

**WEED SCIENCE SOCIETY OF
AMERICA-
WESTERN SOCIETY OF WEED
SCIENCE**

JOINT MEETING

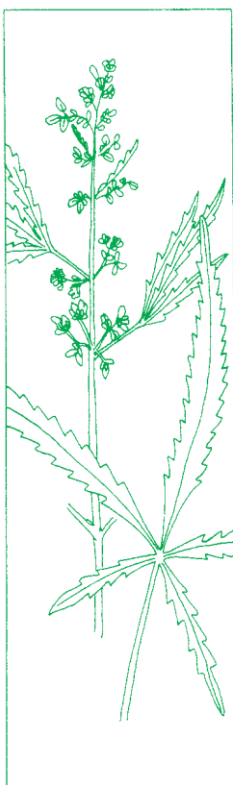
60th Meeting

2020 MEETING PROGRAM

Hyatt Regency

Maui, HI

March 2-5, 2020



WSSA Sustaining Members

PRESIDENTIAL

BASF Corporation
Bayer Crop Science
Corteva Agrisciences
FMC Corporation
Syngenta Crop Protection

LEADERS

Helena Chemical
Valent USA
Winfield United

PATRONS

NuFarm Americas, Inc.
UPL NA Inc
Growmark, Inc.
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Marrone Bio Innovations, Inc.

CONTRIBUTORS

AMVAC Chemical Corp
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Minnesota Valley Testing Lab
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60th Meeting
**Weed Science Society of America/
Western Society of Weed Science**

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Local Arrangements Committee 2020 –Maui

ChairJames Leary

The WSSA/WSWS 2020 Program

Welcome to the 2020 joint Weed Science Society of America (WSSA) and the Western Society of Weed Science (WSWS) Annual Meeting at the Hyatt Regency Maui Resort and Spa. This venue is set upon 40 oceanfront acres on Maui's Ka'anapali Beach offering many activities. Organized tour options include whale watching and a tour of Monsanto Hawaii seed corn operation.

At this year's meeting, we are encouraging a more resort casual dress code; tropical/Hawaiian attire would be great! Most committee meetings will take place on Monday, March 2 in the morning or afternoon with some scattered on other days during the week. Check with your committee chairs for the exact time and location. The General Session and WSSA/WSWS Awards Ceremony will begin Monday at 4:00 PM in the Monarchy Ballroom. Our General Session will begin with a welcome and opening remarks from Dr. Samuel M. 'Ohukani'ōhi'a Gon III, senior scientist and cultural advisor for the Nature Conservancy of Hawaii. Dr. Sam Gon is a native of Hawaii and has 40 years of experience in numerous conservation and land management projects. We are excited to have Dr. Gon join our meeting. Presidents Larry Steckel (WSSA) and Pat Clay (WSWS) will collaborate on the presidential address to the membership. The Awards Ceremony will include presentations of the WSSA and WSWS Annual Awards. Be sure to attend this session to help recognize all the awardees. Following the Awards Ceremony, WSSA/WSWS will host an awards reception beginning around 6:00 p.m. All registered attendees are welcome and encouraged to attend. Please be sure spouses and friends that accompany you have registered so that they may attend this fun event.

As in the past, we will begin Tuesday morning with the Poster Session and will again have multiple breakout sessions throughout the week with presentations addressing invasive plants in natural areas to the genetics of herbicide resistance to the latest herbicide technology. We think we have something for everyone. Also, join us for the 3rd WSSA Women in Weed Science Networking Event tentatively targeted for Tuesday at noon. All female attendees at the conference are welcome to attend the event, just sign up when you register so we have a seat for you!

We are again conducting MS and PhD student poster and oral presentation contests. However, a new oral competition event is being offered in 2020 to both WSSA and WSWS students. This will be a Three-Minute Thesis Research Communication Competition (3MT™) developed by the University of Queensland, Australia (<https://threeminutethesis.uq.edu.au/>). It provides students with the opportunity to profile their research and enhance communication skills. A separate document will be available describing this activity in more detail including how students will be judged and the rules for the competition. A joint WSSA/WSWS student luncheon will take place on Wednesday

where the students will conduct business and have a facilitated session focused on some issues that students face in graduate school. And finally, the student awards ceremony will take place late Wednesday afternoon followed by an organized “Students Night Out”, so there should be plenty of opportunities for our students to contribute in the 2020 meeting.

Tuesday through Thursday, we are going to host five symposia related to important and impactful subjects that need attention in Weed Science. These include: 1) Genomics of Weedy and Invasive Species - 2025 and Beyond, 2) The Ecological and Biodiversity Impact of Invasive Grass Species and Their Management, 3) 2020 Vision for Hawaiian Invasive Plant Management, 4) The Role of Intelligent Machines in Weed Management, and 5) Toxicology and Weed Science. The WSSA and WSWS will both host separate business meetings early Thursday morning. We hope that all members will attend their respective meeting to participate in the decision-making process on societal issues and board activities. Most professional activities will end by noon on Thursday, however a very special workshop titled “Building a Community to the Wicked Problem of Herbicide Resistance” organized by Dr. David Shaw will take place from 1 to 4 pm on Thursday where experts and practitioners will present information on community organization efforts and other strategies to combat the resistance problem. Also, other committee meetings may run into Thursday afternoon, so check the schedule.

Special thanks to our Local Arrangements Chair, Dr. James Leary. Although he relocated to Florida from Hawaii last year, he has been very helpful with developing the program. In addition, thanks to Josh Atwood with the Hawaii Invasive Species Council in helping to identify our Keynote speaker. We would also like to thank Drs. Darrin Dodds, Marty Schraer, and Carl Coburn for their help in organizing and conducting the student contests. Thanks also to Drs. Larry Steckel, Anita Dille, Scott Senseman, Pat Clay, and Andrew Kniss for their help and guidance in preparing the program. We had an overwhelming group of committed folks who submitted great symposia ideas this year and some we could not accommodate but hope to have back in 2021 in San Antonio. We thank all our Section Chairs for helping to organize the program and our WSSA/WSWS meeting manager and Executive Secretary, Mr. Eric Gustafson, for his commitment to ensure a successful meeting on all levels. We are excited about the great participation and the many opportunities to exchange scientific information on weed science research, education and extension. We look forward to a productive and rewarding meeting.

Bill Curran

WSSA Program Chair and President-Elect

Corey Ransom

WSWS Program Chair and President-Elect

2020 Program Committee

General Program Chairs.....	William Curran and Corey Ransom
Vice Chair.....	Anita Dille
Agronomic Crops.....	Ryan Lins and Misha Manuchehri
Horticultural Crops.....	Matthew Cutulle and Jesse Richardson
Turf and Ornamentals.....	Anthony Witcher and Sandeep Rana
Pastures, Rangelands,..... Forests, Rights of Way, Wildlands and Aquatic Invasive Plants	Mark Renz and Harry Quicke
Teaching and Extension.....	Sandeep Rana and Thomas Getts
Formulation, Adjuvant, & Application Technology	Malik Mayank and Vip an Kumar
Weed Biology and Ecology.....	Mohsen Mesagran and Caio Brunharo
Biocontrol of Weeds.....	James Cuda and Min Rayamajhi
Physiology.....	Paul Tseng
Integrated Weed..... Management	Vijay Singh and Shilpa Singh
Sustaining Member Exhibits.....	Greg Dahl
Poster Sessions.....	Thomas Mueller
Student Contest.....	Darrin Dodds and Carl Coburn

Program Booklet and Abstracts

All those registering for the annual meeting will receive a program booklet. All registrants will receive programs at the meeting registration desk. To find the time and location of specific papers, search by the author in the author index in the back of the program.

Please also download the meeting app for the most up to date schedules and information.

Posters and Sustaining Member Exhibits

All posters and Sustaining Member Exhibits will be on display from Tuesday at 7am to Thursday at 11am. The times will not be replicated daily throughout the program.

CONDENSED PROGRAM

WSSA COMMITTEE MEETINGS AND OTHER ACTIVITIES

SATURDAY FEBRUARY 29

WSSA Board of Directors 07:00 AM - 05:00 PM Maui Suite #1

SUNDAY MARCH 1

WSSA Board of Directors Meeting 07:00 AM - 12:00 PM Maui Suite #1

HRAC Global/ US 07:00 AM - 12:00 PM Maui Suite #4

Whale Watching Tour 09:00 AM - 12:00 PM Lobby

HRAC US 01:00 PM - 05:00 PM Maui Suite #3

HRAC Global 01:00 PM - 05:00 PM Maui Suite #4

NIFA Fellow Advisory Committee 01:00 PM - 03:00 PM Maui Suite #1

USDA-ARS IWM Area Wide Project 01:00 PM - 05:00 PM Monarchy #5

MONDAY MARCH 2

Board/ Committee Member Breakfast 06:30 AM - 08:00 AM Japengo

WSWS Board of Directors Meeting 07:00 AM - 04:00 PM Regency Boardroom

APHIS Meeting 07:00 AM - 09:00 AM Monarchy #7

F3 - Endowment Fund 08:00 AM - 09:00 AM Maui Suite #2

P2 - Weed Science Editorial Board 08:00 AM - 09:00 AM Maui Suite #3

E10 - Weed Control for Specialty Crops	08:00 AM - 09:00 AM	Maui Suite #4
E2 - Science Policy	08:00 AM - 10:00 AM	Maui Suite #1
International Weed Genome Committee	08:00 AM - 10:00 AM	Monarchy #2
E6 - Research and Competitive Grants	08:00 AM - 10:00 AM	Monarchy #3
P3 - Weed Technology Editorial Board	09:00 AM - 10:00 AM	Maui Suite #3
W15 - Formulation, Adjuvant & Application Technology	09:00 AM - 10:00 AM	Maui Suite #2
W10 - Constitution and Operating Procedures	09:00 AM - 11:00 AM	Maui Suite #4
Whale Watching Tour	09:00 AM - 12:00 PM	Lobby
E12b - Herbicide Resistance Education	10:00 AM - 12:00 PM	Maui Suite #1
F4 - Professional Development and Membership	10:00 AM - 11:00 AM	Maui Suite #2
P4 - Invasive Plant Science and Management Editorial Board	10:00 AM - 11:00 AM	Maui Suite #3
International Weed Genome Committee	10:00 AM - 11:00 AM	Monarchy #2
WSWS Rita Beard	10:00 AM - 11:00 AM	Monarchy #3
W11 - Extension	11:00 AM - 12:00 PM	Maui Suite #2
P1 - Publications Board	11:00 AM - 12:00 PM	Maui Suite #3
Kochia Work Group	11:00AM – 12:00PM	Monarchy #2
E11 - Weed Loss	11:00 AM - 01:00 PM	Monarchy #6

E12a - Herbicide Resistant Plants	12:00 PM - 02:00 PM	Monarchy #7
IWSS Board Meeting	1:00PM – 4:00PM	Monarchy #6
WERA77	02:00PM- 04:00PM	Monarchy #7
Registration	01:00 PM - 04:00 PM	Monarchy Terrace Foyer
Poster Setup	01:00 PM - 04:00 PM	Maui Suite #1-4
General Session	04:00 PM - 06:00 PM	Monarchy #1-4
Welcome Reception	06:00 PM - 08:00 PM	Halona Kai

TUESDAY MARCH 3

Student Contest Judge Breakfast	06:00 AM - 07:00 AM	Lahaina #3/4
E13 - Public Awareness	07:00 AM - 09:00 AM	Japengo
Registration	07:00 AM - 05:00 PM	Monarchy Terrace Foyer
Judges Work Room	07:00 AM - 05:00 PM	Regency Boardroom
E8 - Environmental Aspects of Weed Management	12:00 PM - 01:00 PM	Japengo
Women in Weed Science Event	12:00 PM - 02:00 PM	Lahaina #3/4
IWSS General Session	05:00 PM - 06:00 PM	Lahaina #3
E4 - Federal Noxious and Invasive Weeds	05:00 PM - 06:00 PM	Lahaina #4
What's New in Industry	05:00 PM - 06:00 PM	Monarchy #4
BASF Sponsored Luau	06:00 PM - 08:00 PM	Halona Kai

WEDNESDAY MARCH 4

Presidents Breakfast	06:30 AM - 08:00 AM	Japengo
E14 - Website	07:00 AM - 09:00 AM	Lahaina #3
F2 - Finance	07:00 AM - 09:00 AM	Lahaina #4
Judges Work Room	07:00 AM - 04:00 PM	Regency Boardroom
Registration	08:00 AM - 05:00 PM	Monarchy Terrace Foyer
WSSA Student Business Meeting	11:00 AM - 12:00 PM	Lahaina #3/4
WSSA/ WSWS Joint Student Luncheon	12:00 PM - 01:00 PM	Lahaina #3/4
WSWS Student Business Meeting	01:00 PM - 02:00 PM	Lahaina #3/4
P22 - Terminology Parent	12:00 PM - 01:00 PM	Maui Suite #5
DSC – Group	12:00PM – 01:00PM	Japengo
Seed Corn Tour	02:00 PM - 04:30 PM	Lobby
Student Awards	05:00 PM - 06:30 PM	Monarchy #4
Student Night Out	07:00 PM - 09:00 PM	Monarchy #4

THURSDAY MARCH 5

WSWS Business Breakfast	06:30 AM - 08:00 AM	Lahaina #3/4
WSSA Business Breakfast	06:30 AM - 08:00 AM	Sunset Terrace
Remove Posters	01:00 PM - 03:00 PM	Maui Suite #1-4
WSWS Board of Directors Meeting	01:00 PM - 02:30 PM	Lahaina #3
WSSA Board of Directors Meeting	03:00 PM - 05:00 PM	Lahaina #4

SUMMARY OF 2020 PROGRAM

TUESDAY and WEDNESDAY MORNINGS, MARCH 3 & 4

Authors of even numbered posters will present on March 3 and odd numbered posters will present on March 4

POSTER - 01. Agronomic Crops	07:00 AM - 09:00 AM	Maui Suite #1-4
POSTER - 02. Horticultural Crops	07:00 AM - 09:00 AM	Maui Suite #1-4
POSTER - 03. Turf and Ornamentals	07:00 AM - 09:00 AM	Maui Suite #1-4
POSTER - 04. Pasture, Range, Forest, Rights of ways, Wildland, and Aquatic Invasive Plants	07:00 AM - 09:00 AM	Maui Suite #1-4
POSTER - 07. Teaching and Extension/ Teaching and Technology Transfer	07:00 AM - 09:00 AM	Maui Suite #1-4
POSTER - 08. Formulation, Adjuvant, & Application Technology	07:00 AM - 09:00 PM	Maui Suite #1-4
POSTER - 09. Weed Biology and Ecology	07:00 AM - 09:00 AM	Maui Suite #1-4
POSTER - 10. Biocontrol of Weeds	07:00 AM - 09:00 AM	Maui Suite #1-4
POSTER - 11. Physiology	07:00 AM - 09:00 AM	Maui Suite #1-4
POSTER - 12. Soil and Environmental Aspects	07:00 AM - 09:00 AM	Maui Suite #1-4

POSTER - 13. 07:00 AM - 09:00 AM Maui Suite #1-4
Integrated Weed
Management

TUESDAY MARCH 3

3MT Student Oral 09:00 AM - 11:00 PM Monarchy #2
Competition - MS

3MT Student Oral 09:00 AM - 11:30 PM Monarchy #3
Competition - PhD

SYMPOSIUM - 4. 09:00 AM - 12:00 PM Monarchy #4
The Ecological and
Biodiversity Impact
of Invasive Grass
Species and Their
Management

ORAL - 01. 09:00 AM - 12:00 PM Monarchy #5
Agronomic Crops I

ORAL - 02. 09:00 AM - 12:00 PM Monarchy #1
Horticultural Crops

ORAL - 09. Weed 09:00 AM - 12:00 PM Monarchy #7
Biology and
Ecology

ORAL - 11. 09:00 AM - 12:00 PM Monarchy #6
Physiology

SYMPOSIUM - 3. 01:00 PM - 05:00 PM Monarchy #4
Genomics of Weedy
and Invasive Species
- 2025 and Beyond

ORAL - 01. 01:00 PM - 05:00 PM Monarchy #5
Agronomic Crops I

ORAL - 01. 01:00 PM - 05:00 PM Monarchy #6
Agronomic Crops II

ORAL - 02. 01:00 PM - 04:30 PM Monarchy #1
Horticultural Crops

ORAL - 04. 01:00 PM - 05:00 PM Monarchy #2
Pasture, Range,
Forest, Rights of
ways, Wildland,
and Aquatic
Invasive Plants

ORAL - 07. 01:00 PM - 05:00 PM Monarchy #3
Teaching and
Extension/ Teaching
and Technology
Transfer

ORAL - 09. Weed 01:00 PM - 04:45 PM Monarchy #7
Biology and
Ecology

WEDNESDAY MARCH 4

SYMPOSIUM - 1. 09:00 AM - 12:00 PM Monarchy #2
2020 Vision for
Hawaiian Invasive
Plant Management

3MT Final Round 09:00 AM - 11:00 AM Monarchy #3

SYMPOSIUM - 2. 09:00 AM - 04:30 PM Monarchy #4
The Role of
Intelligent Machines
in Weed
Management

ORAL - 01. 09:00 AM - 12:00 PM Monarchy #5
Agronomic Crops I

ORAL - 04. 09:00 AM - 12:00 PM Monarchy #1
Pasture, Range,
Forest, Rights of
ways, Wildland,
and Aquatic
Invasive Plants

ORAL - 11. 09:00 AM - 12:00 PM Monarchy #6
Physiology

ORAL - 13. 09:00 AM - 12:00 PM Monarchy #7
Integrated Weed
Management

ORAL - 01. 01:00 PM - 04:30 PM Monarchy #5
Agronomic Crops I

ORAL - 01. 01:00 PM - 04:30 PM Monarchy #6
Agronomic Crops II

ORAL - 03. Turf 01:00 PM - 04:30 PM Monarchy #3
and Ornamentals

- ORAL - 04. 01:00 PM - 04:30 PM Monarchy #1
 Pasture, Range,
 Forest, Rights of
 ways, Wildland,
 and Aquatic
 Invasive Plants
- ORAL - 10. 01:00 PM - 02:45 PM Monarchy #2
 Biocontrol of
 Weeds
- ORAL - 13. 01:00 PM - 04:30 PM Monarchy #7
 Integrated Weed
 Management
- ORAL - 14. Travel 03:00 PM - 04:30 PM Monarchy #2
 Enrichment
 Experience

THURSDAY MARCH 5

- SYMPOSIUM - 5. 08:30 AM - 12:00 PM Monarchy #4
 Toxicology and
 Weed Science
- ORAL - 01. 08:30 AM - 12:00 PM Monarchy #5
 Agronomic Crops I
- ORAL - 04. 08:30 AM - 12:00 AM Monarchy #1
 Pasture, Range,
 Forest, Rights of
 ways, Wildland,
 and Aquatic
 Invasive Plants
- ORAL - 08. 08:30 AM - 12:00 PM Monarchy #2
 Formulation,
 Adjuvant, &
 Application
 Technology
- ORAL - 09. Weed 08:30 AM - 12:00 PM Monarchy #7
 Biology and
 Ecology
- WORKSHOP - 01:00 PM - 04:00 PM Monarchy #4
 Building a
 Community to
 Battle the Wicked
 Problem of
 Herbicide
 Resistance

PROGRAM

MONDAY AFTERNOON MARCH 2

General Session

LOCATION: Monarchy #1-4
TIME: 04:00 PM - 06:00 PM
MODERATOR: William S. Curran
Penn State University
University Park, PA
CO-MODERATOR: Corey V. Ransom
Utah State University
Logan, UT

***SPEAKER**

- 04:00 PM** **Introductions and Announcements.** William S. Curran* and Corey V. Ransom; Penn State University, University Park, PA and Utah State University, Logan, UT
- 04:10 PM** **IWSS Organization and Meeting Update.** Nilda Roma-Burgos*; University of Arkansas, Fayetteville, AR
- 04:15 PM** **Keynote: Hawai'i: A World of Weeds in Microcosm.** Samuel M. 'Ohukani'ōhi'a Gon III*; The Nature Conservancy of Hawaii, Honolulu, HI
- 04:45 PM** **Presidential Address.** Larry Steckel*¹ and Pat Clay*²; ¹University of Tennessee, Jackson, TN, ²VALENT U.S.A. LLC, Fresno, CA
- 05:05 PM** **Presentation of Awards.** William S. Curran*¹ and Pat Clay*²; ¹Penn State University, University Park, PA, ²VALENT U.S.A. LLC, Fresno, CA
- 06:00 PM** **Adjourn for Welcome Reception**

**TUESDAY and WEDNESDAY
MORNINGS, MARCH 3 & 4**

**Authors of even numbered posters will
present on March 3 and odd numbered
posters will present on March 4**

Agronomic Crops

LOCATION: Maui Suite #1-4
TIME: 07:00 AM - 09:00 AM
MODERATOR: Thomas C. Mueller
University of Tennessee
Knoxville, TN

***PRESENTER † STUDENT CONTEST - MS**

†Wheat Variety Tolerance to Metribuzin and Pyroxasulfone. Lane S. Newlin*, Misha R. Manuchehri, Brett F. Carver, Amanda De Oliveira Silva, Hannah C. Lindell, Justin T. Childers; Oklahoma State University, Stillwater, OK (1)

†Overlapping Residual Herbicides for Control of Glyphosate-Resistant Palmer Amaranth in Dicamba/Glyphosate-Resistant Soybean. Shawn T. McDonald*¹, Prashant Jha², Amit J. Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²Iowa State University, Ames, IA (2)

†Interference of *Amaranthus palmeri* in Sugar Beet. Whitney R. Schultz*, Nevin Lawrence; University of Nebraska-Lincoln, Scottsbluff, NE (3)

†Soybean Response to Aminopyralid, Dicamba, 2,4-D and Aminocyclopyrachlor Application. Trey I. Clark*¹, Thomas C. Mueller¹, Larry Steckel²; ¹University of Tennessee, Knoxville, TN, ²University of Tennessee, Jackson, TN (4)

†Meshing Soybean Weed Management with Agronomic Practices in Oklahoma. Misha R. Manuchehri, Sarah E. Kezar*; Oklahoma State University, Stillwater, OK (5)

†Interactions of Dicamba, Glyphosate, and Glufosinate as Tank-Mix Partners. Adam L. Constine*, Christy Sprague; Michigan State University, East Lansing, MI (6)

†**Boll Opening Efficacy as Influenced by Cotton Maturity.** Cayden B. Catlin*, Bradley R. Wilson, Seth A. Byrd; Oklahoma State University, Stillwater, OK (7)

†**'Planting Green' into Cereal Cover Crops Improves Horseweed (*Erigeron canadensis*) Suppression.** John A. Schramski*, Christy Sprague, Karen A. Renner; Michigan State University, East Lansing, MI (8)

†**Cover Crop Vs. Cash Crop: A Comparison of Two Renovation Approaches in Deteriorated Wyoming Hayfields.** Tyler Z. Jones*, Brian Mealor; University of Wyoming, Laramie, WY (9)

†**Control of Velvetleaf by Tank-mixing Dicamba with Fluthiacet or Glyphosate in Dicamba/Glyphosate-resistant Soybean.** Jose H. de Sanctis*¹, Stevan Knezevic², Amit J. Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, Concord, NE (10)

†**Greenhouse Herbicide Screening for Industrial Hemp.** Joseph Mettler*, Kirk A. Howatt; North Dakota State University, Fargo, ND (11)

†**Timing of Post-Emergence Herbicide Application Impacts Weed Control and Seed Fecundity in Wisconsin Soybean Production.** Sarah V. Striegel*, Maxwell Coura Oliveira, Ryan P. DeWerff, Nicholas J. Arneson, David E. Stoltenberg, Shawn P. Conley, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI (12)

Impact of Tank Mix Partner on Solution pH and Secondary Movement of Dicamba and 2,4-D. Sarah V. Striegel*, Nikola Arsenijevic, Maxwell Coura Oliveira, Ryan P. DeWerff, David E. Stoltenberg, Shawn P. Conley, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI (13)

***PRESENTER † STUDENT CONTEST - PhD**

†**The Potential for New Residual Herbicides in Rice.** Connor Webster*, Eric Webster, Benjamin M. McKnight, David C. Walker, Bradley Greer, Samer Y. Rustom; Louisiana State University, Baton Rouge, LA (14)

†**Effects of Deep Seeding on Weed Management and Crop Response in California Rice Systems.** Alexander R. Ceseski*, Amar Godar, Kassim Al-Khatib; University of California, Davis, Davis, CA (15)

†**Evaluating Reduced Rate POST Herbicide Mixtures for Palmer Amaranth (*Amaranthus palmeri*) Control in Dry Bean.** Clint W. Beiermann*¹, Cody F. Creech¹, Amit J. Jhala², Stevan Knezevic³, Robert Harveson¹, Nevin Lawrence¹; ¹University of Nebraska-Lincoln, Scottsbluff, NE, ²University of Nebraska-Lincoln, Lincoln, NE, ³University of Nebraska-Lincoln, Concord, NE (16)

†**Effect of Sublethal 2,4-D Rates on Quality and Value of Cotton Fiber.** Bradley R. Wilson*¹, Misha R. Manuchehri¹, Peter A. Dotray², Wayne Keeling³, Gaylon Morgan⁴, Seth A. Byrd¹; ¹Oklahoma State University, Stillwater, OK, ²Texas Tech University and Texas A&M AgriLife Research and Extension Service, Lubbock, TX, ³Texas A&M AgriLife Research, Lubbock, TX, ⁴Cotton Incorporated, Cary, NC (17)

†**Options for Managing Weedy Rice in Louisiana.** Bradley Greer*¹, Eric Webster¹, Benjamin M. McKnight¹, David C. Walker¹, Samer Y. Rustom¹, Connor Webster¹, Justin B. Hensley²; ¹Louisiana State University, Baton Rouge, LA, ²Arkansas Ag Specialists, LLC, Dumas, AR (18)

†**Carry Over Effects of Residual Cotton Herbicides on Fall-Planted Cover Crops.** Enelise Osco Helvig*¹, Spencer L. Samuelson², Cleber D. de Goes Maciel¹, Muthukumar V. Bagavathiannan²; ¹Universidade Estadual do Centro Oeste, Guarapuava, Brazil, ²Texas A&M University, College Station, TX (19)

†**Evaluation of New Rice Herbicides Applied in a Salvage Situation.** Samer Y. Rustom*, Eric Webster, Benjamin M. McKnight, Connor Webster, Bradley Greer, David C. Walker; Louisiana State University, Baton Rouge, LA (20)

†**Characterization of Dicamba Cross Resistance in a Multiple-Resistant Waterhemp (*Amaranthus tuberculatus*) Population from Illinois.** Lucas Bobadilla*, Darci A. Giacomini, Patrick Tranel; University of Illinois, Urbana, IL (21)

†**Effects of Simulated Dew on Dicamba Volatility and Soybean Sensitivity.** Matthew Osterholt*¹, Julie M. Young², Bryan G. Young²; ¹Purdue University, West Lafayette, IN, ²Purdue University, Brookston, IN (22)

†**Assessment of North Carolina Farmer's Glufosinate Use and Applications.** Eric A. Jones*, Wesley Everman, Ramon G. Leon, Charlie W. Cahoon; North Carolina State University, Raleigh, NC (23)

†**Using Reduced Rates of Quizalofop to Control Weedy Rice.** David C. Walker*¹, Eric Webster¹, Ronald J. Levy Jr.², Benjamin M. McKnight¹, Samer Y. Rustom¹, Lucas C. Webster¹, William B. Greer¹; ¹Louisiana State University, Baton Rouge, LA, ²Louisiana State University, Rayne, LA (24)

†**Cover Crops as a Summer Annual Weed Management Tool in Dryland Corn Cropping Systems of Semi-Arid Nebraska.** Alexandre T. Rosa*¹, Cody F. Creech², Roger Elmore¹, Daran Rudnick¹, John Lindquist¹, Rodrigo Werle³; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, Scottsbluff, NE, ³University of Wisconsin-Madison, Madison, WI (25)

Cover Crops and Wheat Stubble Management Effects on Weed Demographics and Corn Productivity in Semi-Arid Nebraska. Alexandre T. Rosa*¹, Cody F. Creech², Roger Elmore¹, Daran Rudnick¹, John Lindquist¹, Chuck Burr³, Strahinja Stepanovic⁴, Rodrigo Werle⁵; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, Scottsbluff, NE, ³University of Nebraska-Lincoln, North Platte, NE, ⁴University of Nebraska-Lincoln, Grant, NE, ⁵University of Wisconsin-Madison, Madison, WI (26)

Benzobicyclon Utility for Weedy Rice Control. Mason C. Castner*, Jason K. Norsworthy, Chad Brabham, Fidel Gonzalez Torralva; University of Arkansas, Fayetteville, AR (27)

Control of Johnsongrass (*Sorghum halepense*) and Foxtails with Post-emergence Herbicides in Yellow and White Popcorn Hybrids. Samantha D. Isaacson*, Amit J. Jhala, John Lindquist; University of Nebraska-Lincoln, Lincoln, NE (28)

Weed Management and Crop Response Utilizing Isoxaflutole in HPPD Tolerant Cotton. Delaney C. Foster*¹, Peter A. Dotray², Corey Thompson³, Greg Baldwin⁴, Frederick Moore⁵; ¹Texas Tech University, Lubbock, TX, ²Texas Tech University and Texas A&M AgriLife Research and Extension Service, Lubbock, TX, ³BASF, Abernathy, TX, ⁴BASF, Research Triangle Park, NC, ⁵BASF, Lubbock, TX (29)

Effect of Winter Wheat Cover Crop Termination Time on Dry Bean Production. Charles T. Hicks*¹, Andrew R. Kniss², David A. Claypool²; ¹Bayer, Fort Collins, CO, ²University of Wyoming, Laramie, WY (30)

Sphere of Influence of Palmer Amaranth (*Amaranthus palmeri*) in Cotton (*Gossypium hirsutum*). Nicholas T. Basinger*¹, David Weisberger¹, Logan M. Dyer¹, Ramon G. Leon²; ¹University of Georgia, Athens, GA, ²North Carolina State University, Raleigh, NC (31)

Using Pesticides Wisely - Georgia 2019. A Stanley Culpepper*¹, Jenna C. Vance¹, Thomas Gray², Laura P. Johnson³, Eric P. Prostko¹; ¹University of Georgia, Tifton, GA, ²Georgia Department of Agriculture, Atlanta, GA, ³University of Georgia, Athens, GA (32)

Sugarcane (*Saccharum* spp. Hybrids) Yield Component Response to Divine Nightshade (*Solanum nigrescens*) Establishment and Removal Timing. Douglas J. Spaunhorst*; USDA-ARS, Houma, LA (33)

Control of Canada Fleabane in Winter Wheat with Postemergence Herbicides. Nader Soltani*, Peter H. Sikkema; University of Guelph, Ridgetown, ON, Canada (34)

Glyphosate in Organic Grain: Exploring Potential Sources of Contamination Through Seed Analysis. Lilianna M. Bento*¹, Barbara Keith¹, Bruce Maxwell¹, Jona Verreth², William Dyer¹; ¹Montana State University, Bozeman, MT, ²Montana Agriculture Experiment Station Analytical Laboratory, Bozeman, MT (35)

Effective Dicamba Exposure on Enlist Soybean. Julie Reeves*, Sandy Steckel, Clay M. Perkins, Larry Steckel; University of Tennessee, Jackson, TN (36)

Effect of Herbicides Applied at First Visible Female Inflorescence on Palmer Amaranth (*Amaranthus palmeri*) Fecundity and Seed Viability. Eric B. Scruggs*, Michael L. Flessner; Virginia Tech, Blacksburg, VA (37)

Soybean Response to Multiple Dicamba Exposure. Todd A. Baughman*¹, Robbie Peterson¹, Misha R. Manuchehri²; ¹Oklahoma State University, Ardmore, OK, ²Oklahoma State University, Stillwater, OK (38)

Volunteer Cotton Response to POST Herbicide Applications. Robbie Peterson*, Todd A. Baughman; Oklahoma State University, Ardmore, OK (39)

Expanding the Vision of Perennial Agriculture with IR-4 Registration in Kernza. Clair L. Keene*¹, Eugene P. Law², Jacob Jungers³, Don Wyse³, Valentin Picasso⁴, David E. Stoltenberg⁴; ¹North Dakota State University Extension, Williston, ND, ²Cornell University, Ithaca, NY, ³University of Minnesota, Saint Paul, MN, ⁴University of Wisconsin-Madison, Madison, WI (40)

Evaluation of PRE and POST Applications of Metribuzin on Weed Control Programs in Corn (*Zea mays*). Taghi Bararpour*, Ralph R. Hale, M. W. Ebelhar; Mississippi State University, Stoneville, MS (41)

Burndown Residual Herbicide Plus Halauxifen-methyl (Elevore) for Early Preplant Horseweed (*Conyza canadensis*) Control. Taghi Bararpour*¹, Ralph R. Hale¹, Larry C. Walton², Henry M. Edwards¹; ¹Mississippi State University, Stoneville, MS, ²Corteva, Tupelo, MS (42)

Does Late Season Weed Cover Reduce Corn Silage Yield and Alfalfa Establishment in Interseeded Corn/alfalfa Systems? Jose Luiz Carvalho de Souza Dias*, Mark J. Renz; University of Wisconsin-Madison, Madison, WI (43)

Field Bindweed (*Convolvulus arvensis*) Management in California Cotton. Kurt J. Hembree*; University of California Cooperative Extension, Fresno, CA (44)

Cereal Rye Termination Timing and Method Influence Glyphosate-Resistant Horseweed (*Erigeron Canadensis*) Suppression in Sugarbeet. Brian J. Stiles II*, Christy Sprague; Michigan State University, East Lansing, MI (45)

Roughstalk Bluegrass (*Poa trivialis*) Control in Winter Wheat. Gary Edward Powell*, Brian J. Stiles II, Christy Sprague; Michigan State University, East Lansing, MI (46)

Comparison of Herbicide Programs in Conventional, Glufosinate, and Glyphosate/Dicamba-Resistant Soybeans Across Nebraska. Adam Striegel*¹, Stevan Knezevic², Nevin Lawrence³, Gary Hein¹, Greg R. Kruger⁴, Chris Proctor¹, Kent Eskridge¹, Amit J. Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, Concord, NE, ³University of Nebraska-Lincoln, Scottsbluff, NE, ⁴University of Nebraska-Lincoln, North Platte, NE (47)

Herbicide Resistant Italian Ryegrass (*Lolium perenne* Ssp. *multiflorum*) Survey in Northern Idaho and Eastern Washington. Traci Rauch*, Joan M. Campbell; University of Idaho, Moscow, ID (48)

Glyphosate-Tolerant Soybean Yield Loss and Yield Response to Micro-Rates of 2,4-D as Influenced by Growth Stage. Ivan B. Cuvaca*¹, Stevan Knezevic², Jon Scott¹, Darko Jovanovic¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, Concord, NE (49)

Effect of Growth Stage on Glyphosate-Tolerant Soybean Sensitivity to Micro-rates of 2,4-D. Ivan B. Cuvaca*¹, Jon Scott¹, Darko Jovanovic¹, Stevan Knezevic²; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, Concord, NE (50)

Effects of Dicamba Ultra Micro-Rates on Soybean Yield - Hormesis or Not? Stevan Knezevic*; University of Nebraska-Lincoln, Concord, NE (51)

Growth and Sensitivity of Dicamba-Tolerant Soybean to Micro-Rates of 2,4-D. Stevan Knezevic*¹, Jon Scott², Darko Jovanovic², Ivan B. Cuvaca²; ¹University of Nebraska-Lincoln, Concord, NE, ²University of Nebraska-Lincoln, Lincoln, NE (52)

Weed Management Systems in Imidazolinone Tolerant Grain Sorghum in South Texas. Alvaro Garcia*¹, Joshua A. McGinty², Jamie Foster³, Greta Schuster¹, Alinna Umphres¹, Paul A. Baumann⁴; ¹Texas A&M University, Kingsville, TX, ²Texas A&M AgriLife Extension, Corpus Christi, TX, ³Texas A&M AgriLife Research, Corpus Christi, TX, ⁴Texas A&M AgriLife Extension, College Station, TX (53)

Herbicidal Activity of a New Pyridine Derivative M-862 on Broadleaf Weeds and Wheat. Nam-Gyu Cho*¹, Dae-Won Koo¹, Ki-Hwan Hwang¹, Suk-Jin Koo²; ¹Moghu Research Center, Ltd., Yuseong, Daejeon, South Korea, ²Moghu Research Center, Ltd., Daejeon, South Korea (54)

Rapid Spread of Glyphosate-resistant Kochia [*Bassia scoparia* (L.) A.J.Scott] in Manitoba. Charles M. Geddes*¹, Teandra Ostendorf¹, Robert Gulden², Tammy Jones³, Julia Leeson⁴, Scott Shirriff⁴, Shaun Sharpe⁴, Hugh J. Beckie⁵; ¹Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ²University of Manitoba, Winnipeg, Canada, ³Manitoba Agriculture, Carman, MB, Canada, ⁴Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, ⁵University of Western Australia, Crawley, Australia (55)

Characterization of Dicamba- and Fluroxypyr-resistant Kochia [*Bassia scoparia* (L.) A.J.Scott] in Alberta. Charles M. Geddes*¹, Mallory Owen¹, Elise Martin², Linda Hall², Scott Shirriff³, Julia Leeson³, Hugh J. Beckie⁴; ¹Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ²University of Alberta, Edmonton, AB, Canada, ³Agriculture and Agri-Food Canada, Saskatoon, SK, Canada, ⁴University of Western Australia, Crawley, Australia (56)

A Survey of Florida Panhandle Row Crop Producers on Weeds Problem and Management Practices. Pratap Devkota*¹, Ethan T. Carter², Rhoda T. Broughton³; ¹University of Florida, Jay, FL, ²University of Florida, Marianna, FL, ³University of Florida, Live Oak, FL (57)

Guayule (*Parthenium argentatum*) Seedling Response to Carfentrazone-ethyl. Bryan C. Pastor*¹, Guangyao Sam Wang², William B. McCloskey¹; ¹University of Arizona, Tucson, AZ, ²Bridgestone Americas, Inc, Eloy, AZ (58)

Response of Common Louisiana Aquatic Weeds to Rice Herbicides. Benjamin M. McKnight*, Eric Webster, Samer Y. Rustom, Connor Webster, Bradley Greer, David C. Walker; Louisiana State University, Baton Rouge, LA (59)

Inzen™ Sorghum Weed Control Programs with Zest™ WDG Herbicide. David Saunders*¹, Joe Armstrong², Michael Lovelace³, Jeffrey Krumm⁴; ¹Corteva Agriscience, Dallas Center, IA, ²Corteva Agriscience, Indianapolis, IN, ³Corteva Agriscience, Lubbock, TX, ⁴Corteva Agriscience, Hastings, NE (60)

Resicore® for PRE and POST Weed Control in Corn. David Saunders*¹, Joe Armstrong², Kevin Johnson³; ¹Corteva Agriscience, Dallas Center, IA, ²Corteva Agriscience, Indianapolis, IN, ³Corteva Agriscience, Lafayette, IN (61)

Desert Cotton Responses to Low Doses of 2,4-D or Dicamba. William B. McCloskey*¹, Randy Norton², Bryan C. Pastor¹; ¹University of Arizona, Tucson, AZ, ²University of Arizona, Safford, AZ (62)

Field-scale Assessment of Dicamba Off-target Movement from Soybeans in Missouri. Reid Smeda*; University of Missouri, Columbia, MO (63)

Impact of Cereal Rye Cover Crop Termination Timing on the Fate of Soil-applied Residual Herbicides in Wisconsin Corn-soybean Production Systems. Nicholas J. Arneson*, Kolby R. Grint, Nikola Arsenijevic, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI (64)

Comparison of Layered Herbicide Residual Programs for Waterhemp Control in Wisconsin Soybean Production. Nicholas J. Arneson*, Ryan P. DeWerff, Daniel H. Smith, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI (65)

Potential for Gibberellic Acid as a Weed Seedbank Management Tool in Eastern Washington Dryland Systems. Rachel J. Zuger*, Amber L. Hauvermale, Ian Burke; Washington State University, Pullman, WA (66)

Impact of Cover Crop Mixtures and Climate Conditions on Weed Communities. Mary E. DuPre¹, Maryse Bourgault², Darin Boss², Chris Larson¹, Fabian D. Menalled¹, Tim Seipel*¹; ¹Montana State University, Bozeman, MT, ²Montana State University -Northern Ag Research Center, Havre, MT (67)

Potential Yield Loss from Uncontrolled Weeds in Rice in North America. Sandeep S. Rana*¹, Wesley Everman², Anita Dille³, Peter H. Sikkema⁴, Michael L. Flessner⁵, Ian Burke⁶, Mark VanGessel⁷; ¹Bayer Crop Science, Galena, MD, ²North Carolina State University, Raleigh, NC, ³Kansas State University, Manhattan, KS, ⁴University of Guelph, Ridgetown, ON, Canada, ⁵Virginia Tech, Blacksburg, VA, ⁶Washington State University, Pullman, WA, ⁷University of Delaware, Georgetown, DE (68)

Potential Yield Loss from Uncontrolled Weeds in Cotton in North America. Sandeep S. Rana*¹, Wesley Everman², Anita Dille³, Peter H. Sikkema⁴, Michael L. Flessner⁵, Ian Burke⁶, Mark VanGessel⁷; ¹Bayer Crop Science, Galena, MD, ²North Carolina State University, Raleigh, NC, ³Kansas State University, Manhattan, KS, ⁴University of Guelph, Ridgetown, ON, Canada, ⁵Virginia Tech, Blacksburg, VA, ⁶Washington State University, Pullman, WA, ⁷University of Delaware, Georgetown, DE (69)

Evaluation of Weed Control Programs in Furrow Irrigated Rice (*Oryza sativa*). Leah M. Collie*¹, Tom Barber², Thomas R. Butts², Ryan C. Doherty³, Zachary T. Hill⁴, Aaron Ross⁵; ¹University of Arkansas System Division of Agriculture, Beebe, AR, ²University of Arkansas System Division of Agriculture, Lonoke, AR, ³University of Arkansas Division of Agriculture Research & Extension, Monticello, AR, ⁴University of Arkansas Cooperative Extension Service, Monticello, AR, ⁵University of Arkansas, Lonoke, AR (70)

Cotton and Soybean Response to Selected Drift Rates of Imazapyr and Metsulfuron. Michael W. Marshall*; Clemson University Edisto Research & Education Center, Blackville, SC (71)

Large-Scale Evaluation of 2,4-D Off-Target Movement in Wisconsin Soybeans. Rodrigo Werle*, Nicholas J. Arneson, Maxwell Coura Oliveira, Ryan P. DeWerff; University of Wisconsin-Madison, Madison, WI (72)

Aerial Imagery as a Potential Tool to Evaluate Dicamba Off-Target Movement in Soybeans. Rodrigo Werle*¹, Randy Pearson², Josh Pristolas², Maxwell Coura Oliveira¹, Ryan Rector³; ¹University of Wisconsin-Madison, Madison, WI, ²Southern Illinois University Edwardsville, Edwardsville, IL, ³Bayer Crop Science, St Louis, MO (73)

Weedy Rice (*Oryza sativa* f. *spontaneae*) Emergence and Growth Under Variable Irrigation Practices. Whitney Brim-DeForest*¹, Luis Espino²; ¹University of California Division of Agriculture and Natural Resources, Yuba City, CA, ²University of California Division of Agriculture and Natural Resources, Oroville, CA (74)

Evaluation of Benzobicyclon and ALS-inhibiting Herbicide Combinations for Control of Northern Jointvetch (*Aeschynomene virginica*) and Hemp Sesbania (*Sesbania herbacea*) in Drill Seeded Rice (*Oryza sativa*). Nathan Pearrow*¹, Craigs Sandoski², Brad M. Davis³, Thomas R. Butts³; ¹University of Arkansas, Newport, AR, ²Gowan, Collierville, TN, ³University of Arkansas System Division of Agriculture, Lonoke, AR (75)

A Multi-State Screen of Field Populations of Horseweed (*Conyza canadensis*) to Applications of Dicamba and Glufosinate. Nicholas R. Steppig*¹, Julie M. Young², Kevin W. Bradley³, Jason K. Norsworthy⁴, Karla L. Gage⁵, Aaron Hager⁶, Greg R. Kruger⁷, Mark Loux⁸, Larry Steckel⁹, Bryan G. Young²; ¹Purdue University, Lafayette, IN, ²Purdue University, Brookston, IN, ³University of Missouri, Columbia, MO, ⁴University of Arkansas, Fayetteville, AR, ⁵Southern Illinois University Carbondale, Carbondale, IL, ⁶University of Illinois, Urbana, IL, ⁷University of Nebraska-Lincoln, North Platte, NE, ⁸Ohio State University, Columbus, OH, ⁹University of Tennessee, Jackson, TN (76)

How to Avoid Glyphosate Injury in Glyphosate-Resistant Alfalfa. Earl Creech*¹, Chet Loveland¹, Matt Yost¹, Corey V. Ransom¹, Dan Putnam²; ¹Utah State University, Logan, UT, ²University of California, Davis, Davis, CA (77)

Control of Palmer Amaranth (*Amaranthus palmeri*) with Glufosinate and S-metolachlor in Cotton Production Systems. William J. Rutland*¹, Darrin M. Dodds², Jacob P. McNeal², John J. Williams², Bradley J. Norris², Steven D. Hall¹; ¹Mississippi State University, Starkville, MS, ²Mississippi State University, Mississippi State, MS (78)

The Effect of Multiple Exposure of Auxin Herbicide on Soybeans. Beau J. Varner*¹, Kevin W. Bradley², Aaron Hager³, Karla L. Gage⁴, Daniel B. Reynolds¹, Jason K. Norsworthy⁵, Larry Steckel⁶, Bryan G. Young⁷; ¹Mississippi State University, Mississippi State, MS, ²University of Missouri, Columbia, MO, ³University of Illinois, Urbana, IL, ⁴Southern Illinois University Carbondale, Carbondale, IL, ⁵University of Arkansas, Fayetteville, AR, ⁶University of Tennessee, Jackson, TN, ⁷Purdue University, Brookston, IN (79)

Low Tunnel Evaluation of Dicamba Premixes. Graham Oakley*¹, A Stanley Culpepper², Daniel B. Reynolds¹, Reid Smeda³, Christy Sprague⁴, Rodrigo Werle⁵; ¹Mississippi State University, Mississippi State, MS, ²University of Georgia, Tifton, GA, ³University of Missouri, Columbia, MO, ⁴Michigan State University, East Lansing, MI, ⁵University of Wisconsin-Madison, Madison, WI (80)

Impact of Dicamba+Various Postemergence Herbicide Tank-Mixes on Palmer Amaranth (*Amaranthus palmeri*) Control and Cotton Injury. Bradley J. Norris*¹, Darrin M. Dodds¹, Jacob P. McNeal¹, John J. Williams¹, Steven D. Hall², William J. Rutland²; ¹Mississippi State University, Mississippi State, MS, ²Mississippi State University, Starkville, MS (81)

Evaluation of *Echinochloa crus-galli* Sensitivity to Florpyrauxifen-benzyl. Grant L. Priess*, Chad Brabham, Jason K. Norsworthy; University of Arkansas, Fayetteville, AR (82)

Determining Duration of Residual Control of Soil-applied Herbicides in Cotton. Justin S. Calhoun*¹, J Connor Ferguson², Kayla L. Broster², Zachary R. Treadway², Luke H. Merritt², Michael T. Wesley Jr.²; ¹Mississippi State University, Starkville, MS, ²Mississippi State University, Mississippi State, MS (83)

Palmer Amaranth (*Amaranthus palmeri*) and Tarnished Plant Bug (*Lygus lineolaris*) Control with Various Dicamba + Insecticide Tank-Mixes in Cotton. Angus L. Catchot*¹, Darrin M. Dodds², Jacob P. McNeal², John J. Williams², Bradley J. Norris², Steven D. Hall¹, William J. Rutland¹; ¹Mississippi State University, Starkville, MS, ²Mississippi State University, Mississippi State, MS (84)

Effect of Late-Season Applied Herbicide Tank-Mixtures on Control and Seed Production of Palmer Amaranth in Postharvest Wheat Stubble. Rui Liu*, Vipin Kumar, Natalie Aquilina, Taylor Lambert; Kansas State University, Hays, KS (85)

Weed Species Identification Using Multispectral Imagery. Wesley Everman*, John Sanders; North Carolina State University, Raleigh, NC (86)

Implications of Multi-Tactic Weed Management Strategies to Deplete Glyphosate-Resistant Tall Waterhemp Seed Bank in Corn-Soybean Rotations in the Midwest. Ramawatar Yadav*, Prashant Jha, Damian D. Franzenburg, James M. Lee, Iththiphonh A. Macvilay; Iowa State University, Ames, IA (87)

History and Current Status of Herbicide-Resistant Waterhemp [*Amaranthus tuberculatus* (Moq.) J. D. Sauer] in Iowa Corn and Soybean Fields. Prashant Jha*, Ryan C. Hamberg, Iththiphonh A. Macvilay, James M. Lee, Ramawatar Yadav, Avery J. Bennett, Edward S. Dearden, Damian D. Franzenburg; Iowa State University, Ames, IA (88)

Benefit of Dicamba in Early Postemergence Herbicide Tank-mixtures. Brent S. Heaton*, Mark L. Bernards; Western Illinois University, Macomb, IL (89)

**TUESDAY and WEDNESDAY
MORNINGS, MARCH 3 & 4**

POSTER - 02. Horticultural Crops

LOCATION: Maui Suite #1-4
TIME: 07:00 AM - 09:00 AM
MODERATOR: Thomas C. Mueller
University of Tennessee
Knoxville, TN

***PRESENTER † STUDENT CONTEST - MS**

†Seed Treatments for Safening Herbicides in Vegetables. Matthew A. Cutulle¹, Giovanni A. Caputo*²; ¹Clemson University, Charleston, SC, ²Clemson University, Clemson, SC (90)

†Evaluation of Growing Degree Day Based Chemigation Treatments for Management of Branched Broomrape in California Processing Tomato Systems. Matthew J. Fatino*¹, Mohsen B. Mesgaran¹, Brad Hanson²; ¹University of California, Davis, Davis, CA, ²University of California, Davis, Winters, CA (91)

***PRESENTER † STUDENT CONTEST – PhD**

†Effect of Repeated Mechanical Tuber Removal During the Fallow Period on Nutsedge (*Cyperus spp.*) Management in Bell Pepper. Ranjeet S. Randhawa*, Peter J. Dittmar; University of Florida, Gainesville, FL (92)

Preliminary Preemergence Herbicide Tolerance Screen for Transplanted Industrial Hemp. Michael L. Flessner*, Kevin W. Bamber, John H. Fike; Virginia Tech, Blacksburg, VA (93)

Reduced Rates of 2,4-D and Dicamba on Sweetpotato Propagation Beds. Thomas Batts*¹, Stephen C. Smith², Levi D. Moore², Kira C. Sims³, Matthew Waldschmidt², Sushila Chaudhari², Katherine M. Jennings²; ¹NC Cooperative Extension, Wilson, NC, ²North Carolina State University, Raleigh, NC, ³North Carolina State University, Goldsboro, NC (94)

Protecting Specialty Crops from Pests – How the Western Region IR-4 Project Helps Meet Farmer Pest Control Needs.

Michael J. Horak*¹, Stephen Flanagan², Mika Tolson¹; ¹Western Region IR-4 Project, University of California, Davis, Davis, CA, ²Western Region IR-4 Project, University of California, Davis, Eugene, OR (95)

Suppression of Hazelnut (*Corylus avellana*) Suckers with 1-Naphthylacetic Acid.

Arnaldo Marques Caldera da Silva¹, David R. King*², Richard K. Zollinger³, Marcelo L. Moretti²; ¹University of São Paulo, Piracicaba, Brazil, ²Oregon State University, Corvallis, OR, ³Ambac Chemical Company, Spokane, WA (96)

Evaluation of Herbicide Programs in Dormant Stevia (*Stevia rebaudiana*) in North Carolina.

Robert M. Welker*¹, Roger B. Batts²; ¹North Carolina State University, Raleigh, NC, ²NCSU IR-4 Field Research Center, Fremont, NC (97)

Crabgrass Control with Tembotrione, Topramezone, and Tolpyralate in Sweet Corn.

Ed Peachey*; Oregon State University, Corvallis, OR (98)

Yield Loss Estimates for Vegetables in the USA and Canada.

Mark VanGessel*¹, Nicholas T. Basinger², Ian Burke³, Anita Dille⁴, Wesley Everman⁵, Michael L. Flessner⁶, Zahoor A. Ganie⁷, Sandeep S. Rana⁸, Scott Senseman⁹, Peter H. Sikkema¹⁰, Nader Soltani¹⁰; ¹University of Delaware, Georgetown, DE, ²University of Georgia, Athens, GA, ³Washington State University, Pullman, WA, ⁴Kansas State University, Manhattan, KS, ⁵North Carolina State University, Raleigh, NC, ⁶Virginia Tech, Blacksburg, VA, ⁷FMC, Newark, DE, ⁸Bayer Crop Science, Galena, MD, ⁹The University of Tennessee, Knoxville, TN, ¹⁰University of Guelph, Ridgetown, ON, Canada (99)

IR-4 Project Update and Program Changes.

Daniel Kunkel*¹, Roger B. Batts², Jerry Baron³, Michael J. Braverman⁴; ¹IR-4 Project, Rutgers University, Princeton, NJ, ²NCSU IR-4 Field Research Center, Fremont, NC, ³Affiliation Not Specified, Hillsborough, NJ, ⁴Rutgers University, Princeton, NJ (100)

Influence of Hemp Variety and Weed Free Period on Yield in Coastal South Carolina.

Harrison T. Campbell*, Matthew A. Cutulle; Clemson University, Charleston, SC (101)

Can a Sunn Hemp (*Crotalaria juncea*) Living Mulch Reduce Herbicide Usage in Sweet Corn?

Robert E. Nurse*¹, Jichul Bae², Kerry Bosveld¹, Marie-Josée Simard³; ¹Agriculture and Agri-Food Canada, Harrow, ON, Canada, ²Agriculture and Agri-Food Canada, Agassiz, BC, Canada, ³Agriculture and Agri-Food Canada, Saint-jean-sur-richelieu, Canada (102)

Update on Herbicide Resistance Genetic Testing. Kristen A. Obeid¹, Marie-Josée Simard², Martin Laforest³, Robert E. Nurse*¹, Eric R. Page¹, David Miville⁴; ¹Agriculture and Agri-Food Canada, Harrow, ON, Canada, ²Agriculture and Agri-Food Canada, Saint-jean-sur-richelieu, Canada, ³AAC-AAFC, St-jean-sur-richelieu, QC, Canada, ⁴MAPAQ, Quebec City, QC, Canada (103)

Grape Response to Simulated Drift of Auxin Herbicides. Steven C. Haring*¹, Junjun Ou², Kassim Al-Khatib¹, Brad Hanson³; ¹University of California, Davis, CA, ²Corteva Agriscience, Indianapolis, IN, ³University of California, Davis, Winters, CA (104)

On-Farm Evaluation of POST-Directed Flumioxazin in New Mexico Chile Pepper. Brian J. Schutte*; New Mexico State University, Las Cruces, NM (105)

Have Greenhouse - Will Conduct Bioassays: A Grower Asked and We Rode to the Rescue. Pamela J.s. Hutchinson*, Celestina S. Miera, Brenda C. Kendall, Tenika Trevino, Brent R. Beutler; University of Idaho, Aberdeen, ID (106)

***TUESDAY and WEDNESDAY
MORNINGS, MARCH 3 & 4***

POSTER - 03. Turf and Ornamentals

LOCATION: Maui Suite #1-4
TIME: 07:00 AM - 09:00 AM
MODERATOR: Thomas C. Mueller
University of Tennessee
Knoxville, TN

***PRESENTER † STUDENT CONTEST - MS**

†Goosegrass (*Elusine indica*) Resistance to Mitotic Inhibiting Herbicides in Cool-Season Turfgrass. Katherine H. Diehl*¹, Matthew T. Elmore¹, James Brosnan², Sarah Boggess², Robert N. Trigiano²; ¹Rutgers University, New Brunswick, NJ, ²University of Tennessee, Knoxville, TN (107)

†Growth Response of Southern Landscape Ornamentals to Low Rates of 2,4-D, Dicamba, and Glyphosate Particle Drift. Ryan D. Langemeier*, Steve Li, Katilyn J. Price, Frances B. Browne; Auburn University, Auburn, AL (108)

***PRESENTER † STUDENT CONTEST – PhD**

†Shade Intensity and Duration Influences Turfgrass Herbicide Sensitivity. Cameron Stephens*, Daniel Freund, James Kerns, Travis Gannon; North Carolina State University, Raleigh, NC (109)

†Multi-State Research Evaluating Seedling Emergence and Herbicide Resistance Epidemic in Annual Bluegrass (*Poa annua* L.) in Managed Turfgrass Systems. Andrew W. Osburn*, Muthukumar V. Bagavathiannan, Becky Grubbs; Texas A&M University, College Station, TX (110)

How Can Weed Steamers Fit into a Landscape Weed Management Program? Cheryl Wilen¹, Guy G. Hernanadez*²; ¹University of California Division of Agriculture and Natural Resources, San Diego, CA, ²University of California Division of Agriculture and Natural Resources, Lake Forest, CA (111)

Using Drone-collected Imagery to Map Invasive Pampasgrass (*Cortaderia selloana*) Across a Golf Course. Maggie Reiter*; University of California Cooperative Extension, Fresno, CA (112)

Efficacy of Organic Herbicides and Other Alternatives to Glyphosate in Urban Landscapes. Maggie Reiter*¹, Karey Windbiel-Rojas², John A. Roncoroni³; ¹University of California Cooperative Extension, Fresno, CA, ²University of California Statewide IPM Program, Davis, CA, ³University of California Division of Agriculture and Natural Resources, Napa, CA (113)

A Survey of Herbicide Resistance Issues in Nursery Crops, Christmas Trees and Landscape Plantings. Joseph C. Neal*¹, Jeffrey Derr²; ¹North Carolina State University, Raleigh, NC, ²Virginia Tech, Virginia Beach, VA (114)

Weed Control in Container-grown Tree Seedlings Using Mulches and Pre-emerge Herbicides. Anthony L. Witcher*; Tennessee State University, Mcminnville, TN (115)

Herbicide Longevity in Nursery Container Substrates. James Altland*; USDA-ARS, Wooster, OH (116)

The Safety of Conifers to Select Pyridine Herbicides. Mark A. Czarnota*; University of Georgia, Williamson, GA (117)

Post-Emergence Goosegrass (*Eleusine indica*) Control with SpeedZone and SpeedZone + Topramezone Mixtures. Daniel P. Tuck*, Matthew T. Elmore; Rutgers University, New Brunswick, NJ (118)

Zoysiagrass Response to Nonselective Herbicides is More Dependent on Heat Units Than Geography. Whitnee Askew*, Jordan M. Craft, Mike Goatley, Shawn Askew; Virginia Tech, Blacksburg, VA (119)

Effect of Submersion Time on Germination of Four Weed Species. Alisha Shiffer*¹, Anthony V. LeBude², Joe C. Neal¹, James Altland³; ¹North Carolina State University, Raleigh, NC, ²North Carolina State University, Mills River, NC, ³USDA-ARS, Wooster, OH (120)

**TUESDAY and WEDNESDAY
MORNINGS, MARCH 3 & 4**

POSTER - 04. Pasture, Range, Forest, Rights of ways, Wildland, and Aquatic Invasive Plants

LOCATION: Maui Suite #1-4
TIME: 07:00 AM - 09:00 AM
MODERATOR: Thomas C. Mueller
University of Tennessee
Knoxville, TN

***PRESENTER † STUDENT CONTEST - MS**

†**Addressing Challenges of African Mustard (*Brassica tournefortii*) Management in Utah.** Natalie L. Fronk*¹, Corey V. Ransom¹, Benjamin Scow², Chad Reid³; ¹Utah State University, Logan, UT, ²Utah State University Extension, Hurricane, UT, ³Utah State University Extension, Cedar City, UT (121)

†**Using Unmanned Aerial Systems for Estimating Biomass of Smutgrass (*Sporobolus indicus*) and Management Interventions.** Zachary S. Howard*¹, Bishwa B. Sapkota¹, Chenghai Yang², Scott A. Nolte³; ¹Texas A&M University, College Station, TX, ²USDA-ARS, College Station, TX, ³Texas A&M AgriLife Extension, College Station, TX (122)

†**Ventenata (*Ventenata dubia*) Control and Plant Community Response to Herbicide Treatments.** Hailey L. Buell*, Corey V. Ransom, Steve Young; Utah State University, Logan, UT (123)

†**Tolerance of Native Perennial Grasses to Esplanade on Conservation Reserve Program Land.** Jared A. Beuschlein*¹, Rachel J. Zuger¹, Harold Quicke², Ian Burke¹; ¹Washington State University, Pullman, WA, ²Bayer, Windsor, CO (124)

†**Evaluating Historical Treatments to Clarify Optimal Herbicide Treatment Sequences for Invasive Old World Climbing Fern (*Lygodium microphyllum*) on Tree Islands of the Florida Everglades.** Jonathan Glueckert*¹, Stephen F. Enloe²; ¹University of Florida, Boynton Beach, FL, ²University of Florida, Gainesville, FL (125)

***PRESENTER † STUDENT CONTEST - PhD**

†***Phragmites australis* In Colorado: Haplotype Distribution and Molecular Tools for Management Decisions.** Neeta Soni*¹, Eric L. Patterson², Luke Tembrock¹, Todd A. Gaines¹; ¹Colorado State University, Fort Collins, CO, ²Michigan State University, East Lansing, MI (126)

Woody Debris Piles Facilitate Increased Douglas-fir Survival at a Scotch Broom (*Cytisus scoparius*) Infested Site. James Dollins*, Timothy B. Harrington; USDA FOREST SERVICE - PNW RESEARCH STATION, Olympia, WA (127)

Johnsongrass Management on Roadsides: Control, Suppression, or Selectivity? Joe Omielan*; University of Kentucky, Lexington, KY (128)

Response of Seeded Species to Three Common Herbicides Used for Downy Brome (*Bromus tectorum*) Control. Melissa L. Landeen¹, Kevin Gunnell², Steve Young*³; ¹Utah Division of Wildlife Resources, Ephraim, UT, ²Utah Division of Wildlife Resources, Fountain Green, UT, ³Utah State University, Logan, UT (129)

Pollinator Habitat Diversity and Quantity Increases with Long-Term Cheatgrass (*Bromus tectorum*) Control. James Sebastian*¹, Steve Sauer¹, Shannon Clark², Derek J. Sebastian³; ¹Boulder County Open Space, Longmont, CO, ²Colorado State University, Fort Collins, CO, ³Bayer, Greeley, CO (130)

Integrated Management of Some Forest Invasive Weeds in B.c. Forestry, Victoria, Canada. Raj Nil Prasad*; Emeritus scientist / prof, Victoria, BC, Canada (131)

Genetic Study and Chemical Control of Vaseygrass. Renata Thaysa da Silva Santos*¹, Esteban Fernando Rios², Pedro Luis da Costa Aguiar Alves¹; ¹São Paulo State University, Jaboticabal, Brazil, ²University of Florida, Gainesville, FL (132)

Dose-response Curves and Herbicides Efficacy of Post-emergence Applications in *Paspalum virgatum*. Renata Thaysa da Silva Santos*, Aline Brufato, Pedro Luis da Costa Aguiar Alves; São Paulo State University, Jaboticabal, Brazil (133)

Management Considerations for Milkweed (*Asclepias viridis*) Habitat in the Southeast. David Russell*¹, John D. Byrd, Jr.², Nolan H. Thorne³, Maria Leticia M. Zaccaro⁴, Hayden Quick²; ¹Auburn University, Madison, AL, ²Mississippi State University, Mississippi State, MS, ³Mississippi State University, Mississippi State University, MS, ⁴University of Arkansas, Fayetteville, AR (134)

Long-term Effects of Restoration Treatments in a Wyoming Big Sagebrush Community Invaded by Annual Exotic Grasses. Becky K. Kerns*¹, Dana Ikeda¹, Michelle A. Day²; ¹US Forest Service - PNW Research Station, Corvallis, OR, ²US Forest Service - Rocky Mountain Research Station, Corvallis, OR (135)

Integrating Common Control Methods for Wild Parsnip (*Pastinaca sativa*) Near Roads with Imazapic + Metsulfuron for Grass Height Suppression. Leo Roth*, Mark J. Renz; University of Wisconsin-Madison, Madison, WI (136)

The Effect of Common and Novel Pasture Herbicides on Forage Grass Establishment. Wykle C. Greene*, Michael L. Flessner; Virginia Tech, Blacksburg, VA (137)

Cutleaf Vipergrass (*Scorzonera laciniata*) Discovery and Management in Utah. Cody J. Beckley*¹, Jody A. Gale², Corey V. Ransom¹, Mark Nelson³; ¹Utah State University, Logan, UT, ²Utah State University Extension, Richfield, UT, ³Utah State University Extension, Beaver, UT (138)

***TUESDAY and WEDNESDAY
MORNINGS, MARCH 3 & 4***

**POSTER - 07. Teaching and Extension/ Teaching
and Technology Transfer**

LOCATION: Maui Suite #1-4
TIME: 07:00 AM - 09:00 AM
MODERATOR: Thomas C. Mueller
University of Tennessee
Knoxville, TN

***PRESENTER † STUDENT CONTEST - MS**

†Can Trunk Paint Mitigate Herbicide Damage in Young Almond Trees? Drew A. Wolter*¹, Danielle M. Lightle², Brad Hanson³; ¹University of California, Davis, Sacramento, CA, ²University of California Cooperative Extension, Oroville, CA, ³University of California, Davis, Winters, CA (139)

Identifying Herbicide Injury in Potato. Andrew P. Robinson*; North Dakota State University / University of Minnesota, Fargo, ND (141)

Useful Wild Plants of Texas....A Resource for Weed Scientists That Need to Know More Than How to Kill Plants. John D. Byrd, Jr.*; Mississippi State University, Mississippi State, MS (142)

Update to the Herbicide Resistance Action Committee Classification on Mode of Action. Rex A. Liebl*¹, Jeffrey Epp², Bernd Laber³, Hubert Menne³, James Morris⁴, Matthias Witschel⁵; ¹BASF Corp, Raleigh, NC, ²Corteva Agriscience, Indianapolis, IN, ³Bayer AG Crop Science, Frankfurt, Germany, ⁴Syngenta, Bracknell, United Kingdom, ⁵BASF SE, Ludwigshafen, Germany (143)

University of Tennessee Dicamba Stewardship Education Efforts. Larry Steckel, Ginger Rowsey*; University of Tennessee, Jackson, TN (144)

Montana Noxious Weed Survey: Has 25 Years of Education Been Effective? Shantell A. Frame-Martin*¹, Jane Mangold², Eric Raile²; ¹Montana Noxious Weed Education Campaign, Bozeman, MT, ²Montana State University, Bozeman, MT (145)

Undergraduate Students Self-Assess Learning Gains. Karen A. Renner*; Michigan State University, East Lansing, MI (146)

Efforts in Weed Management Outreach for Urban & Community Audiences in California. Karey Windbiel-Rojas*¹, Maggie Reiter², John A. Roncoroni³; ¹University of California Statewide IPM Program, Davis, CA, ²University of California Cooperative Extension, Fresno, CA, ³University of California Division of Agriculture and Natural Resources, Napa, CA (147)

The Weedy and Invasive Plant Species Community of the American Society of Agronomy: Activities and Opportunities. Anil Shrestha*¹, Sharon Clay²; ¹California State University, Fresno, Fresno, CA, ²South Dakota State University, Brookings, SD (148)

Unseen Flowers: Weed Macrophotography Update. Robert F. Norris*; University of California, Davis, Davis, CA (149)

**National Pesticide Safety Education Center (NPSEC):
Supporting Territory Pesticide Safety Education Programs
(PSEPs).** Kerry Richards*¹, Carroll Moseley²; ¹National
Pesticide Safety Education Center, Port Matilda, PA, ²Syngenta,
High Point, NC (150)

***TUESDAY and WEDNESDAY
MORNINGS, MARCH 3 & 4***

**POSTER - 08. Formulation, Adjuvant, &
Application Technology**

LOCATION: Maui Suite #1-4
TIME: 07:00 AM - 09:00 PM
MODERATOR: Thomas C. Mueller
University of Tennessee
Knoxville, TN

***PRESENTER † STUDENT CONTEST - MS**

**†Efficacy and Economic Analysis of Light Activated Weed
Seeking Spray Technology in Eastern Washington Fallow
Systems.** Lydia S. Fields*¹, Rachel J. Zuger¹, Derek Appel², Ian
Burke¹; ¹Washington State University, Pullman, WA,
²Washington State University, Davenport, WA (151)

**†Evaluating Spray Nozzles at Lower Heights and Pressures
for Circular Application.** Haosheng Lin*¹, Joseph Neal², Gary
Roberson², Sierra Young², Ramon G. Leon²; ¹North Carolina
State University, Cary, NC, ²North Carolina State University,
Raleigh, NC (152)

***PRESENTER † STUDENT CONTEST - PhD**

**†Soybean Response to Dicamba Tank Contamination,
Particle Drift, and Vapor.** Frances B. Browne*¹, Steve Li¹,
Katilyn J. Price¹, Ryan D. Langemeier¹, Greg R. Kruger²;
¹Auburn University, Auburn, AL, ²University of Nebraska-
Lincoln, North Platte, NE (153)

**A Novel Fluorescent Compound to Measure Herbicide
Physical Drift.** Vijay Nandula*; USDA-ARS, Stoneville, MS
(154)

**Enlist™ Herbicides with Colex-D Technology for On-Target
Applications.** David M. Simpson*; Corteva, Indianapolis, IN
(155)

Introducing Four New Adjuvants from AgraSyst for Herbicide Use. Jim T. Daniel*¹, Scott Parrish²; ¹Daniel Ag Consulting, Keenesburg, CO, ²AGRASYST, Spokane, WA (156)

Herbicide Influence on Bradyrhizobia Growth. Joy Amajioyi*; South Dakota State University, Brookings, SD (157)

Impact of Carrier Volume Rate on Efficacy of PRE-Emergence Herbicides in Wisconsin Cropping Systems. Ryan P. DeWerff*, Maxwell Coura Oliveira, Sarah V. Striegel, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI (158)

The Utility of a Planter Mounted Pulse Width Modulation Spray System. Ryan P. DeWerff*, Nicholas J. Arneson, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI (159)

***TUESDAY and WEDNESDAY
MORNINGS, MARCH 3 & 4***

POSTER - 09. Weed Biology and Ecology

LOCATION: Maui Suite #1-4
TIME: 07:00 AM - 09:00 AM
MODERATOR: Thomas C. Mueller
University of Tennessee
Knoxville, TN

***PRESENTER † STUDENT CONTEST - MS**

†Germination Response of Downy Brome, Wild Oat, and Italian Ryegrass to Gibberellic Acid in Palouse Silt Loam. Madisyn R. Beaudoin*, Rachel J. Zuger, Ian Burke; Washington State University, Pullman, WA (160)

†Effects of Tillage and Pesticides on Weed Seedling Emergence Over a Growing Season. Samuel A. Palmer*¹, Benjamin Fehr², Richard G. Smith²; ¹University of New Hampshire, Epsom, NH, ²University of New Hampshire, Durham, NH (161)

†**Using Biology to Better Inform Marestalk (*Conyza canadensis*) Management.** Ryan Collins*¹, Erin Haramoto¹, Karla L. Gage², Brent Sunderlage², Anita Dille³, Reid Smeda⁴; ¹University of Kentucky, Lexington, KY, ²Southern Illinois University Carbondale, Carbondale, IL, ³Kansas State University, Manhattan, KS, ⁴University of Missouri, Columbia, MO (162)

†**Evaluating Evapotranspiration and Growth of Palmer Amaranth (*Amaranthus palmeri*) in a Corn/Soybean and Non-crop Situation Under Subsurface Drip and Center-pivot Irrigation Systems.** Jasmine M. Mausbach*¹, Suat Irmak¹, John Lindquist¹, Debalin Sarangi², Amit J. Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Wyoming, Powell, WY (163)

†**Genetics of Dioecy in *Amaranthus tuberculatus* and *A. palmeri*: an Update.** Jacob S. Montgomery*, Darci A. Giacomini, Patrick Tranel; University of Illinois, Urbana, IL (164)

***PRESENTER † STUDENT CONTEST - PhD**

†**Confirmation of Glyphosate Resistance in a Johnsongrass (*Sorghum halepense*) Biotype from Missouri.** Sarah E. Dixon*, Reid Smeda; University of Missouri, Columbia, MO (165)

†**Germination Patterns of California Weedy Rice (*Oryza sativa* f. *spontaneae* Rosh.) at Various Temperature and Water Potential Combinations Under Controlled Conditions.** Liberty B. Galvin*, Mohsen B. Mesgaran, Kassim Al-Khatib; University of California, Davis, Davis, CA (166)

†**Determining the Origin of Glyphosate Resistant *Amaranthus palmeri* (Palmer Amaranth) in South America by Comparison of Extrachromosomal Circular DNA (eccDNA) EPSPS Replicon.** Crystal D. Sparks*¹, Todd A. Gaines¹, Paul Neve², Anita Kuepper³, Gancho Slavov², Martin Vila-Aiub⁴, Alejandro Garcia⁵, Aldo Merotto⁶; ¹Colorado State University, Fort Collins, CO, ²Rothamsted Research, Harpenden, United Kingdom, ³Bayer Cropscience, Frankfurt, Germany, ⁴University of Buenos Aires, Buenos Aires, Argentina, ⁵INIA Uruguay, Montevideo, Uruguay, ⁶University of Rio Grande do Sul, Porto Alegre, Brazil (167)

†**Population Structure of Russian-thistle (*Salsola tragus* L.) in the Inland Pacific Northwest.** Ian Burke, Drew J. Lyon, John F. Spring, Samuel R. Revolinski*; Washington State University, Pullman, WA (168)

Interspecific Gene Flow Between *Sorghum bicolor* and *S. halepense* with and without Self-Pollen Competition. Cynthia Sias*, Blake L. Young, Daniel Hathcoat, George Hodnett, William Rooney, Muthukumar V. Bagavathiannan; Texas A&M University, College Station, TX (169)

Evolution of Resistance to HPPD-inhibiting Herbicides in a Wild Radish (*Raphanus raphanistrum*) Population Via Enhanced Herbicide Metabolism. Huan Lu*¹, Qin Yu², Heping Han², Mechelle J. Owen², Stephen B. Powles³; ¹University of Western Australia, Crawley, Australia, ²University of Western Australia, Perth, Australia, ³University of Western Australia, Nedlands, Australia (170)

The European Project IWMPRAISE: Integrated Weed Management in Olive Orchards of Spain. Veronica Pedraza¹, Irache Garnica², Juan A. Lezaun², Jose L. Gonzalez-Andujar*³; ¹CSIC, Cordoba, Spain, ²INTIASA, Villaba, Spain, ³Instituto de Agricultura Sostenible (CSIC), Cordoba, Spain (171)

Identification of Goosegrass (*Eleusine indica*) Resistant to Dithiopyr and Dinitroaniline Herbicides. Joseph S. McElroy*¹, John M. Peppers², Nathan D. Hall¹, Elijah C. Russell¹, James Harris¹, Jinesh D. Patel¹; ¹Auburn University, Auburn, AL, ²Virginia Tech, Blacksburg, VA (172)

Light Quality and Weed Seed Germination: What We Have Learnt and the Practical Application Potential. Albert T. Adjesiwor*, Andrew R. Kniss; University of Wyoming, Laramie, WY (173)

Risk Assessment and Tools for Monitoring Herbicide-Resistance Evolution in Weedy *Sorghum*. John Lindquist*¹, Melinda Yerka², Brigitte Tenhumberg¹, Amit J. Jhala¹, Rodrigo Werle³; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nevada - Reno, Reno, NV, ³University of Wisconsin-Madison, Madison, WI (174)

Multiple Resistance to ACCase, ALS and EPSPS Inhibiting Herbicides in the Genus *Lolium*. Jose G. Vázquez García*¹, Ricardo Alcántara-de la Cruz², Candelario Palma-Bautista¹, Hugo Enrique Cruz-Hipolito¹, Joel Torra³, Antonia M. Rojano-Delgado¹, Rafael De Prado¹; ¹University of Cordoba, Cordoba, Spain, ²Universidade Federal de São Carlos, São Carlos, Brazil, ³Universitat de Lleida, Lleida, Spain (175)

Multiple Herbicide Resistance in *Parthenium hysterophorus* from Central America. Candelario Palma Bautista*¹, Jose G. Vázquez-García¹, Hugo Enrique Cruz-Hipolito¹, Guido Plaza², Verónica Hoyos³, Joel Torra⁴, Antonia M. Rojano-Delgado¹, Rafael De Prado¹; ¹University of Cordoba, Cordoba, Spain, ²Universidad Nacional de Colombia, Bogotá, Colombia, ³Universidad del Magdalena, Santa Marta, Colombia, ⁴Universitat de Lleida, Lleida, Spain (176)

Relationship Between Glyphosate Resistance and Root Fluorescence in Italian Ryegrass (*Lolium perenne* L. spp. *multiflorum*) Populations from Oregon. Andréia Kazumi Suzukawa*, Carol Mallory-Smith, Andrew G. Hulting, Caio A. Brunharo; Oregon State University, Corvallis, OR (177)

***Chloris radiata* Resistant to EPSPS and ALS Inhibitors from Colombia.** Veronica Hoyos¹, Guido Plaza², Jose G. Vázquez García³, Candelario Palma-Bautista³, Antonia M. Rojano-Delgado³, Rafael De Prado*³; ¹Universidad del Magdalena, Santa Marta, Colombia, ²Universidad Nacional de Colombia, Bogotá, Colombia, ³University of Cordoba, Cordoba, Spain (178)

Characterization of *Bromus* Species Using SSR Markers. José G. Vázquez García¹, Patricia Castro², Teresa Millan², Rafael De Prado*²; ¹University of Cordoba, Córdoba, Spain, ²University of Cordoba, Cordoba, Spain (179)

Using Canopy Hyperspectral Reflectance Data to Distinguish Six Pigweeds. Reginald S. Fletcher*; Affiliation Not Specified, Greenville, MS (180)

Management of Downy Brome (*Bromus tectorum* L.) in Fallow Systems with Indaziflam. Tara L. Burke*¹, Derek Appel², Rachel J. Zuger³, Ian Burke³; ¹Washington State University, Albion, WA, ²Washington State University, Davenport, WA, ³Washington State University, Pullman, WA (181)

The International Weed Genomics Consortium: a Resource for Weed Genomics. Sarah Morran*¹, Paul Neve², Eric L. Patterson³, Scott McElroy⁴, Roland S. Beffa⁵, Todd A. Gaines¹; ¹Colorado State University, Fort Collins, CO, ²Rothamsted Research, Harpenden, United Kingdom, ³Michigan State University, East Lansing, MI, ⁴Auburn University, Auburn, AL, ⁵Bayer AG, CropScience Division, Frankfurt, Germany (182)

Genotyping *Echinochloa* for Species Identification and Resistance. Sarah Morran*, Todd A. Gaines; Colorado State University, Fort Collins, CO (183)

Characterization of F₁ Hybrid Progenies Originating from Grain Sorghum (*Sorghum bicolor*) x Johnsongrass (*S. halepense*) Crosses. Nithya K. Subramanian*¹, Cynthia Sias¹, Usha Rani Pedireddi¹, Sara Ohadi², Daniel Hathcoat¹, George Hodnett¹, William Rooney¹, Muthukumar V. Bagavathiannan¹; ¹Texas A&M University, College Station, TX, ²University of California, Davis, Davis, CA (184)

Understanding Gene Flow from Grain Sorghum (*Sorghum bicolor*) to Johnsongrass (*S. halepense*). Nithya K. Subramanian*, Daniel Lavy, Cynthia Sias, George Hodnett, William Rooney, Muthukumar V. Bagavathiannan; Texas A&M University, College Station, TX (185)

Predictive Habitat Modeling for *Ventenata dubia* (*Ventenata*). Stacey N. Robbins*, Lisa J. Rew, Nicholas Fox; Montana State University, Bozeman, MT (186)

Waterhemp (*Amaranthus tuberculatus*) Seed Production and Seed Viability Following Injury from Sublethal Dicamba Dose. Mark L. Bernards*, Faith Duke, Allyson M. Rumler, Alexis L. Meadows, Brent S. Heaton; Western Illinois University, Macomb, IL (187)

***TUESDAY and WEDNESDAY
MORNINGS, MARCH 3 & 4***

POSTER - 10. Biocontrol of Weeds

LOCATION: Maui Suite #1-4
TIME: 07:00 AM - 09:00 AM
MODERATOR: Thomas C. Mueller
University of Tennessee
Knoxville, TN

***PRESENTER † STUDENT CONTEST - MS**

†Evaluation of Biofumigants in California Strawberry Nurseries. Nelly Guerra*; University of California, Davis, Davis, CA (188)

**TUESDAY and WEDNESDAY
MORNINGS, MARCH 3 & 4**

POSTER - 11. Physiology

LOCATION: Maui Suite #1-4
TIME: 07:00 AM - 09:00 AM
MODERATOR: Thomas C. Mueller
University of Tennessee
Knoxville, TN

***PRESENTER † STUDENT CONTEST - PhD**

†Recurrent Selection with Fenoxaprop Decrease *Echinochloa crus-galli* (Barnyardgrass) Control by Quinclorac. Carlos Alberto Gonsiorkiewicz Rigon*¹, Luan Cutti², Guilherme Menegol Turra², Enrico Zilch Ferreira², Todd A. Gaines¹, Franck E. Dayan¹, Aldo Merotto Jr²; ¹Colorado State University, Fort Collins, CO, ²Federal University of Rio Grande do Sul, Porto Alegre, Brazil (189)

†The Physiological Basis of Differential Resistance to PPO-Inhibiting Herbicides Used Pre- and Post-Emergent. Abigail Barker*, Franck E. Dayan; Colorado State University, Fort Collins, CO (190)

Altered Target Site-Based Resistance to Mesosulfuron, an ALS Inhibitor, in Italian Ryegrass from Mississippi. Vijay Nandula*¹, Darci A. Giacomini², Jason A. Bond³; ¹USDA-ARS, Stoneville, MS, ²University of Illinois, Urbana, IL, ³Mississippi State University, Stoneville, MS (191)

Defining the Locoweed-Fungal Endophyte Complex: A Common Garden Study Comparing Locoweed Stress Responses with and without its Fungal Endophyte. Barbara Keith*¹, Megan Hofland¹, Sarah Ward², David K. Weaver¹, Tracy M. Sterling³; ¹Montana State University, Bozeman, MT, ²Colorado State University, Fort Collins, CO, ³Affiliation Not Specified, Bozeman, MT (192)

Inhibitions of Goosegrass (*Eleusine indica* L. Gaertn.) and Soybean [*Glycine max* (L.) Merr.] Germination, Growth, and Development by Cover Crop Residues. Avat Shekoofa*¹, Larry Steckel¹, Clay M. Perkins¹, Virginia Sykes²; ¹University of Tennessee, Jackson, TN, ²University of Tennessee, Knoxville, TN (193)

Identification of Candidate Genes on Wheat Group 5 Chromosomes Associated with Halauxifen-Methyl Tolerance. Olivia A. Obenland, Brendan V. Jamison, Dean E. Riechers*; University of Illinois, Urbana, IL (194)

Root System Architecture and Genes Associated with Allelopathy in Weedy Rice. Brooklyn C. Schumaker¹, Swati Shrestha², Shandrea D. Stallworth², Auriana P. Tucker², Te-Ming (Paul) Tseng*²; ¹Mississippi State University, Starkville, MS, ²Mississippi State University, Mississippi State, MS (195)

Herbicide Physiology Online: A Multi-Institutional Course Spanning a Decade. Tracy M. Sterling*¹, William Dyer², Sarah Ward³, Lynn Igegneri⁴, Erin E. Burns⁵, Fabian D. Menalled², Deana Namuth-Covert⁶, Mithila Jugulam⁷; ¹Affiliation Not Specified, Bozeman, MT, ²Montana State University, Bozeman, MT, ³Colorado State University, Fort Collins, CO, ⁴Oregon State University, Corvallis, OR, ⁵Michigan State University, East Lansing, MI, ⁶Ohio State University, Columbus, OH, ⁷Kansas State University, Manhattan, KS (196)

A Genetic Map for *Amaranthus tuberculatus*. Brent P. Murphy*, Darci A. Giacomini, Jacob S. Montgomery, Patrick Tranel; University of Illinois, Urbana, IL (197)

EPSPS Gene Copy Number of Glyphosate-Resistant Common Waterhemp Biotypes from Eastern Nebraska Counties. Rachana A. Jhala*¹, Todd A. Gaines², Crystal D. Sparks², Stevan Knezevic³, Amit J. Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²Colorado State University, Fort Collins, CO, ³University of Nebraska-Lincoln, Concord, NE (198)

***TUESDAY and WEDNESDAY
MORNINGS, MARCH 3 & 4***

POSTER - 12. Soil and Environmental Aspects

LOCATION: Maui Suite #1-4
TIME: 07:00 AM - 09:00 AM
MODERATOR: Thomas C. Mueller
University of Tennessee
Knoxville, TN

***PRESENTER † STUDENT CONTEST - PhD**

†**Seasonal Fluctuations of 2,4-D and Dicamba Concentrations in Bulk Deposition Samples Collected Throughout Missouri in 2019.** Eric Oseland*¹, Robert Lerch², Mandy Bish¹, Kevin W. Bradley¹; ¹University of Missouri, Columbia, MO, ²USDA-ARS, Columbia, MO (199)

†**Effects of Repeated Herbicide Applications on Soil Microbial Communities: an Analysis of Microbial Fitness.** Katie Martin*¹, Brad Hanson²; ¹University of California, Davis, Davis, CA, ²University of California, Davis, Winters, CA (200)

Optimizing Chemical Analysis of Dicamba Residues from Polyurethane Foam (PUF) Samples. Shelby E. Lanz*, Thomas C. Mueller; University of Tennessee, Knoxville, TN (201)

Role of Bonechar in Indaziflam Efficiency on Weed Control. Kassio F. Mendes*¹, Ivan F. Furtado¹, Kamila C. Mielke¹, Alessandro C. Lima¹, Larissa M. Mota¹, Rodrigo N. Sousa²; ¹Universidade Federal de Viçosa, Viçosa, Brazil, ²ESALQ/USP, Piracicaba, Brazil (202)

Transport of ¹⁴C-Mesotrione Through Soil Columns Under Different Physical-Chemical Properties. Rodrigo N. Sousa*¹, Kassio F. Mendes², Alessandro C. Lima², Kamila C. Mielke², Valdemar L. Tornisielo³; ¹ESALQ/USP, Piracicaba, Brazil, ²Universidade Federal de Viçosa, Viçosa, Brazil, ³CENA/USP, Piracicaba, Brazil (203)

***TUESDAY and WEDNESDAY
MORNINGS, MARCH 3 & 4***

POSTER - 13. Integrated Weed Management

LOCATION: Maui Suite #1-4
TIME: 07:00 AM - 09:00 AM
MODERATOR: Thomas C. Mueller
University of Tennessee
Knoxville, TN

***PRESENTER † STUDENT CONTEST - MS**

†**Rapid Detection of Herbicide-resistant Annual Ryegrass (*Lolium rigidum*).** Martina Badano Perez*, Danica Goggin, Roberto Busi, Hugh J. Beckie; University of Western Australia, Crawley, Australia (204)

†**Impacts of Winter Cover Crops on Weeds in Southwest Irrigated Agriculture.** Prashasti Agarwal*, Erik A. Lehnhoff; New Mexico State University, Las Cruces, NM (205)

†**Winter Wheat Variety, Planting Date, and Herbicide Selection: Effects on Rescuegrass (*Bromus catharticus*) Management.** Hannah C. Lindell*¹, Misha R. Manuchehri¹, Todd A. Baughman², Emi Kimura³, Brett F. Carver¹, Lane S. Newlin¹, Justin T. Childers¹; ¹Oklahoma State University, Stillwater, OK, ²Oklahoma State University, Ardmore, OK, ³Texas A&M AgriLife, College Station, TX (206)

†**Ecological and Economic Implications of Integrated Palmer Amaranth (*Amaranthus palmeri*) Management Strategies in Cotton.** Rodger B. Farr*¹, Jason K. Norsworthy¹, Tom Barber², Grant L. Priess¹, Mason C. Castner¹; ¹University of Arkansas, Fayetteville, AR, ²University of Arkansas System Division of Agriculture, Lonoke, AR (207)

***PRESENTER † STUDENT CONTEST - PhD**

†**Efficacy of Cotton and Peanut Residual Herbicides in High Residue Cover Crop System.** Katilyn J. Price*, Steve Li, Frances B. Browne, Ryan D. Langemeier; Auburn University, Auburn, AL (208)

†**Impact of Harvest-time and Post-harvest Seedbank Management Tactics for Italian Ryegrass (*Lolium multiflorum*) in South-Central US Wheat Production.** Aniruddha Maity*¹, Blake L. Young¹, Lauren M. Lazaro², Nicholas Korres³, Jason K. Norsworthy⁴, Muthukumar V. Bagavathiannan¹; ¹Texas A&M University, College Station, TX, ²Louisiana State University AgCenter, Baton Rouge, LA, ³USDA-ARS, Urbana, IL, ⁴University of Arkansas, Fayetteville, AR (209)

†**Weed-Microbial Competition for Nitrogen in Soils Amended with Carbon: A New Soil Modification Tool for Weed Management?** Maria A. Gannett*; Cornell University, Ithaca, NY (210)

†**The Search for Herbicidal Natural Products from the Plants of Hawai'i.** Joey Ooka*, Sherry-Ann Hara, Daniel K. Owens; University of Hawaii, Manoa, Honolulu, HI (211)

†**Population Dynamics of Common Waterhemp (*Amaranthus rudis*) Under Short-term Versus Diversified Cropping Systems, a Matrix Modeling Approach.** Matt Liebman, Huong Nguyen*; Iowa State University, Ames, IA (212)

†**Evaluation of PtxD-phosphite as a Weed Control System in Cotton.** Shilpa Singh*, Devendra Pandeya, Keerti Rathore, Muthukumar V. Bagavathiannan; Texas A&M University, College Station, TX (213)

First Report of Multiple Herbicide Resistance in Ragweed *Parthenium (Parthenium hysterophorus L.)* from Texas. Shilpa Singh*¹, Vijay Singh², Joshua A. McGinty³, Muthukumar V. Bagavathiannan¹; ¹Texas A&M University, College Station, TX, ²Virginia Tech, Painter, VA, ³Texas A&M AgriLife Extension Service, Corpus Christi, TX (214)

†Effect of Four Summer Cover Crop Species and Planting Timing on Weed Suppression, Soil Moisture Dynamics, and Yield in Corn. Spencer L. Samuelson*, Muthukumar V. Bagavathiannan; Texas A&M University, College Station, TX (215)

Evaluation of Non-chemical Tactics for Managing Johnsongrass (*Sorghum halepense*). Spencer L. Samuelson*, Leonard Herndon, Muthukumar V. Bagavathiannan; Texas A&M University, College Station, TX (216)

†Synthesizing Images for Semantic Segmentation of Weed Species in an Airborne RGB Imagery. Chengsong Hu*¹, Bishwa B. Sapkota¹, Steven B. Mirsky², Muthukumar V. Bagavathiannan¹; ¹Texas A&M University, College Station, TX, ²USDA-ARS, Beltsville, MD (217)

Virtual Agriculture: Modeling 3D Structure and Phenological Developments of Crops and Weeds. Chengsong Hu*, Muthukumar V. Bagavathiannan; Texas A&M University, College Station, TX (218)

Dry Bean Responses to 2,4-D Ester Applied Preplant and Preemergence. Nader Soltani*, Peter H. Sikkema; University of Guelph, Ridgetown, ON, Canada (219)

Getting Rid of Weeds Through Integrated Weed Management. Claudio G. Rubione*¹, Mark VanGessel¹, Lauren M. Lazaro², Michael L. Flessner³, Kara Pittman³, Muthukumar V. Bagavathiannan⁴, Lovreet S. Shergill⁵, Steven B. Mirsky⁶, Victoria Ackroyd⁷; ¹University of Delaware, Georgetown, DE, ²Louisiana State University AgCenter, Baton Rouge, LA, ³Virginia Tech, Blacksburg, VA, ⁴Texas A&M University, College Station, TX, ⁵USDA-ARS & University of Delaware, Beltsville, MD, ⁶USDA-ARS, Beltsville, MD, ⁷USDA, Beltsville, MD (220)

Harvest Weed Seed Control in Wheat Production Systems of the PNW. Judit Barroso*¹, Carolina San Martin Hernandez², Jennifer A. Gourlie¹, Stewart B. Wuest³, Mark Thorne⁴, Kyle Roerig⁵, Andrew G. Hulting⁵; ¹Oregon State University, Adams, OR, ²Oregon State University, Pendleton, OR, ³USDA-ARS, Adams, OR, ⁴Washington State University, Pullman, WA, ⁵Oregon State University, Corvallis, OR (221)

Evaluation of Herbicides for Potential Use in an Integrated Release Method of *Trichogramma ostriniae*. Jeffrey D. Cluever¹, Robert Wright², Nevin Lawrence¹, Jeff Bradshaw*¹; ¹University of Nebraska-Lincoln, Scottsbluff, NE, ²University of Nebraska-Lincoln, Lincoln, NE (222)

Control Alternatives in *Carduus acanthoides* Resistant to 2,4-D and Glyphosate. Candelario Palma-Bautista*¹, Pablo Belluccini², Valentin Gentiletti³, Jose G. Vazquez García¹, Antonia M. Rojano-Delgado¹, Rafael De Prado¹; ¹University of Cordoba, Cordoba, Spain, ²INTA Marcos Juarez, Cordoba, Argentina, ³ETS Ingenieros Agronomos, Camilo Aldao, Argentina (223)

Efficacy of Indazaflam on Downy Brome Control in Northern Nevada. Charlie D. Clements*; USDA-ARS, Reno, NV (224)

Total Weed and Nutsedge Populations in Fall Vs. Spring Planted Crops Following Different Cultivation Types and Frequency During the Fallow Period. Peter J. Dittmar*, Danielle D. Treadwell; University of Florida, Gainesville, FL (225)

Broadleaf Weed Population and Diversity Following Different Cultivation Types and Frequency Before Fall or Spring Vegetable Crops. Peter J. Dittmar*, Danielle D. Treadwell; University of Florida, Gainesville, FL (226)

Using Unmanned Aerial Systems for Early Prediction of Competitive Interactions Between Italian Ryegrass (*Lolium perenne* Ssp. *multiflorum*) and Wheat. Bishwa B. Sapkota*¹, Vijay Singh², Clark Neely³, Muthukumar V. Bagavathiannan¹; ¹Texas A&M university, College Station, TX, ²Virginia Tech, Painter, VA, ³Washington State University, Pullman, WA (227)

Advanced Machine Learning Approaches for Evaluation of Herbicide Drift Injury in Cotton. Bishwa B. Sapkota*, Muthukumar V. Bagavathiannan; Texas A&M university, College Station, TX (228)

Weed Classification Using Unmanned Aerial Systems-based Imagery. Vijay Singh*¹, Chi Zhaohui², Michael Bishop², Anthony Filippi², Muthukumar V. Bagavathiannan²; ¹Virginia Tech, Painter, VA, ²Texas A&M University, College Station, TX (229)

Efficacy of Unmanned Aerial System-based Herbicide Applications. Vijay Singh*¹, Daniel Martin², Mohamed Latheef², Bishwa B. Sapkota³, Muthukumar V. Bagavathiannan³; ¹Virginia Tech, Painter, VA, ²United States Department of Agriculture, College Station, TX, ³Texas A&M university, College Station, TX (230)

Nozzle Type Effect on Coverage, Canopy Penetration, and Weed Control Using Enlist One and Liberty in Enlist E3 Soybeans. Ashley N. McCormick*¹, Troy W. Dillon², Brad M. Davis², Thomas R. Butts², Collie M. Leah²; ¹University of Arkansas System Division of Agriculture, Newport, AR, ²University of Arkansas System Division of Agriculture, Lonoke, AR (231)

Reimagining the Use of Electricity to Kill Weeds. Erik A. Lehnhoff*, Donovan Bailey, Paul Neher; New Mexico State University, Las Cruces, NM (232)

Yield Loss to *Cirsium arvense* in Montana's Organic Cropping Systems. Daniel Chichinsky¹, Tim Seipel*¹, Perry Miller¹, Fabian D. Menalled¹, Patrick Carr²; ¹Montana State University, Bozeman, MT, ²Montana State University - Central Ag Research Center, Moccasin, MT (233)

Integration of Cultural Practices and Herbicides for Weed Control in Grain Sorghum and Soybean. Vipran Kumar*¹, Rui Liu¹, Natalie Aquilina¹, Taylor Lambert¹, Ramsamy Perumal¹, Troy Ostmeier¹, Andrew Tucker²; ¹Kansas State University, Hays, KS, ²Fort Hays State University, Hays, KS (234)

Common Waterhemp (*Amaranthus tuberculatus*): Directed Energy Management of Weed Seed Bank in Corn. Cadance A. Lowell*¹, Marcus Nagle¹, Deng Cao¹, Jon Jackson²; ¹Central state university, Wilberforce, OH, ²Global Neighbor, Inc., Centerville, OH (235)

Impact of Cotton Desiccants on Seed Viability of Palmer Amaranth (*Amaranthus palmeri*). Debalin Sarangi*¹, Kaisa M. Werner², Bojana Pilipovic², Peter A. Dotray³, Muthukumar V. Bagavathiannan²; ¹University of Wyoming, Powell, WY, ²Texas A&M University, College Station, TX, ³Texas Tech University and Texas A&M AgriLife Research and Extension Service, Lubbock, TX (236)

TUESDAY MORNING MARCH 3

3MT Student Oral Competition - MS

LOCATION: Monarchy #2
TIME: 09:00 AM - 11:00 PM
MODERATOR: Darrin M. Dodds
Mississippi State University
Mississippi State, MS
CO-MODERATOR: Marty Schraer
Meridian, ID

***SPEAKER † STUDENT CONTEST**

- 09:00 AM †Halaloxifen-methyl: a Tool for Managing Glyphosate-resistant Weeds.** Jessica E. Quinn*¹, Nader Soltani¹, Jamshid Ashigh², David C. Hooker¹, Darren E. Robinson¹, Peter H. Sikkema¹; ¹University of Guelph, Ridgetown, ON, Canada, ²Corteva Agriscience, London, ON, Canada (237)
- 09:05 AM †Diurnal Response to Dicamba and Glyphosate Applications on Broad-leaf Weed Species in Cotton.** Jacob R. Kalina*¹, Timothy L. Grey¹, Christopher B. Corkern², Donn G. Shilling³, Nicholas T. Basinger³; ¹University of Georgia, Tifton, GA, ²Bayer Crop Sciences, Tifton, GA, ³University of Georgia, Athens, GA (238)
- 09:10 AM †Evaluation of Active Ingredient and Application Timing on Chinese Tallow (*Triadica sebifera*) and Callery Pear (*Pyrus calleryana*) by Hack-and-squirt.** Hayden Quick*¹, John D. Byrd, Jr.¹, David Russell²; ¹Mississippi State University, Mississippi State, MS, ²Auburn University, Madison, AL (239)
- 09:15 AM †Glyphosate Plus Dicamba Efficacy as Influenced by Spray Nozzle Design and Weed Density.** Madison D. Kramer*¹, Travis Legleiter², Zach Perry³; ¹University of Kentucky, Lynn, IN, ²University of Kentucky, Princeton, KY, ³University of Kentucky, Paducah, KY (240)
- 09:20 AM †Mechanism of the Exclusive Reliance on *ALSI* and *ALS3* in the Evolution of Herbicide Resistance in *Monochoria vaginalis*.** Shinji Tanigaki*; Kyoto University, Kyoto, Japan (241)
- 09:25 AM †The Influence of Adjuvants on Tolpyralate Efficacy.** Nicole M. Langdon*¹, Peter H. Sikkema¹, Darren E. Robinson¹, Alan J. Raedar², David C. Hooker¹; ¹University of Guelph, Ridgetown, ON, Canada, ²ISK Biosciences Inc., Concord, OH (242)
- 09:30 AM †Overwinter Survival of Johnsongrass (*Sorghum halepense*) Rhizomes in Nebraska and Kansas.** Samantha D. Isaacson*, Amit J. Jhala, John Lindquist; University of Nebraska-Lincoln, Lincoln, NE (243)

- 09:35 AM** †**Unraveling Glyphosate Resistance Mechanisms in Horseweed (*Conyza canadensis* (L.) Cronq.).** Francois Tardif¹, Emily L. Priester*², Clarence Swanton³, Eric R. Page⁴; ¹University of Guelph, Guelph, ON, Canada, ²University of Guelph, Tillsburg, ON, Canada, ³University of Guelph, Guelph, AZ, Canada, ⁴Agriculture and Agri-Food Canada, Harrow, ON, Canada (244)
- 09:40 AM** †**Cucumber Tolerance to Glufosinate At-planting.** Taylor M. Randell*, Jenna C. Vance, A Stanley Culpepper; University of Georgia, Tifton, GA (245)
- 09:45 AM** †**Impacts of Glyphosate on Citrus Health and Productivity.** Biwek Gairhe*, Ramdas Kanissery; University of Florida, Immokalee, FL (246)
- 09:50 AM** †**Young Peanut Physiological Response to Flumioxazin Applications Across Multiple Planting Dates and Seed Vigors.** Nicholas L. Hurdle*¹, Timothy L. Grey², Eric P. Prostko², Walter S. Monfort², Cristiane Pilon²; ¹University of Georgia, Collierville, TN, ²University of Georgia, Tifton, GA (247)
- 09:55 AM** †**Impact of Droplet Size and Carrier Volume on Soybean (*Glycine max*) Harvest Aid Efficacy.** Steven D. Hall*¹, Darrin M. Dodds², Greg R. Kruger³, Jon T. Irby², Jacob P. McNeal², Lucas X. Franca², John J. Williams², Bradley J. Norris², William J. Rutland¹; ¹Mississippi State University, Starkville, MS, ²Mississippi State University, Mississippi State, MS, ³University of Nebraska-Lincoln, North Platte, NE (248)
- 10:00 AM** †**Effect of Herbicides Applied at First Visible Female Inflorescence on Palmer Amaranth (*Amaranthus palmeri*) Fecundity and Seed Viability.** Eric B. Scruggs*, Michael L. Flessner; Virginia Tech, Blacksburg, VA (249)
- 10:05 AM** †**Utility of Potassium Borate as a Volatility Reduction Agent and its Impact on Weed Control in Xtend™ Crops.** Mason C. Castner*, Jason K. Norsworthy, Trenton L. Roberts; University of Arkansas, Fayetteville, AR (250)

- 10:10 AM †HPPD Tolerant Cotton Response, Weed Management, and Tank Mix Partners with Isoxaflutole.** Delaney C. Foster*¹, Peter A. Dotray², Corey Thompson³, Greg Baldwin⁴, Frederick Moore⁵; ¹Texas Tech University, Lubbock, TX, ²Texas Tech University and Texas A&M AgriLife Research and Extension Service, Lubbock, TX, ³BASF, Abernathy, TX, ⁴BASF, Research Triangle Park, NC, ⁵BASF, Lubbock, TX (251)
- 10:15 AM †Control of Glyphosate/Glufosinate-Resistant Volunteer Corn in Corn Resistant to Aryloxyphenoxypropionates.** Adam Striegel*¹, Stevan Knezevic², Nevin Lawrence³, Jeffrey Krumm⁴, Gary Hein¹, Amit J. Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, Concord, NE, ³University of Nebraska-Lincoln, Scottsbluff, NE, ⁴Corteva Agriscience, Hastings, NE (252)
- 10:20 AM †Understanding Interspecific Hybridization Between *Sorghum bicolor* and its Weedy Congener *S. halepense*.** Cynthia Sias*, Blake L. Young, Daniel Hathcoat, George Hodnett, William Rooney, Muthukumar V. Bagavathiannan; Texas A&M University, College Station, TX (253)

TUESDAY MORNING MARCH 3

3MT Student Oral Competition - PhD

LOCATION: Monarchy #3
 TIME: 09:00 AM - 11:30 PM
 MODERATOR: Darrin M. Dodds
 Mississippi State University
 Mississippi State, MS
 CO-MODERATOR: Marty Schraer
 Meridian, ID

***SPEAKER † STUDENT CONTEST**

- 09:00 AM** †**A Target Site Mutation Confers Protoporphyrinogen Oxidase (PPO)-resistance in Wild Poinsettia (*Euphorbia heterophylla* L.).** Rafael R. Mendes*¹, Hudson K. Takano², Fernando Storniolo Adegas³, Rubem S. Oliveira Jr.¹, Todd A. Gaines², Franck E. Dayan²; ¹Maringa State University, Maringa, Brazil, ²Colorado State University, Fort Collins, CO, ³Embrapa Soybean, Londrina, Brazil (254)
- 09:05 AM** †**Shedding Light on the Power of Plant Competition.** Nicole Berardi*¹, Clarence Swanton²; ¹University of Guelph, Guelph, ON, Canada, ²University of Guelph, Guelph, AZ, Canada (255)
- 09:10 AM** †**Evolved Resistance to Herbicides in Palmer Amaranth Accessions Collected in the North Carolina Coastal Plain.** Denis J. Mahoney*; North Carolina State University, Clayton, NC (256)
- 09:15 AM** †**Sweetpotato Tolerance to Indaziflam.** Stephen C. Smith*¹, Katherine M. Jennings¹, David W. Monks¹, Michael R. Schwarz², David L. Jordan¹, Chris Reberg-Horton¹; ¹North Carolina State University, Raleigh, NC, ²Affiliation Not Specified, Raleigh, NC (257)
- 09:20 AM** †**Application Timing on Control of *Echinochloa*.** Clay M. Perkins*¹, Larry Steckel¹, Thomas C. Mueller², Marshall Hay³, Ethan T. Parker³; ¹University of Tennessee, Jackson, TN, ²University of Tennessee, Knoxville, TN, ³Syngenta, Vero Beach, FL (258)
- 09:25 AM** †**Exploring the Impacts of Weeds in Perennial Grain Crops.** Eugene P. Law*¹, Matthew R. Ryan¹, Antonio DiTommaso²; ¹Cornell University, Ithaca, NY, ²Cornell University, Dryden, NY (259)
- 09:30 AM** †**Cover Crops for Suppressing Weeds in Citrus (*Citrus sinensis*) Row-Middles.** Ramdas Kanissery¹, Miurel T. Brewer*², Davie M. Kadyampakeni³; ¹University of Florida, Immokalee, FL, ²University of Florida, Arcadia, FL, ³University of Florida, Lake Alfred, FL (260)
- 09:35 AM** †**Understanding Herbicide Resistance Through the Lens of Epigenetics.** Gourav Sharma*, Jacob Barney, Shawn Askew, James Westwood, David Haak, Liqing Zhang, Suzanne Laliberte; Virginia Tech, Blacksburg, VA (261)

- 09:40 AM** †**Quantifying 2,4-D and Dicamba Dissipation from Plastic Mulch Using Analytical and Bioassay Techniques.** Lavesta C. Hand*, Kayla M. Eason, Taylor M. Randell, Timothy L. Grey, A Stanley Culpepper; University of Georgia, Tifton, GA (262)
- 09:45 AM** †**Fine Tuning Goosegrass (*Eleusine indica*) Control for Northern Bermudagrass.** John Brewer*, Jordan M. Craft, Shawn Askew; Virginia Tech, Blacksburg, VA (263)
- 09:50 AM** †**Testing Rangeland Drought Resistance in the Presence of Ventenata (*Ventenata dubia*).** Marshall Hart*¹, Brian Mealar²; ¹University of Wyoming, Sheridan, WY, ²University of Wyoming, Laramie, WY (264)
- 09:55 AM** †**The Effect of Low-Dose Dicamba Applications on Snap Bean (*Phaseolus vulgaris*), Lima Bean (*Phaseolus lunatus*) and Southern Cowpea (*Vigna unguiculata*).** Hannah E. Wright*¹, Thomas Gray², John Shugart³, A Stanley Culpepper⁴; ¹University of Georgia, Athens, GA, ²Georgia Department of Agriculture, Atlanta, GA, ³Georgia Department of Agriculture, Tifton, GA, ⁴University of Georgia, Tifton, GA (265)
- 10:00 AM** †**Using Linuron to Improve Sweetpotato Production.** Levi D. Moore*, Katherine M. Jennings, David W. Monks, Michael D. Boyette, David L. Jordan, Ramon G. Leon; North Carolina State University, Raleigh, NC (266)
- 10:05 AM** †**Adapting Integrated Pest Management for Weeds in Almonds.** Steven C. Haring*; University of California, Davis, Davis, CA (267)
- 10:10 AM** †**Characterization of Trifludimoxazin, a New Herbicide for Use in Soybean Production Systems.** Nicholas R. Steppig*¹, Bryan G. Young²; ¹Purdue University, Lafayette, IN, ²Purdue University, Brookston, IN (268)
- 10:15 AM** **Break**
- 10:30 AM** †**Advanced Image Analysis for Weed Species Segmentation in Cotton.** Bishwa B. Sapkota*, Muthukumar V. Bagavathiannan; Texas A&M university, College Station, TX (269)

- 10:35 AM** †**Cotton (*Gossypium hirsutum*) Defoliation as Affected by Carrier Volume and Droplet Size.** Jacob P. McNeal*¹, Darrin M. Dodds¹, Greg R. Kruger², John J. Williams¹, Bradley J. Norris¹, Steven D. Hall³, William J. Rutland³; ¹Mississippi State University, Mississippi State, MS, ²University of Nebraska-Lincoln, North Platte, NE, ³Mississippi State University, Starkville, MS (270)
- 10:40 AM** †**Effect of Herbicide Program, Spray Droplet Size, and Drift Reduction Agent on Glufosinate Efficacy.** John J. Williams*¹, Darrin M. Dodds¹, Jacob P. McNeal¹, Steven D. Hall², Bradley J. Norris¹, William J. Rutland²; ¹Mississippi State University, Mississippi State, MS, ²Mississippi State University, Starkville, MS (271)
- 10:45 AM** †**The Genetic Diversity of *Amaranthus tuberculatus*: a Success Story in the American Midwest.** Brent P. Murphy*, Patrick Tranel; University of Illinois, Urbana, IL (272)
- 10:50 AM** †**Chromatography: the Key to Quantifying Herbicide Dissipation.** Kayla M. Eason*, Timothy L. Grey, A Stanley Culpepper; University of Georgia, Tifton, GA (273)
- 10:55 AM** †**Making a Better Glufosinate: Alleviating Environmental Parameters and Improving Efficacy.** Grant L. Priess*, Jason K. Norsworthy; University of Arkansas, Fayetteville, AR (274)
- 11:00 AM** †**Spray Away the Herbicide Antagonism.** Justin S. Calhoun*¹, J Connor Ferguson², Luke H. Merritt², Kayla L. Broster², Zachary R. Treadway², Michael T. Wesley Jr.²; ¹Mississippi State University, Starkville, MS, ²Mississippi State University, Mississippi State, MS (275)
- 11:05 AM** †**Ecological Management of Kochia in Irrigated Western Cropping Systems.** Ramawatar Yadav*¹, Prashant Jha¹, Andrew R. Kniss², Nevin Lawrence³, Gustavo Sbatella²; ¹Iowa State University, Ames, IA, ²University of Wyoming, Laramie, WY, ³University of Nebraska-Lincoln, Scottsbluff, NE (276)
- 11:10 AM** †**Microbial Contributions to Weed Suppression in Conventional and Organic Farm Soils.** Liang Cheng*¹, Jenny Kao-Kniffin¹, Antonio DiTommaso²; ¹Cornell University, Ithaca, NY, ²Cornell University, Dryden, NY (277)

TUESDAY MORNING MARCH 3

**SYMPOSIUM - 4. The Ecological and Biodiversity
Impact of Invasive Grass Species and Their
Management**

LOCATION: Monarchy #4
TIME: 09:00 AM - 12:00 PM
MODERATOR: Lisa J. Rew
Montana State University
Bozeman, MT
CO-MODERATOR: Timothy S. Prather
University of Idaho
Moscow, ID

***SPEAKER**

- 09:00 AM Introduction to Symposium.** Lisa J. Rew*; Montana State University, Bozeman, MT (278)
- 09:00 AM Lehmann Lovegrass (*Eragrostis lehmanniana*) Ecological Impacts and Management Opportunities.** Erik A. Lehnhoff*, Sherri Buerdsell, Andrew Dominguez, Nicole Pietrasiak; New Mexico State University, Las Cruces, NM (279)
- 09:20 AM Reducing Invasive Grass Populations in Garry Oak Ecosystems Over the Long-term Via Mowing or Grazer Exclusion.** David R. Clements*, Joy Marconato, Virginia Oeggerli, Vanessa L. Jones, Jessica Brouwer; Trinity Western University, Langley, BC, Canada (280)
- 09:40 AM Plant Community Response Following Invasive Annual Grass Control in the Intermountain West.** Corey V. Ransom*; Utah State University, Logan, UT (281)
- 10:00 AM Ventenata (*Ventenata dubia*) Management in Northern Mixed Prairie: Implications for Ecosystem Goods and Services.** Marshall Hart*¹, Brian Mealor²; ¹University of Wyoming, Sheridan, WY, ²University of Wyoming, Laramie, WY (282)
- 10:20 AM Break**

- 10:35 AM** **The Impacts of Downy Brome (*Bromus tectorum*) on Pasture Forage Quality and Quantity in Colorado.** Jacob Courkamp*; Colorado State University, Fort Collins, CO (283)
- 10:55 AM** **Perspectives on the Ecological Impacts of Annual Grasses Across the Great Divide.** Lisa J. Rew¹, Timothy S. Prather*²; ¹Montana State University, Bozeman, MT, ²University of Idaho, Moscow, ID (284)
- 11:15 AM** **Bring Back Bees: Controlling Invasive Annual Grasses Restores Native Flowering Plants and Their Pollinators.** Arathi Seshadri*; USDA ARS/WRRC/ISPH, Davis, CA (285)
- 11:35 AM** **Quail in the Grass: Controlling Cheatgrass to Enhance Nesting and Brood-rearing Habitat for Bobwhite Quail and Other Grassland Birds.** Noe Marymor*; USDA-NRCS, Greeley, CO (286)
- 11:55 AM** **Facilitated Discussion.** Lisa J. Rew*; Montana State University, Bozeman, MT (287)

TUESDAY MORNING MARCH 3

ORAL - 01. Agronomic Crops I

LOCATION: Monarchy #5

TIME: 09:00 AM - 12:00 PM

MODERATOR: Ryan D. Lins
Syngenta Crop Protection, LLC
Rochester, MN

CO-MODERATOR: Misha R. Manuchehri
Oklahoma State University
Stillwater, OK

***SPEAKER † STUDENT CONTEST**

- 09:00 AM** **Glyphosate and AMPA Persistence and Distribution in Soils Under Field Conditions in the Midwestern USA.** Robert J. Kremer*; University of Missouri, Columbia, MO (288)
- 09:15 AM** **Developing a Predictive Yield Loss Model for Sensitive Soybeans Exposed to Dicamba.** Jerri Lynn Henry*¹, Reid Smeda¹, Jason Weirich²; ¹University of Missouri, Columbia, MO, ²Affiliation Not Specified, Columbia, MO (289)

- 09:30 AM Implications of Dicamba and 2,4-D Tank Contamination Across Enlist and Xtend Soybean Varieties.** Bryan G. Young*¹, N. Cade Hayden², Matthew Osterholt², Mandy Bish³, Kevin W. Bradley³, Shawn P. Conley⁴, William G. Johnson², Greg R. Kruger⁵, Jason K. Norsworthy⁶, Daniel B. Reynolds⁷, Larry Steckel⁸; ¹Purdue University, Brookston, IN, ²Purdue University, West Lafayette, IN, ³University of Missouri, Columbia, MO, ⁴University of Wisconsin-Madison, Madison, WI, ⁵University of Nebraska-Lincoln, North Platte, NE, ⁶University of Arkansas, Fayetteville, AR, ⁷Mississippi State University, Mississippi State, MS, ⁸University of Tennessee, Jackson, TN (290)
- 09:45 AM Dicamba Rate Influences on Fruiting in Sensitive Cotton.** Kyle R. Russell*¹, Peter A. Dotray², Irish L. B. Pabuayon¹, Glen L. Ritchie¹; ¹Texas Tech University, Lubbock, TX, ²Texas Tech University and Texas A&M AgriLife Research and Extension Service, Lubbock, TX (291)
- 10:00 AM Influence of Carrier Water Characteristics and Adjuvants on Dicamba Volatilization in a Controlled Environment.** Matthew Osterholt*¹, N. Cade Hayden¹, Julie M. Young², Manoj S. Ghaste¹, William G. Johnson¹, Joshua R. Widhalm¹, Bryan G. Young²; ¹Purdue University, West Lafayette, IN, ²Purdue University, Brookston, IN (292)
- 10:15 AM Break**
- 10:30 AM Dicamba Research Update.** Thomas C. Mueller*¹, Larry Steckel²; ¹University of Tennessee, Knoxville, TN, ²University of Tennessee, Jackson, TN (293)
- 10:45 AM Influence of pH Buffers on Volatility of Dicamba Tank Mixtures.** Ryan D. Langemeier*, Steve Li, Katilyn J. Price, Frances B. Browne; Auburn University, Auburn, AL (294)

- 11:00 AM Greenhouse Evaluation of Suspected Resistance to XtendiMax® Herbicide with VaporGrip® Technology as Part of the Conditions of Registration.** Daljit Singh*¹, Sean Evans², Jeffrey E. Herrmann³, Chandrashekar Aradhya¹; ¹Bayer Crop Science, Chesterfield, MO, ²Bayer Crop Science, Jacksonville, IL, ³Bayer Crop Science, Creve Coeur, MO (295)
- 11:15 AM Engenia Herbicide for 2020.** Tracy Rowlandson*; BASF, Raleigh, NC (296)
- 11:30 AM Enlist E3™ Soybean Weed Control and Crop Tolerance.** David M. Simpson*; Corteva, Indianapolis, IN (297)
- 11:45 AM PPO-resistant *Amaranthus* Species Control in XtendFlex® Soybeans.** Neha Rana*¹, Blake Barlow², Ryan E. Rapp³, Rod Stevenson⁴; ¹Bayer Crop Science, St Louis, MO, ²Bayer Crop Science, Hallsville, MO, ³Bayer Crop Science, Mitchell, SD, ⁴Bayer Crop Science, Lansing, MI (298)

TUESDAY MORNING MARCH 3

ORAL - 02. Horticultural Crops

LOCATION: Monarchy #1
 TIME: 09:00 AM - 12:00 PM
 MODERATOR: Matthew A. Cutulle
 Clemson University
 Charleston, SC
 CO-MODERATOR: Jesse M. Richardson
 Corteva Agriscience
 Mesa, AZ

***SPEAKER † STUDENT CONTEST**

- 09:00 AM Pyroxasulfone for Faba Bean and Safflower Production.** Harlene M. Hatterman-Valenti*, Johnson M. Burton, Auwarter M. Collin, Kutay Yilmaz; North Dakota State University, Fargo, ND (299)
- 09:15 AM Strawberry Tolerance and Flumioxazin Persistence Under Plastic Mulch in Florida Strawberry.** Nathan Boyd*¹, Ramdas Kanissery²; ¹University of Florida, Balm, FL, ²University of Florida, Immokalee, FL (300)

- 09:30 AM Weed Control in Organic Highbush Blueberries.** Marcelo L. Moretti*; Oregon State University, Corvallis, OR (301)
- 09:45 AM Screening of Herbicides for Selective Weed Control in Brassicaceous Crops.** Ed Peachey*; Oregon State University, Corvallis, OR (302)
- 10:00 AM Don't be a Wet Blanket - Hit the Bullseye in Potatoes with Targeted Tank Mixes.** Pamela J.s. Hutchinson*; University of Idaho, Aberdeen, ID (303)
- 10:15 AM Two Chipping Potato Cultivar Plant Back Responses When Mother Plants Received Sub-lethal Dicamba And/or Glyphosate Rates.** Matthew Brooke, Collin M. Auwarter, Harlene M. Hatterman-Valenti*; North Dakota State University, Fargo, ND (304)
- 10:30 AM Break**
- 10:45 AM Marking of Vegetable Crop Plants to Ensure Recognition by Automated Weeders.** HannahJoy Kennedy¹, Steve Fennimore*¹, David Slaughter²; ¹University of California, Davis, Salinas, CA, ²University of California, Davis, Davis, CA (305)
- 11:00 AM †Inter-row Cultivation Integrated with Residual Herbicide Programs in Sugarbeet.** Nathan H. Haugrud*¹, Thomas J. Peters²; ¹North Dakota State University, Fargo, ND, ²North Dakota State University / University of Minnesota, Fargo, ND (306)
- 11:15 AM Better Bunch: Evaluating the Impact of Sweetpotato Growth Habit on Yield and Weed Competition.** Matthew A. Cutulle*¹, Phillip Wadl²; ¹Clemson University, Charleston, SC, ²USDA-ARS, Charleston, SC (307)
- 11:30 AM Yellow Nutsedge (*Cyperus esculentus*) Interference in Simulated Sweetpotato (*Ipomoea batatas*) Plant Beds.** Stephen L. Meyers*¹, T. Casey Barickman², Jeffrey L. Main³; ¹Purdue University, West Lafayette, IN, ²Mississippi State University, Verona, MS, ³Mississippi State University, Pontotoc, MS (308)

11:45 AM Trends in Collaboration: Minor Use Foundation, Inc. - Working with Governments, Grower Groups, and Specialty Crop and Minor Use Organizations on Technology Tools. Dirk C. Drost*; Minor Use Foundation, Inc, High Point, NC (309)

12:00 PM The Effect of 2,4-D on Hazelnut Abscission. Larissa Larocca De Souza, Marcelo L. Moretti*; Oregon State University, Corvallis, OR (310)

TUESDAY MORNING MARCH 3

ORAL - 09. Weed Biology and Ecology

LOCATION: Monarchy #7
TIME: 09:00 AM - 12:00 PM
MODERATOR: Caio A. Brunharo
Oregon State University
Corvallis, OR
CO-MODERATOR: O. Adewale Osipitan
University of California-Davis
Davis, CA

***SPEAKER † STUDENT CONTEST**

09:00 AM †Predict Invasive Potential of a Weed Likely to Increase with Climate Change. Hannah Duff*, Bruce Maxwell; Montana State University, Bozeman, MT (311)

09:15 AM The Evolutionary Genomics of Herbicide-Resistant Weeds. Bridgit W. Vasiljevic*, Ulrich Lutz, Ilja Bezrukov, Detlef Weigel; Max Planck Institute for Developmental Biology, Tübingen, Germany (312)

09:30 AM †Do Certain Nutrients and Plant-Soil Feedbacks Affect *Ventenata dubia* (*Ventenata*) Seedling Growth? Michelle L. Majeski*, Catherine Zabinski, Lisa J. Rew, Jane Mangold; Montana State University, Bozeman, MT (313)

09:45 AM Developing Growing Degree Day Models to Manage Annual Polygonum Species in Western Washington. Steven S. Seefeldt*¹, Chris Benedict², Brian Maupin¹; ¹Washington State University, Mount Vernon, WA, ²Washington State University, Bellingham, WA (314)

- 10:00 AM** †**EPSPS Gene Amplification Confers Glyphosate Resistance in *Bromus tectorum* (Downy Brome).** Pragya Asthana*, Rachel J. Zuger, Rhoda Brew-Appiah, Karen Sanguinet, Ian Burke; Washington State University, Pullman, WA (315)
- 10:15 AM** **Break**
- 10:30 AM** †**Escaping Proteolysis: A 27 Base Pair Deletion in AUX/IAA2 Degron Tail Confers Resistance to Auxinic Herbicides in *Sisymbrium orientale*.** Marcelo Figueiredo*¹, Anita Küpper², Christopher Preston³, Jenna Malone⁴, Tijana Petrovic⁴, Anireddy Reddy¹, Kasavajhala Prasad¹, Todd A. Gaines¹; ¹Colorado State University, Fort Collins, CO, ²Bayer, Frankfurt, Germany, ³University of Adelaide, Glen Osmond, Australia, ⁴University of Adelaide, Adelaide, Australia (316)
- 10:45 AM** **Acetolactate Synthase Inhibitor Resistance in Ontario Populations of *Chenopodium album* L.** Clement Mo*¹, Francois Tardif²; ¹University of Guelph, Markham, ON, Canada, ²University of Guelph, Guelph, ON, Canada (317)
- 11:00 AM** †**Weighing the Mechanisms of Yield Loss: from the Bucket to the Field.** Joe G. Ballenger*, Albert T. Adjesiwor, David A. Claypool, Andrew R. Kniss; University of Wyoming, Laramie, WY (318)
- 11:15 AM** **Horseweed (*Erigeron canadensis*) Emergence Time and Over-winter Mortality.** Erin Haramoto*¹, Ryan Collins¹, Anita Dille², Karla L. Gage³, Reid Smeda⁴, Brent Sunderlage³; ¹University of Kentucky, Lexington, KY, ²Kansas State University, Manhattan, KS, ³Southern Illinois University Carbondale, Carbondale, IL, ⁴University of Missouri, Columbia, MO (319)
- 11:30 AM** †**Status of Herbicide-Resistant Kochia (*Bassia scoparia*) and Palmer Amaranth (*Amaranthus palmeri*) in Colorado.** Andrew D. Effertz*, Philip Westra, Eric P. Westra; Colorado State University, Fort Collins, CO (320)
- 11:45 AM** **Exploring the Dynamics of EPSPS and Abiotic Stress Genes in Kochia.** Philip Westra*¹, Andrew D. Effertz¹, Todd A. Gaines¹, Crystal D. Sparks¹, Eric L. Patterson²; ¹Colorado State University, Fort Collins, CO, ²Michigan State University, East Lansing, MI (321)

TUESDAY MORNING MARCH 3

ORAL - 11. Physiology

LOCATION: Monarchy #6
TIME: 09:00 AM - 12:00 PM
MODERATOR: Te-Ming (Paul) Tseng
Mississippi State University
Mississippi State, MS
CO-MODERATOR: Chenxi Wu
Bayer CropScience
St Louis, MO

***SPEAKER † STUDENT CONTEST**

09:00 AM Target Site-Based Resistance to ALS Inhibitors, Glyphosate, and PPO Inhibitors in a Palmer Amaranth Accession from Mississippi. Vijay Nandula*¹, Darci A. Giacomini², William T. Molin¹; ¹USDA-ARS, Stoneville, MS, ²University of Illinois, Urbana, IL (322)

09:15 AM †A Safener Does Influence Pacific Northwest Winter Wheat Varietal Response to Very-Long-Chain Fatty Acid-Inhibiting Herbicides. Damilola A. Raiyemo*¹, William J. Price¹, Traci Rauch¹, Joan M. Campbell¹, Fangming Xiao¹, Rong Ma², Timothy S. Prather¹; ¹University of Idaho, Moscow, ID, ²Bayer CropScience, Chesterfield, MO (323)

09:30 AM *Cyperus difformis* ALS Cross-resistance Levels and Target-site Characterization. Alexander R. Ceseski*, Kassim Al-Khatib; University of California, Davis, Davis, CA (324)

09:45 AM †Simultaneous Overexpression of Three Cytochrome P450s is Involved in High Level Resistance to Diclofop-methyl in Multiple-herbicide Resistant Late Watergrass (*Echinochloa phyllopogon*). Hiroe Suda*¹, Yusuke Yoshimoto¹, Kohei Kurata¹, Keisuke Tanaka², Satoru Tanaka², Takuya Yamaguchi³, Masahiro Miyashita¹, Tohru Tominaga¹, Satoshi Iwakami¹; ¹Kyoto University, Kyoto, Japan, ²Tokyo University of Agriculture, Tokyo, Japan, ³University of Tsukuba, Tsukuba, Japan (325)

- 10:00 AM** **Herbicide-Resistance In Waterhemp (*Amaranthus tuberculatus*) Identified in Israel is Due to a Long Distance Gene Transfer.** Inon Yadid, Zvi Peleg, Baruch Rubin*; The Hebrew University of Jerusalem, Rehovot, Israel (326)
- 10:15 AM** **Break**
- 10:30 AM** **†Candidate Mutations for Fluroxypyr Resistance in Kochia (*Bassia Scoparia*).** Olivia E. Todd*, Todd A. Gaines; Colorado State University, Fort Collins, CO (327)
- 10:45 AM** **A Non-destructive Leaf Disc Assay for Rapid Diagnosis of Weed Resistance to Multiple Herbicide Modes of Action.** Chenxi Wu*¹, Vijaya Varanasi¹, Alejandro Perez-Jones²; ¹Bayer CropScience, St Louis, MO, ²Bayer Crop Science, Chesterfield, MO (328)
- 11:00 AM** **†Investigation of Physiological Mechanism of 2,4-D Resistance in Palmer Amaranth (*Amaranthus palmeri*).** Chandrima Shyam*, Dallas E. Peterson, Mithila Jugulam; Kansas State University, Manhattan, KS (329)
- 11:15 AM** **Investigating Metabolic Resistance to S-Metolachlor in Two Illinois Waterhemp (*Amaranthus tuberculatus*) Populations.** Seth A. Strom*¹, Aaron Hager¹, Nicholas J. Seiter¹, Adam Davis¹, Shiv S. Kaundun², Dean E. Riechers¹; ¹University of Illinois, Urbana, IL, ²Syngenta, Bracknell, United Kingdom (330)
- 11:30 AM** **A New Understanding on the Mechanism of Action of Glufosinate.** Franck E. Dayan*¹, Hudson K. Takano¹, Christopher Preston², Philip Westra¹, Roland S. Beffa³; ¹Colorado State University, Fort Collins, CO, ²University of Adelaide, Glen Osmond, Australia, ³Bayer AG, CropScience Division, Frankfurt, Germany (331)
- 11:45 AM** **A Biochemical Approach to Improve the Efficacy of Glufosinate.** Hudson K. Takano*¹, Roland S. Beffa², Christopher Preston³, Philip Westra¹, Franck E. Dayan¹; ¹Colorado State University, Fort Collins, CO, ²Bayer AG, CropScience Division, Frankfurt, Germany, ³University of Adelaide, Glen Osmond, Australia (332)

TUESDAY AFTERNOON MARCH 3

SYMPOSIUM - 3. Genomics of Weedy and Invasive Species - 2025 and Beyond

LOCATION: Monarchy #4
TIME: 01:00 PM - 05:00 PM
MODERATOR: Mithila Jugulam
Kansas State University
Manhattan, KS

***SPEAKER**

- 01:00 PM Introduction to Symposium.** Mithila Jugulam*; Kansas State University, Manhattan, KS (333)
- 01:00 PM The International Weed Genomics Consortium: A Resource for Weed Genomics.** Todd A. Gaines*¹, Sarah Morran¹, Paul Neve², Eric L. Patterson³, Joseph S. McElroy⁴, Roland S. Beffa⁵, Mithila Jugulam⁶, Patrick Tranel⁷; ¹Colorado State University, Fort Collins, CO, ²Rothamsted Research, Harpenden, United Kingdom, ³Michigan State University, East Lansing, MI, ⁴Auburn University, Auburn, AL, ⁵Bayer AG, CropScience Division, Frankfurt, Germany, ⁶Kansas State University, Manhattan, KS, ⁷University of Illinois, Urbana, IL (334)
- 01:10 PM Systems Biology and Synthetic Biology Unite: Towards Elucidation of Non-target Herbicide Resistance Mechanism in *Conyza*.** Charles Neal Stewart*, Cristiano Piasecki, Yongil Neal Yang, Bryce Trull, Reginald Millwood; University of Tennessee, Knoxville, TN (335)
- 01:30 PM New Tools to Investigate and Manipulate Blackgrass (*Alopecurus myosuroides*).** Dana R. MacGregor*; Rothamsted Research, Harpenden, United Kingdom (336)
- 01:50 PM Using Genomics to Investigate Dioecy in *Amaranthus* Species.** Patrick Tranel*; University of Illinois, Urbana, IL (337)
- 02:10 PM Molecular Cytogenetic Analysis of Herbicide-resistant Weeds.** Dal-Hoe Koo*, Mithila Jugulam, Bernd Friebe, Bikram S. Gill; Kansas State University, Manhattan, KS (338)

02:30 PM Break

02:45 PM The eccDNA Replicon, Adaptive Potential, and Functional Genomics in *Amaranthus Palmeri*. Christopher A. Saski*¹, William T. Molin²;
¹Clemson University, Clemson, SC, ²USDA-ARS, Stoneville, MS (339)

03:05 PM The Genome of *Kochia scoparia*: A Story of Evolution in Action. Eric L. Patterson*¹, Todd A. Gaines², Christopher A. Saski³, Philip Westra², Crystal D. Sparks²; ¹Michigan State University, East Lansing, MI, ²Colorado State University, Fort Collins, CO, ³Clemson University, Clemson, SC (340)

03:25 PM Canada Fleabane Genome Sequence. Martin Laforest*¹, Sara L. Martin², Eric R. Page³; ¹AAC-AAFC, St-jean-sur-richelieu, QC, Canada, ²AAC-AAFC, Ottawa, ON, Canada, ³Agriculture and Agri-Food Canada, Harrow, ON, Canada (341)

03:45 PM Symposium Discussion. Mithila Jugulam*; Kansas State University, Manhattan, KS (342)

TUESDAY AFTERNOON MARCH 3

ORAL - 01. Agronomic Crops I

LOCATION: Monarchy #5
TIME: 01:00 PM - 05:00 PM
MODERATOR: Alejandro Perez-Jones
Bayer Crop Science
Chesterfield, MO
CO-MODERATOR: Ryan D. Lins
Syngenta Crop Protection, LLC
Rochester, MN

***SPEAKER † STUDENT CONTEST**

01:00 PM Control of Multiple-herbicide-resistant Waterhemp in Corn. Christian A. Willemse*¹, Peter H. Sikkema¹, Amit J. Jhala², Darren E. Robinson¹, David C. Hooker¹; ¹University of Guelph, Ridgetown, ON, Canada, ²University of Nebraska-Lincoln, Lincoln, NE (343)

- 01:15 PM †Does Amplification of the *EPSPS* Gene Alone Confer Glyphosate Resistance in Common Waterhemp.** Balaji Aravindhan Pandian*, Sanzhen Liu, P.V. Vara Prasad, Tesfaye Tesso, Mithila Jugulam; Kansas State University, Manhattan, KS (344)
- 01:30 PM Control of Glyphosate-Resistant Canada Fleabane with Three-Way Tankmixes in Soybean.** Peter H. Sikkema*, Nader Soltani; University of Guelph, Ridgetown, ON, Canada (345)
- 01:45 PM †Horseweed (*Erigeron canadensis*) Growth Stage Response to Herbicide Technologies.** Aaron Froemke*¹, Kirk A. Howatt²; ¹North Dakota State University, Lisbon, ND, ²North Dakota State University, Fargo, ND (346)
- 02:00 PM A Kochia Population with Possible Field Resistance to Dicamba, Fluroxypr and Glyphosate.** Randall S. Currie*¹, Patrick Geier¹, Chandrima Shyam², Mithila Jugulam²; ¹Kansas State University, Garden City, KS, ²Kansas State University, Manhattan, KS (347)
- 02:15 PM Characterizing Response of Glyphosate-, Dicamba-, and Fluroxypr-Resistant Kochia to Atrazine and Metribuzin.** Rui Liu*¹, Vipin Kumar¹, Randall S. Currie², Patrick Geier², Taylor Lambert¹, Phillip W. Stahlman¹; ¹Kansas State University, Hays, KS, ²Kansas State University, Garden City, KS (348)
- 02:30 PM Break**
- 02:45 PM Heat Stress and Recurrent Herbicide Application May Speed the Evolution of Junglerice Tolerant to Florpyrauxifen-benzyl.** Lariza Benedetti¹, Nilda Roma-Burgos², Luis A. Avila*¹; ¹Universidade Federal de Pelotas, Pelotas, Brazil, ²University of Arkansas, Fayetteville, AR (349)
- 03:00 PM Evaluation of Herbicide Resistance in Diverse Palmer Amaranth and Waterhemp Populations in the USA.** Alejandro Perez-Jones*¹, Rong Ma¹, Chenxi Wu², Chandrashekar Aradhya¹; ¹Bayer Crop Science, Chesterfield, MO, ²Bayer CropScience, St Louis, MO (350)

- 03:15 PM Investigation of Herbicide-resistant Redroot Pigweed (*Amaranthus retroflexus*) Populations in North Carolina.** Eric A. Jones*, Wesley Everman, Ramon G. Leon; North Carolina State University, Raleigh, NC (351)
- 03:30 PM Synthetic Auxins and Glufosinate Applied Sequentially for Control of Palmer Amaranth and Associated Physiological Response.** Frances B. Browne*, Steve Li, Katilyn J. Price, Ryan D. Langemeier; Auburn University, Auburn, AL (352)
- 03:45 PM Waterhemp (*Amaranthus tuberculatus*) and Palmer Amaranth (*Amaranthus palmeri*) Control in a Glyphosate, Glufosinate, and Dicamba Resistant Soybean Variety.** Travis Legleiter*¹, J. D. Green²; ¹University of Kentucky, Princeton, KY, ²University of Kentucky, Lexington, KY (353)
- 04:00 PM The Importance of Glufosinate for Managing Palmer Amaranth (*Amaranthus palmeri*) in Auxin-Based Herbicide Systems.** Grace F. Flusche Ogden*¹, Peter A. Dotray², John Everitt³; ¹Texas Tech University, Lubbock, TX, ²Texas Tech University and Texas A&M AgriLife Research and Extension Service, Lubbock, TX, ³Bayer - US Crop Science, Shallowater, TX (354)

04:15 PM Discussion

TUESDAY AFTERNOON MARCH 3

ORAL - 01. Agronomic Crops II

LOCATION: Monarchy #6

TIME: 01:00 PM - 05:00 PM

MODERATOR: Misha R. Manuchehri
Oklahoma State University
Stillwater, OK

CO-MODERATOR: Joseph T. Ikley
North Dakota State University
Fargo, ND

***SPEAKER † STUDENT CONTEST**

- 01:00 PM Efficacy of a New Fluroxypyr + Arylex Active Weed Control Product in Wheat.** Mike Moechnig*¹, Jeffery Krumm², Joe Yenish³, Bruce Steward⁴, Patti Prasifka⁵, Dave Johnson⁶, Michael Lovelace⁷; ¹Corteva Agriscience, Brookings, SD, ²Corteva Agriscience, Hastings, NE, ³Corteva Agriscience, Billings, MT, ⁴Corteva, Oklahoma City, OK, ⁵Corteva Agriscience, West Fargo, ND, ⁶Corteva Agriscience, Eagan, MN, ⁷Corteva Agriscience, Lubbock, TX (355)
- 01:15 PM Assessment of Potential Allelopathic Effects of Pacific Northwest Winter Wheat Cultivars on Annual Weeds.** Haifeng Xing¹, Steve Young*²; ¹Inner Mongolia Agricultural University, Hohhot City, China, ²Utah State University, Logan, UT (356)
- 01:30 PM Efficacy and Crop Safety of a New Broadleaf Herbicide for Northern Plains Cereals Containing, Clopyralid, Halauxifen-methyl, and Fluroxypyr.** Joe Yenish*¹, Patti Prasifka², Dave Johnson³, Mike Moechnig⁴; ¹Corteva Agriscience, Billings, MT, ²Corteva Agriscience, West Fargo, ND, ³Corteva Agriscience, Eagan, MN, ⁴Corteva Agriscience, Brookings, SD (357)
- 01:45 PM Feral Rye (*Secale cereale*) Control and Economics with ACCase Tolerant Wheat Production System in Colorado.** Eric P. Westra*, Todd A. Gaines; Colorado State University, Fort Collins, CO (358)
- 02:00 PM Four Seasons of Italian Ryegrass (*Lolium perenne* Ssp. *multiflorum*) Management in Oklahoma Winter Wheat.** Misha R. Manuchehri*, Justin T. Childers, Hannah C. Lindell, Lane S. Newlin; Oklahoma State University, Stillwater, OK (359)
- 02:15 PM Is Dichlorprop-p Less Antagonistic Than 2,4-D to Group 1 Herbicides in Wheat?** Kirk A. Howatt*¹, Joseph Mettler¹, Paul O. Johnson², Bob Bruss³; ¹North Dakota State University, Fargo, ND, ²South Dakota State University, Brookings, SD, ³Nufarm Americas, Morrisville, NC (360)
- 02:30 PM Break**

- 02:45 PM The Extent of Herbicide Resistance in Key Weeds of the Southeastern Australian Grain Production Region.** Christopher Preston*¹, John C. Broster², Peter Boutsalis¹, Gurjeet S. Gill³; ¹University of Adelaide, Glen Osmond, Australia, ²Charles Sturt University, Wagga Wagga, Australia, ³University of Adelaide, Adelaide, Australia (361)
- 03:00 PM †Herbicide Metabolism Affects Quizalofop Tolerance of CoAXium Wheat.** Raven A. Bough*, Franck E. Dayan, Todd A. Gaines; Colorado State University, Fort Collins, CO (362)
- 03:15 PM Voraxor: a New Novel Herbicide for Grass and Broadleaf Weed Control in Australian Winter Cereals.** Ian Francis*¹, Marco Montagna², Russell Ison¹, Gavin Heard³; ¹BASF Australia, Tamworth, Australia, ²BASF Australia, Bannockburn, Australia, ³BASF Australia, Melbourne, Australia (363)
- 03:30 PM †Non-Tolerant Wheat Response to Quizalofop-P-ethyl in Central Oklahoma.** Justin T. Childers*¹, Misha R. Manuchehri¹, Vipin Kumar², Tyson Ochsner¹, Rui Liu², Hannah C. Lindell¹, Lane S. Newlin¹; ¹Oklahoma State University, Stillwater, OK, ²Kansas State University, Hays, KS (364)
- 03:45 PM Dichlorprop-p Combinations with Auxin Herbicides for Weed Control in Chemical Fallow.** Philip Westra*¹, Kirk A. Howatt², Greg R. Kruger³, Peter A. Dotray⁴, Misha R. Manuchehri⁵, Vipin Kumar⁶, Bob Bruss⁷; ¹Colorado State University, Fort Collins, CO, ²North Dakota State University, Fargo, ND, ³University of Nebraska-Lincoln, North Platte, NE, ⁴Texas Tech University and Texas A&M AgriLife Research and Extension Service, Lubbock, TX, ⁵Oklahoma State University, Stillwater, OK, ⁶Kansas State University, Hays, KS, ⁷Nufarm Americas, Morrisville, NC (365)
- 04:00 PM †Dicotyledonous Weed Control with Pulse-Width Modulation (PWM) Technology.** Kelly T. Satrom*, Kirk A. Howatt; North Dakota State University, Fargo, ND (366)
- 04:15 PM Discussion**

TUESDAY AFTERNOON MARCH 3

ORAL - 02. Horticultural Crops

LOCATION: Monarchy #1
TIME: 01:00 PM - 04:30 PM
MODERATOR: Jesse M. Richardson
Corteva Agriscience
Mesa, AZ
CO-MODERATOR: Matthew A. Cutulle
Clemson University
Charleston, SC

*SPEAKER † STUDENT CONTEST

- 01:00 PM Overlapping S-Metolachlor Treatments for Weed Control in Lima Bean.** Kurt M. Vollmer*¹, Mark VanGessel², Quintin R. Johnson², Barbara A. Scott²; ¹University of Maryland, Queenstown, MD, ²University of Delaware, Georgetown, DE (367)
- 01:15 PM Investigating the Genetic Basis of Herbicide Tolerance in Snap Bean.** Martin Williams*¹, Alvaro Garzon², Phillip Miklas², James Myers³, Ed Peachey³; ¹USDA-ARS, Urbana, IL, ²USDA-ARS, Prosser, WA, ³Oregon State University, Corvallis, OR (368)
- 01:30 PM Using Rimsulfuron Tank Mixes to Extend Residual Control of Pindar GT in Southeast Orchards.** Christopher Holmberg*, Wayne E. Mitchem; North Carolina State University, Mills River, NC (369)
- 01:45 PM Penoxsulam+Oxyfluorfen For Residual Weed Management in Western Pecans.** Jesse M. Richardson*¹, William B. McCloskey²; ¹Corteva Agriscience, Mesa, AZ, ²University of Arizona, Tucson, AZ (370)
- 02:00 PM Efficacy of Preemergent Herbicides in Watermelon Production on Bareground Vs. a Cereal Rye Cover.** Matthew B. Bertucci*¹, Amanda McWhirt¹, Alden Hotz², Lesley B. Smith²; ¹University of Arkansas, Fayetteville, AR, ²University of Arkansas, Alma, AR (371)

- 02:15 PM Novel Weed Management Tools for Horticulture Production in Florida.** Ramdas Kanissery*; University of Florida, Immokalee, FL (372)
- 02:30 PM Break**
- 02:45 PM Growth and Reproductive Response of Vidal Blanc Grapes to Dicamba.** Sarah E. Dixon*, Reid Smeda; University of Missouri, Columbia, MO (373)
- 03:00 PM Invasions of a New Species, Alkaliweed (*Crussa truxillensis*) in Orchards of California.** Anil Shrestha*¹, James Schaeffer¹, Kurt J. Hembree²; ¹California State University, Fresno, Fresno, CA, ²University of California Cooperative Extension, Fresno, CA (374)
- 03:15 PM Grape (*Vitis vinifera*) Response to 2,4-D Choline Applied as a Directed Spray in Vineyards.** Wayne E. Mitchem*¹, Kira C. Sims², Christopher Holmberg¹, Katherine M. Jennings³; ¹North Carolina State University, Mills River, NC, ²North Carolina State University, Goldsboro, NC, ³North Carolina State University, Raleigh, NC (375)
- 03:30 PM Effective Management of Yellow Nutsedge in Onion Depends on Herbicides Used in Preceding Crop Rotations.** Joel Felix*; Oregon State University, Ontario, OR (376)
- 03:45 PM Discussion**

TUESDAY AFTERNOON MARCH 3

ORAL - 04. Pasture, Range, Forest, Rights of ways, Wildland, and Aquatic Invasive Plants

LOCATION: Monarchy #2
 TIME: 01:00 PM - 05:00 PM
 MODERATOR: Harold Quicke
 Bayer
 Windsor, CO
 CO-MODERATOR: Shannon Clark
 Colorado State Univ.
 Fort Collins, CO

*SPEAKER † STUDENT CONTEST

- 01:00 PM** **Scotch Broom (*Cytisus scoparius*) Seed Germination Responses to Light.** Timothy B. Harrington*; USDA Forest Service - PNW Research Station, Olympia, WA (377)
- 01:15 PM** †**Revitalizing the Use of Crested Wheatgrass (*Agropyron cristatum*) for the Management of Annual Invasive Grasses.** Emily B. Repas*, Daniel R. Tekiela; University of Wyoming, Laramie, WY (378)
- 01:30 PM** **Management Scale Application of Aminopyralid to Sterilize Medusahead (*Taeniatherum caput-medusae*) Seed on Rangeland.** Jeremy James*¹, Matthew J. Rinella², Josh Davy³, Larry Forero⁴; ¹University of California Division of Agriculture and Natural Resources, Browns Valley, CA, ²USDA-ARS, Miles City, MT, ³University of California Division of Agriculture and Natural Resources, Red Bluff, CA, ⁴University of California Division of Agriculture and Natural Resources, Redding, CA (379)
- 01:45 PM** †**Impact of Relative Early Emergence and Growth Rates of Cool-season Bunchgrasses on Priority Effects with Invasive Grasses.** Jaycie N. Arndt*¹, Brian Meador²; ¹University of Wyoming, Arvada, WY, ²University of Wyoming, Laramie, WY (380)
- 02:00 PM** **Perennial Pepperweed: Does the Drizzle Method of Herbicide Application Work?** Thomas J. Getts*; University of California Cooperative Extension, Susanville, CA (381)
- 02:15 PM** †**Plant Community Data May Improve Susceptibility Modeling for Two Hieracium Species in the Greater Yellowstone Ecosystem.** Christie Hubbard Guetling*¹, Lisa C. Jones¹, Don W. Morishita², Eva K. Strand¹, Julia L. Piaskowski¹, Timothy S. Prather¹; ¹University of Idaho, Moscow, ID, ²University of Idaho, Kimberly, ID (382)
- 02:30 PM** **Break**
- 02:45 PM** †**Evaluating Native Plant Community Response to Prescribed Burning and Indaziflam.** Rachel H. Seedorf*, Shannon Clark, Scott J. Nissen; Colorado State University, Fort Collins, CO (383)

- 03:00 PM** **Invader or Not? Utilizing Drone Remote Sensing to Identify Dalmatian Toadflax (*Linaria dalmatica*) in Rangelands.** Chloe M. Mattilio*, Daniel R. Tekiela; University of Wyoming, Laramie, WY (384)
- 03:15 PM** **†Integrated Management of Leafy Spurge (*Euphorbia esula*) Seed Production in a Riparian Ecosystem.** Hannah A. D. Kuhns*, Daniel R. Tekiela; University of Wyoming, Laramie, WY (385)
- 03:30 PM** **Western Salsify (*Tragopogon dubias*) and Cutleaf Vipergrass (*Scorzonera laciniata*) Response to Selective Herbicides.** Shannon Clark*¹, Rachel H. Seedorf¹, Derek J. Sebastian², Scott J. Nissen¹; ¹Colorado State University, Fort Collins, CO, ²Bayer, Greeley, CO (386)
- 03:45 PM** **†Evaluating the Efficacy of Herbicide to Manage Cheatgrass (*Bromus tectorum*) in High Elevation Sagebrush Steppe.** Colter Mumford*, Jane Mangold, John Winnie, Catherine Zabinski, Lisa J. Rew; Montana State University, Bozeman, MT (387)
- 04:00 PM** **Could Plant - Soil Feedback Play a Role in *Ventenata dubia*'S Invasion of the Inland Pacific Northwest?** Lisa C. Jones*, Brenda Schroeder, Timothy S. Prather; University of Idaho, Moscow, ID (388)
- 04:15 PM** **Discussion**

TUESDAY AFTERNOON MARCH 3

ORAL - 07. Teaching and Extension/ Teaching and Technology Transfer

LOCATION: Monarchy #3
 TIME: 01:00 PM - 05:00 PM
 MODERATOR: Sandeep S. Rana
 Bayer Crop Science
 Galena, MD
 CO-MODERATOR: Thomas J. Getts
 UCCE
 Susanville, CA

***SPEAKER**

- 01:00 PM Herbicide Diversity Calculator: Interactive Web App That Estimates the Risk of Herbicide Resistance.** Andrew R. Kniss¹, Albert T. Adjesiwor*¹, Nevin Lawrence²; ¹University of Wyoming, Laramie, WY, ²University of Nebraska-Lincoln, Scottsbluff, NE (389)
- 01:15 PM Glyphosate and Seed Germination, is the Jury Still Out ?** William T. Cobb*; Cobb Consulting Services, Kennewick, WA (390)
- 01:30 PM Lessons Learned: Implementing *Ventenata* and Medusahead EDRR on a Mixed Ownership Landscape.** Andrew C. Cassidy*¹, Brian Mealor², Luke Sander³; ¹USDA NRCS, Sheridan, WY, ²University of Wyoming, Laramie, WY, ³Sheridan County Weed and Pest, Sheridan, WY (391)
- 01:45 PM Machine Vision: A Promising Tool for Smart Farming.** Aman Rana*, Jeffrey Derr; Virginia Tech, Virginia Beach, VA (392)
- 02:00 PM Winfield® United Clinics: Show and Tell for 21st Century Agriculture.** Gregory K. Dahl*¹, Ryan J. Edwards², Lillian C. Magidow², Annie Makepeace², Genevieve M. Mrnak²; ¹WinField United, Eagan, MN, ²WinField United, River Falls, WI (393)
- 02:15 PM 2019 National Survey Results for the Most Common and Troublesome Weeds in Broadleaf Crops, Fruits, and Vegetables.** Lee Van Wychen*; Weed Science Society of America, Alexandria, VA (394)
- 02:30 PM Break**
- 02:45 PM The History and Future of Adjuvant Research and Education.** Joe V. Gednalske¹, Gary Halvorson*²; ¹Council of Producers & Distributors of Agrotechnology, Washington, DC, ²Council of Producers and Distributors of Agrotechnology, Washington, DC (395)
- 03:00 PM Using Plot Demonstrations to Improve Herbicide Decisions for Waterhemp in Iowa.** Meaghan Anderson*¹, Angie Rieck-Hinz²; ¹Iowa State University, Nevada, IA, ²Iowa State University, Clarion, IA (396)

03:15 PM **Survey of Rice Growing Practices in California Identifies Perceptions and Management of Weeds and Weedy Rice.** Elizabeth Karn¹, Serena Bhagirath¹, Luis Espino², Whitney Brim-DeForest*¹; ¹University of California Division of Agriculture and Natural Resources, Yuba City, CA, ²University of California Division of Agriculture and Natural Resources, Oroville, CA (397)

03:30 PM **An Update on Herbicide-Resistant Kochia and Palmer Amaranth in Western Kansas.** Vipin Kumar*¹, Rui Liu¹, Taylor Lambert¹, Randall S. Currie², Phillip W. Stahlman¹; ¹Kansas State University, Hays, KS, ²Kansas State University, Garden City, KS (398)

03:45 PM **Weeds Week: Using Social Media to Teach About Weed Control.** Jeanne S. Falk Jones*; Kansas State University, Colby, KS (399)

04:00 PM **Discussion**

TUESDAY AFTERNOON MARCH 3

ORAL - 09. Weed Biology and Ecology

LOCATION: Monarchy #7
TIME: 01:00 PM - 04:45 PM
MODERATOR: Caio A. Brunharo
 Oregon State University
 Corvallis, OR
CO-MODERATOR: O. Adewale Osipitan
 University of California-Davis
 Davis, CA

***SPEAKER † STUDENT CONTEST**

01:00 PM **Kochia (*Bassia scoparia*) Biology and Ecology Provide Insight into Optimal Management Scenarios.** Charles M. Geddes*; Agriculture and Agri-Food Canada, Lethbridge, AB, Canada (401)

- 01:15 PM A Multi-state Examination of Weed Phenology and its Drivers.** Lauren M. Lazaro*¹, Lovreet S. Shergill², Jeffrey Evans³, Muthukumar V. Bagavathiannan⁴, Mandy Bish⁵, Jason A. Bond⁶, Kevin W. Bradley⁵, William S. Curran⁷, Adam Davis⁸, Wesley Everman⁹, Michael L. Flessner¹⁰, Nicholas Jordan¹¹, John Lindquist¹², Jason K. Norsworthy¹³, Larry Steckel¹⁴, Mark VanGessel¹⁵, Steven B. Mirsky¹⁶; ¹Louisiana State University AgCenter, Baton Rouge, LA, ²USDA-ARS & University of Delaware, Beltsville, MD, ³Farmscape Analytics, Concord, NH, ⁴Texas A&M University, College Station, TX, ⁵University of Missouri, Columbia, MO, ⁶Mississippi State University, Stoneville, MS, ⁷Penn State University, University Park, PA, ⁸University of Illinois, Urbana, IL, ⁹North Carolina State University, Raleigh, NC, ¹⁰Virginia Tech, Blacksburg, VA, ¹¹University of Minnesota, Saint Paul, MN, ¹²University of Nebraska-Lincoln, Lincoln, NE, ¹³University of Arkansas, Fayetteville, AR, ¹⁴University of Tennessee, Jackson, TN, ¹⁵University of Delaware, Georgetown, DE, ¹⁶USDA-ARS, Beltsville, MD (402)
- 01:30 PM How is Dicamba Doing on Palmer Amaranth (*Amaranthus palmeri*) in the US Mid-South?** Nilda Roma-Burgos*¹, Matheus Machado Noguera¹, Larry Steckel², James W. Heiser³, Taghi Bararpour⁴, Robert L. Nichols⁵; ¹University of Arkansas, Fayetteville, AR, ²University of Tennessee, Jackson, TN, ³University of Missouri, Portageville, MO, ⁴Mississippi State University, Stoneville, MS, ⁵Cotton Incorporated, Cary, NC (403)
- 01:45 PM Impact of Elevated Temperature, CO₂, and Soil Moisture Stress on Seed and Plant Morphological Traits of Italian Ryegrass (*Lolium multiflorum*).** Aniruddha Maity*¹, Zorica Vasic¹, Victor Cieza², Gerald Ray Smith³, Muthukumar V. Bagavathiannan¹; ¹Texas A&M University, College Station, TX, ²Department of Soil and Crop Sciences, Texas A&M University, College Station, TX, ³Texas A&M University, Overton, TX (404)
- 02:00 PM The Effects of Desiccation on Broad-leaved Dock (*Rumex obtusifolius*) and Curled Dock (*Rumex crispus*) Root Fragment Regeneration.** Khalid S. Alshallash*; Shaqra University / Saudi Arabia, Riyadh, Saudi Arabia (405)

- 02:15 PM Ethical Considerations for Predicting Future Distribution of Weeds.** Bruce Maxwell*; Montana State University, Bozeman, MT (406)
Break
- 02:30 PM**
- 02:45 PM A Model for Simulating Crop-Weed Competition for Light, Soil Water and Nitrogen.** John Lindquist*¹, Lammert Bastiaans², Xinyou Yin²; ¹University of Nebraska-Lincoln, Lincoln, NE, ²Wageningen University and Research, Wageningen, Netherlands (407)
- 03:00 PM Climate-Mediated Weed Species Composition Shifts in a Rainfed Corn System.** Erin E. Burns*; Michigan State University, East Lansing, MI (408)
- 03:15 PM Development of a Novel Derived Polymorphic Amplified Cleaved Sequence (dPACS) Assay for the Identification of the Resistance-Causing D210 PPO Codon Deletion in Amaranthus and Ambrosia Species.** Shiv S. Kaundun*, Sarah-Jane Hutchings, Elisabetta Marchegiani, Ruben Rauser, Lucy V. Jackson; Syngenta, Bracknell, United Kingdom (409)
- 03:30 PM An IAA16 Mutation Endowing Dicamba Resistance in Kochia (*Bassia scoparia*) Also Alters Plant Architecture, Vegetative and Reproductive Development, and Reduces Plant Competitiveness.** Chenxi Wu*¹, Marta Paciorek¹, Sherry LeClere¹, Kang Liu¹, Alejandro Perez-Jones², Philip Westra³, Doug Sammons⁴; ¹Bayer CropScience, St Louis, MO, ²Bayer Crop Science, Chesterfield, MO, ³Colorado State University, Fort Collins, CO, ⁴Sammons BFC LLC, St Louis, MO (410)
- 03:45 PM Common Sowthistle (*Sonchus oleraceus*) and Prickly Lettuce (*Lactuca serriola*) in Lentil (*Lens culinaris*) Crops of Southern Australia: Managing Herbicide Resistance and Highly Mobile Resistance Genes.** Alicia B. Merriam*¹, Jenna Malone¹, Gurjeet S. Gill¹, Christopher Preston²; ¹University of Adelaide, Adelaide, Australia, ²University of Adelaide, Glen Osmond, Australia (411)
- 04:00 PM Discussion**

WEDNESDAY MORNING MARCH 4

3MT Student Oral Competition – Final Round

LOCATION: Monarchy #3
TIME: 09:00 AM - 11:00 AM
MODERATOR: Darrin M. Dodds
Mississippi State University
Mississippi State, MS
CO-MODERATOR: Marty Schraer
Meridian, ID

WEDNESDAY MORNING MARCH 4

**SYMPOSIUM - 1. 2020 Vision for Hawaiian
Invasive Plant Management**

LOCATION: Monarchy #2
TIME: 09:00 AM - 12:00 PM
MODERATOR: David R. Clements
Trinity Western University
Langley, BC, Canada
CO-MODERATOR: Curtis Daehler
University of Hawaii at Manoa
Waipahu, HI

***SPEAKER**

09:00 AM Introduction to Symposium. David R. Clements*¹, Curtis Daehler²; ¹Trinity Western University, Langley, BC, Canada, ²University of Hawaii at Manoa, Waipahu, HI (412)

09:10 AM Invasive Plant Establishment and Spread in the Hawaiian Islands: History, Current Trends, and Strategies for Prevention. Curtis Daehler*¹, Kelsey Brock²; ¹University of Hawaii at Manoa, Waipahu, HI, ²University of Hawaii at Manoa, Honolulu, HI (413)

- 09:30 AM The Risk and Resources for Mitigating an Incipient Miconia Invasion.** David Lewis*¹, James Leary², Kimberly Burnett³, Chris Wada³, Brooke Mahnken⁴; ¹University of Hawaii at Manoa- Department of Natural Resources and Environmental Management, Honolulu, HI, ²University of Florida, Gainesville, FL, ³University of Hawaii at Manoa- University of Hawaii Office of Economic Research, Honolulu, HI, ⁴University of Hawaii at Manoa- Maui Invasive Species Committee, Makawao, HI (414)
- 09:50 AM Synergies Between Nonnative Ungulate and Plant Invasions in Hawai'i – Can the Tide be Turned?** Creighton M. Litton*¹, Rebecca J. Cole², Jed P. Sparks³, Christian P. Giardina⁴, Amanda Knauf¹; ¹University of Hawaii at Manoa, Honolulu, HI, ²Osa Conservation, Puerto Jiménez, Costa Rica, ³Cornell University, Ithaca, NY, ⁴Institute of Pacific Islands Forestry, USDA Forest Service, Hilo, HI (415)
- 10:10 AM Break**
- 10:30 AM Challenges for Restoration of Invaded Hawaiian Landscapes: Why We Need the Hybrid Ecosystem Concept.** Rebecca Ostertag*¹, Nicole DiManno¹, Susan Cordell², Amanda Uowolo²; ¹University of Hawaii at Hilo, Hilo, HI, ²Institute of Pacific Islands Forestry, USDA Forest Service, Hilo, HI (416)
- 10:50 AM Challenges for Restoration of Invaded Hawaiian Wet Forest Ecosystems.** Christy Martin*; UH PCSU/Coordinating Group on Alien Pest Species, Honolulu, HI (417)
- 11:10 AM Challenges for Restoration of Invaded Hawaiian Dry Forest Ecosystems.** Susan Cordell*; Institute of Pacific Islands Forestry, USDA Forest Service, Hilo, HI (418)
- 11:30 AM Hawaiian Invasions as a Call for Help for Invasions Throughout the Pacific Islands – What Hope is There for the Future of Island Ecosystems?** David R. Clements*; Trinity Western University, Langley, BC, Canada (419)
- 11:50 AM Discussion.** David R. Clements*¹, Curtis Daehler²; ¹Trinity Western University, Langley, BC, Canada, ²University of Hawaii at Manoa, Waipahu, HI (420)

WEDNESDAY MORNING MARCH 4

**SYMPOSIUM - 2. The Role of Intelligent
Machines in Weed Management**

LOCATION: Monarchy #4
TIME: 09:00 AM - 04:30 PM
MODERATOR: Steve Fennimore
University of California - Davis
Salinas, CA
CO-MODERATOR: Sharon Clay
SDSU
Brookings, SD

***SPEAKER**

- 09:00 AM Introduction to Symposium.** Sharon Clay*; South Dakota State University, Brookings, SD (421)
- 09:15 AM Deep Learning and Weed Management - from Data Acquisition to Control of Herbicide-Resistant Weeds.** William L. Patzoldt*; Blue River Technology, Sunnyvale, CA (422)
- 09:45 AM Weed 4.0—A Data-Driven Weed Science and Technology.** Mohsen B. Mesgaran*; University of California, Davis, Davis, CA (423)
- 10:15 AM Break**
- 10:30 AM Tackling the Herbicide Resistant Weed Crisis with Teams of Mechanical Agbots.** Girish Chowdhary*; University of Illinois, Champaign, IL (424)
- 11:00 AM Autonomous Weeding in Vegetable Crops.** Thomas Palomares*; FarmWise, San Francisco, CA (425)
- 11:30 AM Economic Considerations for Automated Weed Management in Vegetable Crops.** Laura Tourte*; University of California Cooperative Extension, Watsonville, CA (426)
- 12:00 PM Lunch**

- 01:00 PM Linkage Between Workforce Development and Precision Agriculture Diffusion.** Scott Fausti*¹, Sumadhur Shakya¹, Sharon Clay², David Clay², Bruce Erickson³; ¹California State Univ. Monterey Bay, Marina, CA, ²South Dakota State University, Brookings, SD, ³Purdue University, West Lafayette, IN (427)
- 01:30 PM 2D And 3D Vision Techniques for Crop Plant Detection in Mechanical Intra-row Weed Control.** Lie Tang*; Iowa State University, Ames, IA (428)
- 02:00 PM Machine Vision Systems for Automated Weeding – Current Technologies and Future Directions.** Mark C. Siemens*; University of Arizona, Yuma, AZ (429)
- 02:30 PM Break**
- 02:45 PM Precision Crop Protection: Soil Management Zones for Optimizing Weed Control Efficacy.** Anita Dille*¹, Garrison J. Gundy²; ¹Kansas State University, Manhattan, KS, ²Valent U.S.A LLC, Seymour, IL (430)
- 03:15 PM The Advent of Autonomous Solutions in the Management of Weeds, and its Impact on the Use of Chemicals for Precision Agriculture.** Wade Robey*; Raven Industries, Sioux Falls, SD (431)
- 03:45 PM Panel and Open Discussion.** Steve Fennimore*; University of California, Davis, Salinas, CA (432)

WEDNESDAY MORNING MARCH 4

ORAL - 01. Agronomic Crops I

- LOCATION: Monarchy #5
- TIME: 09:00 AM - 12:00 PM
- MODERATOR: Vipin Kumar
Kansas State University
Hays, KS
- CO-MODERATOR: Misha R. Manuchehri
Oklahoma State University
Stillwater, OK

***SPEAKER † STUDENT CONTEST**

- 09:00 AM †Herbicides for Industrial Hemp Grain Production.** Joseph Mettler*, Kirk A. Howatt; North Dakota State University, Fargo, ND (433)
- 09:15 AM Common Ragweed (*Ambrosia artemisiifolia*) and Palmer Amaranth (*Amaranthus palmeri*) Control and Fecundity from POST Herbicides at Various Growth Stages with and without Fomesafen.** Eric B. Scruggs*, Michael L. Flessner; Virginia Tech, Blacksburg, VA (434)
- 09:30 AM †Herbicide Potential for Palmer Amaranth (*Amaranthus palmeri*) Control in Sugarbeet, Selectivity of Desmedipham and Phenmedipham.** Clint W. Beiermann*¹, Cody F. Creech¹, Amit J. Jhala², Stevan Knezevic³, Robert Harveson¹, Nevin Lawrence¹; ¹University of Nebraska-Lincoln, Scottsbluff, NE, ²University of Nebraska-Lincoln, Lincoln, NE, ³University of Nebraska-Lincoln, Concord, NE (435)
- 09:45 AM Comparing Weed Communities of Perennial and Annual Small Grain Cropping Systems.** Eugene P. Law*¹, Matthew P. Spoth¹, Sandra Wayman¹, Christopher J. Pelzer¹, Matthew R. Ryan¹, Antonio DiTommaso²; ¹Cornell University, Ithaca, NY, ²Cornell University, Dryden, NY (436)
- 10:00 AM †Herbicide Efficacy on Threespike Goosegrass (*Eleusine tristachya*) in California Orchards.** Drew A. Wolter*¹, Brad Hanson²; ¹University of California, Davis, Sacramento, CA, ²University of California, Davis, Winters, CA (437)
- 10:15 AM Break**
- 10:30 AM Trials and Tribulations with the Integrated Harrington Seed Destructor in Arkansas.** Tom Barber*¹, Thomas R. Butts¹, Jason K. Norsworthy²; ¹University of Arkansas System Division of Agriculture, Lonoke, AR, ²University of Arkansas, Fayetteville, AR (438)
- 10:45 AM Initial Impressions of the Seed Terminator™ as a Harvest Weed Seed Control Tool After One Season of Evaluation in Missouri.** Kevin W. Bradley*; University of Missouri, Columbia, MO (439)

- 11:00 AM** **Man vs. Machine: Using Drone Aerial Imagery to Accurately Quantify Herbicide Tolerance.**
Eric N. Johnson, Christian J. Willenborg, Steve Shirliffe*, Hemma Duddu; University of Saskatchewan, Saskatoon, SK, Canada (440)
- 11:15 AM** **The Role of Unintelligent Machines in Weed Management.** Eric N. Johnson*, Steven J. Shirliffe; University of Saskatchewan, Saskatoon, SK, Canada (441)
- 11:30 AM** **Integrating Gene Editing and Synthetic Biology to Develop Next-Generation Herbicide Resistant Crops.** Lucas Lieber*; BIOHEURIS, St. Louis, MO (442)
- 11:45 AM** **Value of Weed Maps at Harvest in Wheat Cropping Systems of the PNW.** Judit Barroso*¹, Carolina San Martin Hernandez², John D. McCallum³, Dan S. Long³; ¹Oregon State University, Adams, OR, ²Oregon State University, Pendleton, OR, ³USDA-ARS, Adams, OR (443)

WEDNESDAY MORNING MARCH 4

ORAL - 04. Pasture, Range, Forest, Rights of ways, Wildland, and Aquatic Invasive Plants

LOCATION: Monarchy #1
 TIME: 09:00 AM - 12:00 PM
 MODERATOR: Glenn Nice
 University of Wisconsin
 Madison
 Madison, WV
 CO-MODERATOR: Mark J. Renz
 University of Wisconsin
 Madison
 Madison, WV

***SPEAKER † STUDENT CONTEST**

09:00 AM **†Impacts of Indaziflam on Biodiversity of Intact Sage-brush Steppe Plant Communities.** Jordan Meyer-Morey*, Lisa J. Rew, Jane Mangold; Montana State University, Bozeman, MT (444)

- 09:15 AM** **Management of Red Bromegrass (*Bromus rubens*) with Indaziflam and Other Pre-Emergent Herbicides.** John H. Brock*; Arizona State University, Tempe, AZ (445)
- 09:30 AM** **†Influence of Seeding Depth on Native Species Establishment in the Presence of Indaziflam.** Jodie A. Crose*¹, Brian Mealor²; ¹University of Wyoming, Sheridan, WY, ²University of Wyoming, Laramie, WY (446)
- 09:45 AM** **Utilizing a Weed Risk Assessment for Listing State Noxious Weeds.** Daniel R. Tekiela*; University of Wyoming, Laramie, WY (447)
- 10:00 AM** **†Florpyrauxifen-benzyl: A Novel Auxin Herbicide for Aquatic Plant Management.** Mirella F. Ortiz*, Franck E. Dayan; Colorado State University, Fort Collins, CO (448)
- 10:15 AM** **Break**
- 10:30 AM** **†Management of Ventenata (*Ventenata dubia*) with Indaziflam at Different Preemergent Timings on Conservation Reserve Program Land.** Jared A. Beuschlein*¹, Rachel J. Zuger¹, Timothy S. Prather², Harold Quicke³, Ian Burke¹; ¹Washington State University, Pullman, WA, ²University of Idaho, Moscow, ID, ³Bayer, Windsor, CO (449)
- 10:45 AM** **Changes in Botanical Canopy Cover and Seasonal Forage Production with Herbicide Impregnated Dry Fertilizer.** Scott Flynn*¹, Byron B. Sleugh², D Chad Cummings³, William L. Hatler⁴, David E. Hillger⁵; ¹Corteva Agriscience, Lee's Summit, MO, ²Corteva Agriscience, Carmel, IN, ³Corteva Agriscience, Bonham, TX, ⁴Corteva Agriscience, Meridian, ID, ⁵Corteva Agriscience, Thorntown, IN (450)
- 11:00 AM** **†The Effect of Common and Novel Pasture Herbicides on Forage Grass Establishment.** Wykle C. Greene*, Michael L. Flessner; Virginia Tech, Blacksburg, VA (451)
- 11:15 AM** **Growth Regulator Effects on Ventenata (*Ventenata dubia*) Seed Viability Under Field Conditions.** Beth Fowers*¹, Brian Mealor², William L. Hatler³; ¹University of Wyoming, Sheridan, WY, ²University of Wyoming, Laramie, WY, ³Corteva Agriscience, Meridian, ID (452)

11:30 AM †**Impacts of Simulated Trampling on Nonstructural Carbohydrates in Yellow-Flag Iris (*Iris pseudacorus*)**. Alexandra L. Stoneburner*; Colorado State University, Fort Collins, CO (453)

11:45 AM **Long-term Outcome of Integrating Herbicide and Seeding in Leafy Spurge (*Euphorbia esula*)-Invaded Rangeland**. Matthew J. Rinella¹, Alan D. Knudsen², Jim S. Jacobs³, Jane Mangold*⁴; ¹USDA-ARS, Miles City, MT, ²Missoula County Weed District, Missoula, MT, ³NRCS, retired, Bozeman, MT, ⁴Montana State University, Bozeman, MT (454)

WEDNESDAY MORNING MARCH 4

ORAL - 11. Physiology

LOCATION: Monarchy #6
TIME: 09:00 AM - 12:00 PM
MODERATOR: Te-Ming (Paul) Tseng
Mississippi State University
Mississippi State, MS
CO-MODERATOR: Chenxi Wu
Bayer CropScience
St Louis, MO

***SPEAKER † STUDENT CONTEST**

09:00 AM **Role of Epigenetics Modifications in the Development of Herbicide Resistance**. Gourav Sharma*, Jacob Barney, Shawn Askew, James Westwood, David Haak, Suzanne Laliberte, Liqing Zhang; Virginia Tech, Blacksburg, VA (455)

09:15 AM **A Characterization of Tissue Specific Alpha-Tubulin Gene Expression Two Grass Species, Annual Bluegrass (*Poa annua*) and Finger Millet (*Eleusine coracana*)**. Nathan D. Hall*, Jinesh D. Patel, Elijah C. Russell, James Harris, Leslie R. Goertzen, Joseph S. McElroy; Auburn University, Auburn, AL (456)

- 09:30 AM** **Establishing a Basis for 2,4-D Tolerance in Red Clover (*Trifolium pratense*): RNA-seq Analysis of Susceptible and Tolerant Cultivars Following 2,4-D Application.** Lucas Araujo*¹, Michael Barrett¹, Randy Dinkins², Linda D. Williams¹, Troy Bass²; ¹University of Kentucky, Lexington, KY, ²USDA/FAPRU, Lexington, KY (457)
- 09:45 AM** **Mechanisms of 2,4-D Resistance in Palmer Amaranth.** Wendy A. Peer*; University of Maryland, College Park, MD (458)
- 10:00 AM** **Investigation of Lactofen Resistance in a Population of *Amaranthus palmeri*.** Jacob S. Montgomery*, Darci A. Giacomini, Patrick Tranel; University of Illinois, Urbana, IL (459)
- 10:15 AM** **Break**
- 10:30 AM** **Integrating UPLC-qTOF-MS and UPLC-MS/MS to Characterize Resistance to Bentazon in *Chenopodium album* L. Populations from Oregon.** Lucas Baiochi Riboldi*, Ed Peachey, Andrew G. Hulting, Caio A. Brunharo; Oregon State University, Corvallis, OR (460)
- 10:45 AM** **QTL Discovery for Resistance to HPPD Inhibitors in *Amaranthus tuberculatus*.** Brent P. Murphy*, Patrick Tranel; University of Illinois, Urbana, IL (461)
- 11:00 AM** **Modes of Action of Two Natural Herbicides in the Bioherbicide MBI-014.** Stephen O. Duke*¹, Franck E. Dayan², Louis G. Boddy³, Zhiqiang Pan⁴, Joanna Basja-Hirschel⁴; ¹University of Mississippi, Oxford, MS, ²Colorado State University, Fort Collins, CO, ³Marrone BIo Innovations, Davis, CA, ⁴USDA- ARS, Oxford, MS (462)
- 11:15 AM** **Resistance to a Non-Selective HPPD-Inhibiting Herbicide in Multiple-Resistant Waterhemp (*Amaranthus tuberculatus*) Populations.** Jeanafior Crystal Concepcion¹, Sarah-Jane Hutchings², James Morris², Shiv S. Kaundun², Anatoli V. Lygin¹, Dean E. Riechers*¹; ¹University of Illinois, Urbana, IL, ²Syngenta, Bracknell, United Kingdom (463)

11:30 AM **The Transcriptional Landscape of Glyphosate Resistance in Palmer Amaranth (*Amaranthus palmeri*): More Than EPSPS Gene Amplification.** William T. Molin*¹, Christopher A. Saski²; ¹USDA-ARS, Stoneville, MS, ²Clemson University, Clemson, SC (464)

11:45 AM **Progress in the Characterization of CYPs and GSTs Involved in Weed Resistance to Herbicides. Functional Validation.** Roland S. Beffa*; Bayer AG, CropScience Division, Frankfurt, Germany (465)

WEDNESDAY MORNING MARCH 4

ORAL - 13. Integrated Weed Management

LOCATION: Monarchy #7
TIME: 09:00 AM - 12:00 PM
MODERATOR: Vijay Singh
 Virginia Tech
 Painter, VA
CO-MODERATOR: Shilpa Singh
 Texas A&M University
 College Station, TX

***SPEAKER** † **STUDENT CONTEST**

09:00 AM **Multiple Modes of Selection Prove Successful in Managing Horseweed (*Conyza canadensis* (L.) Cronq.).** Theodore R. Vanhie*¹, Michael Cowbrough², Clarence Swanton³, Francois Tardif¹; ¹University of Guelph, Guelph, ON, Canada, ²Ontario Ministry of Agriculture, Food and Rural Affairs, Guelph, ON, Canada, ³University of Guelph, Guelph, AZ, Canada (466)

09:15 AM **Pollen Swamping Population Management Possibilities for Waterhemp (*Amaranthus tuberculatus*) Simulated *in silico*.** Brendan C. Alexander*, Patrick Tranel, Aaron Hager, Nicolas F. Martin, Adam Davis; University of Illinois, Urbana, IL (467)

- 09:30 AM Unexpected Resistance Evolution to a Carotenoid Biosynthesis Inhibiting Herbicide in Field Selected Cross-Resistant Rigid Ryegrass (*Lolium rigidum*) Populations from Australia.** David J. Brunton*; University of Adelaide, Adelaide, Australia (468)
- 09:45 AM Present Status and Future Strategies for the Management of Herbicide Resistant Weeds of Wheat in India.** Samunder Singh*; CCS HAU Hisar, Hisar, India (469)
- 10:00 AM Long-term Multi-tactic Herbicide Resistance Weed Management.** Steven B. Mirsky*¹, Lovreet S. Shergill², Mark VanGessel³, Jason K. Norsworthy⁴, Adam Davis⁵; ¹USDA-ARS, Beltsville, MD, ²USDA-ARS & University of Delaware, Beltsville, MD, ³University of Delaware, Georgetown, DE, ⁴University of Arkansas, Fayetteville, AR, ⁵University of Illinois, Urbana, IL (470)
- 10:15 AM Break**
- 10:30 AM The Western IPM Kochia Work Group: Update and Next Steps.** Todd A. Gaines*¹, Charles M. Geddes², Philip Westra¹, Kelly Bennett³, Cody F. Creech⁴, Rory Degenhardt⁵, Mithila Jugulam⁶, Rand Merchant⁷, Sarah Morran¹, Olivia E. Todd¹; ¹Colorado State University, Fort Collins, CO, ²Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ³Corteva Agriscience Canada, Calgary, AB, Canada, ⁴University of Nebraska-Lincoln, Scottsbluff, NE, ⁵Affiliation Not Specified, Edmonton, AB, Canada, ⁶Kansas State University, Manhattan, KS, ⁷BASF, Greeley, CO (471)
- 10:45 AM Efficacy of Cotton and Peanut Residual Herbicides in High Residue Cover Crop System.** Katilyn J. Price*, Steve Li, Frances B. Browne, Ryan D. Langemeier; Auburn University, Auburn, AL (472)
- 11:00 AM Impact of Four Winter Cover Crop Species and Termination Timing on Weed Suppression, Soil Moisture Dynamics, and Yield in Cotton.** Spencer L. Samuelson*, Muthukumar V. Bagavathiannan; Texas A&M University, College Station, TX (473)

11:15 AM Using Living Mulch in Reduced Tillage Sweet Corn. Alan W. Leslie*, Veronica Yurchak, Cerruti R. Hooks; University of Maryland, College Park, MD (474)

11:30 AM Cover Crop-based Weed Management in Soybean Across mid-Atlantic, North-central, and South-central United States. Lovreet S. Shergill*¹, Mark VanGessel², Michael L. Flessner³, Muthukumar V. Bagavathiannan⁴, Kevin W. Bradley⁵, John Lindquist⁶, Jason A. Bond⁷, Lauren M. Lazaro⁸, Adam Davis⁹, Jason K. Norsworthy¹⁰, William S. Curran¹¹, Wesley Everman¹², George Frisvold¹³, Nicholas Jordan¹⁴, Larry Steckel¹⁵, Steven B. Mirsky¹⁶; ¹USDA-ARS & University of Delaware, Beltsville, MD, ²University of Delaware, Georgetown, DE, ³Virginia Tech, Blacksburg, VA, ⁴Texas A&M University, College Station, TX, ⁵University of Missouri, Columbia, MO, ⁶University of Nebraska-Lincoln, Lincoln, NE, ⁷Mississippi State University, Stoneville, MS, ⁸Louisiana State University AgCenter, Baton Rouge, LA, ⁹University of Illinois, Urbana, IL, ¹⁰University of Arkansas, Fayetteville, AR, ¹¹Penn State University, University Park, PA, ¹²North Carolina State University, Raleigh, NC, ¹³University of Arizona, Tucson, AZ, ¹⁴University of Minnesota, Saint Paul, MN, ¹⁵University of Tennessee, Jackson, TN, ¹⁶USDA-ARS, Beltsville, MD (475)

11:45 AM †Evaluation of Post Emergence Applications of Mustard Seed Meal in Chile Pepper. Asmita Nagila*, Brian J. Schutte, Soum Sanogo, John Idowu; New Mexico state university, Las Cruces, NM (476)

WEDNESDAY AFTERNOON MARCH 4

ORAL - 01. Agronomic Crops I

LOCATION: Monarchy #5
TIME: 01:00 PM - 04:30 PM
MODERATOR: Ryan D. Lins
Syngenta Crop Protection, LLC
Rochester, MN
CO-MODERATOR: Alejandro Perez-Jones
Bayer Crop Science
Chesterfield, MO

***SPEAKER**

- 01:00 PM Sustaining the Utility of Herbicides in U.S. Agriculture: What Have We Learned and What is the Path Forward?** Jason K. Norsworthy*¹, Muthukumar V. Bagavathiannan²; ¹University of Arkansas, Fayetteville, AR, ²Texas A&M University, College Station, TX (477)
- 01:15 PM Presence of Neighbouring Weeds Alters the Response of Maize to Thiamethoxam.** Megan House¹, Sasan Amirsadeghi², Clarence Swanton*³, Lewis Lukens²; ¹University of Saskatchewan, Saskatoon, SK, Canada, ²University of Guelph, Guelph, ON, Canada, ³University of Guelph, Guelph, AZ, Canada (478)
- 01:30 PM Italian Ryegrass (*Lolium perenne* Ssp. *multiflorum*) Timing of Removal Effects on Corn Growth and Yield in Mississippi.** Michael T. Wesley Jr.¹, J Connor Ferguson*¹, Jason A. Bond², Daniel B. Reynolds¹, Erick J. Larson¹; ¹Mississippi State University, Mississippi State, MS, ²Mississippi State University, Stoneville, MS (479)
- 01:45 PM Optimizing the Use of Pyroxasulfone for Grass Weed Control in Cool-Season Grasses Grown for Seed.** Andrew G. Hulting*, Kyle Roerig, Caio A. Brunharo, Carol Mallory-Smith; Oregon State University, Corvallis, OR (480)
- 02:00 PM Effect of Cereal Residual Herbicides on Faba Bean Planted the Following Season.** Sid A. Darras*, Eric N. Johnson, Christian J. Willenborg; University of Saskatchewan, Saskatoon, SK, Canada (481)
- 02:15 PM Intercropping Winter Wheat into Forage Radish (*Raphanus sativus*).** Michael L. Flessner*¹, Kara Pittman¹, Mark S. Reiter², Eric B. Scruggs¹, Kevin W. Bamber¹; ¹Virginia Tech, Blacksburg, VA, ²Virginia Tech, Painter, VA (482)
- 02:30 PM Break**
- 02:45 PM Helping Glufosinate Work in the West: Adjuvants, Rates, and Timings.** Andrew R. Kniss*; University of Wyoming, Laramie, WY (483)

- 03:00 PM Preplant Burndown Weed Control with Elevore® Herbicide with Arylex™ Active.** Joe Armstrong*¹, Kristin Rosenbaum², David Saunders³; ¹Corteva Agriscience, Indianapolis, IN, ²Corteva Agriscience, Coffey, MO, ³Corteva Agriscience, Dallas Center, IA (484)
- 03:15 PM Introduction and Overview of MON 301107: A New Glyphosate Formulation.** Christopher M. Mayo*¹, Ross A. Recker², David J. Mayonado³, Neha Rana⁴; ¹Bayer, Gardner, KS, ²Bayer, Smithton, IL, ³Bayer, Hebron, MD, ⁴Bayer Crop Science, St Louis, MO (485)
- 03:30 PM The Bicyclopyrone Weed Control Advantage in a New Premix Product Concept for Corn.** Ryan D. Lins*¹, Thomas H. Beckett², Scott E. Cully³, Gordon D. Vail², Dane L. Bowers²; ¹Syngenta, Rochester, MN, ²Syngenta, Greensboro, NC, ³Syngenta, Marion, IL (486)
- 03:45 PM Triazine Benefits in Corn and Sorghum.** Carroll Moseley*¹, David Bridges², Patricia D. Laird³; ¹Syngenta, High Point, NC, ²Abraham Baldwin University, Tifton, GA, ³Syngenta Crop Protection, Greensboro, NC (487)
- 04:00 PM Dimetric Charged: A New Option for Burndown and Residual Weed Control.** Ryan J. Edwards*¹, Gregory K. Dahl²; ¹WinField United, River Falls, WI, ²WinField United, Eagan, MN (488)
- 04:15 PM Impact of Pre-Harvest Glyphosate on Oat (*Avena sativa*).** Christian J. Willenborg*¹, Eric N. Johnson¹, Nancy Ames²; ¹University of Saskatchewan, Saskatoon, SK, Canada, ²Agriculture and Agri-Food Canada, Winnipeg, MB, Canada (489)

WEDNESDAY AFTERNOON MARCH 4

ORAL - 01. Agronomic Crops II

LOCATION: Monarchy #6
TIME: 01:00 PM - 04:30 PM
MODERATOR: Joseph T. Ikley
North Dakota State University
Fargo, ND
CO-MODERATOR: Misha R. Manuchehri
Oklahoma State University
Stillwater, OK

***SPEAKER**

- 01:00 PM** **Future of Academic Weed Science from Hemp to Students to Cancer.** David D. Baltensperger*; Texas A&M University, College Sttion, TX (490)
- 01:15 PM** **Weed Management in Cotton as Influenced by Cover Crop and Herbicide Program.** Pratap Devkota*, Ruby Tiwari, Prasanna Kharel, Michael J. Mulvaney; University of Florida, Jay, FL (491)
- 01:30 PM** **Florpyrauxifen-benzyl Sensitivity in *Gossypium hirsutum*, as Influenced by Application Placement.** Ryan C. Doherty*¹, Tom Barber², Leah M. Collie³, Zachary T. Hill⁴; ¹University of Arkansas Division of Agriculture Research & Extension, Monticello, AR, ²University of Arkansas System Division of Agriculture, Lonoke, AR, ³University of Arkansas System Division of Agriculture, Beebe, AR, ⁴University of Arkansas Cooperative Extension Service, Monticello, AR (492)
- 01:45 PM** **Kochia (*Bassia scoparia*) Control in Enlist™ Cotton (*Gossypium hirsutum*) Following Different Preplant Herbicide Options in the Texas High Plains.** Ubaldo Torres*¹, Peter A. Dotray², Kyle R. Russell¹, Michael Lovelace³; ¹Texas Tech University, Lubbock, TX, ²Texas Tech University and Texas A&M AgriLife Research and Extension Service, Lubbock, TX, ³Corteva Agriscience, Lubbock, TX (493)

- 02:00 PM Use of Isoxaflutole as an Alternative Herbicide Site of Action in Cotton.** Rodger B. Farr*¹, Jason K. Norsworthy¹, Tom Barber², Grant L. Priess¹, Mason C. Castner¹; ¹University of Arkansas, Fayetteville, AR, ²University of Arkansas System Division of Agriculture, Lonoke, AR (494)
- 02:15 PM Evaluating Tank Mix Partners with Isoxaflutole Across the Cotton Belt.** Delaney C. Foster*¹, Peter A. Dotray², Seth A. Byrd³, A Stanley Culpepper⁴, Darrin M. Dodds⁵, Steven D. Hall⁶, Bradley J. Norris⁵, Reagan L. Noland⁷, Scott A. Nolte⁸, Mason T. House⁹, Jason K. Norsworthy¹⁰, Rodger B. Farr¹⁰, Larry Steckel¹¹, Corey Thompson¹²; ¹Texas Tech University, Lubbock, TX, ²Texas Tech University and Texas A&M AgriLife Research and Extension Service, Lubbock, TX, ³Oklahoma State University, Stillwater, OK, ⁴University of Georgia, Tifton, GA, ⁵Mississippi State University, Mississippi State, MS, ⁶Mississippi State University, Starkville, MS, ⁷Texas A&M Agrilife Extension Service, San Angelo, TX, ⁸Texas A&M AgriLife Extension, College Station, TX, ⁹Texas A&M University, College Station, TX, ¹⁰University of Arkansas, Fayetteville, AR, ¹¹University of Tennessee, Jackson, TN, ¹²BASF, Abernathy, TX (495)
- 02:30 PM Break**
- 02:45 PM Safety of Pre- and Early-post Herbicides to Hemp for Seed Production.** Angela R. Post*; North Carolina State University, Raleigh, NC (496)
- 03:00 PM Challenges and Opportunities for Weed Control in Popcorn.** Ethann R. Barnes*¹, Stevan Knezevic², Nevin Lawrence³, Amit J. Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, Concord, NE, ³University of Nebraska-Lincoln, Scottsbluff, NE (497)
- 03:15 PM Utility of Two New Premix Concepts Containing Rinskor Active for Improved Efficacy and Weed Spectrum in MidSouth Rice Production.** Drew Ellis*¹, Larry C. Walton², Hunter Perry³, Chris J. Meyer³, Jeff Ellis⁴, Mauricio Morell⁵; ¹Corteva Agriscience, Arlington, TN, ²Corteva, Tupelo, MS, ³Corteva agriscience, Leland, MS, ⁴Dow AgroSciences, Sterlington, LA, ⁵Corteva Agriscience, Indianapolis, IN (498)

- 03:30 PM Efficacy and Crop Safety of Rinskor™ Active (Florpyrauxifen-benzyl) in California Rice.** Stephen F. Colbert*¹, Mauricio Morell²; ¹Corteva Agriscience, Escalon, CA, ²Corteva Agriscience, Indianapolis, IN (499)
- 03:45 PM Rice Production in Canada and Challenges of Weed Management.** Kalidas Subedi*; Agriculture and Agri-Food Canada, Ottawa, ON, Canada (500)
- 04:00 PM Efficacy of Metamitron Applied PRE in the High Plains Sugar Beet Production Region.** Andrew R. Kniss*; University of Wyoming, Laramie, WY (501)
- 04:15 PM Volunteer Corn Management with Fluazifop + Dicamba Tank Mixtures in Dicamba Tolerant Soybean.** Marty Schraer*¹, Peter Eure², Thomas H. Beckett², Marshall Hay³, Sudeep Matthew², Ethan T. Parker³; ¹Syngenta, Meridian, ID, ²Syngenta, Greensboro, NC, ³Syngenta, Vero Beach, FL (502)

WEDNESDAY AFTERNOON MARCH 4

ORAL - 03. Turf and Ornamentals

LOCATION: Monarchy #3
 TIME: 01:00 PM - 04:30 PM
 MODERATOR: Anthony L. Witcher
 Tennessee State University
 McMinnville, TN
 CO-MODERATOR: Sandeep S. Rana
 Bayer Crop Science
 Galena, MD

***SPEAKER**

01:00 PM Crew Specialty Herbicide (Dithiopyr + Isoxaben): A New Herbicide for Broad-Spectrum Weed Control in Turf and Ornamentals. David E. Hillger*¹, Amy L. Agi², Paul Marquardt³; ¹Corteva Agriscience, Thorntown, IN, ²Corteva Agriscience, Brooks, GA, ³Corteva Agriscience, Des Moines, IA (503)

- 01:15 PM** **Moisture Status Affects Efficacy of Foramsulfuron for Postemergence Goosegrass (*Eleusine indica*) Control.** James Brosnan*¹, Avat Shekoofa², Matthew T. Elmore³, Jose J. Vargas¹, Dan Tuck³, Greg Breeden¹, Joaquin Simon²;
¹University of Tennessee, Knoxville, TN, ²University of Tennessee, Jackson, TN, ³Rutgers University, New Brunswick, NJ (504)
- 01:30 PM** **Efficacy of Pinoxaden for Grass Control.** Jeffrey Derr*; Virginia Tech, Virginia Beach, VA (505)
- 02:00 PM** **Frequent, Low-Dose Treatments for Weed Control on Putting Greens.** John M. Peppers*, John Brewer, Shawn Askew; Virginia Tech, Blacksburg, VA (506)
- 02:15 PM** **Mitigating Creeping Bentgrass Phytotoxicity from Topramezone.** Clebson G. Goncalves*¹, John Brewer¹, Joseph S. McElroy², Shawn Askew¹;
¹Virginia Tech, Blacksburg, VA, ²Auburn University, Auburn, AL (507)
- 02:30 PM** **Break**
- 02:45 PM** **NativeKlean™ Herbicide (Aminopyralid + 2,4-D): A New Herbicide for Native Grass Roughs on Golf Courses.** David E. Hillger*¹, Amy L. Agi², Paul Marquardt³; ¹Corteva Agriscience, Thorntown, IN, ²Corteva Agriscience, Brooks, GA, ³Corteva Agriscience, Des Moines, IA (508)
- 03:00 PM** **Winter Slicing and Herbicides Affect Bermudagrass (*Cynodon dactylon*) Control in Creeping Bentgrass.** Shawn Askew*, Jordan M. Craft, John Brewer; Virginia Tech, Blacksburg, VA (509)
- 03:15 PM** **Control of Bermudagrass (*Cynodon dactylon*) with Dazomet, Glyphosate, and Glyphosate Alternatives.** Fred Yelverton*¹, Patrick E. McCullough², Travis Gannon¹; ¹North Carolina State University, Raleigh, NC, ²University of Georgia, Griffin, GA (510)
- 03:30 PM** **Consistent Efficacy and Defining the Use of ALS-Inhibiting Herbicides for Purple Nutsedge (*Cyperus rotundus*) Control in Turf.** Kai Umeda*; University of Arizona, Phoenix, AZ (511)

- 03:45 PM Weed Management in Carbon Seeded Kentucky Bluegrass and Perennial Ryegrass.** Raul Arroyo Rosas¹, Tara L. Burke*², Rachel J. Zuger¹, Ian Burke¹; ¹Washington State University, Pullman, WA, ²Washington State University, Albion, WA (512)
- 04:00 PM Improving Tolerance of Pollinator-Serving Plants to Herbicides Using Band-Applied Charcoal.** Shawn Askew*, Jordan M. Craft, Morgan Shock; Virginia Tech, Blacksburg, VA (513)
- 04:15 PM Evaluating Preemergent Herbicides for Use in Tropical Plants.** Nathan Boyd¹, Shawn T. Steed*²; ¹University of Florida, Balm, FL, ²University of Florida, Seffner, FL (514)

WEDNESDAY AFTERNOON MARCH 4

ORAL - 04. Pasture, Range, Forest, Rights of ways, Wildland, and Aquatic Invasive Plants

LOCATION: Monarchy #1
 TIME: 01:00 PM - 04:30 PM
 MODERATOR: Mark J. Renz
 University of Wisconsin
 Madison
 Madison, WV
 CO-MODERATOR: Glenn Nice
 University of Wisconsin
 Madison
 Madison, WV

***SPEAKER † STUDENT CONTEST**

- 01:00 PM †Long-term Downy Brome (*Bromus tectorum*) Seedling Reduction with Indaziflam in Sagebrush-Grassland Plant Communities in Sublette County, WY US.** Jake Courkamp*; Colorado State University, Fort Collins, CO (515)

- 01:15 PM Ecosystem Response to Thirteen Operational Indaziflam Cheatgrass (*Bromus tectorum*) Treatments.** James Sebastian*¹, Steve Sauer¹, Shannon Clark², Derek J. Sebastian³; ¹Boulder County Open Space, Longmont, CO, ²Colorado State University, Fort Collins, CO, ³Bayer, Greeley, CO (516)
- 01:30 PM †Evaluating the Efficacy of Various Herbicides for Bulbous Bluegrass (*Poa bulbosa*) Control.** Jordan L. Skovgard*; University of Wyoming, Laramie, WY (517)
- 01:45 PM Restoration of Invasive Annual Grass Degraded Landscapes: Overview of the Indaziflam Field Trial Program.** Harold Quicke*¹, John H. Brock², Ian Burke³, Shannon Clark⁴, Thomas J. Getts⁵, Jane Mangold⁶, Brian Mealor⁷, Scott J. Nissen⁴, Timothy S. Prather⁸, Corey V. Ransom⁹, Derek J. Sebastian¹⁰, Stephen M. Van Vleet¹¹; ¹Bayer, Windsor, CO, ²Arizona State University, Tempe, AZ, ³Washington State University, Pullman, WA, ⁴Colorado State University, Fort Collins, CO, ⁵University of California Cooperative Extension, Susanville, CA, ⁶Montana State University, Bozeman, MT, ⁷University of Wyoming, Laramie, WY, ⁸University of Idaho, Moscow, ID, ⁹Utah State University, Logan, UT, ¹⁰Bayer, Greeley, CO, ¹¹Washington State University, Colfax, WA (518)
- 02:00 PM Developing Chemical Control Strategies for the Invasive Weed Oblong Spurge, *Euphorbia oblongata*.** Scott Oneto*; University of California Cooperative Extension, Jackson, CA (519)
- 02:15 PM Southern Sandbur (*Cenchrus echinatus*) Control in Bermudagrass Pasture with Rezilon™.** Jason Belcher*¹, Tyler Monday²; ¹Bayer, Auburn, AL, ²Auburn University, Auburn, AL (520)
- 02:30 PM Break**
- 02:45 PM Collaboratively Addressing the Wilding Invasive Pine Issue Across East Maui - Part 1.** Alison C. Cohan*¹, Jeffrey Mallinson²; ¹The Nature Conservancy of Hawaii, Makawao, HI, ²Haleakala National Park, Makawao, HI (521)
- 03:00 PM Collaboratively Addressing the Wilding Invasive Pine Issue Across East Maui - Part 2.** Alison C. Cohan¹, Jeffrey Mallinson*²; ¹The Nature Conservancy of Hawaii, Makawao, HI, ²Haleakala National Park, Makawao, HI (522)

- 03:15 PM Automatic Detection of Invasive Weeds in Hawaii Using High Resolution Imagery and Machine Learning.** Ryan L. Perroy*¹, David Benitez²; ¹University of Hawaii at Hilo, Hilo, HI, ²National Park Service, Volcano, HI (523)
- 03:30 PM Herbicide Trials with Brazilian Egeria (*Egeria densa*) for Management in the Sacramento / San Joaquin River Delta.** John D. Madsen*; USDA-ARS, Davis, CA (524)
- 03:45 PM Use of Machine Learning to Automate Aquatic Plant Identification from Sensing Technologies.** Robert J. Richardson*¹, Maharshi Patel¹, Andrew Howell², Shaphan Jernigan¹, Scott Ferguson¹, Greg Buckner¹; ¹North Carolina State University, Raleigh, NC, ²North Carolina State University, Sanford, NC (525)
- 04:00 PM Economics and Efficacy of Japanese Stiltgrass (*Microstegium vimineum*) Control After Nine Years of Treatments in a Forest Understory.** John Brewer*¹, Becky Fletcher¹, Daniel R. Tekiela², Angela R. Post³, Gourav Sharma¹, Vasiliy Lakoba¹, Jacob Barney¹, Shawn Askew¹; ¹Virginia Tech, Blacksburg, VA, ²University of Wyoming, Laramie, WY, ³North Carolina State University, Raleigh, NC (526)
- 04:15 PM Effect of Spatial Extent on the Performance of Six Forest Invasive Plant Habitat Suitability Models in Wisconsin.** Niels A. Jorgensen, Mark J. Renz*; University of Wisconsin-Madison, Madison, WI (527)

WEDNESDAY AFTERNOON MARCH 4

ORAL - 10. Biocontrol of Weeds

LOCATION: Monarchy #2
 TIME: 01:00 PM - 03:00 PM
 MODERATOR: James P. Cuda
 University of Florida
 Gainesville, FL
 CO-MODERATOR: Min B. Rayamajhi
 USDA/ARS-IPRL
 Cooper City, FL

***SPEAKER**

- 01:00 PM Impacts of Weed Biocontrol in Hawaii.** M Tracy Johnson*; USDA Forest Service, Volcano, HI (528)
- 01:15 PM Mechanisms of Weed Seed Predation and its Potential Role in Weed Biocontrol.** Khaldoun Ali*; University of Saskatchewan, Saskatoon, SK, Canada (529)
- 01:30 PM Identification of a Potential Allelopathic Substance Involved in Allelopathic Activity of False Mangosteen (*Garcinia xanthochymus*).** Md Mahfuzur Rob*¹, Keitaro Iwasaki², Arihiro Iwasaki², Kiyotake Suenaga², Hisashi Kato-Noguchi¹; ¹Kagawa University, Miki, Japan, ²Keio University, Yokohama, Japan (530)
- 01:45 PM Inhibiting Herbicide Resistant Amaranthus by Suppressing Reproduction.** Efrat Lidor Nili¹, Ido Shwartz¹, Herve Huet¹, Miriam Aminia¹, Micheal D. Owen², Jonathan Gressel³, Orly Noivirt-Brik*¹; ¹WeedOUT Ltd., Ness Ziona, Israel, ²Iowa State University, Ames, IA, ³Affiliation Not Specified, Rehovot, Israel (531)
- 02:00 PM Penology of *Dioscorea bulbifera* and its Co-evolved Natural-enemy *Lilioceris cheni*: Implication in Biological Control Efficacy in Florida.** Min B. Rayamajhi*; USDA/ARS Invasive Plant Res Lab, Fort Lauderdale, FL (532)
- 02:15 PM Developing a Microbial Herbicide to Control Amaranthus Weeds.** Louis G. Boddy*, Tim Johnson; Marrone BIo Innovations, Davis, CA (533)
- 02:30 PM Progress on Classical Biological Control of Cogongrass (*Imperata cylindrica*) in the Southeastern United States.** James P. Cuda*¹, Purnama Hidayat², Izza A. Putri²; ¹University of Florida, Gainesville, FL, ²Bogor Agricultural University, Bogor, Indonesia (534)

WEDNESDAY AFTERNOON MARCH 4

ORAL - 13. Integrated Weed Management

LOCATION: Monarchy #7
TIME: 01:00 PM - 04:30 PM
MODERATOR: Vijay Singh
Virginia Tech
Painter, VA
CO-MODERATOR: Shilpa Singh
Texas A&M University
College Station, TX

***SPEAKER**

- 01:00 PM Manipulating Cropping Systems to Create a Better Harvest Weed Seed Control Target in Wild Oat (*Avena fatua*).** Breanne D. Tidemann*¹, Larry Michielsen¹, Patty Reid¹, Jennifer Zuidhof¹, Elizabeth Sroka¹, Hiroshi Kubota¹, K. Neil Harker², Robert Gulden³, Rebecca Dueck⁴, Alick Mulenga⁵, Cindy Gampe⁵, Greg Semach⁶; ¹Agriculture and Agri-Food Canada, Lacombe, AB, Canada, ²Agriculture and Agri-Food Canada (retired), Lacombe, AB, Canada, ³University of Manitoba, Winnipeg, Canada, ⁴University of Manitoba, Winnipeg, MB, Canada, ⁵Agriculture and Agri-Food Canada, Scott, SK, Canada, ⁶Agriculture and Agri-Food Canada, Beaverlodge, AB, Canada (535)
- 01:15 PM The Weed Chipper: a Site-Specific Non-Chemical Weed Control Option for Conservation Cropping Systems.** Andrew L. Guzzomi*¹, Michael J. Walsh²; ¹University of Western Australia, Crawley, Australia, ²University of Sydney, Sydney, Australia (536)
- 01:30 PM Nozzle Type and Arrangement Effect on Spray Coverage.** Ashley N. McCormick*¹, Landon G. Smith¹, Troy W. Dillon², Thomas R. Butts², Brad M. Davis², Leah M. Collie³; ¹University of Arkansas System Division of Agriculture, Newport, AR, ²University of Arkansas System Division of Agriculture, Lonoke, AR, ³University of Arkansas System Division of Agriculture, Beebe, AR (537)

- 01:45 PM Continuing Evolution of Impact Mill Systems for Harvest Weed Seed Control.** Michael J. Walsh*¹, John C. Broster²; ¹University of Sydney, Sydney, Australia, ²Charles Sturt University, Wagga Wagga, Australia (538)
- 02:00 PM Weed-Sensing Technology Reworks Fallow Management of Rush Skeletonweed (*Chondrilla juncea* L.).** Jacob W. Fischer*, Mark Thorne, Drew J. Lyon; Washington State University, Pullman, WA (539)
- 02:15 PM Advances in Precision Weed Management 2020.** Vijay Singh*¹, Daniel Martin², Mohamed Latheef², Bishwa B. Sapkota³, Muthukumar V. Bagavathiannan³; ¹Virginia Tech, Painter, VA, ²United States Department of Agriculture, College Station, TX, ³Texas A&M university, College Station, TX (540)
- 02:30 PM Break**
- 02:45 PM Effects of Cover Crops on Nutrient Dynamics and Weed Communities.** Karla L. Gage*¹, Rachel Cook², Randy McElroy³, Gurbir Singh¹, Jon Schoonover¹, Karl Williard¹; ¹Southern Illinois University Carbondale, Carbondale, IL, ²North Carolina State University, Raleigh, NC, ³Bayer Crop Science, Farina, IL (541)
- 03:00 PM Cover Crop Planting Date and Weed Emergence in Almond Orchards.** Steven C. Haring*¹, Brad Hanson²; ¹University of California, Davis, Davis, CA, ²University of California, Davis, Winters, CA (542)
- 03:15 PM Seasonal Variability in Pre-harvest Seed-dispersal in *Hordeum glaucum* (Smooth Barley) and *Bromus diandrus* (Ripgut Brome) – Implications for Harvest Weed Seed Control.** Daniel Petersen, Gurjeet S. Gill*; University of Adelaide, Adelaide, Australia (543)
- 03:30 PM Evaluation of Rate and Timing of Herbicide Application During the Establishment of a Living White Clover (*Trifolium repens*) Mulch for Field Corn Production.** Nicholas T. Basinger*, Nicholas S. Hill; University of Georgia, Athens, GA (544)

- 03:45 PM Soybean Response to Sublethal Dosages of Dicamba Particle Drift Vs. Vapor.** Frances B. Browne¹, Steve Li*¹, Katilyn J. Price¹, Ryan D. Langemeier¹, Greg R. Kruger²; ¹Auburn University, Auburn, AL, ²University of Nebraska-Lincoln, North Platte, NE (545)
- 04:00 PM Driver Weeds and the Balance of Control Option Space.** Anita Kuepper*¹, Frank Rothweiler², Tracy Klingaman², Hubert Menne³, Philipp Welter⁴, Catherine de Vulder⁴; ¹Bayer Cropscience, Frankfurt, Germany, ²Bayer AG, St. Louis, MO, ³Bayer AG Crop Science, Frankfurt, Germany, ⁴Bayer AG, Monheim, Germany (546)
- 04:15 PM Annual Bluegrass Management in Cool-Season Grasses Grown for Seed in Oregon: A Meta-Analysis of Multiple Years of Internal Data.** Seth Bernard E. Abugho*, Caio A. Brunharo, Andrew G. Hulting; Oregon State University, Corvallis, OR (547)

WEDNESDAY AFTERNOON MARCH 4

ORAL - 14. Travel Enrichment Experience

LOCATION: Monarchy #2
 TIME: 03:00 PM - 04:00 PM
 MODERATOR: Nicholas R. Steppig
 Purdue University
 Lafayette, IN
 CO-MODERATOR: Wykle C. Greene
 Virginia Tech
 Blacksburg, VA

***SPEAKER**

03:00 PM Tackling Toadflax in Montana. Jessica E. Quinn*; University of Guelph, Ridgetown, ON, Canada (548)

03:10 PM From Inception to Market: Learning the Herbicide Registration Cycle with Syngenta. John A. Schramski*¹, Carroll Moseley², Janis E. McFarland³; ¹Michigan State University, East Lansing, MI, ²Syngenta, High Point, NC, ³Affiliation Not Specified, Chapel Hill, NC (549)

- 03:20 PM** **A Week in the West - My 2019 Travel Enrichment Experience with Syngenta.** Nicholas R. Steppig*; Purdue University, Lafayette, IN (550)
- 03:30 PM** **Agriculture Beyond Borders: Tifton to Saskatoon.** Kayla M. Eason*; University of Georgia, Tifton, GA (551)
- 03:40 PM** **Specialty Weeds at Commodity Scale; California's Central Valley.** Samuel A. Palmer*; University of New Hampshire, Epsom, NH (552)
- 03:50 PM** **The Intersection of Weed Science and Politics: What I Learned During My Fellowship in DC.** Haleigh Summers*¹, John A. Schramski², Lee Van Wychen³; ¹Weed Science Society of America, Ames, IA, ²Michigan State University, East Lansing, MI, ³Weed Science Society of America, Alexandria, VA (553)

WEDNESDAY AFTERNOON MARCH 4

Student Awards

LOCATION: Monarchy #4
TIME: 05:00 PM - 06:30 PM
MODERATOR: Darrin M. Dodds
 Mississippi State University
 Mississippi State, MS
CO-MODERATOR: Carl W. Coburn
 Gothenburg, NE

THURSDAY MORNING MARCH 5

SYMPOSIUM - 5. Toxicology and Weed Science

LOCATION: Monarchy #4
TIME: 08:30 AM - 12:00 PM
MODERATOR: Scott Senseman
 The University of Tennessee
 Knoxville, TN

***SPEAKER**

- 08:30 AM Introduction to Symposium.** Scott Senseman*; The University of Tennessee, Knoxville, TN (554)
- 08:30 AM Risk Assessment and Management Review.** Michael A. Hayoun*; University of California, Davis, Sacramento, CA (555)
- 09:00 AM Data and Discernment: Glyphosate as a Case Study.** Bernalyn McGaughey*; Compliance Services International, Lakewood, WA (556)
- 09:30 AM The Glyphosate Issue: a Poor Man's Toxicology Viewpoint.** Scott Senseman*; The University of Tennessee, Knoxville, TN (557)
- 10:00 AM Break**
- 10:15 AM How the Court System Handles Scientific Data and How an Expert Witness Presents Data in Court.** Philip A. Banks*; Marathon-Agricultural & Environmental Consulting, Inc., Las Cruces, NM (558)
- 10:45 AM Getting and Staying Out of the Weeds When it Comes to Effectively Communicating Science.** Norman Hammitt*; South College, Knoxville, TN (559)
- 11:15 AM Media Training Demonstration and Discussion.** Scott Senseman*; The University of Tennessee, Knoxville, TN (560)
- 11:40 AM Group Panel Discussion.** Scott Senseman*; The University of Tennessee, Knoxville, TN (561)

THURSDAY MORNING MARCH 5

ORAL - 01. Agronomic Crops I

- LOCATION:** Monarchy #5
- TIME:** 08:30 AM - 12:00 PM
- MODERATOR:** Misha R. Manuchehri
Oklahoma State University
Stillwater, OK
- CO-MODERATOR:** Ryan D. Lins
Syngenta Crop Protection, LLC
Rochester, MN

***SPEAKER**

- 08:30 AM Tirexor (Trifludimoxazin): Next Generation Burndown Update - US.** Douglas Findley*¹, Cletus C. Youmans², Steven Bowe³; ¹BASF, Rolesville, NC, ²BASF, Dyersburg, TN, ³BASF, Research Triangle Park, NC (562)
- 08:45 AM Tirexor® a New (PPO) Herbicide to Manage Weed Resistance in Argentina.** Teofilo Bustingorri*; BASF Argentina SA, Buenos Aires, Argentina (563)
- 09:00 AM Tirexor Herbicide: Tirexor + Kixor for Pre-seed Burndown Weed Control in Cereals and Pulse Crops in Western Canada. .** Mark Oostlander*¹, Ethan Bertholet², Lyle Drew², Brittany Hedges¹, Brendan Metzger³; ¹BASF, Calgary, AB, Canada, ²BASF, Saskatoon, SK, Canada, ³BASF, Winkler, MB, Canada (564)
- 09:15 AM Luximo – A Soil Active Residual Herbicide as a Novel Resistance Management Tool.** Helmut Kraus*¹, Stuart J. Kevis², Giuseppe Allegretta³, Laurent Picard³, Ulrike Anders³, Sascha Schlaefer³, Sudhakar Kandru⁴, Andreas Landes³, Gerd Kraemer³, Bernd Sievernich⁵, Ruth Campe³, Ian Francis⁶; ¹BASF Corporation, Durham, NC, ²BASF Plc, Bury St. Edmunds, United Kingdom, ³BASF SE, Limburgerhof, Germany, ⁴BASF South East Asia Pte. Ltd., Singapore, Singapore, ⁵BASF SE, Limburgehof, Germany, ⁶BASF Australia, Tamworth, Australia (565)
- 09:30 AM Introducing Luximo - A New Dawn for Black-grass Control in the UK.** Stuart J. Kevis*; BASF Plc, Bury St. Edmunds, United Kingdom (566)
- 09:45 AM Luximo: A New Mode of Action (MOA) Pre-emergence Herbicide for the Control of Annual Ryegrass (*Lolium rigidum* Gaud.) and Other Monocotyledon Weeds in Cereals in Australia.** Ian Francis*; BASF Australia, Tamworth, Australia (567)
- 10:00 AM Break**
- 10:15 AM Weed Control in Dicamba-Tolerant Soybean in Southwest North Dakota.** Caleb D. Dalley*, Daniel Guimaraes Abe; North Dakota State University, Hettinger, ND (568)

- 10:30 AM** **Evaluating Weed Control and Crop Safety of a Premix of Dicamba and Pyroxasulfone in Dicamba-resistant Soybean in Nebraska.** Ethann R. Barnes*¹, Brady Kappler², Amit J. Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²BASF, Eagle, NE (569)
- 10:45 AM** **Guayule (*Parthenium argentatum*) Response to Preemergence Herbicides.** William B. McCloskey*¹, Guangyao Sam Wang², Bryan C. Pastor¹; ¹University of Arizona, Tucson, AZ, ²Bridgestone Americas, Inc, Eloy, AZ (570)
- 11:00 AM** **Field Assessment of Flax Tolerance to Preemergence and Postemergence Herbicides.** Caleb D. Dalley¹, Brian Jenks², Daniel Guimaraes Abe*¹; ¹North Dakota State University, Hettinger, ND, ²North Dakota State University, Minot, ND (571)
- 11:15 AM** **Plantain (*Plantago lanceolata* L.), in Red Clover (*Trifolium pratense* L.) Grown for Seed.** Kyle Roerig*, Andrew G. Hulting; Oregon State University, Corvallis, OR (572)

THURSDAY MORNING MARCH 5

ORAL - 04. Pasture, Range, Forest, Rights of ways, Wildland, and Aquatic Invasive Plants

LOCATION: Monarchy #1
TIME: 08:30 AM - 12:00 AM
MODERATOR: Mark J. Renz
 University of Wisconsin
 Madison
 Madison, WV
CO-MODERATOR: Glenn Nice
 University of Wisconsin
 Madison
 Madison, WV

***SPEAKER**

- 08:30 AM MezaVue Herbicide: Pricklypear Control and Beyond.** D Chad Cummings*¹, Byron B. Sleugh², William L. Hatler³, Scott Flynn⁴, Charles Hart⁵, James R. Jackson⁶; ¹Corteva Agriscience, Bonham, TX, ²Corteva Agriscience, Carmel, IN, ³Corteva Agriscience, Meridian, ID, ⁴Corteva Agriscience, Lee's Summit, MO, ⁵Dow AgroSciences, Stephenville, TX, ⁶Texas A&M AgriLife Extension, Stephenville, TX (573)
- 08:45 AM Rinkor + Aminopyralid (TerraVue): A New Herbicide for Noncrop Land Management.** Byron B. Sleugh¹, William L. Hatler*², Scott Flynn³, D Chad Cummings⁴; ¹Corteva AgriScience, Carmel, IN, ²Corteva Agriscience, Meridian, ID, ³Corteva Agriscience, Lee's Summit, MO, ⁴Corteva Agriscience, Bonham, TX (574)
- 09:00 AM Can I Keep My Clover? Rinkor Active: A New Herbicide Enabling Selective Broadleaf Weed Control in White Clover-Grass Pastures.** Byron B. Sleugh*¹, Scott Flynn², D Chad Cummings³, William L. Hatler⁴, David E. Hillger⁵; ¹Corteva Agriscience, Carmel, IN, ²Corteva Agriscience, Lee's Summit, MO, ³Corteva Agriscience, Bonham, TX, ⁴Corteva Agriscience, Meridian, ID, ⁵Corteva Agriscience, Thorntown, IN (575)
- 09:15 AM Rinkor + Aminopyralid (Duracor) - A New Herbicide for Control of Weeds in Rangeland and Pastures.** Scott Flynn*¹, Byron B. Sleugh², William L. Hatler³, D Chad Cummings⁴, David E. Hillger⁵; ¹Corteva Agriscience, Lee's Summit, MO, ²Corteva Agriscience, Carmel, IN, ³Corteva Agriscience, Meridian, ID, ⁴Corteva Agriscience, Bonham, TX, ⁵Corteva Agriscience, Thorntown, IN (576)
- 09:30 AM Control of Key Rangeland Noxious and Invasive Weeds with Rinkor + Aminopyralid in the Western U.S.** William L. Hatler*¹, Scott Flynn², Byron B. Sleugh³, D Chad Cummings⁴, David E. Hillger⁵; ¹Corteva Agriscience, Meridian, ID, ²Corteva Agriscience, Lee's Summit, MO, ³Corteva Agriscience, Carmel, IN, ⁴Corteva Agriscience, Bonham, TX, ⁵Corteva Agriscience, Thorntown, IN (577)

- 09:45 AM** **Desirable Forb Tolerance to Applications of Rinskor Containing Herbicides in Rangeland and Pastures.** D Chad Cummings*¹, Byron B. Sleugh², William L. Hatler³; ¹Corteva Agriscience, Bonham, TX, ²Corteva Agriscience, Carmel, IN, ³Corteva Agriscience, Meridian, ID (578)
- 10:00 AM** **Break**
- 10:15 AM** **Weed Control Spectrum of a Novel Herbicide, Florpyrauxifen-benzyl, for Pastures and Hayfields.** Wykle C. Greene*, Michael L. Flessner; Virginia Tech, Blacksburg, VA (579)
- 10:30 AM** **Documenting the Impact of Training Municipalities to Control Invasive Plants on Wisconsin Roads.** Mark J. Renz*, Leo Roth, Anne Pearce; University of Wisconsin-Madison, Madison, WI (580)
- 10:45 AM** **Evaluating the Effectiveness of Hexazinone on Brunswickgrass in Bahiagrass Seed Production Fields.** Clay T. Cooper*¹, Brent A. Sellers²; ¹University of Florida Extension, Lecanto, FL, ²University of Florida, Ona, FL (581)
- 11:00 AM** **Smutgrass Response to Hexazinone Using Different Application Techniques.** Brent A. Sellers*¹, José Luiz Carvalho de Souza Dias²; ¹University of Florida, Ona, FL, ²University of Wisconsin-Madison, Madison, WI (582)

THURSDAY MORNING MARCH 5

ORAL - 08. Formulation, Adjuvant, & Application Technology

LOCATION: Monarchy #2
TIME: 08:30 AM - 12:00 PM
MODERATOR: Mayank S. Malik
 Bayer Crop Science
 Chesterfield, MO
CO-MODERATOR: Vipin Kumar
 Kansas State University
 Hays, KS

***SPEAKER**

- 08:30 AM Assessment of Commercial Scale Dicamba and 2,4-D Drift Using Drift Reducing Adjuvants.** Ryan J. Edwards*¹, Lillian C. Magidow¹, Steven A. Fredricks¹, Gregory K. Dahl²; ¹WinField United, River Falls, WI, ²WinField United, Eagan, MN (583)
- 08:45 AM Survey of Commercial Sprayers in Alabama for Dicamba Residue Retention Following Triple Rinse with Water.** Frances B. Browne*, Steve Li, Katilyn J. Price; Auburn University, Auburn, AL (584)
- 09:00 AM Fatty Acid Methyl Ester Ethoxylates: A New Surfactant and Adjuvant for Crop Protection.** Dean Oester*¹, Timothy H. Anderson²; ¹BASF, Cincinnati, OH, ²BASF Corporation, Cincinnati, OH (585)
- 09:15 AM Evaluating Weed Control Efficacy of Dicamba and Dicamba/tembotrione with and without Ammonium Sulfate in Corn in the Midwest.** Ethann R. Barnes¹, Brian Dintelmann², Kevin W. Bradley², Aaron Hager³, Amit J. Jhala*¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Missouri, Columbia, MO, ³University of Illinois, Urbana, IL (586)
- 09:30 AM Efficacy of Three New Adjuvant Formulations on Herbicide Performance Across the Mid-Western United States.** Jim T. Daniel*¹, Tom Hoverstad², Paul O. Johnson³, Scott Parrish⁴, Bruce Potter⁵, Prashant Jha⁶, Philip Westra⁷; ¹Daniel Ag Consulting, Keenesburg, CO, ²University of Minnesota Southern Research and Outreach Center, Waseca, MN, ³South Dakota State University, Brookings, SD, ⁴AGRASYST, Spokane, WA, ⁵University of Minnesota Southwest Research and Outreach Center, Lamberton, MN, ⁶Iowa State University, Ames, IA, ⁷Colorado State University, Fort Collins, CO (587)
- 09:45 AM Plant Macro- and Micronutrients Formulated as Effective Environmentally Benign Postemergence Herbicides.** David A. Cobb*; Belvedere Foliar LLC, Belvedere, CA (588)
- 10:00 AM Break**

- 10:15 AM Quizalofop-P-Ethyl: Adjuvants, Nitrogen Fertilizer, and Tank-mixtures - the Rest of the Story.** Richard K. Zollinger*¹, Peter J. Porpiglia², Mark L. Bernards³, Jerry M. Green⁴, Kirk A. Howatt⁵, Prashant Jha⁶, Greg R. Kruger⁷, Christy Sprague⁸, Mark VanGessel⁹, Bryan G. Young¹⁰;
¹Amvac Chemical Company, Spokane, WA, ²Amvac Chemical Company, Newport Beach, CA, ³Western Illinois University, Macomb, IL, ⁴Green Ways Consulting LLC, Landenberg, PA, ⁵North Dakota State University, Fargo, ND, ⁶Iowa State University, Ames, IA, ⁷University of Nebraska-Lincoln, North Platte, NE, ⁸Michigan State University, East Lansing, MI, ⁹University of Delaware, Georgetown, DE, ¹⁰Purdue University, Brookston, IN (589)
- 10:30 AM Shear Stabilization of High Molecular Weight Drift Control Polymers.** Timothy H. Anderson*¹, Dean Oester², Melvin Long¹; ¹BASF Corporation, Cincinnati, OH, ²BASF, Cincinnati, OH (590)
- 10:45 AM Mirror, Mirror on the Wall: What's the Best Adjuvant of Them All.** Joe V. Gednalske¹, Gary Halvorson*²; ¹Council of Producers & Distributors of Agrotechnology, Washington, DC, ²Council of Producers and Distributors of Agrotechnology, Washington, DC (591)
- 11:00 AM The Influence of Adjuvants and Tank-Mix Products on the Performance of New Dicamba and 2,4-D Herbicides.** Gregory K. Dahl*¹, Ryan J. Edwards², Lillian C. Magidow², Annie Makepeace², Joshua J. Skelton³, Steven A. Fredericks², Andrea C. Clark²; ¹WinField United, Eagan, MN, ²WinField United, River Falls, WI, ³WinField United, Saint Paul, MN (592)
- 11:15 AM Optimizing the Oxford P15 for Droplet Spectrum Measurement and Spray Analysis in the Field and Laboratory.** J Connor Ferguson*¹, Justin S. Calhoun², Kayla L. Broster¹, Zachary R. Treadway¹, Zaim Ugljic¹; ¹Mississippi State University, Mississippi State, MS, ²Mississippi State University, Starkville, MS (593)

11:30 AM The Effect of pH Modifying Adjuvants on Efficacy of Glyphosate + Dicamba Tank-Mixes. Joseph T. Ikley*¹, Mike Ostlie², Nathan H. Haugrud¹, Nicholas R. Steppig³, Bryan G. Young⁴; ¹North Dakota State University, Fargo, ND, ²North Dakota State University, Carrington, ND, ³Purdue University, Lafayette, IN, ⁴Purdue University, Brookston, IN (594)

11:45 AM On-Farm Evaluations of Auxin Nozzles for Peanut Pest Management - Year 2. Eric P. Prostko*¹, Mark R. Abney¹, Robert C. Kemerait¹, Glen C. Rains¹, D. Scott Carlson², James L. Jacobs³, D. Bryce Sutherland², William G. Tyson⁴; ¹University of Georgia, Tifton, GA, ²University of Georgia Extension, Sylvester, GA, ³University of Georgia Extension, Blackshear, GA, ⁴University of Georgia Extension, Statesboro, GA (595)

THURSDAY MORNING MARCH 5

ORAL - 09. Weed Biology and Ecology

LOCATION: Monarchy #7
TIME: 08:30 AM - 12:00 PM
MODERATOR: Mohsen B. Mesgaran
UC Davis
Davis, CA
CO-MODERATOR: Caio A. Brunharo
Oregon State University
Corvallis, OR

***SPEAKER**

08:30 AM Unequal Crossover in Heterochromatin Rich Region of a Chromosome Drives Amplification of ACC-ase Gene and Sethoxydim Resistance in Large Crabgrass. Mithila Jugulam*¹, Dal-Hoe Koo¹, Sushila Chaudhari¹, Martin Laforest², Brahim Soufiane², Bernd Friebe¹, Bikram S. Gill¹; ¹Kansas State University, Manhattan, KS, ²AAC-AAFC, St-jean-sur-richelieu, QC, Canada (596)

- 08:45 AM** **A Novel Invasive Annual Grass in North American Interior Ecosystems: *Ventenata dubia* (North Africa Grass).** Becky K. Kerns*¹, Claire Tortorelli², Ty C. Nietupski², Michelle A. Day³, Meg Krawchuk², Bridgett Naylor⁴, John Kim¹; ¹US Forest Service - PNW Research Station, Corvallis, OR, ²Oregon State University, Corvallis, OR, ³US Forest Service - Rocky Mountain Research Station, Corvallis, OR, ⁴US Forest Service - PNW Research Station, La Grande, OR (597)
- 09:00 AM** **Efficacy of Crop Rotation, Tillage and Herbicide for Long-Term Herbicide-Resistant Kochia (*Bassia scoparia*) Management.** Elizabeth G. Mosqueda*¹, Andrew R. Kniss², Nevin Lawrence³, Prashant Jha⁴, Charlemagne A. Lim⁵; ¹California State University-Monterey Bay, Marina, CA, ²University of Wyoming, Laramie, WY, ³University of Nebraska-Lincoln, Scottsbluff, NE, ⁴Iowa State University, Ames, IA, ⁵Montana State University, Huntley, MT (598)
- 09:15 AM** **Population Genomics of Italian Ryegrass (*Lolium perenne* L. spp. *multiflorum*) with Diverse Herbicide Resistance Patterns: a RAD-Seq Approach.** Caio A. Brunharo*, Andrew G. Hulting; Oregon State University, Corvallis, OR (599)
- 09:30 AM** **Herbicide Resistance Survey in Winter Wheat Cropping Systems Identifies the First *Secale cereale* Imazamox-Resistant Population.** Neeta Soni*, Eric P. Westra, Philip Westra, Todd A. Gaines; Colorado State University, Fort Collins, CO (600)
- 09:45 AM** **Weed Biology Insights to Improve Management of *Chloris virgata*.** Bhagirath S. Chauhan*; University of Queensland, Gatton, Australia (601)
- 10:00 AM** **Break**
- 10:15 AM** **Maternal Water Stress Influences Progeny Characteristics and Management in Palmer Amaranth.** O. Adewale Osipitan*¹, Maor Matzrafi², Sara Ohadi¹, Mohsen B. Mesgaran¹; ¹University of California, Davis, Davis, CA, ²Newe Ya'ar Research Center, Department of Weed Research and Plant Pathology, Agricultural Research Organization, Ramat Yishai, Israel (602)

- 10:30 AM Salt Stress and Recurrent Herbicide Application May Speed the Evolution of Jungle Rice Resistant to Imidazolinones.** Lariza Benedetti¹, Nilda Roma-Burgos², Luis A. Avila*¹, Gustavo M. Souza¹; ¹Universidade Federal de Pelotas, Pelotas, Brazil, ²University of Arkansas, Fayetteville, AR (603)
- 10:45 AM Burial Depth and Flooding Effects on Emergence of Five California Weedy Rice (*Oryza sativa* f. *spontaneae* Rosh.) Accessions.** Liberty B. Galvin*¹, Mohsen B. Mesgaran¹, Whitney Brim-DeForest², Kassim Al-Khatib¹; ¹University of California, Davis, Davis, CA, ²University of California Division of Agriculture and Natural Resources, Yuba City, CA (604)
- 11:00 AM Exposure to Dicamba Influences Sex-Ratio in Palmer Amaranth (*Amaranthus palmeri*).** Debalin Sarangi*¹, Aniruddha Maity², Nithya K. Subramanian², Muthukumar V. Bagavathiannan²; ¹University of Wyoming, Powell, WY, ²Texas A&M University, College Station, TX (605)
- 11:15 AM High Trait Variations Within and Among the Transcontinental Populations of a Global Invader: *Anthemis cotula* L. (Mayweed Chamomile).** Subodh Adhikari*¹, Ian Burke², Sanford Eigenbrode¹; ¹University of Idaho, Moscow, ID, ²Washington State University, Pullman, WA (606)
- 11:30 AM Impacts of Drought and Native Grass Competition on Buffelgrass (*Pennisetum ciliare*): Opportunities for Active Restoration.** Hannah Lucia Farrell*, Elise S. Gornish; University of Arizona, Tucson, AZ (607)
- 11:45 AM Structural Characterization of Phytotoxic Compounds from *Lantana camara*.** Dr. Tauseef Anwar*, Huma Qureshi; Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan (608)

THURSDAY AFTERNOON MARCH 5

**WORKSHOP - Building a Community to Battle
the Wicked Problem of Herbicide Resistance**

LOCATION: Monarchy #4
TIME: 01:00 PM - 04:00 PM
MODERATOR: David R. Shaw
Mississippi State University
Mississippi State, MS

***SPEAKER**

01:00 PM Building Communities to Battle the Wicked Problem of Herbicide Resistance. David R. Shaw*¹, Jill Schroeder², Michael Barrett³, David E. Ervin⁴, George Frisvold⁵, Amy Asmus⁶, Susan M. Koehler⁷, Ian Burke⁸, Mark VanGessel⁹, Clint D. Pilcher¹⁰, A Stanley Culpepper¹¹, Katherine Dentzman¹², Addie Mayfield¹, Jesaelyn Gizotti de Moraes¹³; ¹Mississippi State University, Mississippi State, MS, ²New Mexico State University, Las Cruces, NM, ³University of Kentucky, Lexington, KY, ⁴Portland State University, Portland, OR, ⁵University of Arizona, Tucson, AZ, ⁶Asmus Farm Supply, Inc, Rake, IA, ⁷USDA-APHIS, Columbia, MD, ⁸Washington State University, Pullman, WA, ⁹University of Delaware, Georgetown, DE, ¹⁰Corteva AgriScience, Johnston City, IA, ¹¹University of Georgia, Tifton, GA, ¹²University of Idaho, Moscow, ID, ¹³University of Nebraska-Lincoln, West Platte, NE (609)

- Introductory Comments: David Shaw
- Panel on Community Organization Efforts: Moderator Amy Asmus
 1. Ian Burke: Pacific Northwest
 2. Mark VanGessel: Northeast
 3. Clint Pilcher: North Central
 4. Stanley Culpeper: Southeast
 5. George Frisvold: Pink Bollworm
 6. Dave Ervin: Other examples
- Open discussion with panel.

Break

- Facilitated Panel Discussion: What do weed scientists and others need to help build these communities? Katie Dentzman, Addie Mayfield, Jesaelen Gizotti de Moraes
- Open discussion with panel.

Adjourn

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Meeting Conduct Reminder

The WSSA Code of Ethics defines professional conduct binding on all members of the Society. Members should recognize that this code of ethics and conduct signifies a voluntary assumption of the obligation of self-discipline and members should strive to uphold and maintain the honor and dignity of the Society.

The following rules and standards of conduct have been developed for the safe and efficient operation of the WSSA and for the benefit and protection of the rights and safety of all.

WSSA members are expected to observe the highest standards of professional conduct at all times, while at work or engaged in Society business.

1. Obey all laws, rules and regulations governing our business. The WSSA is subject to applicable federal laws in the state or country of the meeting or event. It is the policy of the WSSA that all laws, rules and regulations are complied with fully and completely. If it is unclear whether an action or activity is a legal or ethical violation, contact the WSSA President and/or Executive Secretary immediately for advice. Any incident or situation that violates the law or this policy should be immediately reported to the President and/or Executive Secretary; in person or via this contact information: info@wssa.net or 720-445-4789.

2. Be honest, truthful, fair and trustworthy in all WSSA activities and relationships. The WSSA expects each member to treat other members with respect and honesty. This includes providing information that is accurate, complete, objective, timely, relevant, and understandable.

3. Respect and protect WSSA assets. Assets are anything of value owned by the WSSA. All WSSA members are expected to be custodians of those assets. Members are responsible to maintain Society assets in good condition and to protect them from loss. This includes, but is not limited to, real assets and equipment as well as “soft assets” such as intellectual property, member lists, and other confidential information owned by the Society. WSSA assets of any kind should not be used for personal benefit.

4. Avoid all conflicts of interest between Society business and personal affairs. All WSSA members are expected to act with total objectivity regarding WSSA business. Accordingly, it is improper for a WSSA member to be in a position where their personal interests’ conflict, or appears to conflict, with WSSA interests. WSSA members should not use their position within the WSSA to influence WSSA members or others for their personal benefit. If a member believes that a conflict of interest has developed or may develop, it should be promptly reported to the WSSA President and/or Executive Secretary. The Society’s Conflict of Interest Policy is outlined in 5.8.

5. Promote a culture of respect for all WSSA members. The WSSA supports and adheres to laws and regulations dealing with fair member practices. Membership discrimination in our Society based on sex, race, age, religion, national origin, or sexual preference will not be tolerated. Sexual harassment will not be tolerated. Sexual harassment is defined as unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature that explicitly or implicitly affects an individual's membership in the society, unreasonably interferes with an individual's activities within the society, or creates an intimidating, hostile or offensive society environment. This also includes inappropriate use of nudity and/or sexual images in public spaces (including within visual presentations, Twitter, and other online media); deliberate intimidation, stalking, or unwelcome following; harassing photography or recording; and sustained disruption of talks or other events.

6. Use your best efforts to maintain a safe environment and protect the Society. The WSSA believes in and supports the laws designated to keep our Society safe and designed to protect the environment. If you believe that an unsafe condition exists in our Society, bring it immediately to the attention of the President, a member of the Board, or Executive Secretary. If an accident takes place, report it pursuant to policy and immediately take action to address the problem. Any incident or situation that violates the law or this policy should be immediately reported to the President and/or Executive Secretary; in person or via this contact information: info@wssa.net or 720-445-4789.

7. Promote an ethical culture for all WSSA members. The WSSA always expects all of its members to conduct themselves ethically and to encourage and support that behavior in their fellow members. Members exercise integrity in scientific research activities and in the reporting of results.

8. Relation of professionals to the public. They shall not knowingly permit the publication of reports or other documents for any unsound or illegitimate undertaking.

9. Respect fellow WSSA members. Members shall freely give credit for work done by others to whom the credit is due and shall refrain from plagiarism in oral and written communication, and not knowingly accept credit rightfully due to another person.

10. Reporting alleged violations. Violation of the WSSA Code of Ethics and Conduct may subject a member to disciplinary action up to and including membership revocation. At the annual conference, when “Safe WSSA” members become aware of a complaint, they will seek out the alleged victim(s) and offender(s) separately and gather facts. Immediate responses at the conference may range from warning a harasser to cease his or her behavior immediately, to ending a speaker’s talk early if the speaker uses inappropriate language or images, to requiring a harasser to leave the conference immediately with no refund, to banning a harasser from future events “either indefinitely or for a certain time period.” Law enforcement may be engaged if circumstances require.

PERSONAL TIME SCHEDULE

Time	Monday	Tuesday	Wednesday	Thursday
6:30				WSSA
7:00		Poster Session	Poster Session	WSWS
7:30				Business
8:00				Breakfasts
8:30				
9:00				
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3:45				
4:00	General Session And Awards Presentation			
4:15				
4:30				
4:45				
5:00				
5:30				
6:00				
6:30	Awards Reception	BASF Sponsored Luau		
7:00				
7:30				
8:00				

NOTES

NOTES

WSSA

**2021 Annual Meeting
February 15-18, 2021
San Antonio, TX**

**2022 Annual Meeting
February 21-24, 2022
Vancouver, Canada**

**2023 Annual Meeting
January 30 – February 02, 2023
Arlington, VA**

WSWS

**2021 Annual Meeting
March 01-04, 2021
Boise, ID**

**2022 Annual Meeting
March 07-10, 2022
Newport Beach, CA**