation weed control with fertilizer management should be done over multiple years to see financial returns.

When Spray Drones Meet the Wind: Drift Control Through Nozzle Model, Speed, and Flight Height. A. A. Tavares[1], S. Baker Holley[1], L. de Avila[1], D. Dodds[1]; [1]Mississippi State University, Starkville, United States.

Spray drift is a major concern in pesticide applications using Remotely Piloted Aerial Application Systems (RPAAS), posing risks to non-target areas and the environment. This study evaluated spray drift potential under varying operational parameters, including nozzle type, flight height, and carrier volume. Experiments were conducted at the Mississippi State University Black Belt Branch Experiment Station using a randomized complete block design with a 3 × 3 × 2 factorial arrangement of treatments and five replications. The RPAAS platform utilized was a Leading Edge PrecisionVision 22, equipped with a 4-nozzle boom spaced 30 inches apart. Treatment factors included three flight heights (1, 2, and 3 m above ground), three nozzle types (XR 110015, AIXR 110015, and TTI 110015), and two carrier volumes (28 and 94 L ha^{-1}). A fluorescent dye solution at 0.1% concentration was used as a tracer. The RPAAS flew perpendicular to the wind direction, with drift collectors positioned parallel to the wind at distances ranging from −7 m to 40 m relative to the treated area, with 0 m marking the center of the flight line. To ensure comparability across carrier volumes, a correction factor was applied to account for differences in dye concentration between treatments. Meteorological data, including wind speed, wind direction, air temperature, and relative humidity, were recorded during each application using a portable weather station. These conditions were analyzed to assess their potential influence on drift dynamics. Data analysis included outlier detection and a 4-way ANOVA, with treatment averages compared using standard error. Results showed that among the main factors, only nozzle type ($P < 0.001$) and collection distance ($P < 0.001$) significantly influenced the amount of drift collected. The XR 110015 nozzle consistently produced the highest dye deposition within the effective swath range, regardless of carrier volume or flight height. Drift collection beyond 15.24 m demonstrated notable differences between nozzle types. The AIXR 110015 and TTI 110015 nozzles produced minimal drift at these distances, while the XR 110015 nozzle resulted in drift collections as high as 15 µL cm^{-2} at 2 and 3 m flight heights, independent of carrier volume. The results highlight the critical role of droplet size in mitigating drift, as the TTI 110015 nozzle, known for producing larger droplets, was the most effective in reducing drift at longer distances. Flight height and carrier volume did not significantly influence drift reduction but were closely linked to the effective swath width. This suggests optimizing droplet size through nozzle selection is paramount for drift mitigation in RPAAS applications. Larger droplets reduce off-target movement while maintaining effective coverage within the target swath. These findings underscore the importance of nozzle selection as the primary factor in managing spray drift in RPAAS operations.

Confirmation of Multiple Resistance in Goosegrass (*Eleusine indica*) in North Carolina. R. Argueta[1], D. Contreras[1], C. Bradshaw[1], J. Alsdorf[1], C. Cahoon[1], W. Everman[1]; [1]North Carolina State University, Raleigh, United States.

In 2022, near Winfall, NC, a farmer indicated that the goosegrass population survived glyphosate and clethodim applications in a cotton field. The objective was to evaluate the putative-resistant population's response at different glyphosate, clethodim, and fluazifop rates. Two susceptible populations from Wake County (NC1 and NC3) were used to determine differential susceptibility. Glyphosate was applied at 1.34 kg ae ha^{-1} (1X), clethodim at 102 g ai ha^{-1} (1X), and fluazifop at 140 g ai ha^{-1} (1X). Goosegrass control was evaluated at 7, 14, and 21 days after treatment (DAT), and mortality and biomass were collected at 21 DAT. Results were analyzed in SAS 9.4 and subsequently graphed in Sigmaplot using a 4-parameter logistic equation. The resulting resistance ratio (R/S) of 9.81 and 16.06 suggests that the Winfall population is glyphosate-resistant. The resulting R/S 2.58 to 3.25 indicates that the Winfall population may be clethodim-resistant. The resulting R/S 12.41 to 13.26 suggests that the Winfall population is fluazifop-resistant. The differential susceptibility to glyphosate, clethodim, and fluazifop exhibited by the putative-resistant population compared to the NC1 and NC3 populations suggests that the population is two-way resistant. These results provide evidence that the Winfall population goosegrass has evolved resistance to glyphosate, clethodim, and fluazifop. Nomenclature: Glyphosate; clethodim; fluazifop; goosegrass. Herbicide resistance, weed management.

WEEDS: A Multiregional Decision Support System for Integrated Weed Management. P. Gyawali[1], K. Lindsey[2], S. Mirsky[3], M. Popp[2], J. Norsworthy[4], M. Bagavathiannan[1]; [1]Department of Soil and Crop Sciences, Texas A&M University, College Station, TX, United States, [2]Department of Agricultural Economics and Agribusiness, University of Arkansas, Fayetteville, AR, United States, [3]United States Department of Agriculture, Agricultural Research Service, Beltsville Agricultural Research Center, Sustainable Agricultural Systems Laboratory, Beltsville, MD, United States, [4]Department of Crop, Soil, and Environmental Sciences, University of Arkansas, Fayetteville, AR, United States.

The management of herbicide-resistant weeds requires integrated strategies that balance ecological sustainability and economic viability. Bioeconomic models, which combine weed population dynamics with economic assessments of management strategies, offer a powerful framework for optimizing weed management decisions. These bioeconomic model-assisted decision support systems (DSS) help farmers and practitioners develop effective, long-term management plans by evaluating best practices and assessing the consequences of various strategies. In this context, the Weed Ecological and Economic Decision Support (WEEDS) model is being developed to address key broadleaf and grass weed species across major agricultural regions in the United States. WEEDS is an extension of the Palmer Amaranth Management (PAM) model, originally designed for managing Palmer amaranth (*Amaranthus palmeri*) in the Mid-Southern U.S. Recent updates to WEEDS incorporate common waterhemp (*Amaranthus tuberculatus*) and barnyardgrass (*Echinochloa crus-galli*), both of which pose significant challenges to U.S. agriculture. The current version of WEEDS simulates the long-term population dynamics of these species and evaluates economic outcomes under various crop rotations (including corn, soybean, and cotton) and management considerations. Although adaptable to other weed species and regions across the U.S., the model's immediate focus is on managing Palmer amaranth, common waterhemp, and barnyardgrass in the Midwest and South-Central U.S. The development of WEEDS offers a valuable decision-support tool for improving herbicide-resistant weed management by assisting in the identification of effective, region-specific management practices. However, continued testing, validation, and expert feedback are essential to ensure the model's practical applicability and effectiveness in different cropping systems and farming scenarios.

Alternative Burndown Programs in Rice for Reduced Plant-Back Restrictions. E. Williams[1], C. Webster[1], M. Hains[1], G. Sparks[1], W. Carr[1], B. Stoker[1]; [1]LSU AgCenter, Baton Rouge, United States.

In Louisiana, the ideal burndown program prior to planting rice (*Oryza sativa* L.) is an application of glyphosate mixed with 2,4-D. A burndown application of glyphosate plus 2,4-D is not only cost effective but also provides broad-spectrum control of grasses and broadleaf weeds. However, there are limitations regarding 2,4-D in relation to planting rice following an application. The plant-back interval for rice following 2,4-D is 30 days or 21 days following an inch of rainfall, which can be problematic if burndown applications can not be made in a timely manner. This research evaluates herbicide mixture options with glyphosate outside of 2,4-D that would allow for a shorter plant-back window. A field study was conducted in 2024 at the H. Rouse Caffey Rice Research Station in Crowley, Louisiana to evaluate alternative burndown programs in rice. Plot size was 3×9.14 m^2. The experimental design consisted of a randomized complete block design with nine herbicide treatments and a nontreated added for comparison. The herbicide treatments evaluated in this study consisted of several ALS-inhibiting herbicides applied in mixture with glyphosate and/or saflufenacil. All herbicide applications were applied with a CO_2-pressurized backpack sprayer calibrated to deliver 93.5 L ha^{-1}. Visual evaluations of percent control were observed for alligatorweed [*Alternanthera philoxeroides* (Mart.) Griseb.], Indian jointvetch (*Aeschynomene indica* L.), little barley (*Hordeum pusillum* Nutt.), hairy buttercup (*Ranunculus sardous* Crantz), and hedgeparsley [*Torilis arvensis* (Huds.) Link] at 21, 35 and 49 days after treatment (DAT). Rice flatsedge (*Cyperus iria* L.), eclipta [*Eclipta prostrata* (L.) L.], and eastern black nightshade (*Solanum ptychanthum*) were also evaluated at 35 and 49 DAT. Glyphosate alone and all glyphosate-containing mixtures controlled little barley 99% across all evaluation dates. At 35 DAT, glyphosate alone controlled Indian jointvetch 73% compared to all other glyphosate mixtures, where control was observed from 85 to 96%. At 49 DAT, glyphosate alone controlled hedgeparsley 23% and a mixture of glyphosate plus saflufenacil controlled hedgeparsley 63%. At the same rating date, glyphosate mixtures containing an ALS-inhibiting herbicide controlled hedgeparsley 96–98%. This research indicates that incorporating an ALS-inhibiting herbicide into a burndown program can enhance both the spectrum and levels of control while maintaining a short plant-back window.

Evaluating the Safety of PRE and POST Herbicides on Bambara Nuts (*Vigna subterranea*) When Applied in the Greenhouse and Field. S. Crawford[1], K. Jennings[1], D. Monks[1], D. Jordan[1], J. Schultheis[1], A. Gorny[1], S. Ippolito[1]; [1]North Carolina State University, Raleigh, United States.

Bambara nut (*Vigna subterranea*) is a groundnut that originates from West Sub-Saharan Africa. Similar to a peanut, their pods ripen below the soil and are turned over to dry before harvesting. While it is the third most popular legume grown in Africa, no commercialized production exists in the United States, therefore there are no registered herbicides to apply on bambara nut. Studies were conducted to evaluate the safety of PRE and POST herbicides to bambara nut grown in the greenhouse and field. Bambara nut was planted in a greenhouse at the Horticultural Field Laboratory at NC State University and treated with PRE herbicide treatments consisting of fluridone at 168 g ai ha^{-1}, flumioxazin at 91 g ai ha^{-1}, S-metolachlor at 800 g ai ha^{-1}, and clomazone at 840 g ai ha^{-1}. Bambara nut was also planted in the Method Road Greenhouse 1 at NC State University and then tolpyralate at 29.2 g ai ha^{-1}, metribuzin at 210 g ai ha^{-1}, S-metolachlor at 800 g ai ha^{-1}, clomazone at 840 g ai ha^{-1}, and rimsulfuron at 17.5 g ai ha^{-1} were applied POST to bambara nut at the 8 to 13 cm crop growth stage. Based on the results of the greenhouse studies, flumioxazin, fluridone, clomazone and S-metolachlor applied preemergence and tolpyralate and S-metolachlor applied postemergence have potential to provide sufficient weed control without causing significant injury to bambara nut. Field studies with bambara nut were then conducted at the Horticultural Crops Research Station in Clinton, North Carolina with treatments that showed potential in the greenhouse, with fluridone at 168 g ai ha^{-1}, flumioxazin at 91 g ai ha^{-1}, S-metolachlor at 800 g ai ha^{-1}, and clomazone at 840 g ai ha^{-1} applied PRE and tolpyralate at 29.2 g ai ha^{-1} and S-metolachlor at 800 g ai ha^{-1} applied POST at the 8 to 13 cm crop growth stage.

Assessing the Potential for Poultry Litter in Reducing Residual Herbicide Injury to *Brassica carinata*. K. Eason[1], S. Bowen[2]; [1]USDA-ARS, Tifton, United States, [2]University of Georgia, Tifton, United States.

Residual herbicide injury to *Brassica carinata* is a major concern for growers wanting to include it in their crop rotations. Since microbial degradation is the major breakdown pathway for most residual herbicides, field experiments were conducted to evaluate the potential for applying poultry litter as a soil amendment to promote and accelerate herbicide degradation. The study was conducted as a 5 × 3 factorial design with four replications per treatment. The five residual herbicides were flumioxazin (0.15 L ha^{-1}), fomesafen (0.9 L ha^{-1}), pyrithiobac sodium (0.2 L ha^{-1}), imazapic (0.3 L ha^{-1}), and chlorimuron (0.03 L ha^{-1}). The three rates of poultry litter were a 0X, 1X (2242 kg ha^{-1}), and 2X (4484 kg ha^{-1}) field rate. Peanut and cotton crops were grown according to current extension recommendations with each residual herbicide being applied at a typical timing for the given crop. Following harvest the poultry litter was incorporated into the bare ground. *Brassica carinata* was planted and grown according to current recommendations. Biomass samples (1.7 m^2) were collected before crop termination. There was no interaction between the rate of poultry litter and residual herbicide on *Brassica carinata* biomass. When combined over poultry litter rate, fomesafen was the only herbicide to cause a reduction in biomass when compared to the control. The high residue biomass produced by *Brassica carinata* warrants further evaluations on best-fit practices in the Southeastern U.S.

Efficacy of Saflufenacil on Fomesafen-Resistant Palmer Amaranth. P. Dhaka[12], G. Rangani[1], A. Porri[3], I. Meiners[4], N. Roma-Burgos[1]; [1]Department of Crop, Soil and Environmental Sciences, University of Arkansas, Fayetteville, AR, United States, [2]Cell and Molecular Biology, University of Arkansas, Fayetteville, AR, United States, [3]BASF SE, Agricultural Research Station, Limburgerhof, Germany, [4]BASF SE, Research Triangle Park, NC, United States.

Palmer amaranth (*Amaranthus palmeri*) is one of the most problematic weeds in the USA. Protoporphyrinogen oxidase (PPO)-inhibiting herbicides play a vital role in Palmer amaranth control, particularly after the extensive spread of resistance to acetolactate synthase (ALS) inhibitors and glyphosate. The increasing prevalence of PPO-herbicide-resistant Palmer amaranth poses a significant challenge to effective weed management. This study aimed to evaluate the efficacy of saflufenacil on fomesafen-resistant Palmer amaranth. The experiment was conducted in a greenhouse at the Milo Shult Agricultural Research and Extension Center (SAREC), Fayetteville, with four replications of treatments arranged in a completely randomized design. Twenty-four populations from two highly resistant clusters of fomesafen-resistant Palmer amaranth were treated with a 1× dose of saflufenacil. Data collected 21 days after treatment included visible injury and survival frequency. Saflufenacil exhibited excellent efficacy, with survival frequencies of 0–16% in 79% of the populations and >98% visible injury of survivors in all cases. However, six populations (AR17-RAN-E1, MO17-BUT-C, AR17-RAN-A1, MO17-MIS-B, AR17-RAN-F, and AR17-RAN-G1) had >10% survivors, suggesting reduced sensitivity to saflufenacil. Fomesafen-treated populations showed 18–86% survivor frequencies and significantly lower injury levels (29–51%). Thus, we confirmed that saflufenacil is highly effective against most fomesafen-resistant Palmer amaranth populations but highlight the need for further investigation into populations with reduced sensitivity to develop robust weed management strategies.

Survey of Weed Species in North Carolina Sweetpotato (*Ipomoea batatas*). K. Goble[1], K. Jennings[1], D. Monks[1], D. Jordan[1], S. Ippolito[1], S. Crawford[1]; [1]North Carolina State University, Raleigh, United States.

A survey was conducted across seven North Carolina counties (Edgecombe, Greene, Johnston, Nash, Pitt, Wayne, Wilson) and 35 randomly selected sweetpotato fields during the summer of 2024. Five fields in each county were surveyed for the presence of weed species and a total count within ten randomly sampled 1 m quadrats. The total number of fields with each species of weed was divided by the total number of fields sampled to determine weed presence. A total sum of weeds counted within the sampled quadrats was found to determine the species with the highest presence. Palmer amaranth (*Amaranthus palmeri*) was the most common weed and was observed in 83% of fields, followed by carpetweed (*Mollugo verticillata*) and sicklepod (*Senna obtusifolia*) at 60 and 49%, respectively. The weed species with the highest populations were carpetweed, common chickweed (*Stellaria media*), and annual sedge (*Cyperus compressus*). Results suggested that sicklepod populations have increased in comparison to a similar survey conducted in 2010. High carpetweed presence may be a concern for growers as it has a high potential for serving as a host for root knot nematodes.

Exploring Nicosulfuron Combinations for Broadspectrum Weed Control in Warm-Season Turf. S. Hale[1], J. Peppers[1], B. Corbett[1], S. Askew[1]; [1]Virginia Tech, Blacksburg, United States.

Exploring Nicosulfuron Combinations for Broadspectrum Weed Control in Warm-Season Turf. Nicosulfuron, an herbicide developed in the early 1990s, marked a significant advancement in weed management due to its ability to control grassy weeds without harming similar grass crops such as corn. Although certain turfgrass species tolerate nicosulfuron, it has not been registered for use in turfgrass. Studies have shown that some warm-season grasses, such as bermudagrass and zoysiagrass, may be tolerant of nicosulfuron at rates of 35–75 g ha^{-1}, allowing for selective goosegrass control, especially when mixed with sulfentrazone. Since products for postemergence goosegrass control are lacking in southern turf, nicosulfuron may be a viable tank mix partner with other herbicides to deliver broad-spectrum weed control. Similarly, related sulfonylurea herbicides like rimsulfuron, thifensulfuron, and tribenuron may be viable tank mix partners for value-added products in both cool- and warm-season turfgrass. Two studies were conducted in Blacksburg, Virginia, over nine site-years using a randomized complete block design with four replicates. The first study evaluated nicosulfuron, rimsulfuron, thifensulfuron, and tribenuron for weed control and turfgrass response across six turfgrass species and four weeds over seven site-years. The second study compared nicosulfuron alone and in mixtures with pyridate, rimsulfuron, thifensulfuron, and/or tribenuron to topramezone plus metribuzin and clethodim applied to both bermudagrass and goosegrass at two sites. While nicosulfuron and rimsulfuron caused significant injury to tall fescue, fine fescue, Kentucky bluegrass, perennial ryegrass, and creeping bentgrass, thifensulfuron and tribenuron were harmless. Bermudagrass was tolerant to all the tested sulfonylurea herbicides. All sulfonylureas tested controlled white clover but had limited to no effect on broadleaf plantain and crabgrass, with nicosulfuron being the only herbicide effective against goosegrass. In the second study, nicosulfuron controlled mature goosegrass 81%, which was less effective than topramezone plus metribuzin but comparable to clethodim. Mixtures of pyridate or other sulfonylurea herbicides did not improve goosegrass control compared to nicosulfuron alone. Topramezone plus metribuzin and clethodim injured bermudagrass 35 and 65%, respectively, while all treatments containing nicosulfuron caused no more than 15% injury to bermudagrass. This research highlights the potential of nicosulfuron, particularly in combination with other herbicides, for managing weeds in warm-season turfgrass systems, offering insights into its selective use and impact on turfgrass health.

Evaluation of Soybean Weed Management in Absence of Synthetic Auxin Herbicides. C. Bradshaw[1], D. Contreras[1], J. Alsdorf[1], R. Argueta[1], W. Everman[1]; [1]North Carolina State University, Raleigh, United States.

Dicamba is an effective postemergence herbicide for broadleaf weed control that was used extensively in dicamba-tolerant soybean weed management programs. However, with the loss of the dicamba label for over-the-top use on soybeans, growers must rely on other herbicide options for weed control in soybeans. A field study was conducted to investigate the effectiveness of different herbicides labeled for use on soybeans. The study included 15 different preemergence herbicide treatments, followed by postemergence treatments with or without a residual application. Excellent weed control was achieved with all preemergence treatments for Palmer amaranth while more variability in control was observed for tall morningglory. Weed control did not differ for either Palmer amaranth or tall morningglory based on the postemergence treatment used. Weed control was excellent for both Palmer amaranth and tall morningglory 28 days after the postemergence treatments. The results of this experiment indicate that excellent weed control is still possible without the use of synthetic auxin herbicides in soybeans; however, weed species present may dictate which herbicides may be more effective.

Weedy Rice Resistance to Imidazolinone Herbicides and Control with Glyphosate in Colombia. J. Velasquez[1], V. Hoyos[2], N. Roma-Burgos[1], G. Plaza[3]; [1]University of Arkansas, Fayetteville, United States, [2]Universidad Nacional de Colombia, Cali, Colombia, [3]Universidad Nacional de Colombia, Bogotá, Colombia.

Weedy rice (*Oryza sativa* L.) is a serious competitor of rice, causing severe yield losses. It contaminates and reduces the quality of harvested grain. This study aims to (1) evaluate the response of Colombian weedy rice accessions to glyphosate and the mixture of imazamox + imazapyr (F-IMIs) at commercial rates; and (2) determine the resistance level of one morphotype of weedy rice putatively resistant to the F-IMIs from objective (1). Ten weedy rice accessions were evaluated for response to F-IMIs (imazamox + imazapyr 49.5 and 22.5 g a.i. ha^{-1}, respectively) and glyphosate (960 g a.e. ha^{-1}). One putative ALS-resistant and five genotypically different accessions were subjected to a dose–response assay to determine the level of resistance, or sensitivity, to F-IMIs. The doses included 0, 0.5, 1, 2, 4, 8, and 16; and 0, 0.15, 0.25, 0.5, 0.75, 1, and 2 times the commercial rate of F-IMIs for resistant and susceptible, respectively. The F-IMIs controlled weedy rice tested (>71%), except one straw-hull-awned accession (<5%). The GR_{50} of weedy rice genotypes ranged from 0.26- to 0.32-fold the commercial rate of F-IMIs; therefore the accessions tested, representing distinct genotypes, were susceptible. The resistant straw-hull-awned morphotype was 47.04-fold resistant to the F-IMIs based on GR_{25}. Glyphosate controlled all morphotypes and genotypes >90%. Most Colombian weedy rice can be controlled with IMI herbicides recommended for ALS-resistant rice; however, at least one population evolved resistance to IMI herbicides. Glyphosate is effective on weedy rice populations and can be used before planting rice or after rice harvest.

Assessing the Impact of Sweep Tillage under High Residue System on Weed Control in Soybeans. G. Chahal[1], C. Bonnell[1], A. Price[2], A. Gamble[1], S. Li[1]; [1]Auburn University, Auburn, United States, [2]USDA-ARS, Auburn, United States.

Sweep tillage is a conservation tillage method that utilizes wide, flat blades to cut weeds just below the soil surface, aiming to minimize soil disturbance while effectively controlling weed growth. This method can be integrated with cover crops to enhance weed suppression, particularly in managing herbicide-resistant weeds, and may also be combined with herbicides for more comprehensive control. The hypothesis of this study is that varying frequencies of sweep tillage under cover crop residue conditions will provide effective weed control in soybean production, comparable to herbicide treatments, and superior to winter fallow. The objective was to compare the efficacy of mechanical weed control (sweep tillage), chemical control (herbicide treatment), and a check (winter fallow, non-treated) in soybean production under cover crop residue. A randomized complete block design (RCBD) with four replications was used to evaluate the treatments: pre-emergence herbicide (Valor + Zidua), post-emergence herbicide (Reflex + Liberty), sweep tillage at three, six, and nine weeks after planting (WAP), double sweep at three and six WAP, and winter fallow with no sweep or herbicide. The study was conducted under cereal rye cover crop residue at two locations in Alabama: the E.V. Smith Research and Extension Center (Shorter) and the Wiregrass Research and Extension Center (Headland). Weed control efficacy was assessed through weed biomass collection, weed counts, and visual ratings at 9 and 11 WAP. Data analysis was performed using ANOVA in RStudio, with means separated by Tukey's HSD ($P \leq 0.05$). Results indicated that at nine WAP weed biomass was significantly lower as compared to sweep and winter fallow non-treated check. At 11 WAP the triple sweep method showed potential for weed control comparable to herbicide applications. Additionally, sweep tillage was linked to increased weed emergence. Furthermore, integrating the reduced tillage followed by herbicide application may help decrease the weed seed bank. This study highlights the potential of sweep tillage as a sustainable and effective weed control approach in soybean production, with implications for both conventional and organic farming systems.

Evaluation of Cover Crops and Herbicides for Texas Panicum Control in Peanut. M. Marshall[1], A. Clobas-Celiz[1]; [1]Clemson University, Blackville, United States.

Texas panicum (TP) has become a challenging weed in South Carolina peanut due to its season-long emergence and limited mid- to late-season herbicide options. Early residual herbicides, applied within 40 days of planting, provide insufficient control of later emerging TP. Effective postemergence (POST) herbicides like clethodim or imazapic are essential for the control of Texas panicum. Therefore, field studies were conducted in 2022/23 at one site and in 2023/24 at two sites to evaluate fall-planted rye cover crop or no cover crop followed by in-season residual (S-metolachlor, pyroxasulfone, acetochlor, dimethenamid-p) and foliar (imazapic, clethodim, paraquat, acifluorfen + bentazon) herbicides at 15, 30, 60, and 75 days after planting. Fall-planted rye residue reduced TP emergence and population across environments. Among the herbicide programs, POST treatments combining residual herbicides and imazapic provided the highest TP control, with sequential clethodim applications providing 100% TP control 15 days after $POST_4$ (DAP_4). Overall, TP populations were higher in 2024 than in 2023. At 15 DAP_4, TP populations and biomass were 0 plants m^{-2} and 0 g m^{-2} in the imazapic plus residual herbicides followed by two applications of clethodim treatments. Peanut yield ranged from 4,111 to 5,353 kg ha^{-1} across treatments. Although all herbicide treatments significantly improved yields over the non-treated, a cost analysis showed that imazapic plus pyroxasulfone, dimethenamid-p, acetochlor or S-metolachlor followed by two applications of clethodim provided the highest TP control (100%) at the lowest cost ($208.85 ha^{-1}). In summary, these findings demonstrate the value of integrating cover crops and residual plus foliar herbicides to enhance TP control and peanut yield.

AI-Driven Real-Time Weed Detection and Precision Spot Spraying System. R. Wamanse[1], D. Shrivastava[2], V. Singh[1]; [1]Virginia Tech Eastern Shore AREC, Painter, United States, [2]Donald Danforth Plant Science Center, Saint Louis, United States.

Recent advances in robotics, deep learning (DL), and intelligent controlled spraying systems have opened new possibilities for enhancing agricultural production. Robotic systems developed by large corporations are often expensive, making them less accessible to small and medium-scale farmers, thereby limiting their widespread adoption in agriculture. This study proposes a precision weed management system using Jetson Orin Nano 8 GB and OAK-D Pro Auto-Focus camera assembled on a Farm-ng Amiga® platform. This study uses the YOLOv8 nano model, a swift and lightweight object detection model, for identifying common ragweed (*Ambrosia artemisiifolia*) in soybean (*Glycine max*) fields. Solenoids incorporated before spray nozzles, controlled by relays and GPIO pins, allow for accurate herbicide delivery, considerably lowering chemical usage while maintaining effective weed control. While current robotic systems are relatively inexpensive, further innovations can make advanced agricultural technologies even more accessible to farmers.

Multiple Herbicide Resistant Palmer Amaranth in Virginia. M. Viric[1], V. Singh[1], M. Flessner[2]; [1]Virginia Tech, Painter, United States, [2]Virginia Tech, Blacksburg, United States.

Palmer amaranth (*Amaranthus palmeri*) poses significant challenges for management in row crop production systems in Virginia, making it one of the most problematic weeds due to its rapid growth, high seed production, and resistance to several herbicide modes of action. From 2022–2024, we carried out field surveys aimed at understanding the distribution of this herbicide-resistant species and assessing the potential threat to production fields in the area. Following the collection of 50 samples, they were dried, threshed, and tested in the greenhouse for sensitivity to trifloxysulfuron (15.76 g ai ha^{-1}), 2,4-D (533.68 g ai ha^{-1}), fomesafen (420.3 g ai ha^{-1}), atrazine (2242.8 g ai ha^{-1}), and glyphosate (867.7 g ai ha^{-1}) at 1× field rate. After the herbicide screenings, dose–response assays were performed on the most resistant Palmer populations using six different rates (0.5, 1, 2, 4, 8, 16×), compared to a susceptible population at five rates (0.125, 0.25, 0.5, 1, and 2×). The experiment was conducted in a completely randomized design with three replications and two experimental runs. Survivors were characterized as highly resistant (0–20% injury), moderately resistant (21–79%), and susceptible (>80% injury). Results showed a high level of resistance to ALS, EPSPS, PSII, and PPO-inhibitor herbicides and also multiple herbicide resistance. The ratio of GR_{50} values indicated that the most resistant population had 14-, 14-, and 47-fold resistance to fomesafen, atrazine, and trifloxysulfuron. GR_{50} value for the glyphosate-resistant population was 1238 g ha^{-1}, and no susceptible standard was available for comparison. All 50 samples collected across the state were resistant to glyphosate. There is a risk associated with these herbicide-resistant Palmer amaranth populations that can spread multiple herbicide resistance to nearby fields through gene flow, leading to the possible emergence of hybrid plants. The increasing prevalence of multiple herbicide-resistant weeds poses a significant barrier to sustainable crop production in Virginia and complicates integrated weed management tactics.

From Lab to Field: Predicting Seed Longevity in Palmer Amaranth (*Amaranthus palmeri*) Using Accelerated Aging Test. A. Singh[1], A. Maity[1], D. Russell[1]; [1]Auburn University, Auburn, United States.

Successful management of weed infestations necessitates a comprehensive understanding of their biology, including the longevity of their seedbank. In this study, a controlled aging test was conducted on Palmer amaranth (*Amaranthus palmeri*) weed seeds to estimate their seed longevity under elevated soil temperature scenarios. The test involved subjecting the seeds to two different temperatures, namely 41 °C and 45 °C, for distinct time periods with a 12-hour interval up to 96 hours for each temperature. The results demonstrated a decline in germination with increase in temperature and duration of controlled ageing, indicating a reduced viability of Palmer amaranth seeds under expected climate change scenarios. The purpose of this method was to accelerate seed aging in a controlled environment, enabling the construction of a seed survival curve with respect to simulated temperature rise over extended duration under soil seedbank conditions. By combining this data with field longevity data from existing literature, we were able to estimate the longevity of Palmer amaranth weed seeds. This information is crucial for devising effective weed management strategies. The controlled aging test showed a high correlation with natural aging patterns, indicating its potential as a predictor of soil seedbank longevity under field conditions. This method offers a quicker alternative to seed burial studies for predicting soil seedbank longevity.

Determining Drift Potential of Unmanned Aerial System Using Machine Learning Approach.
F. Esmaeilbeiki[1], D. E. Martin[2], V. Singh[1]; [1]Virginia Tech, Painter, United States, [2]USDA, College Station, United States.

The widespread use of remotely piloted aerial application systems (RPAASs) has raised concerns about spray drift and its off-target movement, yet limited data exist to improve the understanding of the factors influencing drift and deposition. Monitoring spray drift in the field is often expensive, time-consuming, and labor-intensive, making predictive models a practical alternative. While several mechanistic models have been developed for drift prediction, they are complex, requiring extensive input data that may not always be readily available. Furthermore, most existing studies on drift prediction using machine learning focus on backpack sprayers, leaving a significant gap in research specific to RPAAS datasets. This highlights the need for simplified, accurate, and adaptable modeling approaches tailored to aerial application systems. This study is focused on predicting spray drift using machine learning models by analyzing field data collected with Precision Vision 35X (LeadingEdge) and XAG P100 Pro (XAG) aerial sprayers, using medium and coarse droplet sizes, operating at application heights of 3 m and 5 m. Calibration was done before testing to determine spray pressure, flow rate, and swath width at these heights. Deposition samplers and airborne drift collectors were strategically positioned in a single line, perpendicular to the spray swath and aligned parallel to the wind direction within a ±30º range, to effectively capture drift patterns. Measurements were obtained through optical and fluorimetric methods, and meteorological parameters such as wind speed (WS), temperature (T), relative humidity (RH), and solar radiation were used as model inputs. Five drift prediction scenarios were tested: Scenario 1 considered WS alone; Scenario 2 added T; Scenario 3 included T, RH, and solar radiation; Scenario 4 excluded solar radiation but retained WS, T, and RH; Scenario 5 combined all factors. Machine learning models, including SVM, MLP, MARS, and M5TREE, were evaluated using metrics such as correlation coefficient (R), root mean square error (RMSE), mean absolute error (MAE), coefficient of determination (R^2), and Willmott index of agreement (WI). For weather parameters, the SVM model consistently achieved the best results, particularly in Scenario 1, with the highest R (0.973), R^2 (0.947), and WI (0.986), as well as the lowest RMSE (1.897) and MAE (1.464). This study highlights the effectiveness of machine learning models in improving spray drift prediction, offering a practical tool for enhancing RPAAS applications while minimizing off-target impacts.

Assessing Herbicide Injury in Cotton Using UAV-based Thermal and Multispectral Imagery.
B. Anokye[1], U. Torres[1], B. Gurjar[1], N. Singh[1], C. Yang[2], M. Bagavathiannan[1]; [1]Texas A&M University, College Station, United States, [2]USDA-ARS Aerial Application Research Unit, College Station, United States.

Herbicide drift poses a significant challenge in cotton (*Gossypium* spp.) production, often leading to reduced yields and compromised crop quality. Conventional injury assessments rely on visible symptoms, which take many days to appear, and often are too late for intervention. Accurate detection and assessment of herbicide injury are critical for timely interventions. Long-wave infrared thermography, combined with multispectral data, allows for monitoring of canopy temperature (CT) changes, and may serve as an early indicator of herbicide stress. This study aims to quantify herbicide injury in cotton by assessing CT responses to four herbicide modes of action (MOA) using airborne thermal and multispectral imagery. The research involved both greenhouse and field experiments. The field experiment was arranged in a factorial randomized complete block design, while the greenhouse experiment followed a completely randomized design. Four herbicide treatments, applied at two rates, along with a control group were evaluated. The imagery data were collected at various time intervals following the herbicide treatment, using a FLIR SC660 thermal and a Micasense Altum-PT multispectral sensor mounted on a Hylio drone. Image processing was conducted using PIX4Dmapper, with NDVI and plant CT estimated using Python packages and ArcGIS Pro. ANOVA was performed to evaluate the effects of the treatments, while regression analysis was employed to examine the relationship between canopy temperature (CT) and NDVI. A significant change in CT was observed over time, with marginal differences across treatment types, indicating varied responses to different herbicide applications. The highest CT variability was noted on day 7 for the 2,4-D (1×) treatment, signifying peak herbicide impact. CT increases observed on days 3 and 7 suggested stress responses, followed by a stabilization trend by day 14 across all treatments, potentially reflecting a recovery phase to the applied herbicides. A negative correlation ($r = -0.37$) between CT and NDVI underscores their potential as early indicators of plant stress. Overall, our research demonstrates the effectiveness of UAV-based thermal and multispectral imagery for early detection of herbicide injury in cotton, thus providing a non-destructive, scalable method to monitor and assess herbicide drift injury in cotton.

Survey of Herbicide-Resistant Weeds in the South

Please refer to **www.herbicideresistance.org** for up-to-date information on herbicide resistant weeds in the Southern region.

Annual Meeting Attendees

Himani Ahlawat
University of Georgia
Georgia

Andrew Ahlersmeyer
Auburn University
Auburn, Alabama

Jackson Alsdorf
North Carolina State University
Raleigh, North Carolina

Shawn Askew
Virginia Tech
Blacksburg, Virginia

Jeff Atkinson
Harrell's, LLC
Fort Mill, South Carolina

Tristen Avent
UPL

Kelly Backscheider
Corteva Agriscience

Robert Baker
Scotts MiracleGro
Marysville, Ohio

Sanjeev Bangarwa
BASF
Tennessee

Taghi Bararpour
Mississippi State University
Mississippi

Haeden Barber
University of Arkansas System
Division of Ag
Little Rock, Arkansas

Tom Barber
University of Arkansas Division of Agriculture
Lonoke, Arkansas

Nicholas Basinger
The University of Georgia
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Lubbock, Texas

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David Black
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Maxwell Bloodworth
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Kyle Briscoe
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Charlie Cahoon
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2025 SWSS Sustaining Members

Platinum

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Syngenta Crop Protection

Gold

BASF Corporation (Crop protection)
Corteva Agriscience
FMC

Silver

BASF trait development (fromerly Bayer Seeds Group)
Blue River Technology
Cotton Inc.
Gylling Data Management Inc
Nutrien Ag Solutions

Bronze

Agricenter International
Bellspray, Inc.
Diligence Technologies
Envu
Frontier Precision
Gowan
Helena Agri-Enterprises, LLC.
K-I Chemical U.S.A. Inc.
Nichino America
NuFarm
PBI/Gordon Corp
SePRO
The Scotts Company
United Phosphorus, Inc.
UPL
Valent USA Corp