



**2024**

**79<sup>th</sup> Annual Meeting**

**North Central Weed Science Society**

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**[www.ncwss.org](http://www.ncwss.org)**

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**December 9-12, 2024**

**Westin Kansas City at Crown Center  
1 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

# NCWSS General Program Information

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](mailto: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

## NCWSS General Program Information

### 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
<b>Thursday</b>		
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

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***TUESDAY MORNING DECEMBER 10***

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## **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)

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***TUESDAY MORNING DECEMBER 10***

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## **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\*<sup>1</sup>, Erin Haramoto<sup>1</sup>, Matthew Allen<sup>1</sup>, John Wallace<sup>2</sup>; <sup>1</sup>University of Kentucky, Lexington, KY, <sup>2</sup>Pennsylvania 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\*<sup>1</sup>, Ryan DeWerff<sup>1</sup>, Doug Wiedenbeck<sup>1</sup>, Kolby Grint<sup>2</sup>, Jacob Felsman<sup>1</sup>, Christopher Baxter<sup>3</sup>, Ahmadreza Mobli<sup>1</sup>, Rodrigo Werle<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, Madison, WI, <sup>2</sup>USDS-NRCS, Altoona, WI, <sup>3</sup>University of Wisconsin-Platteville, Platteville, WI (4)

† **Impact of Fall-Planted Cover Crop and Tillage on Weed Control and Soybean Yield.** Datta Chiruvelli\*<sup>1</sup>, Angie Peltier<sup>2</sup>, Thomas Peters<sup>3</sup>, Debalin Sarangi<sup>1</sup>; <sup>1</sup>University of Minnesota, St Paul, MN, <sup>2</sup>University of Minnesota, Crookston, MN, <sup>3</sup>North 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\*<sup>1</sup>, Grant Hoffer<sup>2</sup>, Mercy Odemba<sup>1</sup>, Nicholas Basinger<sup>3</sup>, Wesley Everman<sup>4</sup>, Karla Gage<sup>5</sup>, Erin Haramoto<sup>6</sup>, Jodi Boe<sup>7</sup>, Richard Little<sup>7</sup>, Eric Miller<sup>5</sup>, Wayne Mitchem<sup>8</sup>, Claudio Rubione<sup>9</sup>, Mark VanGessel<sup>9</sup>, John Wallace<sup>2</sup>; <sup>1</sup>The Ohio State University, Columbus, OH, <sup>2</sup>The Pennsylvania State University, University Park, PA, <sup>3</sup>University of Georgia, Athens, GA, <sup>4</sup>North Carolina State University, Raleigh, NC, <sup>5</sup>Southern Illinois University, Carbondale, IL, <sup>6</sup>University of Kentucky, Lexington, KY, <sup>7</sup>University of Nebraska-Lincoln, Lincoln, NE, <sup>8</sup>USDA-ARS, Beltsville, MD, <sup>9</sup>University 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\*<sup>1</sup>, Karla Gage<sup>2</sup>, Prashant Jha<sup>3</sup>, Amit Jhala<sup>4</sup>, William G Johnson<sup>5</sup>, Sarah Lancaster<sup>6</sup>, Bryan Young<sup>5</sup>, Kevin Bradley<sup>1</sup>; <sup>1</sup>University of Missouri, Columbia, MO, <sup>2</sup>Southern Illinois University, Carbondale, IL, <sup>3</sup>Louisiana State University, Baton Rouge, LA, <sup>4</sup>University of Nebraska-Lincoln, Lincoln, NE, <sup>5</sup>Purdue University, West Lafayette, IN, <sup>6</sup>Kansas 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\*<sup>1</sup>, Jose Nunes<sup>1</sup>, Karla Gage<sup>2</sup>, Sarah Lancaster<sup>3</sup>, Travis Legleiter<sup>4</sup>, Joseph Ikley<sup>5</sup>, Jason Norsworthy<sup>6</sup>, Alyssa Essman<sup>7</sup>, Christy Sprague<sup>8</sup>, Vipin Kumar<sup>9</sup>, Kevin Bradley<sup>10</sup>, William G Johnson<sup>11</sup>, Bryan Young<sup>11</sup>, Ryan DeWerff<sup>1</sup>, Rodrigo Werle<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, Madison, WI, <sup>2</sup>Southern Illinois University, Carbondale, IL, <sup>3</sup>Kansas State University, Manhattan, KS, <sup>4</sup>University of Kentucky, Princeton, KY, <sup>5</sup>North Dakota State University, Fargo, ND, <sup>6</sup>University of Arkansas, Fayetteville, AR, <sup>7</sup>Ohio State University, Columbus, OH, <sup>8</sup>Michigan State University, East Lansing, MI, <sup>9</sup>University of Nebraska-Lincoln, Lincoln, NE, <sup>10</sup>University of Missouri, Columbia, MO, <sup>11</sup>Purdue 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\*<sup>1</sup>, Eugene Law<sup>1</sup>, Elijah Dean<sup>2</sup>, Cassandra Brown<sup>3</sup>; <sup>1</sup>The Ohio State University, Columbus, OH, <sup>2</sup>Timberlane Organic Farms, Bellevue, OH, <sup>3</sup>The Ohio State University, Wooster, OH (16)

† **Weed Management Strategies for Establishing Kentucky Bluegrass as a Perennial Cover Crop.** Kiera Searcy\*<sup>1</sup>, Erin Haramoto<sup>1</sup>, Travis Legleiter<sup>2</sup>, Sydney Pridie<sup>3</sup>, Matthew Allen<sup>1</sup>, Brandon Schlautman<sup>4</sup>; <sup>1</sup>University of Kentucky, Lexington, KY, <sup>2</sup>University of Kentucky, Princeton, KY, <sup>3</sup>Corteva Agriscience, Lee's Summit, MO, <sup>4</sup>The Land Institute, Salina, KS (17)

† **Evaluating Cool-Season *Poaceae* Species as Perennial Groundcover in Corn.** Hallie Sandeen\*<sup>1</sup>, Erin Haramoto<sup>1</sup>, Brandon Schlautman<sup>2</sup>, Shui-zhang Fei<sup>3</sup>, Sara Lira<sup>4</sup>, Tim Phillips<sup>1</sup>, Travis Legleiter<sup>1</sup>, Matthew Allen<sup>1</sup>; <sup>1</sup>University of Kentucky, Lexington, KY, <sup>2</sup>The Land Institute, Salina, KS, <sup>3</sup>Iowa State University, Ames, IA, <sup>4</sup>Corteva 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\*<sup>1</sup>, Zaim Ugljic<sup>1</sup>, Thomas Butts<sup>2</sup>, Rodrigo Werle<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, Madison, WI, <sup>2</sup>Purdue University, West Lafayette, IN **(23)**

**‡ Combining Targeted Herbicide Application and Drone Imagery.** Douglas Koch\*<sup>1</sup>, Gaurav Jha<sup>1</sup>, Sarah Lancaster<sup>1</sup>, Ethan Noll<sup>2</sup>; <sup>1</sup>Kansas State University, Manhattan, KS, <sup>2</sup>Rantizo, 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\*<sup>1</sup>, M. Faletti<sup>2</sup>, Julie Young<sup>1</sup>, Thomas Butts<sup>1</sup>, Bryan Young<sup>1</sup>; <sup>1</sup>Purdue University, West Lafayette, IN, <sup>2</sup>Precision 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\*<sup>1</sup>, Ryan DeWerff<sup>1</sup>, Maxwell Oliveira<sup>2</sup>, Calvin Miller<sup>3</sup>, Rodrigo Werle<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, Madison, WI, <sup>2</sup>BASF, Cologne, Germany, <sup>3</sup>BASF, Seymour, IL **(29)**



## NCWSS Program

**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\*<sup>1</sup>, Isaac Buyungo<sup>1</sup>, Christopher Proctor<sup>1</sup>, Victor de Sousa Ferreira<sup>1</sup>, Vinicius Velho<sup>1</sup>, Andre Graciano Garcia<sup>1</sup>, Rafael Munhoz Pedroso<sup>2</sup>; <sup>1</sup>University of Nebraska-Lincoln, Lincoln, NE, <sup>2</sup>ESALQ - 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\*<sup>1</sup>, Hunter Medenwald<sup>1</sup>, Ryan Edwards<sup>2</sup>, Julie Young<sup>1</sup>, Bryan Young<sup>1</sup>; <sup>1</sup>Purdue University, West Lafayette, IN, <sup>2</sup>WinField United, River Falls, WI (35)

**Antagonism of Clethodim from pH Buffers Used with Dicamba.** Marcelo Zimmer\*<sup>1</sup>, Bryan Young<sup>1</sup>, Julie Young<sup>1</sup>, R. Scott Tann<sup>2</sup>, William G Johnson<sup>1</sup>; <sup>1</sup>Purdue University, West Lafayette, IN, <sup>2</sup>Lamberti, 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\*<sup>1</sup>, Eric Miller<sup>1</sup>, Thierry Besançon<sup>2</sup>, Lynn Sosnoskie<sup>3</sup>, Karla Gage<sup>1</sup>; <sup>1</sup>Southern Illinois University, Carbondale, IL, <sup>2</sup>Rutgers University, New Brunswick, NJ, <sup>3</sup>Cornell 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 Mohan<sup>1</sup>, Victoria Johnson\*<sup>1</sup>, Sarah Lancaster<sup>1</sup>, Mithila Jugulam<sup>2</sup>; <sup>1</sup>Kansas State University, Manhattan, KS, Kansas State University, Manhattan, KS, Kansas State University, Manhattan, KS, <sup>2</sup>Texas 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\*<sup>1</sup>, Ahmadreza Mobli<sup>1</sup>, Daniel Valadão Silva<sup>2</sup>, Rodrigo Werle<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, Madison, WI, <sup>2</sup>Federal 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)

## NCWSS Program

† **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\*<sup>1</sup>, Eduardo Lago<sup>1</sup>, Eric Miller<sup>1</sup>, Isabel Schlegel Werle<sup>2</sup>, Patrick Tranel<sup>2</sup>, Karla Gage<sup>1</sup>; <sup>1</sup>Southern Illinois University, Carbondale, IL, <sup>2</sup>University 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\*<sup>1</sup>, Ryan Henry<sup>2</sup>, Kip Jacobs<sup>2</sup>, Damilola Raiyemo<sup>1</sup>, Isabel Schlegel Werle<sup>1</sup>, Patrick Tranel<sup>1</sup>; <sup>1</sup>University of Illinois Urbana-Champaign, Urbana, IL, <sup>2</sup>UPL NA Inc., King of Prussia, PA **(74)**

## NCWSS Program

† **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\*<sup>1</sup>, Osman Guzel<sup>1</sup>, Karl Williard<sup>1</sup>, Jon Schoonover<sup>1</sup>, Steffen Mueller<sup>2</sup>, Amir Sadeghpour<sup>1</sup>, Karla Gage<sup>1</sup>; <sup>1</sup>Southern Illinois University, Carbondale, IL, <sup>2</sup>Energy 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\*<sup>1</sup>, Thomas Mueller<sup>2</sup>; <sup>1</sup>UPL NA Inc., Fort Wayne, IN, <sup>2</sup>University 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 Tice<sup>1</sup>, Marshall

## NCWSS Program

Hay<sup>1</sup>, Jesse Haarmann<sup>2</sup>, Mark Kitt<sup>3</sup>, David Belles<sup>3</sup>, Tom Beckett<sup>3</sup>; <sup>1</sup>Syngenta Crop Protection, Garden Plain, KS, <sup>2</sup>Syngenta Crop Protection, Rochester, MN, <sup>3</sup>Syngenta 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\*<sup>1</sup>, Susee Sudhakar<sup>2</sup>, Yaiphabi Kumam<sup>3</sup>, Veerendra Sharma<sup>1</sup>, Harold N. Trick<sup>1</sup>, P.V. Vara Prasad<sup>1</sup>, Mithila Jugulam<sup>1</sup>; <sup>1</sup>Kansas State University, Manhattan, KS, <sup>2</sup>University of Arkansas, Fayetteville, AR, <sup>3</sup>University 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\*<sup>1</sup>, Isabel Schlegel Werle<sup>2</sup>, Alexander Lopez<sup>2</sup>, Patrick Tranel<sup>2</sup>, David Stoltenberg<sup>1</sup>, Rodrigo Werle<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, Madison, WI, <sup>2</sup>University 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\*<sup>1</sup>, Veerendra Sharma<sup>1</sup>, Yaiphabi Kumam<sup>2</sup>, Harold N. Trick<sup>1</sup>, P.V. Vara Prasad<sup>1</sup>, Mithila Jugulam<sup>1</sup>; 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**

## NCWSS Program

**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\*<sup>1</sup>, David Belles<sup>2</sup>, Dana Spatz<sup>3</sup>; <sup>1</sup>US HRAC, Fort Wayne, IN, <sup>2</sup>US HRAC, Greenville, NC, <sup>3</sup>US HRAC, Johnston, IA **(91)**

**† Physiological Basis of Corn Injury to Mesotrione under High-Temperature Stress.** Yasir Nazir Parrey\*<sup>1</sup>, Mithila Jugulam<sup>2</sup>, P.V. Vara Prasad<sup>1</sup>; <sup>1</sup>Kansas State University, Manhattan, KS, <sup>2</sup>Texas 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\*<sup>1</sup>, Gregg Johnson<sup>2</sup>; <sup>1</sup>USDA-ARS, Morris, MN, <sup>2</sup>University of Minnesota, Waseca, MN **(95)**



# NCWSS Program

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## ***TUESDAY MORNING DECEMBER 10***

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### **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**

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***TUESDAY AFTERNOON DECEMBER 10***

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**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*

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***TUESDAY AFTERNOON DECEMBER 10***

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**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

## NCWSS Program

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\*<sup>1</sup>, Eric Patterson<sup>1</sup>, Peter Lundquist<sup>1</sup>, Jinyi Chen<sup>2</sup>; <sup>1</sup>Michigan State University, East Lansing, MI, <sup>2</sup>Nanjing 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\*<sup>1</sup>, Todd Gaines<sup>1</sup>, Anita Kuepper<sup>2</sup>, Peter Luemmen<sup>3</sup>, Franck Dayan<sup>1</sup>; <sup>1</sup>Colorado State University, Fort Collins, CO, <sup>2</sup>Bayer Crop Science, Chesterfield, MO, <sup>3</sup>Bayer 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\*<sup>1</sup>, Patrick Tranel<sup>1</sup>, Martin Williams<sup>2</sup>, Aaron Hager<sup>1</sup>; <sup>1</sup>University of Illinois Urbana-Champaign, Urbana, IL, <sup>2</sup>USDA-ARS, Urbana, IL (111)
- 3:45 PM † Shedding Light on Weed Seed Germination: The Role of Light Quality and Incubation Period.** Datta Chiruvelli\*<sup>1</sup>, Amit Jhala<sup>2</sup>, Dave Moeller<sup>1</sup>, Roger Becker<sup>1</sup>, Debalin Sarangi<sup>1</sup>; <sup>1</sup>University of

## NCWSS Program

Minnesota, St Paul, MN, <sup>2</sup>University 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\*<sup>1</sup>, Kurt Spokas<sup>2</sup>, Gregg Johnson<sup>3</sup>, Axel Garcia y Garcia<sup>4</sup>, Ce Yang<sup>1</sup>, Debalin Sarangi<sup>1</sup>; <sup>1</sup>University of Minnesota, St. Paul, MN, <sup>2</sup>USDA-ARS, St. Paul, MN, <sup>3</sup>University of Minnesota, Waseca, MN, <sup>4</sup>University 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**

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***TUESDAY AFTERNOON DECEMBER 10***

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**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<sup>\*1</sup>, Christopher Proctor<sup>1</sup>, Isaac Buyungo<sup>1</sup>, Rodrigo Cintra Bachega<sup>1</sup>, Andre Graciano Garcia<sup>1</sup>, Vinicius Velho<sup>1</sup>, Alexandre Tonon Rosa<sup>2</sup>, Mark Reiman<sup>2</sup>; <sup>1</sup>University of Nebraska-Lincoln, Lincoln, NE, <sup>2</sup>Bayer 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)**

## NCWSS Program

- 2:30 PM † Enhancing Weed Control: Tank-Mix Approaches with Metribuzin for Managing *Amaranthus* and Other Weed Species.** Oluwaseun Ola\*<sup>1</sup>, Karla Gage<sup>1</sup>, Eric Miller<sup>1</sup>, Jason Bond<sup>2</sup>, Kevin Bradley<sup>3</sup>, Alyssa Essman<sup>4</sup>, Joseph Ikley<sup>5</sup>, Prashant Jha<sup>6</sup>, Amit Jhala<sup>7</sup>, William G Johnson<sup>8</sup>, Sarah Lancaster<sup>9</sup>, Travis Legleiter<sup>10</sup>, Thomas Mueller<sup>11</sup>, Jason Norsworthy<sup>12</sup>, Christy Sprague<sup>13</sup>; <sup>1</sup>Southern Illinois University, Carbondale, IL, <sup>2</sup>Mississippi State University, Stoneville, MS, <sup>3</sup>University of Missouri, Columbia, MO, <sup>4</sup>The Ohio State University, Columbus, OH, <sup>5</sup>North Dakota State University, Fargo, ND, <sup>6</sup>Louisiana State University, Baton Rouge, LA, <sup>7</sup>University of Nebraska-Lincoln, Lincoln, NE, <sup>8</sup>Purdue University, West Lafayette, IN, <sup>9</sup>Kansas State University, Manhattan, KS, <sup>10</sup>University of Kentucky, Princeton, KY, <sup>11</sup>University of Tennessee, Knoxville, TN, <sup>12</sup>University of Arkansas, Fayetteville, AR, <sup>13</sup>Michigan 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\*<sup>1</sup>, Ryan DeWerff<sup>1</sup>, Shelby Lanz<sup>2</sup>, Thomas Mueller<sup>2</sup>, Rodrigo Werle<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, Madison, WI, <sup>2</sup>University 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\*,

## NCWSS Program

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**

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***TUESDAY AFTERNOON DECEMBER 10***

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**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\*<sup>1</sup>, Pavle Pavlovic<sup>2</sup>, Barbara Scott<sup>3</sup>, Mark VanGessel<sup>3</sup>, Jed Colquhoun<sup>4</sup>, Martin Williams<sup>5</sup>;  
<sup>1</sup>University of Illinois Urbana-Champaign, Urbana, IL, <sup>2</sup>Texas A&M University, College Station, TX, <sup>3</sup>University of Delaware, Georgetown, DE, <sup>4</sup>University of Wisconsin-Madison, Madison, WI, <sup>5</sup>USDA-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.**



## NCWSS Program

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\*<sup>1</sup>, MD Rayhan Shaheb<sup>1</sup>, Marta Kohmann<sup>1</sup>, John Grabber<sup>2</sup>; <sup>1</sup>University of Wisconsin-Madison, Madison, WI, <sup>2</sup>USDA-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\*<sup>1</sup>, Isabel Schlegel Werle<sup>2</sup>, Alexander Lopez<sup>2</sup>, Patrick Tranel<sup>2</sup>, David Stoltenberg<sup>1</sup>, Rodrigo Werle<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, Madison, WI, <sup>2</sup>University of Illinois Urbana-Champaign, Urbana, IL **(143)**

## NCWSS Program

- 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**

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### ***WEDNESDAY MORNING DECEMBER 11***

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### **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*

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***WEDNESDAY MORNING DECEMBER 11***

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**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)**

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***WEDNESDAY MORNING DECEMBER 11***

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**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\*<sup>1</sup>, Navjot Singh<sup>1</sup>, Joseph Ikley<sup>2</sup>, Ryan DeWerff<sup>3</sup>, Rodrigo Werle<sup>3</sup>, Debalin Sarangi<sup>1</sup>; <sup>1</sup>University of Minnesota, St. Paul, MN, <sup>2</sup>North Dakota State University, Fargo, ND, <sup>3</sup>University of Wisconsin-Madison, Madison, WI **(147)**

## NCWSS Program

- 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\*<sup>1</sup>, Ryan Bryant-Schlobohm<sup>2</sup>, Cody Gray<sup>3</sup>, Carlos Antonio Koury d'Arce Junior<sup>4</sup>; <sup>1</sup>UPL NA Inc., Fort Wayne, IN, <sup>2</sup>UPL NA Inc., Amarillo, TX, <sup>3</sup>UPL NA Inc., Colorado Springs, CO, <sup>4</sup>UPL NA Inc., Raleigh, NC **(149)**
- 10:45 AM    Effect of Multiple Very-long-chain Fatty Acid-inhibiting Herbicide Applications on Soybean Yield.** Eric Jones\*<sup>1</sup>, Wesley Everman<sup>2</sup>, Diego Contreras<sup>3</sup>, Jill Alms<sup>1</sup>, Dave Vos<sup>1</sup>; <sup>1</sup>South Dakota State University, Brookings, SD, <sup>2</sup>Iowa State University, Ames, IA, <sup>3</sup>North 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\*<sup>1</sup>, Ryan Henry<sup>2</sup>, Cody Gray<sup>3</sup>, Carlos Antonio Koury d'Arce Junior<sup>4</sup>; <sup>1</sup>UPL NA, Inc., Amarillo, TX, <sup>2</sup>UPL NA, Inc., Fort Wayne, IN, <sup>3</sup>UPL NA Inc., Colorado Springs, CO, <sup>4</sup>UPL NA Inc., Raleigh, NC **(151)**
- 11:15 AM    Surtain Herbicide: Introduction of New Residual Premix for Corn Market.** Sanjeev Bangarwa\*<sup>1</sup>, Kevin Hartman<sup>2</sup>, Nicholas Steppig<sup>3</sup>, Matthew Osterholt<sup>4</sup>, Josh Putman<sup>1</sup>, Troy Klingaman<sup>3</sup>, John Frihauf<sup>2</sup>, Brent McCaskey<sup>4</sup>, Scott Fitterer<sup>5</sup>, David Carruth<sup>5</sup>, Douglas Findley; <sup>1</sup>BASF Corporation Research Triangle Park, Durham, NC, <sup>2</sup>BASF Corporation, Beaver Crossing, NE, <sup>3</sup>BASF Corporation, Seymour, IL, <sup>4</sup>BASF Corporation, Story City, IA, <sup>5</sup>BASF Corporation, Davenport, ND **(152)**
- 11:30 AM    Surtain Herbicide: Field Performance and Success Stories.** Josh Putman\*, Sanjeev

# NCWSS Program

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

**11:45 AM Business Meeting – Row Crop Herbicides**

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## ***WEDNESDAY MORNING DECEMBER 11***

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### **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\*<sup>1</sup>, Salina Raila<sup>1</sup>, Lalit Mohan<sup>1</sup>, Sarah Lancaster<sup>1</sup>, Aaron Hager<sup>2</sup>; <sup>1</sup>Kansas State University, Manhattan, KS, <sup>2</sup>University 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)**

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## ***WEDNESDAY NOON DECEMBER 11***

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### **Society Awards Luncheon**

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

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## ***WEDNESDAY AFTERNOON DECEMBER 11***

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### **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<sup>\*1</sup>, Joseph Ikley<sup>2</sup>, Alyssa Essman<sup>3</sup>; <sup>1</sup>Kansas State University, Manhattan, KS, <sup>2</sup>North Dakota State University, Fargo, ND, <sup>3</sup>The 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<sup>\*1</sup>, Yaiphabi Kumam<sup>2</sup>, Veerendra Sharma<sup>1</sup>, Harold N. Trick<sup>1</sup>, P.V. Vara Prasad<sup>1</sup>, Mithila Jugulam<sup>1</sup>; <sup>1</sup>Kansas State

## NCWSS Program

University, Manhattan, KS, <sup>2</sup>University of Florida, Gainesville, FL **(168)**

**4:15 PM    Delaying Cereal Rye Termination Reduces Weed Density in Corn but Can Also Reduce Yield.** Erin Haramoto\*<sup>1</sup>, Matthew Allen<sup>1</sup>, Carlene Chase<sup>2</sup>, Parmeshwor Aryal<sup>2</sup>, Alison Robertson<sup>3</sup>, Rashelle Matthiesen-Anderson<sup>3</sup>, John Tooker<sup>4</sup>, Matthew Boucher<sup>5</sup>, Jared Adam<sup>6</sup>; <sup>1</sup>University of Kentucky, Lexington, KY, <sup>2</sup>University of Florida, Gainesville, FL, <sup>3</sup>Iowa State University, Ames, IA, <sup>4</sup>Penn State University, State College, PA, <sup>5</sup>Maine Department of Agriculture, Conservation, and Forestry, Augusta, ME, <sup>6</sup>Montana 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\*<sup>1</sup>, Christopher Baxter<sup>2</sup>, Ryan DeWerff<sup>1</sup>, John Rodwell<sup>2</sup>, Daniel Smith<sup>1</sup>, David Stoltenberg<sup>1</sup>, Rodrigo Werle<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, Madison, WI, <sup>2</sup>University of Wisconsin-Platteville, Platteville, WI **(170)**

**4:45 PM    Business Meeting – Extension**

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### ***WEDNESDAY AFTERNOON    DECEMBER 11***

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#### **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\*<sup>1</sup>, Jesse Haarmann<sup>2</sup>, Mark Kitt<sup>3</sup>, David Belles<sup>3</sup>, Tom Beckett<sup>3</sup>; <sup>1</sup>Syngenta Crop Protection, Madison, WI, <sup>2</sup>Syngenta Crop Protection, Rochester, MN, <sup>3</sup>Syngenta 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\*<sup>1</sup>, Matt Faletti<sup>2</sup>, Julie Young<sup>1</sup>, Thomas Butts<sup>1</sup>, Bryan Young<sup>1</sup>; <sup>1</sup>Purdue University, West

## NCWSS Program

Lafayette, IN , <sup>2</sup>Precision 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\*<sup>1</sup>, Bryan Young<sup>1</sup>, Lauren Lazaro<sup>2</sup>, Thomas Butts<sup>1</sup>, William G Johnson<sup>1</sup>; <sup>1</sup>Purdue University, West Lafayette, IN, <sup>2</sup>Blue 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 Enrria<sup>1</sup>, Maxwell Oliveira<sup>2</sup>, Alicia Montoya<sup>3</sup>, Cheyanne Macagno<sup>4</sup>, Anita Dille\*<sup>1</sup>; <sup>1</sup>Kansas State University, Manhattan, KS, <sup>2</sup>BASF Digital Farming, Koeln, Germany, <sup>3</sup>Garden City Community College, Garden City, KS, <sup>4</sup>California Polytechnic State University-San Luis Obispo, San Luis Obispo, CA **(181)**
- 4:30 PM    Kansas Farmer Adoption of Targeted Herbicide Application Technology.** Sarah Lancaster\*<sup>1</sup>, Jeanne Falk Jones<sup>2</sup>, Lucas Haag<sup>2</sup>, Gaea Hock<sup>1</sup>; <sup>1</sup>Kansas State University, Manhattan, KS, <sup>2</sup>Kansas State University, Colby, KS **(182)**
- 4:45 PM    Business Meeting – Herbicide Application Technologies**

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***WEDNESDAY AFTERNOON DECEMBER 11***

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**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\*<sup>1</sup>, Samantha Wells<sup>2</sup>, Debalin Sarangi<sup>2</sup>, Mark Bernards<sup>3</sup>; <sup>1</sup>University of Minnesota, Waseca, MN, <sup>2</sup>University of Minnesota, St. Paul, MN, <sup>3</sup>USDA-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)

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### ***WEDNESDAY EVENING DECEMBER 11***

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#### **Society Social**

*Sponsored by the Sustaining Members – Open to all attendees.*

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

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### ***WEDNESDAY EVENING DECEMBER 11***

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#### **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*

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***THURSDAY MORNING DECEMBER 12***

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**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

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### **Vice-President**

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### **Past President**

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### **Secretary/Treasurer**

Eric Spandl

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### **Editor, NCWSS Proceedings**

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### **Editor, NCWSS Communications**

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### **WSSA Representative**

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Tom Peters

North Dakota State University

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### **Executive Secretary**

Eric Gustafson

Interactive Management, Inc.

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# NCWSS Information

## Directors at Large

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Graduate Students	Kaitlin Creager kaitlin.creager@siu.edu
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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

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Marcelo Zimmer, Vice Chair	zimmer6@purdue.edu

### Graduate Student Committee

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Cristiana Rankrape, Vice- chair	cris.rankrape@siu.edu

### Industry

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Seth Strom, Vice Chair	seth.strom@syngenta.com

### Resident Education

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Adam Striegel, Vice-chair	adam.striegel@bayer.com
Nicholas Steppig, 2 <sup>nd</sup> 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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## **Cover Crops and IWM Technologies**

Nathan Haugrud, Chair  
Devin Hammer, Vice-chair

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## **Herbicide Application Technologies**

Steve Valenti, Chair  
Angela Kazmierczak, Vice-chair

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## **Weed Genetics & Herbicide Physiology**

Samuel Revolinski, Chair  
Isabel Schlegel Werle, Vice-chair

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## **Weed Biology & Ecology**

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Mandeep Singh, Vice-Chair

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## **Horticulture & Specialty Crops**

Manjot Sidhu, Chair  
Reid Smeda, Vice-chair

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## **Range, Pasture & Vegetation Management**

Tate Castillo, Chair  
Mark Renz, Vice-Chair

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# 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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# 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 Mark Wrucke
2006	James R. Martin Bernard H. Zandstra	2016	David Simpson Curtis Thompson
2007	Chris M. Boerboom Michael J. Horak	2017	John Hinz Patrick J. Tranel
2008	Thomas J. Peters Jeffrey Gunsolus Kassim Al-Khatib	2018	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

<sup>1</sup>Society 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	Bjerkén 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

<b>YEAR</b>	<b>Company</b>	<b>Location</b>
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



# AUTHOR INDEX

Surname, First	Paper #
Aberle, Adam	84, 144
Ackley, Bruce	80
Adam, Jared	169
Adeleke, Adebisi	50
Agila, Milena	78
Ahmad, Waqas	120
Allen, Matthew	2, 17, 18, 169
Alms, Jill	67, 70, 150
Anderson, Meaghan	135
Arana, Jeanine	44, 136
Arsenijevic, Nikola	23, 130, 155, 173
Aryal, Parmeshwor	169
Auwarter, Collin	133
Babaei, Sirwan	27
Bagavathiannan, Muthukumar	187
Balic, Adam	20, 25, 28, 30, 178
Bangarwa, Sanjeev	73, 152, 153
Barclay, Colin	71, 119, 121
Basinger, Nicholas	7
Baxter, Christopher	4, 170
Beaulieu, Carter	176
Becker, Roger	112
Beckett, Tom	82, 174
Behnken, Lisa	50
Belles, David	82
Benson, Blake	8
Bernardi Rankrape, Cristiana	6, 27, 69, 158
Bernards, Mark	95, 96, 103, 158, 183, 191
Besançon, Thierry	41
Boe, Jodi	7
Bond, Jason	122
Boucher, Matthew	169
Bradley, Kevin	10, 14, 31, 38, 46, 62, 120, 156
Brown, Cassandra	16
Bryant-Schlobohm, Ryan	149, 151
Burns, Erin	55, 68, 93, 104, 127
Burris, Wade	52, 75
Butts, Thomas	23, 26, 107, 115, 131, 161, 179, 180

# NCWSS Author Index

Buyungo, Isaac	3, 15, 33, 118
Bynegeri, Akshitha Reddy	83
Caldieraro, Leno	37
Carruth, David	152
Cason, Estevan	129
Ceperkovic, Isidor	19
Cerritos-Garcia, Josue	42, 44, 78, 136
Chase, Carlene	169
Chen, Jinyi	108
Chiruvelli, Datta	5, 112
Chmielewski, Alex	49
Chudzik, Guilherme	12, 14, 124, 130
Cintra Bachega, Rodrigo	3, 15, 33, 118
Coburn, Carl	148
Coe, Grant	46
Colquhoun, Jed	132
Colten, Todd	175
Contreras, Diego	150
Corado, Celia	42, 44, 78, 136
Creager, Kaitlin	41, 158
Cunningham, Betsy	121
Davis, Jada	54, 115
Dayan, Franck	110
de Andrade Faleco, Felipe	51, 86, 143
de Sousa Ferreira, Victor	3, 15, 33, 118
de Souza Viera, Laura	25, 28, 178
Dean, Elijah	16
DeWerff, Ryan	4, 12, 14, 29, 65, 124, 128, 147, 170
Dhanda, Sachin	50, 147
Dille, Anita	72, 113, 181
Dobbels, Anthony	71, 80, 119, 121
Duff, Landon	157
Edwards, Ryan	35, 176
Elizalde, Kyle	127
Emmons, Amber	80
Enrria, Joaquin	181
Essman, Alyssa	8, 11, 14, 71, 80, 89, 119, 121, 122, 160
Everman, Wesley	7, 150, 164
Faletti, Matt	26, 179
Falk Jones, Jeanne	182
Fei, Shui-zhang	18
Felsman, Jacob	4, 126, 170

# NCWSS Author Index

Fernholz, Carmen	186
Findley, Douglas	152
Fitterer, Scott	152
Fluttert, John	61
Fonseca, Valeria	42, 44, 78
Francis, Neethu	88, 168
Franco, Arthur	138
Frihauf, John	152
Fujihara, Gustavo	12, 130
Gage, Karla	6, 7, 10, 14, 27, 41, 69, 77, 122
Gaines, Todd	110
Gramig, Greta	120
Gander, Jody	148
Garcia y Garcia, Axel	114
Gewirtz, Kaddi	140
Golus, Jeffrey	20, 25, 28, 30
Grabber John	137
Graciano Garcia, Andre	3, 15, 33, 118
Gray, Cody	149, 151
Grint, Kolby	4
Grujic, Aleksander	2
Guzel, Osman	77
Haag, Lucas	181
Haarmann, Jesse	82, 174
Hager, Aaron	11, 157, 171
Hanson, Anthony	159
Haramoto, Erin	2, 7, 17, 18, 169
Hart, Nash	93, 127
Hartman, Kevin	152
Hartzler, Bob	135
Hatterman-Valenti, Harlene	133
Hay, Marshall	82
Henry, Ryan	79, 91, 149, 151
Hernandez, Bayron	119
Hoffer, Grant	7
Hock, Gaea	181
Hought, Carson	57
Hoverstad, Thomas	50
Hunter, Mitch	187, 191
Ibendahl, Gregory	123
Ikley, Joseph	14, 57, 59, 81, 122, 147, 160, 166
Ingwell, Laura	78

# NCWSS Author Index

Isaacs, Grant	87, 105
Islam, Md Mazharul	32
Jacobs, Kip	74
Jha, Gaurav	24
Jha, Prashant	10, 122
Jhala, Amit	10, 13, 49, 53, 90, 106, 112, 122, 154, 171
Jin, Jian	107
Johnson, Gregg	95, 114, 185
Johnson, Hannah	55
Johnson, Victoria	58
Johnson, William G	10, 14, 21, 36, 54, 115, 122, 129, 131, 161, 180
Jones, Eric	67, 70, 150, 162
Jordan, Nicholas	184
Joshi, Deepak	37
Jugulam, Mithila	32, 58, 72, 75, 83, 88, 92, 168
Kaur, Ramandeep	94
Kitt, Mark	82, 174
Klingaman, Troy	152
Knezevic, Stevan	13, 45, 56, 90, 106
Koch, Douglas	24
Koester, Devin	117
Kohler, John	89
Kohmann, Marta	137, 138
Kopecky Bobadilla, Lucas	85
Koury d'Arce Junior, Carlos Antonio	149, 151
Kuepper, Anita	110
Kumam, Yaiphabi	83, 88, 168
Kumar, Vipin	14, 49, 154
Lagerhausen, Emma	109
Lago, Eduardo	6, 69
Lancaster, Sarah	10, 14, 24, 32, 37, 52, 58, 75, 122, 123, 146, 157, 160, 182
Lanz, Shelby	124
Law, Eugene	7, 16, 80
Lazaro, Lauren	179
Legleiter, Travis	14, 17, 18, 122, 165
Leitz, Richard	148
Lewis, Jessie	35
Lingenfelter, Dwight	64
Lira, Sara	18

# NCWSS Author Index

Little, Richard	7
Liu, Xian	27
Lloyd, Randy	30
Lopez, Alexander	74, 85, 86, 94, 143, 167
Lorenz, Aaron	66, 116
Loureiro Da Silva Rodrigues, Luma Lorena	12, 51, 60, 173
Luemmen, Peter	110
Lundquist, Peter	108
Macagno, Cheyanne	181
Mahey, Mohit	108
Massie, Sawyer	176
Mata, Lidysce	42, 44, 78, 136
Mathew, Sithin	66, 116
Matthiesen-Anderson, Rashelle	169
McCaskey, Brent	152
McCormick, Emily	11
Medenwald, Hunter	26, 35, 179
Mesquita Machado, Filipi	85
Meyers, Stephen	42, 44, 78, 136, 161
Miao, Zewei	148
Miller, Eric	6, 7, 41, 69, 122
Miller, Julianna	84
Miller, Kalvin	29
Miller, Logan	172
Miller, Ryan	50, 159
Milosevic, Luka	13, 45, 56, 90, 106
Mitchem, Wayne	7
Mohan, Lalit	58, 157
Mobli, Ahmadreza	4, 12, 51, 60, 173
Moeller, Dave	112
Montoya, Alicia	181
Muehlfeld, Andrew	177
Mueller, Steffen	77
Mueller, Thomas	79, 122, 124
Mueth, Alexander R.	21, 131
Munhoz Pedroso, Rafael	33
Myers, Lidia	40
Naeve, Seth	19, 66, 116
Nicolai, David	19, 159
Niu, Zhongzhong	107

# NCWSS Author Index

Nocito, Helen	42, 44, 78, 136
Noel Torres, Richard Jose	134
Noguera, Matheus	10
Noll, Ethan	24
Norsworthy, Abigail	48, 107
Norsworthy, Jason	14, 122
Norton, Amie E	32
Nunes, Jose	14, 158, 174
Odemba, Mercy	7, 16
Oganda, George	40
Ola, Oluwaseun	77, 122
Oliveira, Maxwel	29, 180
Osterholt, Matthew	152
Otavio Pradella, Luiz	52
Parrey, Yassir Nazir	92
Patterson, Eric	93, 104, 108
Patton, Aaron	161
Paul, Siddhartho	131
Pavlovic, Pavle	132
Peltier, Angie	5, 159
Peters, Scott	183
Peters, Thomas	5, 84, 144
Phillips, Tim	18
Poling, Ella	71
Prasad, P.V. Vara	83, 88, 92, 168
Price, Katilyn	148
Pridie, Sydney	17
Proctor, Christopher	3, 15, 33, 118
Purvis, Connor	68, 104
Putman, Josh	73, 152, 153
Qiao, Lang	9
Raila, Salina	52, 75, 123, 157
Raiyemo, Damilola	74, 85, 167
Reiman, Mark	118
Ren, Zhe	39
Renz, Mark	137, 138, 141
Rezende Lima, Igor Gustavo	52, 75
Richer, Eric	8
Riechers, Dean	117
Robertson, Alison	169
Rodriguez, Charlton	141
Rodwell, John	170

# NCWSS Author Index

Roehl, Jack	81
Rogers, Grady	62
Roozeboom, Kriag	75
Rubione, Claudio	7
Sadeghpour, Amir	27, 77
Sandeen, Hallie	18
Sarangi, Debalin	5, 9, 19, 50, 66, 112, 114, 116, 147, 158, 159, 185
Schlautman, Brandon	17, 18
Schlegel Werle, Isabel	69, 74, 85, 86, 143, 167
Scholting, Emily	148
Schoonover, Jon	77
Schroeder de Souza, Joana	72, 113
Schroeder, Kasey	20, 30
Scott, Barbara	132
Scott, Jon	13, 45, 56, 90, 106
Searcy, Kiera	17
Shaheb, MD Rayhan	137
Sharma, Vasudha	66, 116
Sharma, Veerendra	83, 88, 168
Shropshire, Christy	61
Sikkema, Peter	61, 76
Silva, Tatiane	167
Singh, Mandeep	53
Singh, Navjot	147, 159
Skelton, Joshua	34
Smeda, Reid J	40, 125, 134, 139
Smith, Daniel	4, 170
Soltani, Nader	61, 76
Sosnoskie, Lynn	41
Spatz, Dana	91
Spokas, Kurt	114
Sprague, Christy	14, 22, 63, 122, 126, 140, 142
Stahl, Elizabeth	159
Stamenovic, Vuk	20, 25, 178
Starke, Michelle	189
Steppig, Nicholas	152
Stewart, Mark	193
Stiles II, Brian	22, 126
Stoltenberg, David	86, 143, 170
Sudhakar, Susee	83
Takenaka, Yudai	132

# NCWSS Author Index

Tann, R Scott	36
Thompson, Trace	38
Tice, William	82
Tonon Rosa, Alexandre	118
Tooker, John	169
Tranel, Patrick	69, 74, 85, 86, 94, 111, 143, 167
Traxler, Catherine	110
Trick, Harold N.	83, 88, 168
Ugljic, Zaim	23, 29, 128, 130
Valadão Silva, Daniel	60,
VanGessel, Mark	7, 132
Vehige, Andy	40, 125
Velho, Vinicius	3, 15, 33, 118
Vos, Dave	67, 70, 150
Waldecker, Ian	142
Wallace, John	2, 7
Weber, Anderson	34
Weippert, Austin	59
Wells, Samantha	185
Werle, Rodrigo	4, 12, 14, 23, 29, 51, 60, 65, 86, 124, 128, 130, 143, 146, 147, 155, 163, 170, 173,
Westra, Philip	145, 190
Whitworth, Robert J	32
Widhalm, Joshua	21
Wiedenbeck, Doug	4
Wilke, Travis	111
Willemse, Christian	76
Williams, Martin	111, 132
Williard, Karl	77
Wishowski, Lauryn	63
Wyse-Pester, Dawn	192
Xiong, Xi	134
Yang, Ce	9, 114
Young, Bryan	10, 14, 21, 26, 35, 36, , 39, 48, 54, 87, 105, 107, 109, 115, 129, 131, 161, 179, 180,
Young, Julie	26, 35, 36, 48, 54, 87, 105, 107, 109, 115, 131, 179
Yount, Jesse	31, 156
Yu, Eric	9, 114
Zaric, Milos	20, 25, 28, 30, 43, 178
Zhu, Daniel	65, 130
Zimmer, Marcelo	36, 161, 180



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# NCWSS Notes



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# NCWSS Notes

## Time Schedule

Mark papers and meetings in the space below.

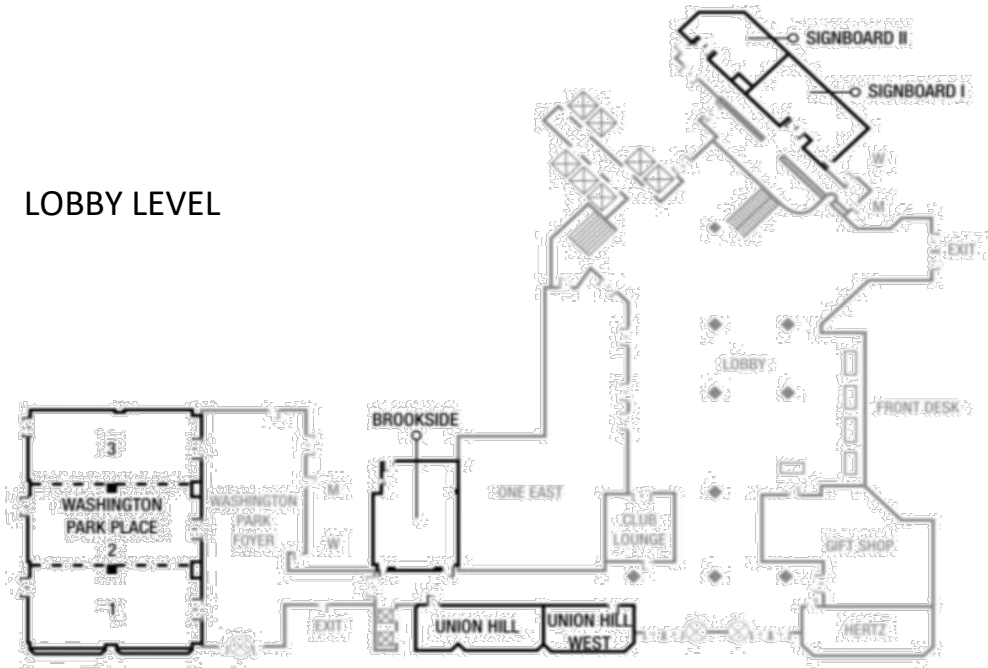
Time	Tuesday	Wednesday	Thursday	
8:00	Poster Session 1	Poster Session 2	Society Breakfast & What’s New in Industry	
8:15				
8:30				
8:45				
9:00				
9:15				
9:30				
9:45				
10:00	General Session			
10:15				
10:30				
10:45				
11:00				
11:15				
11:30				
11:45				
12:00	Student Luncheon	NCWSS 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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LOBBY LEVEL



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