



2024

79th Annual Meeting

**North Central Weed
Science Society**

www.ncwss.org

December 9-12, 2024

**Westin Kansas City
at Crown Center1 E
Pershing Rd
Kansas City, MO**

NCWSS General Program Information

President's Welcome

2024 North Central Weed Science Society Meeting

Welcome to the 79th annual meeting of the North Central Weed Science Society (NCWSS). Mark Bernards, President Elect and Program Chair for the 2024 annual meeting has put together a very engaging program of science and activities. Local flare is incorporated into the program starting with the Student Tour of the Bayer facility and the famous KC (Kansas City) caves. The General Session featuring the Harry S. Truman Presidential Museum and Library. Sarah Lancaster organized a panel of farmers and consultants from the KC area for a discussion on weed management on Wednesday morning. And we will end our run in KC with Thursday morning's Society Breakfast that will feature Mark Stewart, CEO of AFA, a KC based organization that build bridges for young leaders, fostering engagement and innovation in food and agriculture.

Unique offerings for our 2024 program on Wednesday include 1) the morning session for students focused on helping prepare employment application materials for academic, industry and government positions, 2) the first ever "What's New in Extension" session organized by Dave Nicolai and 3) a featured symposium titled "Creating New Systems to Manage Weeds – A retrospective of and Invitation from the Career of Don Wyse."

Thanks to Kristin Rosenbaum and the Local Arrangement Committee for their hard work in organizing this meeting. Please take a moment to thank them, along with Mark Benards, when you see them.

To our Sustaining Members, thank you for your generous support. Your contributions help cover the costs of this meeting. Especially, Bayer, BASF, Corteva, and Syngenta for event sponsorship. I also extend my thanks to the paper and poster judges for their dedication to develop our talent and enrich the science within our society.

Remember, the strength of our society lies in the dedication and passion of its members. By volunteering, you not only contribute to the success of our events but also help shape the future of weed science. Consider joining a committee to make a lasting impact. Speak to me or Mark Bernards if you're interested or attend a committee meeting for more details. Your involvement can inspire innovation, foster collaboration, and drive progress. Together, we can make a difference.

It has been a pleasure serving as your NCWSS President.

Dawn Refsell, President

NCWSS General Program Information

Conference Headquarters

All sessions of the conference and the meeting events will be held at the Westin Kansas City at Crown Center, 1 East Pershing Road, Kansas City, MO 64108

Registration Hours

The registration desk is at **Century B Foyer**, and will be open Monday 3 to 6:30 pm, Tuesday 7:30 am to 4 pm, Wednesday 8 to 11 am and 2 to 4 pm.

Meeting Rooms

All sessions and meetings will be in The Westin Kansas City at Crown Center. Additional meetings may be arranged any time during the conference by contacting Kristin Rosenbaum, Local Arrangements Chair.

Proceedings

2024 NCWSS Proceedings will be available following the meeting online at the NCWSS website.

Sustaining Members

Sustaining members that have made prior arrangements with the Industry Chair may put up a display in the Exhibit area. No other displays are allowed.

Endowment Support Opportunity – Silent Auction

Silent auction items will be available for viewing and bidding near the registration desk until Wednesday at 3 pm.

Bidding online at: <http://ncwss.betterworld.org/auctions/2024-ncwss-student-endowment-auc>

Auction items winners may pick up items beginning at 5 pm Wednesday evening at the registration desk. Proceeds from the Silent Auction will be placed into the NCWSS Endowment Fund.

Health and Safety

Attendees need to always wear NCWSS name badges. Please always keep your personal belongings with you. Smoking is allowed in designated areas only. In the event of any medical emergency, please contact hotel security as soon as possible through any public area house phone or by dialing the hotel operator and stating that you have a medical emergency.

Please contribute to the conference environment in which diverse attendees may learn, network, and enjoy the company of colleagues in a professional and harassment-free atmosphere.

The NCWSS 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 incident takes place, report it

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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 Executive Secretary; in person or via this contact information: info@ncwss.org or 720-445-4789.

NCWSS on Social

Keep up to date with the latest NCWSS news by following @NCWeedScience on **X**. Use the hash tag #NCWSS2024 when sharing on LinkedIn, X, Instagram, or other social media platforms.

No photographs or videos

Do not take pictures or videos of any presentations without prior permission from the presenter. The posters will be available online after the conference.

Program Symbols

- * Presenting Author
- † Paper or poster in the graduate student contest
- ‡ Poster in the undergraduate student contest

Meal Functions of the Society 2024

Meal Functions

If you requested specific dietary needs during the meeting, please identify yourself and needs to the wait staff as they begin serving.

Breaks

Tuesday, 9:45 – 10:00 am	Pershing Place
Tuesday, 3:15 – 3:30 pm	Century B Foyer
Wednesday, 9:45 – 10:00 am	Pershing Place
Wednesday, 3:15 pm – 3:30 pm	Century B Foyer

Presidential Reception

Open to 2024 Distinguished Award Winners, New and Current Fellows, Current Board Members

Monday, 6:00 – 7:00 pm	Liberty
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Student Mixer

Sponsored by BASF Corporation – Open to all attendees.

Monday, 6:30 – 10:00 pm	Century A
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Student Luncheon/Business Meeting

Sponsored by Corteva Agriscience – Open to all students.

Tuesday, 12:00 – 1:15 pm	Mission/Shawnee
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Women in Weed Science Networking Breakfast

Open to all (preregistration required)

Tuesday, 6:30 – 7:45 am	Mission/Shawnee
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Society Award Luncheon

Open to all

Wednesday, 12:00 – 1:30 pm	Century C
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Society Social

Sponsored by Sustaining Members – Open to all attendees.

Wednesday, 4:45-5:45 pm	Century B Foyer
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Student Contest Awards

Sponsored by Sustaining Members – Open to all attendees.

Wednesday, 5:30 – 6:00 pm	Century A
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Society Breakfast

Students sponsored by Syngenta – Open to all attendees (preregistration required)

Thursday, 7:00 – 9:45 am	Century A
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Tours of the Society 2024

Student Tour of Bayer Manufacturing Facility and Caves

Hosted by Bayer Crop Science. Tour departs from the lobby of the Westin Kansas City at Crown Center on Monday, Dec 9 at 8:30 a.m.

Monday, 8:30 am – 4:00 pm

Meet in Lobby

NCWSS General Program Information

NCWSS Committee Meetings

Meetings will take place for conducting the business of each respective committee. Most meetings are open to members. Please contact the committee chair or attend the committee meeting if you are interested in serving the society by being a committee member. * Denotes committees that will elect a new Vice Chair to serve as Chair in 2025.

Board of Directors

Monday, 1:00-4:00 pm

Roanoke

Finance, Steering & Policy

Monday, 4:30-5:30 pm

Roanoke

Resident Education, Summer Contest and Contest Rules Joint meeting

Monday, 4:30-5:30 pm

Mission

Paper Judges

Monday, 5:30-6:30 pm

Mission

Tuesday, 5:15-6:30 pm

Mission

Poster Judges

Monday, 5:30-6:30 pm

Shawnee

Tuesday, 5:15-6:30 pm

Shawnee

Resolutions & Necrology

Monday, 5:30-6:30 pm

Roanoke

Program Committee and Section Chairs

Monday, 7:30-8:30 pm (*Session Chairs*)

Roanoke

Fellows*

Tuesday, 5:45-6:45 pm

Independence

Distinguished Achievement Awards

Tuesday, 5:45-6:45 pm

Presidents

Nominating*

Tuesday, 5:45-6:45 pm

Penn Valley

Strategic Planning

Tuesday, 5:45-7:15 pm

Roanoke

Industry

Thursday, 9:45 am

Century A

Board of Directors

Thursday, 10:00 a.m.-12:00 pm

Roanoke

Program Section Business Meetings

Program Section Business Meetings

Weed Genetics and Herbicide Physiology (WG&HP)

Tuesday, 5:15 pm

Century A

Weed Biology & Ecology (WB&E)

Tuesday, 5:15 pm

Century A

Cover Crops & Integrated Weed Management (CC&IWM)

Tuesday, 5:15 pm

Century B

Horticulture & Specialty Crops (H&SC)

Tuesday, 5:15 pm

Liberty

Range, Pasture, and Vegetation Management (RP&VM)

Tuesday, 5:15 pm

Liberty

Row Crop Herbicide Management (RCHM)

Wednesday, 11:45 am

Century B

Extension

Wednesday, 4:45 pm

Century A

Herbicide Application Technology (HAT)

Wednesday, 4:45 pm

Century B

Symposia

Local Perspectives of Weed Management Challenges and Solutions

Wednesday, 10:00-11:55 am

Century A

What's New in Extension

Wednesday, 1:30-3:45 pm

Century A

Creating New Systems to Manage Weeds – A Retrospective of and Invitation from the Career of Don Wyse

Wednesday, 1:30-5:00 pm

Liberty

What's New in Industry

Thursday, 8:00-9:30 am

Century A

Graduate Student Workshop

Preparing Effective Application Materials

Wednesday, 10:25-11:55 am

Liberty

NCWSS General Program Information

Condensed Program

Monday

Committee meetings	4:30-8:30	Various
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Student Mixer	6:30-10:00 pm	Century A
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Tuesday

Women in Weed Science Breakfast	6:30-7:45 am	Shawnee/Mission
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POSTER SESSION 1 – Student Contest	8:00-9:50 am	Pershing Place
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General Session	10:00-11:50 am	Century A
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Student Luncheon	12:00-1:15 pm	Shawnee/Mission
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ORAL 1 – Student Contest (WG&HP, RCHM, WB&E, CC&IWM)	1:30-5:30 pm	Century A
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ORAL 2 – Student Contest (CC&IWM, RCHM, HAT)	1:30-5:30 pm	Century B
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ORAL 3 – Student Contest plus H&SC, RP&VM, WB&E	1:30-5:30 pm	Liberty
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Wednesday

POSTER SESSION 2	8:00-9:50 am	Pershing Place
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ORAL 4 - <i>Symposium</i> – Local Perspectives of Weed Management	10:00-11:55 am	Century A
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ORAL 5 – Row Crop Herbicide Mngt	10:00-11:55 am	Century B
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Oral 6 – Student Video Contest & Grad Student Workshop	10:00-11:55 am	Liberty
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NCWSS General Program Information

Society Awards Luncheon	12:00-1:15 pm	Century C
ORAL 7 – <i>Symposium</i> – What’s New in Extension plus WG&HP and CC&IWM	1:30-5:00 pm	Century A
ORAL 8 – Herbicide Application Technologies plus RCHM	1:30-5:00 pm	Century B
ORAL 9 – <i>Symposium</i> – Creating New Systems to Manage Weeds	1:30-5:00 pm	Liberty
Society Social	4:45-5:45 pm	Century Foyer
Student Contest Awards	5:30-6:00 pm	Century A
Thursday		
Society Breakfast	7:00-7:45 am	Century A
<i>Symposium</i> - What’s New in Industry	7:45-9:45 am	Century A

NCWSS General Program Information

Poster Sessions

LOCATION:

Pershing Place

CHAIRS:

Nicholas Stepping

BASF

Ram Yadav

The Ohio State University

Poster Setup

Posters can be set up between 4:00 and 9:00 pm on Monday, December 9. All NCWSS posters will be on display on Tuesday, December 10 from 7:00 am until 7:00 pm and on Wednesday, December 11 from 7:00 am until 5:00 pm.

Students in the Poster Contest must be with their posters during the Poster Sessions on Tuesday morning for judging. Students in the poster contest are required to bring at least 25 letter-sized copies of your posters to hand out.

Tuesday, December 10

8:00 – 9:50 am Poster Session I

Wednesday, December 11

8:00 – 9:50 am Poster Session II

Poster Removal

All posters must be removed by 7:00 pm on Wednesday, December 11.

NCWSS Sustaining Member Exhibitors

Tuesday & Wednesday

Exhibit Hall

Set up Monday afternoon.

Program Symbols

- * Presenting Author
- † Paper or poster in the graduate student contest
- ‡ Poster in the undergraduate student contest

PROGRAM

TUESDAY MORNING DECEMBER 10

Women in Weed Science Breakfast

LOCATION: Shawnee-Mission
TIME: 6:30 AM – 7:55 AM Central Time
CHAIR: Anita Dille
Kansas State University

***SPEAKER**

6:30 AM Meal Served (*Preregistration Required*)

7:00 AM Highlighting Your Worth: Ideas for Negotiating.
(1)

TUESDAY MORNING DECEMBER 10

POSTER SESSION 1 – Student Contest

LOCATION: Pershing Place
TIME: 8:00 AM - 9:50 AM Central Time

***PRESENTER**

† GRADUATE CONTEST

‡ UNDERGRADUATE CONTEST

All student contest participants (†, ‡) are to be at posters on Tuesday, 8:00 am - 9:50 a.m.

All presenters not participating in the student contest are to be at posters on Wednesday, 8:00 am - 9:50 am

POSTER SECTION

Cover Crops and Integrated Weed Management

† **Integrated Weed Management Using Cereal Rye Residue in No-till Soybean.** Aleksandar Grujic*¹, Erin Haramoto¹, Matthew Allen¹, John Wallace²; ¹University of Kentucky, Lexington, KY, ²Pennsylvania State University, University Park, PA (2)

‡ **The Impact of Cover Crops on the Weed Seed Bank of Nebraska Row-Crop Systems.** Andre Graciano Garcia*, Victor de Sousa Ferreira, Vinicius Velho, Christopher Proctor, Rodrigo Cintra Bachega, Isaac Buyungo; University of Nebraska-Lincoln, Lincoln, NE (3)

Weed and Crop Management Strategies: Practical Insights from a Wisconsin Systems Study. Daniel Smith*¹, Ryan DeWerff¹, Doug Wiedenbeck¹, Kolby Grint², Jacob Felsman¹, Christopher Baxter³, Ahmadreza Mobli¹, Rodrigo Werle¹; ¹University of Wisconsin-Madison, Madison, WI, ²USDS-NRCS, Altoona, WI, ³University of Wisconsin-Platteville, Platteville, WI (4)

† **Impact of Fall-Planted Cover Crop and Tillage on Weed Control and Soybean Yield.** Datta Chiruvelli*¹, Angie Peltier², Thomas Peters³, Debalin Sarangi¹; ¹University of Minnesota, St Paul, MN, ²University of Minnesota, Crookston, MN, ³North Dakota State University, Fargo, ND (5)

† **Evaluating Allelopathic Effect of Barley (*Hordeum vulgare*) on Palmer Amaranth (*Amaranthus palmeri*).** Eduardo Lago*, Cristiana Bernardi Rankrape, Eric Miller, Karla Gage; Southern Illinois University, Carbondale, IL (6)

Effects of Soil Temperature and Moisture on Broadleaf Weed Emergence Patterns. Eugene Law*¹, Grant Hoffer², Mercy Odemba¹, Nicholas Basinger³, Wesley Everman⁴, Karla Gage⁵, Erin Haramoto⁶, Jodi Boe⁷, Richard Little⁷, Eric Miller⁵, Wayne Mitchem⁸, Claudio Rubione⁹, Mark VanGessel⁹, John Wallace²; ¹The Ohio State University, Columbus, OH, ²The Pennsylvania State University, University Park, PA, ³University of Georgia, Athens, GA, ⁴North Carolina State University, Raleigh, NC, ⁵Southern Illinois University, Carbondale, IL, ⁶University of Kentucky, Lexington, KY, ⁷University of Nebraska-Lincoln, Lincoln, NE, ⁸USDA-ARS, Beltsville, MD, ⁹University of Delaware, Georgetown, DE (7)

NCWSS Program

‡ Viability of Weed Seed Following Electrocution Treatment.

Blake Benson*, Eric Richer, Alyssa Essman; The Ohio State University, Columbus, OH (8)

† Estimating Cereal Rye (*Secale cereale* L.) Cover Crop

Biomass Using Remote Sensing.

Eric Yu*, Lang Qiao, Ce Yang, Debalin Sarangi; University of Minnesota, St. Paul, MN (9)

Electrocution as a late season weed control tool: a multi-state study.

Matheus M. Noguera*¹, Karla Gage², Prashant Jha³, Amit Jhala⁴, William G Johnson⁵, Sarah Lancaster⁶, Bryan Young⁵, Kevin Bradley¹; ¹University of Missouri, Columbia, MO, ²Southern Illinois University, Carbondale, IL, ³Louisiana State University, Baton Rouge, LA, ⁴University of Nebraska-Lincoln, Lincoln, NE, ⁵Purdue University, West Lafayette, IN, ⁶Kansas State University, Manhattan, KS (10)

‡ The Influence of Biological Residue Management Products on the Viability of Cover Crop and Weed Seed.

Emily McCormick*, Alyssa Essman; The Ohio State University, Columbus, OH (11)

† PRE Herbicides Bioassay: Impact of Cereal Rye Cover Crop on Residual Weed Control.

Gustavo Fujihara*, Guilherme Chudzik, Ahmadreza Mobli, Luma Lorena Loureiro Da Silva Rodrigues, Ryan DeWerff, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI (12)

Soybean Tolerance to Flaming During Flowering Stage.

Stevan Knezevic*, Jon Scott, Amit Jhala, Luka Milosevic; University of Nebraska-Lincoln, Lincoln, NE (13)

† Critical Time of Cereal Rye Cover Crop Termination in Soybean Planted Green and Early.

Guilherme Chudzik*¹, Jose Nunes¹, Karla Gage², Sarah Lancaster³, Travis Legleiter⁴, Joseph Ikley⁵, Jason Norsworthy⁶, Alyssa Essman⁷, Christy Sprague⁸, Vipin Kumar⁹, Kevin Bradley¹⁰, William G Johnson¹¹, Bryan Young¹¹, Ryan DeWerff¹, Rodrigo Werle¹; ¹University of Wisconsin-Madison, Madison, WI, ²Southern Illinois University, Carbondale, IL, ³Kansas State University, Manhattan, KS, ⁴University of Kentucky, Princeton, KY, ⁵North Dakota State University, Fargo, ND, ⁶University of Arkansas, Fayetteville, AR, ⁷Ohio State University, Columbus, OH, ⁸Michigan State University, East Lansing, MI, ⁹University of Nebraska-Lincoln, Lincoln, NE, ¹⁰University of Missouri, Columbia, MO, ¹¹Purdue University, West Lafayette, IN (14)

NCWSS Program

‡ **Assessing Sensors as a Non-Destructive Tool for Weed and Cover Crop Biomass Estimation.** Isaac Buyungo*, Christopher Proctor, Vinicius Velho, Victor de Sousa Ferreira, Rodrigo Cintra Bachega, Andre Graciano Garcia; University of Nebraska-Lincoln, Lincoln, NE (15)

Flame Weeding: An Alternative for Minimizing Cultivation Passes in Organic Corn Production Systems. Mercy Odemba*¹, Eugene Law¹, Elijah Dean², Cassandra Brown³; ¹The Ohio State University, Columbus, OH, ²Timberlane Organic Farms, Bellevue, OH, ³The Ohio State University, Wooster, OH (16)

† **Weed Management Strategies for Establishing Kentucky Bluegrass as a Perennial Cover Crop.** Kiera Searcy*¹, Erin Haramoto¹, Travis Legleiter², Sydney Pridie³, Matthew Allen¹, Brandon Schlautman⁴; ¹University of Kentucky, Lexington, KY, ²University of Kentucky, Princeton, KY, ³Corteva Agriscience, Lee's Summit, MO, ⁴The Land Institute, Salina, KS (17)

† **Evaluating Cool-Season *Poaceae* Species as Perennial Groundcover in Corn.** Hallie Sandeen*¹, Erin Haramoto¹, Brandon Schlautman², Shui-zhang Fei³, Sara Lira⁴, Tim Phillips¹, Travis Legleiter¹, Matthew Allen¹; ¹University of Kentucky, Lexington, KY, ²The Land Institute, Salina, KS, ³Iowa State University, Ames, IA, ⁴Corteva Agriscience, Johnston, Kentucky (18)

POSTER SECTION **Extension**

On-Farm Insights: Farmer Perspectives on Harvest Weed Seed Control in Minnesota Corn and Soybeans Production. Isidor Ceperkovic*, Debalin Sarangi, David Nicolai, Seth Naeve; University of Minnesota, St. Paul, MN (19)

POSTER SECTION **Herbicide Application Technologies**

‡ **Spray Characteristics and Efficacy of Glufosinate-Ammonium Formulations under Greenhouse Conditions.** Adam Balic, Vuk Stamenovic, Kasey Schroeder, Jeffrey Golus, Milos Zaric; University of Nebraska-Lincoln, North Platte, NE (20)

NCWSS Program

† Do Variable Rate Applications of Soil Residual Herbicides on Variable Field Soils Result in Greater Herbicide Availability in the Soil Solution? Alexander R. Mueth*, Joshua Widhalm, William G Johnson, Bryan Young; Purdue University, West Lafayette, IN **(21)**

Effect of Carrier Volume on Waterhemp Control with a Drone. Brian Stiles II*, Christy Sprague; Michigan State University, East Lansing, MI **(22)**

† Aerial Monitoring of Crop Development and Weed Control Using UAVs. Nikola Arsenijevic*¹, Zaim Ugljic¹, Thomas Butts², Rodrigo Werle¹; ¹University of Wisconsin-Madison, Madison, WI, ²Purdue University, West Lafayette, IN **(23)**

‡ Combining Targeted Herbicide Application and Drone Imagery. Douglas Koch*¹, Gaurav Jha¹, Sarah Lancaster¹, Ethan Noll²; ¹Kansas State University, Manhattan, KS, ²Rantizo, Hiawatha, KS **(24)**

Palmer Amaranth Control with Tembotrione and Adjuvants. Jeffrey Golus*, Adam Balic, Laura de Souza Viera, Vuk Stamenovic, Milos Zaric; University of Nebraska-Lincoln, North Platte, NE **(25)**

† Impact of Activator Adjuvants With and Without a DRA on Spray Drone Swath Characteristics. Hunter Medenwald*¹, M. Faletti², Julie Young¹, Thomas Butts¹, Bryan Young¹; ¹Purdue University, West Lafayette, IN, ²Precision Laboratories, LLC, Kenosha, WI **(26)**

Early Detection of Herbicide-Resistant *Amaranthus tuberculatus* Populations Using Drone-Mounted Multispectral Imaging. Sirwan Babaei*, Cristiana Bernardi Rankrape, Xian Liu, Amir Sadeghpour, Karla Gage; Southern Illinois University, Carbondale, IL **(27)**

‡ Spray Deposition of Different Glufosinate Formulations with Single and Dual Fan Nozzles. Laura de Souza Viera*, Adam Balic, Jeffrey Golus, Milos Zaric; University of Nebraska-Lincoln, North Platte, NE **(28)**

† Do Postemergence Herbicide Application Timing and Strategy Impact Weed Control and Foliar Herbicide Savings when using Targeted Application Technologies? Zaim Ugljic*¹, Ryan DeWerff¹, Maxwell Oliveira², Calvin Miller³, Rodrigo Werle¹; ¹University of Wisconsin-Madison, Madison, WI, ²BASF, Cologne, Germany, ³BASF, Seymour, IL **(29)**

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Weed Management with Broadcast, Hooded, and Individual Row Crop Sprayers. Randy Lloyd*, Adam Balic, Kasey Schroeder, Jeffrey Golus, Milos Zaric; University of Nebraska-Lincoln, North Platte, NE **(30)**

† Comparison of UAV and Ground Sprayer for Pre-Emergent Herbicide Application in Soybean. Jesse Yount*, Kevin Bradley; University of Missouri, Columbia, MO **(31)**

Investigating the Herbicide Formulations: Efficacy of Nano-glyphosate and -glufosinate. Md Mazharul Islam*, Mithila Jugulam, Amie E Norton, Robert J Whitworth, Sarah Lancaster; Kansas State University, Manhattan, KS **(32)**

‡ Evaluating Different PPO-inhibitor Rates in Tank-Mix with Glufosinate on Control of Velvetleaf and Common Lambsquarters. Rodrigo Cintra Bachega*¹, Isaac Buyungo¹, Christopher Proctor¹, Victor de Sousa Ferreira¹, Vinicius Velho¹, Andre Graciano Garcia¹, Rafael Munhoz Pedroso²; ¹University of Nebraska-Lincoln, Lincoln, NE, ²ESALQ - Escola Superior de Agricultura Luiz de Queiroz, Piracicaba, Sao Paulo Brazil **(33)**

Utilizing a Fluorescent Pigment to Measure the Influence of Adjuvants on Spray Solution Coverage. Joshua Skelton*, Anderson Weber; WinField United, River Falls, WI **(34)**

† Influence of Commercial and Experimental Deposition Aid Adjuvants on Spray Parameters with Spray Drones. Jessie Lewis*¹, Hunter Medenwald¹, Ryan Edwards², Julie Young¹, Bryan Young¹; ¹Purdue University, West Lafayette, IN, ²WinField United, River Falls, WI **(35)**

Antagonism of Clethodim from pH Buffers Used with Dicamba. Marcelo Zimmer*¹, Bryan Young¹, Julie Young¹, R. Scott Tann², William G Johnson¹; ¹Purdue University, West Lafayette, IN, ²Lamberti, Conroe, TX **(36)**

‡ Variable-rate Residual Herbicide Application Based on Weed Distribution and Soil Texture. Leno Caldieraro*, Sarah Lancaster, Deepak Joshi; Kansas State University, Manhattan, KS **(37)**

† Evaluation of Post Emergent Herbicide Applications with the DJI Agras T40 in Soybean. Trace Thompson*, Kevin Bradley; University of Missouri, Columbia, MO **(38)**

NCWSS Program

Foliar-Active Herbicides: Interactions Across Modes of Action. Zhe Ren*, Bryan Young; Purdue University, West Lafayette, IN (39)

POSTER SECTION **Horticulture & Specialty Crops**

† Reducing the Impact of Dicamba on Tomato (*Solanum lycopersicum*) using Activated Charcoal Coated Fences. Lidia K Myers*, George Oganda, Andy Vehige, Reid J Smeda; University of Missouri, Columbia, MO (40)

Evaluating the Crop Response of Fiber Hemp (*Cannabis sativa* L.) to PRE and Early POST Applications of Soil Residual Herbicides. Kaitlin Creager*¹, Eric Miller¹, Thierry Besançon², Lynn Sosnoskie³, Karla Gage¹; ¹Southern Illinois University, Carbondale, IL, ²Rutgers University, New Brunswick, NJ, ³Cornell University, Ithaca, NY (41)

‡ Evaluation of Jack-o'-Lantern Pumpkin (*Cucurbita pepo* L.) Tolerance to Group 15 Herbicides. Lidysce Mata*, Stephen Meyers, Josue Cerritos-Garcia, Celia Corado, Valeria Fonseca, Helen Nocito; Purdue University, West Lafayette, IN (42)

Optimizing Nozzle Selection and Application Techniques for Effective Product Delivery in Hops. Milos Zaric*; University of Nebraska-Lincoln, North Platte, NE (43)

† Herbicide Impregnated Fertilizer for Increased Pumpkin Crop Safety. Helen Nocito, Stephen Meyers, Celia Corado, Josue Cerritos-Garcia, Lidysce Mata, Jeanine Arana, Valeria Fonseca; Purdue University, West Lafayette, IN (44)

POSTER SECTION **Range, Pasture, and Vegetation Management**

Propane Flaming as a Non-chemical Tool for Alfalfa Weevil Control. Stevan Knezevic*, Jon Scott, Luka Milosevic; University of Nebraska-Lincoln, Lincoln, NE (45)

† Comparison of Electrocutation with Common Herbicide Treatments for Weed and Tall Fescue Seedhead Management in Missouri Pastures. Grant Coe*, Kevin Bradley; University of Missouri, Columbia, MO (46)

Some Early Pollinator Plot Establishment Herbicide Options. Joe Omielan*; University of Kentucky, Lexington, KY (47)

POSTER SECTION
Row Crop Herbicide Management

† Can Metribuzin Enhance the Response of Carryover Injury from Mesotrione in Soybeans? Abigail Norsworthy*, Julie Young, Bryan Young; Purdue University, West Lafayette, IN (48)

Evaluating Overlapping Residual Herbicide Programs for Weed Management in Soybean. Vipin Kumar, Alex Chmielewski*, Amit Jhala; University of Nebraska-Lincoln, Lincoln, NE (49)

† Overcoming ACCase Inhibitor Antagonism with 2,4-D for Controlling Glyphosate-Resistant Volunteer Corn in Enlist Soybean. Adebisi Adeleke*, Sachin Dhanda, Ryan Miller, Lisa Behnken, Thomas Hoverstad, Debalin Sarangi; University of Minnesota, St. Paul, MN (50)

Wisconsin Waterhemp Herbicide Resistance Monitoring: What has Changed in 5 Years? Ahmadreza Mobli*, Felipe Faleco, Luma Lorena Loureiro Da Silva Rodrigues, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI (51)

‡ Wheat Seed Germination Following Pre-Harvest Herbicide Application. Igor Gustavo Rezende Lima*, Sarah Lancaster, Luiz Otavio Pradella, Wade Burris, Salina Raila; Kansas State University, Manhattan, KS (52)

Managing Corn Volunteers in Herbicide-resistant Sorghum. Mandeep Singh*, Amit Jhala; University of Nebraska-Lincoln, Lincoln, NE (53)

† Residual Control of Broadleaf Weeds with Encapsulated Saflufenacil + Pyroxasulfone in Corn. Jada Davis*, Julie Young, William G Johnson, Bryan Young; Purdue University, West Lafayette, IN (54)

† Integrated Management of Key Pests in Corn-Potato Systems. Hannah Johnson*, Erin Burns; Michigan State University, East Lansing, MI (55)

Efficacy of Common Corn Herbicide Programs in Nebraska. Jon Scott*, Luka Milosevic, Stevan Knezevic; University of Nebraska-Lincoln, Lincoln, NE (56)

NCWSS Program

† **Pre-emergence Tank-Mixes for Waterhemp (*Amaranthus tuberculatus*) Control in HT4 Soybean.** Carson Hought, Joseph Ikley; North Dakota State University, Fargo, ND (57)

Enhancing Palmer Amaranth (*Amaranthus palmeri*) Control in Soybean: Effective Strategies for Glufosinate and 2,4-D Applications. Lalit Mohan¹, Victoria Johnson*¹, Sarah Lancaster¹, Mithila Jugulam²; ¹Kansas State University, Manhattan, KS, Kansas State University, Manhattan, KS, Kansas State University, Manhattan, KS, ²Texas A&M University, Beaumont, TX (58)

† **Metribuzin and Sulfentrazone Rate and Combination Effects on Weed Control and Crop Safety in Soybean.** Austin Weippert, Joseph Ikley; North Dakota State University, Fargo, ND (59)

† **Wisconsin Waterhemp Herbicide Resistance Monitoring: Where Are We At?** Luma Lorena Loureiro Da Silva Rodrigues*¹, Ahmadreza Mobli¹, Daniel Valadão Silva², Rodrigo Werle¹; ¹University of Wisconsin-Madison, Madison, WI, ²Federal Rural University of the Semi-Arid, Mossoró, Rio Grande do Norte, Brazil (60)

Response of Two Corn Hybrids to Tolpyralate Combined with Reactive Oxygen Species Generating Herbicides. Nader Soltani*, Christy Shropshire, John Flutterm, Peter Sikkema; University of Guelph, Ridgetown, Ontario, Canada (61)

† **Influence of Deer Repellents and Herbicide Combinations on Weed Control and Deer Browsing in Soybean.** Grady Rogers*, Kevin Bradley; University of Missouri, Columbia, MO (62)

‡ **Comparison of Soybean Variety and Planting Date on Metribuzin Tolerance.** Lauryn Wishowski*, Christy Sprague; Michigan State University, East Lansing, MI (63)

Residual Activity of HPPD-inhibitor Herbicides in Corn Dwight Lingenfelter, Penn State University, University Park, PA (64)

† **Tank Mix Evaluation of Atrazine Alternative PSII- and HPPD-Inhibitors for Control of *Amaranthus tuberculatus* and *Ambrosia trifida* in Wisconsin Corn Production Systems.** Daniel Zhu*, Ryan DeWerff, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI (65)

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† **Impact of Row Spacing and Layered Residual Herbicide on Soybean Growth and Yield.** Sithin Mathew*, Aaron Lorenz, Seth Naeve, Vasudha Sharma, Debalin Sarangi; University of Minnesota, St Paul, MN **(66)**

Weed Management and Soybean Yield with 2,4-D and Glufosinate Applied Alone, Sequentially, and Mixed. Eric Jones*, Dave Vos, Jill Alms; South Dakota State University, Brookings, SD **(67)**

† **Target and Non-target Site Resistance in Diverse Johnsongrass (*Sorghum halepense*) Populations.** Connor Purvis*, Erin Burns; Michigan State University, East Lansing, MI **(68)**

† **Evaluating Glufosinate Resistance in a Waterhemp (*Amaranthus tuberculatus*) Population from Southern Illinois.** Cristiana Bernardi Rankrape*¹, Eduardo Lago¹, Eric Miller¹, Isabel Schlegel Werle², Patrick Tranel², Karla Gage¹; ¹Southern Illinois University, Carbondale, IL, ²University of Illinois Urbana-Champaign, Urbana, IL **(69)**

Effect of Soil-applied Nitrogen on Weed Germination and Control with Herbicides in Soybean. Eric Jones*, Dave Vos, Jill Alms; South Dakota State University, Brookings, SD **(70)**

† **The Effects of Soybean Planting Date and Metribuzin Rates on Waterhemp (*Amaranthus tuberculatus*) Control, Soybean Injury, and Yield.** Ella Poling*, Anthony Dobbels, Colin Barclay, Alyssa Essman; The Ohio State University, Columbus, OH **(71)**

† **Confirmation of Multiple Herbicide Resistance in Waterhemp (*Amaranthus tuberculatus*) Population from Northeast Kansas.** Joana Schroeder de Souza*, Anita Dille, Mithila Jugulam; Kansas State University, Manhattan, KS **(72)**

Surtain Herbicide: A New Residual Herbicide for Weed Control in Corn from BASF. Sanjeev Bangarwa, Josh Putman; BASF Corporation, Research Triangle Park, Durham, NC **(73)**

† **Evaluating Photosystem II Inhibitor Herbicides on Atrazine-Resistant *Amaranthus tuberculatus*.** Alexander Lopez*¹, Ryan Henry², Kip Jacobs², Damilola Raiyemo¹, Isabel Schlegel Werle¹, Patrick Tranel¹; ¹University of Illinois Urbana-Champaign, Urbana, IL, ²UPL NA Inc., King of Prussia, PA **(74)**

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† **Palmer Amaranth Management Following Harvest Aid Herbicide Application in Cotton.** Wade Burris*, Sarah Lancaster, Kriag Roozeboom, Mithila Jugulam, Salina Raila, Igor Gustavo Rezende Lima; Kansas State University, Manhattan, KS (75)

Efficacy of Diflufenican for Controlling Multiple Herbicide-Resistant Waterhemp in Soybean. Peter Sikkema*, Christian Willemse, Nader Soltani; University of Guelph, Ridgetown, Ontario, Canada (76)

POSTER SECTION **Weed Biology and Ecology**

† **Assessing Weed Seedbank Changes in Soybeans under Winter Wheat Double Cropping and Nitrogen Fertilizer Management.** Oluwaseun Ola*¹, Osman Guzel¹, Karl Williard¹, Jon Schoonover¹, Steffen Mueller², Amir Sadeghpour¹, Karla Gage¹; ¹Southern Illinois University, Carbondale, IL, ²Energy Resources Center, University of Illinois-Chicago, Chicago, IL (77)

† **Exploring the Potential of Black Soldier Fly Compost Tea for Weed Suppression.** Celia Corado*, Stephen Meyers, Lidysce Mata, Laura Ingwell, Valeria Fonseca, Milena Agila, Josue Cerritos-Garcia, Helen Nocito; Purdue University, West Lafayette, IN (78)

Relative Volatility of Amicarbazone, Atrazine, and Metribuzin under Laboratory Conditions. Ryan Henry*¹, Thomas Mueller²; ¹UPL NA Inc., Fort Wayne, IN, ²University of Tennessee, Knoxville, TN (79)

† **The Distribution and Frequency of Waterhemp (*Amaranthus tuberculatus*) in Ohio Soybean Fields Prior to Harvest from 2021 to 2024.** Amber Emmons*, Alyssa Essman, Eugene Law, Bruce Ackley, Anthony Dobbels; The Ohio State University, Columbus, OH (80)

† **Pre-emergence Herbicide Effects on Iron Deficiency Chlorosis Severity in Soybean.** Jack Roehl*, Joseph Ikley; North Dakota State University, Fargo, ND (81)

The Benefits of Overlapping Residual Herbicides in Weed Management Programs for Multiple Herbicide-Resistant *Amaranthus* Populations in Corn. William Tice¹, Marshall

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Hay¹, Jesse Haarmann², Mark Kitt³, David Belles³, Tom Beckett³; ¹Syngenta Crop Protection, Garden Plain, KS, ²Syngenta Crop Protection, Rochester, MN, ³Syngenta Crop Protection, Greensboro, NC (82)

POSTER SECTION

Weed Genetics & Herbicide Physiology

† **Expression of HPPD and CYP Genes in Triketone-tolerant Transgenic Wheat.** Akshitha Reddy Bynegeri*¹, Susee Sudhakar², Yaiphabi Kumam³, Veerendra Sharma¹, Harold N. Trick¹, P.V. Vara Prasad¹, Mithila Jugulam¹; ¹Kansas State University, Manhattan, KS, ²University of Arkansas, Fayetteville, AR, ³University of Florida, Gainesville, FL (83)

† **Ethofumesate Controls *Amaranthus* spp. Preemergence in Sugarbeet.** Julianna Miller*, Thomas Peters, Adam Aberle; North Dakota State University, Fargo, ND (84)

Different Nontarget-site Mechanisms underlie Resistance to Dicamba and 2,4-D in an *Amaranthus tuberculatus* Population. Isabel Schlegel Werle*, Lucas Kopecky Bobadilla, Damilola Raiyemo, Alexander Lopez, Filipi Mesquita Machado, Patrick Tranel; University of Illinois Urbana-Champaign, Urbana, IL (85)

† **The Effect of Elevated Temperatures on Expression of Metabolic Herbicide Resistance in Waterhemp (*Amaranthus tuberculatus*).** Felipe de Andrade Faleco*¹, Isabel Schlegel Werle², Alexander Lopez², Patrick Tranel², David Stoltenberg¹, Rodrigo Werle¹; ¹University of Wisconsin-Madison, Madison, WI, ²University of Illinois Urbana-Champaign, Urbana, IL (86)

† **Interaction of Pyridate versus Atrazine with HPPD-Inhibitors for Foliar Weed Control.** Grant Isaacs*, Julie Young, Bryan Young; Purdue University, West Lafayette, IN , Purdue University, West Lafayette, IN (87)

Evaluation of Transgenic Arabidopsis Expressing *Lolium rigidum* CYP81A10v7 for Multiple Herbicide Applications. Neethu Francis*¹, Veerendra Sharma¹, Yaiphabi Kumam², Harold N. Trick¹, P.V. Vara Prasad¹, Mithila Jugulam¹; Kansas State University, Manhattan, KS, University of Florida Gainesville, FL (88)

‡ **Does Glyphosate-Resistance in Giant Ragweed (*Ambrosia trifida*) Influence the Efficacy of Other Active Ingredients in a**

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Tank-mix? John Kohler*, Alyssa Essman; The Ohio State University, Columbus, OH **(89)**

† Differential Response of *Ipomoea hederacea* Jacq. to Glyphosate and Dicamba. Luka Milosevic*, Jon Scott, Amit Jhala, Stevan Knezevic; University of Nebraska-Lincoln, Lincoln, NE **(90)**

Updated HRAC Mode of Action Classification. Ryan Henry*¹, David Belles², Dana Spatz³; ¹US HRAC, Fort Wayne, IN, ²US HRAC, Greenville, NC, ³US HRAC, Johnston, IA **(91)**

† Physiological Basis of Corn Injury to Mesotrione under High-Temperature Stress. Yasir Nazir Parrey*¹, Mithila Jugulam², P.V. Vara Prasad¹; ¹Kansas State University, Manhattan, KS, ²Texas A&M, Beaumont, TX **(92)**

Unraveling the Genetic and Molecular Changes Associated with Clopyralid Resistance in Common Ragweed (*Ambrosia artemisiifolia*). Nash Hart*, Eric Patterson, Erin Burns; Michigan State University, East Lansing, MI **(93)**

† Exploring the Genetic Basis of Spine Evolution in *Amaranthus*. Ramandeep Kaur*, Alexander Lopez, Patrick Tranel; University of Illinois Urbana-Champaign, Urbana, IL **(94)**

Pennycress Response to Soybean Herbicide Carryover. Mark Bernards*¹, Gregg Johnson²; ¹USDA-ARS, Morris, MN, ²University of Minnesota, Waseca, MN **(95)**

NCWSS Program

TUESDAY MORNING DECEMBER 10

General Session

LOCATION: Century A
TIME: 10:00 AM - 11:55 AM Central Time
CHAIR: Mark Bernards
USDA-ARS

***SPEAKER**

- 10:00 AM Welcome to the 79th Annual Meeting of the North Central Weed Science Society.** Mark Bernards*, USDA-ARS, Morris, MN **(96)**
- 10:05 AM Welcome to Kansas City.** Adrian Moses, Syngenta-retired, Kansas City area, MO **(97)**
- 10:15 AM Harry S. Truman: The Farmer President.** Samuel (Sam) Rushay*, US National Archives and Records Administration, Harry S. Truman Library and Museum, Independence, MO **(98)**
- 10:50 AM Washington, D.C., Science Policy Update.** Lee Van Wychen*; Weed Science Society of America, Alexandria, VA **(99)**
- 11:20 AM Presidential Address.** Dawn Refsell*; Corteva Agriscience, Johnston, IA **(100)**
- 11:30 AM NCWSS Finance Update.** Eric Spandl*; Winfield United, River Falls, WI **(101)**
- 11:40 AM Remembering NCWSS Members and Friends.** Brett Lynn*; Bayer Crop Science, Creve Coeur, MO **(102)**
- 11:50 AM Program Announcements.** Mark Bernards*, USDA-ARS, Morris, MN **(103)**
- 11:55 AM Adjourn**

TUESDAY AFTERNOON DECEMBER 10

Student Luncheon and Business Meeting

LOCATION: Shawnee Mission
TIME: 12:00 PM - 1:15 PM
CHAIRS: Kaitlin Creager
Southern Illinois University
Cristiana Bernardi Rankrape
Southern Illinois University

12:00 PM Student Luncheon

Sponsored by Corteva Agriscience – open to all graduate and undergraduate students

TUESDAY AFTERNOON DECEMBER 10

ORAL 1 – Student Contest

LOCATION: Century A
TIME: 1:30 PM - 5:30 PM Central Time
CHAIRS: Samuel Revolinski,
University of Kentucky
Ahmadreza Mobli
University of Wisconsin-Madison
TOPICS: Weed Gen. & Herb Physiol.
Weed Biology & Ecology
Row Crop Herbicides
Cover Crops & IWM

***SPEAKER † GRADUATE CONTEST**

1:30 PM † Development and Application of KASP Assays for Differentiating Between *Sorghum bicolor* x *halepense* Biotypes. Connor Purvis*, Eric Patterson, Erin Burns; Michigan State University, East Lansing, MI (104)

1:45 PM † Characterization of the Interaction of Pyridate and HPPD-Inhibitors for Improved Weed Management. Grant Isaacs*, Julie Young, Bryan

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Young; Purdue University, West Lafayette, IN
(105)

- 2:00 PM † Harnessing the Power of Hormesis: Fact or Fiction?** Luka Milosevic*, Jon Scott | Amit Jhala, Stevan Knezevic; University of Nebraska-Lincoln, Lincoln, NE (106)
- 2:15 PM † Differentiating Soybean Response from Two Classes of Bleaching Herbicides: An Opportunity for Phenotyping Technology.** Abigail Norsworthy*, Zhongzhong Niu, Jian Jin, Thomas Butts, Julie Young, Bryan Young; Purdue University, West Lafayette, IN (107)
- 2:30 PM † Multiple Herbicide Resistance in *Poa annua* is Mediated by Cytochrome P450.** Mohit Mahey*¹, Eric Patterson¹, Peter Lundquist¹, Jinyi Chen²; ¹Michigan State University, East Lansing, MI, ²Nanjing Agricultural University, Nanjing, Jiangsu, China (108)
- 2:45 PM † Influence of Salicylic Acid on Foliar Herbicide Efficacy.** Emma Lagerhausen*, Julie Young, Bryan Young; Purdue University, West Lafayette, IN (109)
- 3:00 PM † The Nexus Between Reactive Oxygen Species and the Mechanism of Action of Herbicides.** Catherine Traxler*¹, Todd Gaines¹, Anita Kuepper², Peter Luemmen³, Franck Dayan¹; ¹Colorado State University, Fort Collins, CO, ²Bayer Crop Science, Chesterfield, MO, ³Bayer AG Frankfurt am Main, Hesse, Germany (110)
- 3:15 PM Break**
- 3:30 PM † Documenting the Extent of Resistance to Group 15 Herbicides in Illinois Waterhemp (*Amaranthus tuberculatus*).** Travis Wilke*¹, Patrick Tranel¹, Martin Williams², Aaron Hager¹; ¹University of Illinois Urbana-Champaign, Urbana, IL, ²USDA-ARS, Urbana, IL (111)
- 3:45 PM † Shedding Light on Weed Seed Germination: The Role of Light Quality and Incubation Period.** Datta Chiruvelli*¹, Amit Jhala², Dave Moeller¹, Roger Becker¹, Debalin Sarangi¹; ¹University of

NCWSS Program

Minnesota, St Paul, MN, ²University of Nebraska-Lincoln, Lincoln, NE **(112)**

- 4:00 PM † Effects of Soil Texture and pH on Level of Soybean (*Glycine max*) Injury to Sulfentrazone and Chlorimuron.** Joana Schroeder de Souza*, Ganga Hettiarachchi, Sophie Westbrook, Anita Dille; Kansas State University, Manhattan, KS **(113)**
- 4:15 PM † Emergence Periodicity of Six Weed Species as Impacted by Cereal Rye (*Secale cereale* L.) Cover Crop in the Upper Midwest.** Eric Yu*¹, Kurt Spokas², Gregg Johnson³, Axel Garcia y Garcia⁴, Ce Yang¹, Debalin Sarangi¹; ¹University of Minnesota, St. Paul, MN, ²USDA-ARS, St. Paul, MN, ³University of Minnesota, Waseca, MN, ⁴University of Minnesota, Lamberton, MN **(114)**
- 4:30 PM † Crop Safety from Encapsulated Saflufenacil + Pyroxasulfone Combinations Applied Postemergence in Corn.** Jada Davis*, Julie Young, William G Johnson, Thomas Butts, Bryan Young; Purdue University, West Lafayette, IN **(115)**
- 4:45 PM † Optimizing Soybean Canopy Growth: The Impact of Planting Date and Variety Selection.** Sithin Mathew*, Aaron Lorenz, Seth Naeve, Vasudha Sharma, Debalin Sarangi; University of Minnesota, St Paul, MN **(116)**
- 5:00 PM † Novel Preemergence Tank Mixtures Based on Synergistic Combinations Improve Control of Amaranthus Species in Maize Production** Devin Koester*, Dean Riechers; University of Illinois Urbana-Champaign, Champaign, IL **(117)**
- 5:15 PM Business Meetings – Weed Genetics & Herbicide Physiology and Weed Biology & Ecology**

TUESDAY AFTERNOON DECEMBER 10

ORAL 2 – Student Contest

LOCATION: Century B
TIME: 1:30 PM - 5:30 PM Central Time
CHAIRS: Nathan Haugrud
 Syngenta Crop Protection
 Steve Valenti
 Bayer Crop Science
TOPICS: Cover Crops & IWM
 Row Crop Herbicides
 Herbicide Application Technologies

***SPEAKER † GRADUATE CONTEST**

- 1:30 PM † Assessing Corn Residual Herbicide Effects on Early Season Interseeded Cover Crops.** Victor de Sousa Ferreira*¹, Christopher Proctor¹, Isaac Buyungo¹, Rodrigo Cintra Bachega¹, Andre Graciano Garcia¹, Vinicius Velho¹, Alexandre Tonon Rosa², Mark Reiman²; ¹University of Nebraska-Lincoln, Lincoln, NE, ²Bayer Crop Science, Gothenburg, NE **(118)**
- 1:45 PM † The Effects of a Rye Cover Crop, Rye Termination Timing, and Herbicide Program on Waterhemp (*Amaranthus tuberculatus*) Control in a Corn-Soybean Rotation.** Bayron Hernandez*, Anthony Dobbels, Colin Barclay, Alyssa Essman; The Ohio State University, Columbus, OH **(119)**
- 2:00 PM † Integrating Intra-Row Electrocutation and Glyphosate Manages Glyphosate-Resistant Kochia (*Bassia scoparia*).** Waqas Ahmad*, Greta Gramig; North Dakota State University, Fargo, ND **(120)**
- 2:15 PM † The Effects of Cereal Rye (*Secale cereale*) Cover Crop Termination Timing, Nitrogen Application Timing, and Herbicide Program on Weed Control and Corn Production.** Betsy Cunningham*, Anthony Dobbels, Colin Barclay, Alyssa Essman; The Ohio State University, Columbus, OH **(121)**

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- 2:30 PM † Enhancing Weed Control: Tank-Mix Approaches with Metribuzin for Managing *Amaranthus* and Other Weed Species.** Oluwaseun Ola*¹, Karla Gage¹, Eric Miller¹, Jason Bond², Kevin Bradley³, Alyssa Essman⁴, Joseph Ikley⁵, Prashant Jha⁶, Amit Jhala⁷, William G Johnson⁸, Sarah Lancaster⁹, Travis Legleiter¹⁰, Thomas Mueller¹¹, Jason Norsworthy¹², Christy Sprague¹³; ¹Southern Illinois University, Carbondale, IL, ²Mississippi State University, Stoneville, MS, ³University of Missouri, Columbia, MO, ⁴The Ohio State University, Columbus, OH, ⁵North Dakota State University, Fargo, ND, ⁶Louisiana State University, Baton Rouge, LA, ⁷University of Nebraska-Lincoln, Lincoln, NE, ⁸Purdue University, West Lafayette, IN, ⁹Kansas State University, Manhattan, KS, ¹⁰University of Kentucky, Princeton, KY, ¹¹University of Tennessee, Knoxville, TN, ¹²University of Arkansas, Fayetteville, AR, ¹³Michigan State University, East Lansing, MI **(122)**
- 2:45 PM † Exploring Integrated Weed Management Strategies for Soybeans (*Glycine max*) with Different Planting Dates.** Salina Raila*, Kriag Roozeboom, Gregory Ibendahl, Sarah Lancaster; Kansas State University, Manhattan, KS **(123)**
- 3:00 PM † Impact of Soil Residual Herbicide Application Timing on Herbicide Fate and Weed Control in Early-Planted Soybean in Wisconsin.** Guilherme Chudzik*¹, Ryan DeWerff¹, Shelby Lanz², Thomas Mueller², Rodrigo Werle¹; ¹University of Wisconsin-Madison, Madison, WI, ²University of Tennessee-Knoxville, Knoxville, TN **(124)**
- 3:15 PM Break**
- 3:30 PM † Long-term Effect of Residual Compared to POST Herbicide Programs on the Soil Seedbank of Waterhemp.** Andy Vehige*, Reid J Smeda; University of Missouri, Columbia, MO **(125)**
- 3:45 PM † What Does Weed Management in Early Planted Dry Beans Look Like?** Jacob Felsman*,

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Christy Sprague, Brian Stiles II; Michigan State University, East Lansing, MI **(126)**

- 4:00 PM † Exploring Short Statured Corn Management Strategies for Weed Control in Michigan.** Kyle Elizalde*, Nash Hart, Erin Burns; Michigan State University, East Lansing, MI **(127)**
- 4:15 PM † The Impact of Spray Coverage on Weed Control When Using Novel Targeted Herbicide Application Technologies.** Zaim Ugljic*, Ryan DeWerff, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI **(128)**
- 4:30 PM † Herbicide Programs for Weed Management in Early-Planted Soybean.** Estevan Cason*, Bryan Young, William G Johnson; Purdue University, West Lafayette, IN **(129)**
- 4:45 PM † Influence of Crop and Weed Canopies on Postemergence Spray Solution Deposition** Nikola Arsenijevic*, Zaim Ugljic, Guilherme Chudzik, Daniel Zhu, Gustavo Fujihara, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI **(130)**
- 5:00 PM † Variable Soil Residual Herbicide Application Rates Should be Determined by More than Just Soil Type.** Alexander R. Mueth*, Thomas Butts, Julie Young, Siddhartho Paul, William G Johnson, Bryan Young; Purdue University, West Lafayette, IN **(131)**
- 5:15 PM Business Meeting – Cover Crops & Integrated Weed Management**

TUESDAY AFTERNOON DECEMBER 10

ORAL 3 – Student Contest Plus Horticulture & Specialty Crops: Range, Pasture & Vegetation Management: and Weed Biology & Ecology

LOCATION: Liberty
TIME: 1:30 PM - 5:30 PM Central Time
CHAIRS: Tate Castillo
Bayer Crop Science
Reid Smeda
University of Missouri
TOPICS: Horticulture & Specialty Crops
Range, Pasture & Veg Mngt
Weed Biology & Ecology

***SPEAKER † GRADUATE CONTEST**

- 1:30 PM † Field Surveys of Lima Bean Reveal Shortcomings in Weed Management.** Yudai Takenaka*¹, Pavle Pavlovic², Barbara Scott³, Mark VanGessel³, Jed Colquhoun⁴, Martin Williams⁵;
¹University of Illinois Urbana-Champaign, Urbana, IL, ²Texas A&M University, College Station, TX, ³University of Delaware, Georgetown, DE, ⁴University of Wisconsin-Madison, Madison, WI, ⁵USDA-ARS, Urbana, IL **(132)**
- 1:45 PM Does Flumioxin Application Timing and Rate Influence Non-russet Type Potatoes?** Harlene Hatterman-Valenti*, Collin Auwarter; North Dakota State University, Fargo, ND **(133)**
- 2:00 PM † Utility of Cover Crops and Residual Herbicides for Early Season Weed Control in Sweetpotato (*Ipomoea batatas* L.).** Richard Jose Noel Torres*, Reid J Smeda, Xi Xiong; University of Missouri, Columbia, MO **(134)**
- 2:15 PM Asian Copperleaf: An Obscure Find in Iowa Crops.** Meaghan Anderson*, Bob Hartzler; Iowa State University, Ames, IA **(135)**
- 2:30 PM † Utilizing Silage Tarps, S-metolachlor, and Hand Weeding for Weed Management in Onions.**

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Josue Cerritos-Garcia*, Stephen Meyers, Celia Corado, Lidysce Mata, Helen Nocito, Jeanine Arana; Purdue University, West Lafayette, IN **(136)**

2:45 PM Yellow Foxtail [*Setaria pumila* (Poir.)] Reduces Establishment of Alfalfa Interseeded into Corn.

Mark Renz*¹, MD Rayhan Shaheb¹, Marta Kohmann¹, John Grabber²; ¹University of Wisconsin-Madison, Madison, WI, ²USDA-ARS Dairy Forage, Madison, WI **(137)**

3:00 PM † Evaluating the Carryover of Corn Residual Herbicides Containing Clopyralid on Alfalfa Establishment and Productivity. Arthur Franco*, Mark Renz, Marta Kohmann; University of Wisconsin-Madison, Madison, WI **(138)**

3:15 PM Break

3:30 PM Weed Management Challenges Associated With Railroad IVM sites. Reid J Smeda*; University of Missouri, Columbia, MO **(139)**

3:45 PM † Fall Herbicide Applications in Early and Late Planted Winter Wheat. Kaddi Gewirtz*, Christy Sprague; Michigan State University, East Lansing, MI **(140)**

4:00 PM Wild Parsnip (*Pastinaca sativa*) Control in Forb Rich Prairies with Florpyrauxifen-methyl. Mark Renz*, Charlton Rodriguez; University of Wisconsin-Madison, Madison, WI **(141)**

4:15 PM † Control of Glyphosate-resistant Waterhemp (*Amaranthus tuberculatus*) in Truvera Sugarbeet. Ian Waldecker*, Christy Sprague; Michigan State University, East Lansing, MI **(142)**

4:30 PM Characterization of Resistance to Protoporphyrinogen Oxidase Inhibitors PRE and POST in a Waterhemp (*Amaranthus tuberculatus*) Accession from Wisconsin. Felipe de Andrade Faleco*¹, Isabel Schlegel Werle², Alexander Lopez², Patrick Tranel², David Stoltenberg¹, Rodrigo Werle¹; ¹University of Wisconsin-Madison, Madison, WI, ²University of Illinois Urbana-Champaign, Urbana, IL **(143)**

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- 4:45 PM** † *Kochia* (*Bassia scoparia*) and Common Ragweed (*Ambrosia artemisiifolia*) Control with Phenmedipham in Sugarbeet. Adam Aberle*, Thomas Peters; North Dakota State University and University of Minnesota, Fargo, ND **(144)**
- 5:00 PM** *Kochia*, Russian Thistle, and Palmer Amaranth Field and Basic Research in Colorado. Philip Westra*; Colorado State University, Fort Collins, CO **(145)**
- 5:15 PM** Business Meetings – Horticulture & Specialty Crops and Range, Pasture & Vegetation Management

WEDNESDAY MORNING DECEMBER 11

POSTER SESSION 2 – NON-STUDENT CONTEST POSTERS

LOCATION: Pershing Place
TIME: 8:00 AM - 9:50 AM Central Time

All presenting authors not in student poster contest are to be at poster on Wednesday, December 11, 8:00-9:50 am

WEDNESDAY MORNING DECEMBER 11

ORAL 4 – Symposium – Local Perspectives of Weed Management Challenges and Solutions

LOCATION: Century A
TIME: 10:00-11:50 AM Central Time
CHAIRS: Sarah Lancaster
Kansas State University
Rodrigo Werle
University of Wisconsin-Madison

***SPEAKER**

10:00 AM Farmer Panel Discussion. Local Perspectives of Weed Management Challenges and Solutions
Dan Bigham*
Scott Gigstad*
Mike Guetterman*
Ed Hesse*
(146)

WEDNESDAY MORNING DECEMBER 11

ORAL 5 – Row Crop Herbicide Management

LOCATION: Century B
TIME: 10:00 AM - 11:55 AM Central Time
CHAIR: Josh Skelton
WinField United
TOPIC: Row Crop Herbicide Management

***SPEAKER**

10:00 AM Effect of Dicamba-Based Preemergence Herbicide Tank Mixtures on Weed Control in Soybean. Sachin Dhanda*¹, Navjot Singh¹, Joseph Ikley², Ryan DeWerff³, Rodrigo Werle³, Debalin Sarangi¹; ¹University of Minnesota, St. Paul, MN, ²North Dakota State University, Fargo, ND, ³University of Wisconsin-Madison, Madison, WI **(147)**

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- 10:15 AM Development of Convintro™ Brand Herbicides for Managing *Amaranthus* Species in Corn and Soybean: Field Performance Update.** Jody Gander*, Katilyn Price, Carl Coburn, Richard Leitz, Zewei Miao, Emily Scholting; Bayer Crop Science, St. Louis, MO **(148)**
- 10:30 AM Intrava™ MX Is a New Herbicide Featuring Amicarbazone for Weed Control in US Field Corn.** Ryan Henry*¹, Ryan Bryant-Schlobohm², Cody Gray³, Carlos Antonio Koury d'Arce Junior⁴; ¹UPL NA Inc., Fort Wayne, IN, ²UPL NA Inc., Amarillo, TX, ³UPL NA Inc., Colorado Springs, CO, ⁴UPL NA Inc., Raleigh, NC **(149)**
- 10:45 AM Effect of Multiple Very-long-chain Fatty Acid-inhibiting Herbicide Applications on Soybean Yield.** Eric Jones*¹, Wesley Everman², Diego Contreras³, Jill Alms¹, Dave Vos¹; ¹South Dakota State University, Brookings, SD, ²Iowa State University, Ames, IA, ³North Carolina State University, Raleigh, NC **(150)**
- 11:00 AM Introducing INTERLINE® MEGA Powered by L-tek™ for Optimized L-glufosinate Applications to Glufosinate-Tolerant Row and Specialty Crops.** Ryan Bryant-Schlobohm*¹, Ryan Henry², Cody Gray³, Carlos Antonio Koury d'Arce Junior⁴; ¹UPL NA, Inc., Amarillo, TX, ²UPL NA, Inc., Fort Wayne, IN, ³UPL NA Inc., Colorado Springs, CO, ⁴UPL NA Inc., Raleigh, NC **(151)**
- 11:15 AM Surtain Herbicide: Introduction of New Residual Premix for Corn Market.** Sanjeev Bangarwa*¹, Kevin Hartman², Nicholas Steppig³, Matthew Osterholt⁴, Josh Putman¹, Troy Klingaman³, John Frihauf², Brent McCaskey⁴, Scott Fitterer⁵, David Carruth⁵, Douglas Findley; ¹BASF Corporation Research Triangle Park, Durham, NC, ²BASF Corporation, Beaver Crossing, NE, ³BASF Corporation, Seymour, IL, ⁴BASF Corporation, Story City, IA, ⁵BASF Corporation, Davenport, ND **(152)**
- 11:30 AM Surtain Herbicide: Field Performance and Success Stories.** Josh Putman*, Sanjeev

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Bangarwa; BASF Corporation, Research Triangle
Park, NC (153)

11:45 AM Business Meeting – Row Crop Herbicides

WEDNESDAY MORNING DECEMBER 11

ORAL 6 – Student Video Contest and Graduate Student Workshop

LOCATION: Liberty
TIME: 10:00 AM - 11:50 AM Central Time
CHAIRS: Marcelo Zimmer
Purdue University
Cristiana Bernardi Rankrape
Southern Illinois University
Kaitlin Creager
Southern Illinois University

***SPEAKER † GRADUATE CONTEST**

**10:00 AM † Critical Timing for Cereal Rye Termination
After Corn Planting for Weed Management and
Yield.** Vipin Kumar*, Amit Jhala; University of
Nebraska-Lincoln, Lincoln, NE (154)

**10:06 AM † From Field Imagery to Data: The Use of
Canopeo for Green Cover Measurements.**
Nikola Arsenijevic*, Rodrigo Werle; University
of Wisconsin-Madison, Madison, WI (155)

**10:12 AM † Comparison of UAV and Airplane for the
Application of Fungicide in Corn.** Jesse Yount*,
Kevin Bradley; University of Missouri, Columbia,
MO (156)

**10:18 AM † Tank Mixing Metribuzin to Improve Palmer
Amaranth Control.** Landon Duff*¹, Salina Raila¹,
Lalit Mohan¹, Sarah Lancaster¹, Aaron Hager²;
¹Kansas State University, Manhattan, KS,
²University of Illinois Urbana-Champaign,
Urbana, IL (157)

NCWSS Program

10:25 AM Graduate Student Workshop – Mastering the Art of Job Applications.

Moderators:

Cristiana Bernardi Rankrape, Kaitlin Creager;
Southern Illinois University, Carbondale, IL

Panelists:

Debalin Sarangi, University of Minnesota
Samuel Noe, Valent USA
Jose Nunes, Syngenta
Lucas Ribeiro Maia, Corteva AgriScience
Mark Bernards, USDA-ARS **(158)**

WEDNESDAY NOON DECEMBER 11

Society Awards Luncheon

LOCATION: Century C
TIME: 12:00 PM - 1:15 PM

WEDNESDAY AFTERNOON DECEMBER 11

ORAL 7 – Symposium – What's New in Extension Plus

LOCATION: Century A
TIME: 1:30 PM - 5:00 PM Central Time
CHAIR: Dave Nicolai
University of Minnesota
Nathan Haugrud
Syngenta Crop Protection
TOPICS: Extension
Cover Crops & IWM
Weed Genetics & Herb. Physiol.

***SPEAKER**

**1:30 PM What's New in Extension: Historical IPM
Assessment Survey Results from Minnesota.**
Lizabeth Stahl*, Ryan Miller, Anthony Hanson,
David Nicolai, Angie Peltier, Navjot Singh, Debalin
Sarangi; University of Minnesota, St. Paul; MN
(159)

NCWSS Program

- 1:45 PM Adding Podcasts as Strategy in the War Against Weeds.** Sarah Lancaster^{*1}, Joseph Ikley², Alyssa Essman³; ¹Kansas State University, Manhattan, KS, ²North Dakota State University, Fargo, ND, ³The Ohio State University, Columbus, OH **(160)**
- 2:00 PM What's New in Extension: New Technology, New Problems.** Thomas Butts*, Marcelo Zimmer, Stephen Meyers, Aaron Patton, William G Johnson, Bryan Young; Purdue University, West Lafayette, IN **(161)**
- 2:15 PM What's New in Extension? South Dakota.** Eric Jones*; South Dakota State University, Brookings, SD **(162)**
- 2:30 PM What's new in Extension? Wisconsin WiscWeeds Update.** Rodrigo Werle*; University of Wisconsin–Madison, Madison, WI **(163)**
- 2:45 PM What's New in Extension in Iowa?** Wesley Everman*; Iowa State University, Ames, IA **(164)**
- 3:00 PM Navigating Weed Control Challenges in Kentucky: Observations and Insights from 2024.** Travis Legleiter*; University of Kentucky, Princeton, KY **(165)**
- 3:15 PM Break**
- 3:30 PM What's New in the Peace Garden State?** Joseph Ikley*; North Dakota State University Fargo, ND **(166)**
- 3:45 PM Exploring the Regulation of Sex Differentiation and Floral Development in *Amaranthus palmeri* and *Amaranthus tuberculatus* through Integrated microRNA and Transcriptome Profiling.** Alexander Lopez*, Tatiane Silva, Damilola Raiyemo, Isabel Schlegel Werle, Patrick Tranel; University of Illinois Urbana-Champaign, Urbana, IL **(167)**
- 4:00 PM RNAi Based Silencing of PDS Gene in Multiple Plant Species.** Neethu Francis^{*1}, Yaiphabi Kumam², Veerendra Sharma¹, Harold N. Trick¹, P.V. Vara Prasad¹, Mithila Jugulam¹; ¹Kansas State

NCWSS Program

University, Manhattan, KS, ²University of Florida, Gainesville, FL **(168)**

4:15 PM Delaying Cereal Rye Termination Reduces Weed Density in Corn but Can Also Reduce Yield. Erin Haramoto*¹, Matthew Allen¹, Carlene Chase², Parmeshwor Aryal², Alison Robertson³, Rashelle Matthiesen-Anderson³, John Tooker⁴, Matthew Boucher⁵, Jared Adam⁶; ¹University of Kentucky, Lexington, KY, ²University of Florida, Gainesville, FL, ³Iowa State University, Ames, IA, ⁴Penn State University, State College, PA, ⁵Maine Department of Agriculture, Conservation, and Forestry, Augusta, ME, ⁶Montana State University, Billings, MT **(169)**

4:30 PM Soil Health Implications After 5 Years of Cereal Rye Cover Crop Adoption in Corn-Soybean Systems. Jacob Felsman*¹, Christopher Baxter², Ryan DeWerff¹, John Rodwell², Daniel Smith¹, David Stoltenberg¹, Rodrigo Werle¹; ¹University of Wisconsin-Madison, Madison, WI, ²University of Wisconsin-Platteville, Platteville, WI **(170)**

4:45 PM Business Meeting – Extension

WEDNESDAY AFTERNOON DECEMBER 11

ORAL 8 – Herbicide Application Technologies

LOCATION: Century B
TIME: 1:30 PM - 5:00 PM Central Time
CHAIRS: Stephen Valenti
 Bayer Crop Science
 Josh Skelton
 WinField United
TOPICS: Herbicide Application Technologies
 Row Crop Herbicide Management

1:30 PM Control of Volunteer Corn in Corn. Amit Jhala*; University of Nebraska-Lincoln, Lincoln, NE **(171)**

1:45 PM Injury Potential to Early Planted Soybean from Various Soil-Residual Herbicides. Logan Miller*,

NCWSS Program

Aaron Hager; University of Illinois Urbana-Champaign, Urbana, IL **(172)**

- 2:00 PM Weed Height Matters: Evaluating the Impact of Herbicide Mixtures on Waterhemp Control Efficacy.** Ahmadreza Mobli*, Nikola Arsenijevic, Luma Lorena Loureiro Da Silva Rodrigues, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI **(173)**
- 2:15 PM An Integrated Weed Management Program Controls Multiple Herbicide-Resistant Amaranthus Populations in Corn.** Jose Nunes*¹, Jesse Haarmann², Mark Kitt³, David Belles³, Tom Beckett³; ¹Syngenta Crop Protection, Madison, WI, ²Syngenta Crop Protection, Rochester, MN, ³Syngenta Crop Protection, Greensboro, NC **(174)**
- 2:30 PM Efficacy and Turn Time on 13,385 Acres of Ultra-High Resolution Drone Imagery for Targeted Herbicide Prescriptions with Nozzle-by-Nozzle Sprayers.** Todd Colten*; Sentera, Inc., St. Paul, MN **(175)**
- 2:45 PM The Effects of Tankmix Adjuvants on Swath, Deposition and Coverage of UAV Atomizer Spray Platforms.** Ryan Edwards*, Carter Beaulieu, Sawyer Massie; WinField United, River Falls, WI **(176)**
- 3:00 PM Opportunities and Challenges for Terrestrial Sprayer Technology in Light of Drone-Based Targeted Prescription Generation.** Andrew Muehlfeld*; Sentera, Inc., St. Paul, MN **(177)**
- 3:15 PM Break**
- 3:30 PM Multidirectional Spray Deposition on Artificial Collectors Using Different Nozzle Spacings and Fan Configurations.** Laura de Souza Viera, Adam Balic, Vuk Stamenovic, Milos Zaric*; University of Nebraska-Lincoln, North Platte, NE **(178)**
- 3:45 PM Spray Coverage, Herbicide Deposition, and Weed Control from Glufosinate with Deposition Aids Applied using a Spray Drone.** Hunter Medenwald*¹, Matt Faletti², Julie Young¹, Thomas Butts¹, Bryan Young¹; ¹Purdue University, West

NCWSS Program

Lafayette, IN , ²Precision Laboratories, LLC
Kenosha, WI **(179)**

- 4:00 PM Management of Herbicide-Resistant Waterhemp (*Amaranthus tuberculatus* (Moq.) J. D. Sauer) with Targeted Herbicide Application Technology.** Marcelo Zimmer*¹, Bryan Young¹, Lauren Lazaro², Thomas Butts¹, William G Johnson¹; ¹Purdue University, West Lafayette, IN, ²Blue River Technology; Sunnyvale, CA **(180)**
- 4:15 PM Evaluation of Weed Management Programs using the ONE SMART SPRAY in corn and soybean in Kansas.** Joaquin Enrria¹, Maxwell Oliveira², Alicia Montoya³, Cheyanne Macagno⁴, Anita Dille*¹; ¹Kansas State University, Manhattan, KS, ²BASF Digital Farming, Koeln, Germany, ³Garden City Community College, Garden City, KS, ⁴California Polytechnic State University-San Luis Obispo, San Luis Obispo, CA **(181)**
- 4:30 PM Kansas Farmer Adoption of Targeted Herbicide Application Technology.** Sarah Lancaster*¹, Jeanne Falk Jones², Lucas Haag², Gaea Hock¹; ¹Kansas State University, Manhattan, KS, ²Kansas State University, Colby, KS **(182)**
- 4:45 PM Business Meeting – Herbicide Application Technologies**

WEDNESDAY AFTERNOON DECEMBER 11

**ORAL 9 – Symposium – Creating New Systems
to Manage Weeds – A Retrospective of and
Invitation from the Career of Don Wyse**

LOCATION: Liberty
TIME: 1:30 PM – 4:45 PM Central Time
CHAIRS: Mark Bernards
USDA-ARS
Dawn Wyse-Pester
WinField United

***SPEAKER**

- 1:30 PM Introduction and Purpose.** Mark Bernards*; USDA-ARS, Morris, MN **(183)**
- 1:35 PM A Retrospective of Don Wyse as a Land-Grant Scientist.** Scott Peters*, Nicholas Jordan*; Cornell University, Ithaca, NY, University of Minnesota, St. Paul, MN **(184)**
- 2:05 PM Developing Winter Annual Crops as a Tool to Improve Weed Management.** Gregg Johnson*¹, Samantha Wells², Debalin Sarangi², Mark Bernards³; ¹University of Minnesota, Waseca, MN, ²University of Minnesota, St. Paul, MN, ³USDA-ARS, Morris, MN **(185)**
- 2:25 PM Farmer Perspectives on Canada Thistle Management and Kernza.** Carmen Fernholz*; A Frame Organic Farms, Madison, MN **(186)**
- 2:45 PM Building Capacity for Change through Alliances with Legislators, NGOs, Farmers and Companies.** Mitch Hunter*; University of Minnesota, St. Paul, MN **(187)**
- 3:15 PM Break**
- 3:30 PM Non-Chemical Weed Control Strategies. Current Directions and Opportunities.** Muthukumar

NCWSS Program

Bagavathiannan*; Texas A&M, College Station,
TX **(188)**

- 4:00 PM Addressing the Regulatory Challenges of Incorporating new Crops into Agronomic Systems.** Michelle Starke*; CoverCress, Inc., St. Louis, MO **(189)**
- 4:20 PM Advancing Science through Asking Hard Questions and Debating Ideas without Being Disagreeable.** Phil Westra*; Colorado State University, Fort Collins, CO **(190)**
- 4:40 PM Discussion: Expanding the Weed Management Toolbox.** Mark Bernards*, Mitch Hunter*; USDA-ARS, Morris, MN, University of Minnesota, St. Paul, MN **(191)**
- 4:55 PM Concluding Remarks.** Dawn Wyse-Pester*; WinField United, River Falls, WI **(192)**

WEDNESDAY EVENING DECEMBER 11

Society Social

Sponsored by the Sustaining Members – Open to all attendees.

LOCATION: Century Ballroom Foyer
TIME: 4:45 PM - 5:45 PM Central Time

WEDNESDAY EVENING DECEMBER 11

Student Contest Awards Recognition

Open to all attendees.

LOCATION: Century A
TIME: 5:30 PM – 6:00 PM Central Time
CHAIRS: Ram Yadav, *Ohio State University*
Adam Striegel, *Bayer*
Nicholas Steppig, *BASF*

THURSDAY MORNING DECEMBER 12

**Society Breakfast and What's New in Industry
Symposium**

LOCATION: Century A
TIME: 7:00 AM - 10:00 AM Central Time
MODERATOR: Ryan S. Henry
UPL NA Inc.

***SPEAKER**

- 7:00 AM Meal Served (Preregistration required)**
- 7:45 AM Keynote Address.** Mark Stewart*; Agriculture Future of America, Kansas City, MO **(193)**
- 8:30 AM Industry Updates.** Sustaining Member Company representatives* **(194)**
- 9:45 AM Industry Business Meeting.**

NCWSS Information

2024 Officers/Executive Committee

President

Dawn Refsell

Corteva Agriscience

dawn.refsell@corteva.com

President-Elect

Mark Bernards

USDA-ARS

mark.bernards@usda.gov

Vice-President

Brett Miller

Syngenta

brett.miller@syngenta.com

Past President

Reid Smeda

University of Missouri

smedar@missouri.edu

Secretary/Treasurer

Eric Spandl

WinField United

epspandl@landolakes.com

Editor, NCWSS Proceedings

Karla Gage

Southern Illinois University

kgage@siu.edu

Editor, NCWSS Communications

Travis Legleiter

University of Kentucky

travis.legleiter@uky.edu

WSSA Representative

Erin Burns

Michigan State University

burnser5@msu.edu

CAST Representative

Tom Peters

North Dakota State University

thomas.j.peters@ndsu.edu

Executive Secretary

Eric Gustafson

Interactive Management, Inc.

info@ncwss.org

NCWSS Information

Directors at Large

Extension	David Nicolai nico0071@umn.edu
Graduate Students	Kaitlin Creager kaitlin.creager@siu.edu
Industry	Ryan Henry ryan.henry@upl-ltd.com
Resident Education	Ram Yadav yadav.206@osu.edu
Strategic Planning	Angela Kazmierczak angela.kazmierczak@bayer.com
Eastern	Steve Meyers (2027) slmeyers@purdue.edu
Central	Chad Smith (2027) chad.smith@valent.com
Western	Tate Castillo (2025) tate.castillo@bayer.com

NCWSS Interest Group Committees

Extension

David Nicolai, Chair	nico0071@umn.edu
Marcelo Zimmer, Vice Chair	zimmer6@purdue.edu

Graduate Student Committee

Kaitlin Creager, Chair	kaitlin.creager@siu.edu
Cristiana Rankrape, Vice- chair	cris.rankrape@siu.edu

Industry

Ryan Henry, Chair	ryan.henry@upl-ltd.com
Seth Strom, Vice Chair	seth.strom@syngenta.com

Resident Education

Ram Yadav, Chair	yadav.206@osu.edu
Adam Striegel, Vice-chair	adam.striegel@bayer.com
Nicholas Steppig, 2 nd Vice-chair	nicholas.steppig@basf.com

Summer Contest Subcommittee

Ram Yadav, Chair	ryadav@iastate.edu
Adam Striegel, Vice-chair	adam.striegel@bayer.com
LeAnna Trail, Host	ltrail@abgagservices.com

NCWSS Section Program Chairs

General Program

Mark Bernards, Chair	mark.bernards@usda.gov
Kristin Rosenbaum, LAC	kristin.rosenbaum@corteva.com

Student Awards, Resident Education

Adam Striegel, Grad Student Papers	adam.striegel@bayer.com
Nicholas Steppig, Grad Student Posters	nicholas.steppig@basf.com
Ram Yadav, Undergraduate Student Posters	yadav.206@osu.edu

Extension, Student Video Contest

Dave Nicolai, Chair	nico0071@umn.edu
Marcelo Zimmer, Vice-chair	zimmer6@purdue.edu

NCWSS Information

Row Crop Herbicide Management

Josh Skelton, Chair

Vipin Kumar, Vice-chair

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vkumar4@huskers.unl.edu

Cover Crops and IWM Technologies

Nathan Haugrud, Chair

Devin Hammer, Vice-chair

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devin.hammer@bayer.com

Herbicide Application Technologies

Steve Valenti, Chair

Angela Kazmierczak, Vice-chair

stephen.valenti@bayer.com

angela.kazmierczak@bayer.com

Weed Genetics & Herbicide Physiology

Samuel Revolinski, Chair

Isabel Schlegel Werle, Vice-chair

sr.revolinski@uky.edu

isabels6@illinois.edu

Weed Biology & Ecology

Ahmadreza Mobli, Chair

Mandeep Singh, Vice-Chair

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msingh9@huskers.unl.edu

Horticulture & Specialty Crops

Manjot Sidhu, Chair

Reid Smeda, Vice-chair

sidhuman@msu.edu

smedar@missouri.edu

Range, Pasture & Vegetation Management

Tate Castillo, Chair

Mark Renz, Vice-Chair

tate.castillo@bayer.com

mrrenz@wisc.edu

NCWSS Information

NCWSS Standing Committees

Strategic Planning

Angela Kazmierczak (Chair)
Alexis Meadows (IA)
Kip Jacobs (IL)
Liz Stahl (MN)
Chad Smith (MO)
Ryan DeWerff (WI)
Stephen Meyers (IN)
Justine Fisher (MI)
Dain Bruns (OH/PA)
Chris Budd (ON)
Travis Legleiter (KY)
Ben Westrich (CO/WY)
Tate Castillo (KS)

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dain.bruns@syngenta.com
christopher.budd@basf.com
travis.legleiter@uky.edu
ben.westrich@syngenta.com
tate.castillo@bayer.com

Distinguished Achievement Award

Reid Smeda, Chair
Dawn Refsell, Vice-chair
David Simpson, Past-chair

smedar@missouri.edu
dawn.refsell@corteva.com
david.simpson@corteva.com

Fellow Committee

Mark Peterson, Chair
Christy Sprague, Vice-chair

sdpete58@hotmail.com
sprague1@msu.edu

Finance Steering and Policy Committee

Eric Spandl, Chair
Amit Jhala, Vice-chair

epsandl@landolakes.com
amit.jhala@unl.edu

Future Site Selection Committee

Mark Loux, Chair
Dawn Refsell, Vice-chair

loux.1@osu.edu
dawn.refsell@corteva.com

Invasive Plants Committee

Tate Castillo, Chair
Mark Renz, Vice-chair

tate.castillo@bayer.com
mrenz@wisc.edu

Resolutions and Necrology Committee

Brett Lynn, Chair
Zach Rystrom, Vice-chair

brett.lynn@bayer.com
zach@midwestresearchinc.com

Local Arrangements

Kristin Rosenbaum, Chair
Haylee Barlow
Brett Miller
Justin Pollard
Tate Castillo
Kevin Bradley
Marshall Hay
Anita Dille
Greg Elmore
Reid Smeda
Eric Spandl, past chair

kristin.rosenbaum@corteva.com
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justin.pollard@bayer.com
tate.castillo@bayer.com
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marshall.hay@syngenta.com
dieleman@ksu.edu
greg.elmore@bayer.com
smedar@missouri.edu
epsandl@landolakes.com

Nominating Committee

Tom Peters, Chair
Nathan Haugrud, Vice-chair
Amit Jhala
Ryan Henry
Ram Yadav
David Johnson
Reid Smeda

thomas.j.peters@ndsu.edu
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ryan.henry@upl-ltd.com
yadav.206@osu.edu
david.h.johnson@corteva.com
smedar@missouri.edu

NCWSS Recognitions

Honorary Members/Fellows

1948	L.W. Dephart *	1983	Ronald E. Doersch
1949	A.H. Larson *	1984	Edward W. Stroube *
1950	J.W. Zahnley *		Oliver E. Strand *
1951	R.W. Fuelleman *		Gail A. Wicks *
	Ted F. Yost *	1985	Robert Hiltibran *
1952	Henry E. Wood *	1986	Elroy J. Peters *
1953	George Briggs *		Deane W. Finnerty *
	Walter C. Dutton *		Oliver G. Russ *
1954	A.L. Bakke *	1987	Ralph Althaus *
1955	Charles J. Willard *		William M. Phillips
1956	R.S. Dunham *		Gerald R. Miller
1957	P.J. Olson *	1988	Robert Benson
1958	L.W. Melander *		Calvin Messersmith
	T.K. Pavlychenko *		Edward Stoller
1959	E.A. Helgeson *	1989	Loyd M. Wax
1960	Oliver C. Lee *		Alan R. Putman
1962	Sig Bjerken *	1990	Alan G. Dexter
1964	K.P. Buchholtz *		Russell L. Nash *
	E.P. Sylwester *	1991	George Kapusta *
1966	Robert C. Beatty *		Marshall McGlamery *
	Clare Buskirk *		Russell Moomaw *
1967	J.K. Freeman *		Don Penner
1968	E.K. Alban *	1992	R. Gordon Harvey, Jr. *
	H.A. Friesen *		Larry K. Binning
1969	Lawrence Southwick *		Alex R. Martin
	David W. Staniforth *		Don Taylor
1970	Delbert D. Hemphill *	1993	Merrill A. Ross, Jr. *
	George Frederick Warren *		Robert G. Wilson
1971	Fred W. Slife *		Jerry D. Doll
1972	Thomas Victor Beck *	1994	Ted R. Warfield
	O. Hale Fletchall *		William W. Witt
1973	Richard Behrens *	1995	Charles R. Fenster
	Lawrence H. Hannah *		Leon J. Wrage
1974	William Lobay *	1996	Thomas T. Bauman *
1975	John D. Furrer *		Earl W. Chamberlain
1976	Lyle A. Derscheid *		Richard S. Fawcett
	LeRoy G. Holm *		William E. Lueschen
1977	James W. Divall	1997	Stephen D. Miller
	James L. Williams, Jr. *		M.D.K. Owen
1978	Melwin K. McCarty *		Fred W. Roeth
	Robert E. Nylund *	1998	Paul J. Ogg *
1979	Ellery L. Knake *		James P. Worthington
	Kenneth W. Bradfield *	1999	Michael Barrett
1980	John D. Nalewaja *		Norman J. Probst
	O.C. Burnside *	2000	Douglas D. Buhler
1981	Rodney J. Fink		Bill Miller
	Juett C. Hogancamp *		Philip L. Orwick
	Larry W. Mitich *		Stephen C. Weller
1982	W.D. Carpenter	2001	LeRoy R. Cobia
	James W. Herron *	2002	James J. Kells
	William F. Meggitt *	2003	Karen Ann Renner
1983	Robert N. Andersen *		Charles Slack
	Dale E. Bush *		Phillip Stahlman

NCWSS Recognitions

Honorary Members/Fellows (continued)

2004	Duane Rathman David Regehr	2014	Adrian Moses David Stoltenberg
2005	Dallas E. Peterson	2015	Dave Johnson
2006	James R. Martin Bernard H. Zandstra	2016	Mark Wrucke David Simpson
2007	Chris M. Boerboom Michael J. Horak	2017	Curtis Thompson John Hinz
2008	Thomas J. Peters Jeffrey Gunsolus Kassim Al-Khatib	2018	Patrick J. Tranel Anita Dille Mark Peterson
2009	J.D. Green Thomas B. Threewitt Robert N. Klein	2019	Greg Dahl Mark Loux Rich Zollinger
2010	No nominations	2020	Kevin Bradley Dawn Refsell Christy Sprague
2011	Bill Johnson Harlene Hatterman-Valenti Gordon K. Roskamp	2021	Aaron Hager Eric Spandl
2012	Peter H. Sikkema Bob Hartzler	2022	Stott Howard Stevan Knezevic
2013	Bryan Young Roger Becker	2023	Greg Elmore Bill Simmons

* Deceased

¹Society members being honored were originally referred to as Honorary Members. Beginning in 1995, the award was changed to Fellow.

NCWSS Recognitions

North Central Weed Science Society Presidents

1944	No President	1985	Messersmith, Calvin G.
1945	Yost, Ted F. *	1986	Wax, Loyd M.
1946	Yost, Ted F. *	1987	Chamberlain, Earl *
1947	Hanson, Noel S. *	1988	Harvey, R. Gordon *
1948	Willard, Charles J. *	1989	Worthington, James P.
1949	Dunham, R. S. *	1990	Martin, Alex R.
1950	Worzella, W. W. *	1991	Taylor, T. Don
1951	Sylwester, Erhardt P. *	1992	Stoller, Edward W.
1952	Buchholtz, Kenneth P. *	1993	Warfield, Ted R.
1953	Gilbert, C. J. *	1994	Bauman, Thomas T. *
1954	Lee, Oliver C. *	1995	Cobia, LeRoy R.
1955	Grigsby, Buford H. *	1996	Dexter, Alan G.
1956	Helgeson, Earl A. *	1997	Miller, Bill
1957	Slife, Fred W. *	1998	Buhler, Douglas D.
1958	Derscheid, Lyle A. *	1999	Orwick, Philip L.
1959	Foster, J. Roe *	2000	Kells, James J.
1960	Holm, Leroy G. *	2001	Rathmann, Duane P.
1961	Alban, E. K. *	2002	Peterson, Dallas E.
1962	Bjerken Sig. *	2003	Horak, Michael J.
1963	Hemphill, Delbert D. *	2004	Doll, Jerry D.
1964	Hemphill, Delbert D. *	2005	Peters, Tom
1965	Furrer, John D. *	2006	Miller, Stephen D.
1966	Furrer, John D. *	2007	Moses, Adrian
1967	Warden, Robert L. *	2008	Johnson, William G.
1968	Fletcher, O. Hale *	2009	Holm, Mick
1969	Beck, Thomas V. *	2010	Boerboom, Chris
1970	Hannah, Lawrence H. *	2011	Wrucke, Mark
1971	Knake, Ellery *	2012	Young, Bryan
1972	Williams, Jr., James L. *	2013	Johnson, Dave
1973	Meggitt, William	2014	Green, J.D.
1974	Bradfield, Kenneth W. *	2015	Hinz, John
1975	Burnside, Orvin C. *	2016	Dille, Anita
1976	Fink, Rodney J. *	2017	Dahl, Gregory
1977	Carpenter, Will D.	2018	Sprague, Christy L.
1978	Doersch, Ronald E.	2019	Hager, Aaron G.
1979	Nalewaja, John D. *	2020	Howard, Stott
1980	Stroube, Edward W. *	2021	Hatterman-Valenti, Harlene
1981	Herron, James W. *	2022	Simpson, David M.
1982	Benson, Robert L.	2023	Smeda, Reid
1983	DiVall, James W.	2024	Refsell, Dawn
1984	Miller, Gerald R.		* Deceased

NCWSS Recognitions

Distinguished Achievement Awards

1990	Gerald W. Gogan – Education Gail A. Wicks - Service Robert G. Wilson - Research Jeffrey L. Gunsolus - Young Scientist
1991	F. Strizke - Education Paul G. Mayland - Industry Patrick J. Shea - Research
1992	William W. Witt - Education James P. Worthington - Education Rex A. Liebl - Research Jerry D. Doll - Service
1993	Robert G. Hartzler - Education Douglas D. Buhler - Research Karen A. Renner - Young Scientist
1994	David L. Regehr - Education Deane W. Finnerty - Industry Robert N. Andersen - Service David A. Mortensen - Young Scientist
1995	Will D. Carpenter - Industry Phillip W. Stahlman - Research M.D.K. Owen - Service
1996	Beverly R. Durgan - Education Charles L. Kern - Industry E. James Retzinger - Industry Michael J. Horak - Young Scientist
1997	Roger Becker - Education Joseph G. Vollmer - Industry Charles H. Slack - Research Richard Zollinger - Service David E. Stoltenberg - Young Scientist
1998	Randy W. Lloyd - Industry Ronald F. Krausz - Research James R. Martin - Service
1999	Thomas R. Hoverstad - Professional Staff Robert J. Kremer - Research J. D. Green - Service Chris M. Boerboom - Young Scientist Reid J. Smeda - Young Scientist
2000	Harlan P. Palm - Industry James F. Lux - Professional Staff Gary E. Powell - Professional Staff David A. Vox - Professional Staff William G. Johnson - Young Scientist
2001	John B. Masiunas - Education Bernard H. Zandstra - Education Patrick W. Geier - Professional Staff Douglas J. Maxwell - Professional Staff Kassim Al-Khatib - Research
2002	Paul L. Sprankle - Industry Thomas B. Threewitt - Industry Monica Elmes - Professional Staff John L. Luecke -Professional Staff Bryan Young - Young Scientist
2003	Mark Loux - Education Kenneth Carlson - Industry Daniel E. Schroeder - Industry Andrew Chomas - Professional Staff

NCWSS Recognitions

2004	Jeffrey Stachler - Professional Staff
	Gordon Roskamp - Education
	Robert N. Klein - Education
	David Stoltenberg - Research
	Robert E. Wolf - Service
2005	Patrick J. Tranel - Young Scientist
	Chris Boerboom - Education
	Dennis Belcher - Industry
	Anthony F. Dobbels - Professional Staff
	Curtis R. Thompson - Service
2006	Christy Sprague - Young Scientist
	Richard K. Zollinger - Education
	John R. Hinz - Industry
	Christy Shropshire - Professional Staff
	Glenn Nice - Service
2007	Dean E. Riechers - Young Scientist
	Douglas Doohan - Education
	Kevin Gibson - Young Scientist
	Martin M. Williams II - Young Scientist
	Frank Forcella - Research
2008	Anita Dille - Young Scientist
	Damian Franzenburg - Professional Staff
	Joseph Matthews - Professional Staff
	Kevin W. Bradley – Young Scientist
	Adam S. Davis – Young Scientist
2009	Reid J. Smeda – Education
	Adrian J. Moses – Industry
	James L. Moody – Professional Staff
	Darren Robinson – Young Scientist
	Aaron Hager – Education
2010	Jon Scott– Professional Staff
	Peter Sikkema - Research
	Anita Dille - Education
	Walter Fick - Education
	Terry Wright - Industry
2011	Greg Dahl - Industry
	Nader Soltani - Professional Staff
	Chad Brabham - Graduate Student
	Dain Bruns - Industry
	Fritz Breitenbach - Professional Staff
2012	Timothy Trower - Professional Staff
	Erin Taylor-Hill - Professional Staff
	Paul Marquardt-Graduate Student
	Kirk Howatt – Education
	Mark Renz – Education
2013	Patrick Tranel – Research
	Stevan Knezevic – Research
	Christy Sprague - Service
	Rodrigo Werle – Graduate Student
	Greg Kruger – Young Scientist
2014	Ryan Lins – Young Scientist
	Dawn Refsell – Industry
	Jeff Golus – Professional Staff
	Collin Auwarter – Professional Staff
	Jessica Bugg – Graduate Student
2015	Brian Jenks – Service
	Doug Nord – Service
	Marvin Schultz – Industry
	Bruce Ackley – Professional Staff

NCWSS Recognitions

2015	Darren Robinson – Research Cody F. Creech – Graduate Student
2016	Richard Cole- Industry Mark Peterson- Industry Larry Hageman- Industry Stott Howard- Service Amit Jhala- Young Scientist
2017	Scott Cully – Industry Helen Flanigan – Industry Lowell Sandell – Industry Steven Knezevic – Education Julie Young – Professional Staff Parminder Chahal – Graduate
2018	Carla Yerkes – Industry Kevin Bradley – Education Peter Sikkema – Education Richard Proost – Professional Staff Phil Westra – Research Marshall Hay – Graduate Student
2019	Mark Bernards – Education David Thomas – Industry Nader Soltani – Research Mithila Jugulam – Research Mayank Malik – Young Scientist
2020	Eric Spandl – Industry Mandy Bish – Research Joe Wuerffel – Young Scientist Vipan Kumar – Young Scientist Lisa Behnken – Professional Staff Ram Yadav – Graduate Student
2021	Kevin Thorsness – Industry Michael Weber – Industry Rodrigo Werle – Young Scientists Ryan Edwards – Young Scientists Andrew Toft – Professional Staff
2022	David Nicolai – Education Nathan Haugrud – Graduate Student
2023	Meaghan Anderson – Education Steve Meyers - Young Scientist Dean Riechers - Research Alexa Lystad - Professional Staff Mandeep Singh – Graduate Student

NCWSS Recognitions

North Central Weed Science Contest Locations

YEAR	Company	Location
1981	Agri-Growth	Hollandale, MN
1982	Agri-Growth	Hollandale, MN
1983	Lilly Research Lab	Leshara, NE
1984	Dow Chemical Research	Geneseo, IL
1985	Bayer (Mobay)	Stilwell, KS
1986	Union Carbide	Newton, IA
1987	Monsanto	Monmouth, IL
1988	Agri-Growth	Hollandale, MN
1989	FMC	Champaign, IL
1990	DowElanco	Greenfield, IN
1991	CibaGeigy	Champaign, IL
1992	Cenex Land o Lakes	Iowa
1993	Zeneca	Champaign, IL
1994	Bayer (Miles)	Stilwell, KS
1995	Amcy	Seymour, IL
1996	Monsanto	Monmouth, IL
1997	Land o Lakes	Webster City, IA
1998	Valent	Champaign, IL
1999	Agri-Growth	Hollandale, MN
2000	Bayer	West Lafayette, IN
2001	Monsanto	Monmouth, IL
2002	Dow AgroSciences	Fowler, IN
2003	Syngenta	Champaign, IL
2004	University of Minnesota- Southern Research & Outreach Ctr.	Waseca, MN
2005	Kansas State University	Manhattan, KS
2006	Midwest Research Inc.	York, NE
2007	Bennett Ag. Research Corp	Richland, IA
2008	SGS Alvey Ag Research	Carlyle, IL
2009	joint NC/NE – ABG Ag Services	Indianapolis, IN
2010	no contest	
2011	Weed Olympics, University of Tennessee	Knoxville, TN
2012	Diamond Ag Research Inc.	Larned, KS
2013	joint NC/NE - Monsanto	Monmouth, IL
2014	DuPont Pioneer	Johnston, IA
2015	Weed Olympics, The Ohio State University	Columbus, OH
2016	Purdue University	West Lafayette, IN
2017	Iowa State University FEEL	Ames, IA
2018	Monsanto Water Utilization Learning Center	Gothenburg, NE
2019	Weed Olympics BASF, Bayer, Corteva, Valent Klein Family Farm	Seymour, IL
2020	Canceled due to Covid	
2021	North Dakota State University	Fargo, ND
2022	Corteva Agriscience	Johnston, IA
2023	Bayer	Union City, TN
2023	ABG Ag Services	Sheridan, IN

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NCWSS Sustaining Members

We are grateful for the support of the 2024 Sustaining Members:

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NCWSS Notes

Time Schedule

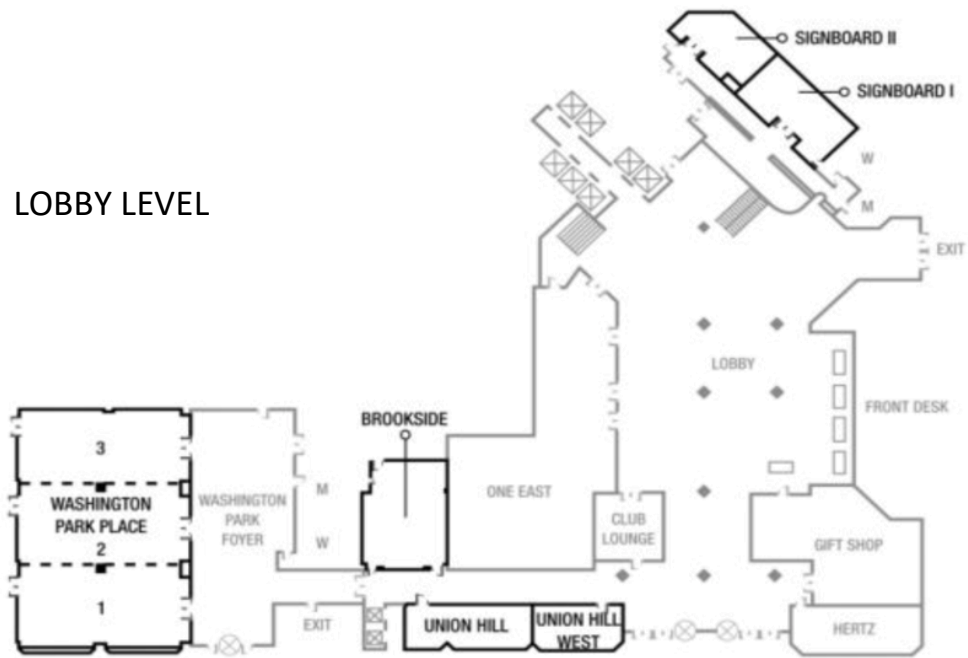
Mark papers and meetings in the space below.

Time	Tuesday	Wednesday	Thursday	
8:00	Poster Session 1	Poster Session 2	Society Breakfast & What's New in Industry	
8:15				
8:30				
8:45				
9:00				
9:15				
9:30				
9:45				
10:00	General Session			
10:15				
10:30				
10:45				
11:00				
11:15				
11:30				
11:45				
12:00	Student Luncheon	NCWSS Awards Luncheon		
12:15				
12:30				
12:45				
1:00				
1:15				
1:30				
1:45				
2:00				
2:15				
2:30				
2:45				Monday
3:00				
3:15				
3:30				
3:45				
4:00				
4:15				
4:30				
4:45		Society Social		
5:00				
5:15				
5:30		Student Contest Awards		
5:45				
6:00				
6:30				

Future NCWSS Annual Meeting Sites

2025 December 15–18	Grand Rapids, MI
2026 December 7–10 w/ NEWSS	Columbus, OH

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