



2018

73rd Annual Meeting

North Central Weed Science Society

www.ncwss.org

December 3 - 6, 2018

Hyatt Regency Milwaukee, WI

President's Welcome

2018 North Central Weed Science Society Meeting

Welcome to the 73rd annual North Central Weed Science Society meeting at the Hyatt Regency in Milwaukee, WI. Since attending my first NCWSS meeting in 1994, I have found this meeting to be one of the most important that I attend every year. This event provides an important venue for those involved in weed science to discuss the latest research, education, and outreach activities in the North Central Region and beyond. This meeting also provides a great opportunity to learn new techniques, share information and experiences, and to catch up with old and new friends. I hope you find this meeting as important to your year as I do and I look forward to visiting with many of you soon.

Richard Proost, Tim Trower, and the Local Arrangements Committee have done an excellent job of preparing the hotel for our meeting. Our experiences with the Hyatt Regency Milwaukee in the past have been excellent and I anticipate that it will continue to be a high-quality venue with exceptional service. Milwaukee is a great city for our meeting with diverse restaurants, exciting nightlife and many local attractions.

Program Chair, Aaron Hager, has assembled an excellent program. In addition to our regular slate of outstanding poster and paper presentations, there will be four symposia available for participants to attend. *"Essential Communication in Weed Science: Within and Beyond our Society"* and *"Atmospheric Conditions for Making On-Target Herbicide Applications"* are half-day symposia that have excellent groups of presenters and experts both within and outside of the weed science community. This year's graduate student symposium, *"Making Data Meaningful: A Guide to Presenting Data at Scientific Meetings"* will provide participants the opportunity to have one-on-one conversations with each speaker during "roundtable rotations" partway through the symposium. Students are encouraged to bring a copy of the statistics used during their poster or paper presentations that could serve as a discussion starter at the roundtable. The final symposium this year will be the ever popular "What's New in Industry" following the industry breakfast on Thursday morning. This symposium will highlight new products and technologies from our industry partners for the 2019 season. To aid in planning your meeting schedule this year, we will once again have the Guidebook App available in addition to the program booklet. These two resources will help enhance your meeting experience and ensure that you don't miss any of these excellent sessions.

I am excited that Anita Dille will be organizing the 5th 'Women in Weed Science' Networking Breakfast. This event provides a great opportunity for the women of our society to meet and learn more about opportunities in weed science. This year's industry breakfast will feature Ms. Janice Person, the Online Engagement Director at Bayer CropSciences. Ms. Pearson is instrumental in developing social media programs encouraging employees to have one-on-one discussions with non-agricultural people regarding food safety and environmental concerns. The Industry breakfast is open to all attendees at the meeting, and tickets for the event can still be purchased on site.

The winners for the Graduate Student Paper and Graduate and Undergraduate Poster Contests will be announced at our Society Social on Wednesday night. Please plan on attending and help us congratulate our NCWSS students. The success of the NCWSS depends on your active participation through attendance and presentations as well as through your service on committees or as an office holder. Every committee of the society will meet during the conference. Please feel free to attend any of the committee meetings that interest you, and please volunteer to serve. Both you and the society will benefit from your involvement.

It has been a great privilege to serve you as President of the NCWSS. I believe that together we will make significant contributions to weed science and to the NCWSS. If you have suggestions on how NCWSS can serve you better, please let me know. I look forward to seeing you in Milwaukee.

Christy Sprague, President

Conference Headquarters

All sessions of the conference and the meeting events will be held at the Hyatt Regency Milwaukee, 333 West Kilbourn Ave., Milwaukee, WI 53203; Phone 414-276-1234.

Registration

Registration is required to attend the conference. Register online at www.ncwss.org/annual-meeting/

Pre-registration is **\$275** (includes banquet). Registration after Nov. 19 or at the conference is **\$325**. Honorary members and Fellows pre-registration is **\$170**; registration after Nov. 19 or at the conference is **\$220**.

Student pre-registration is **\$130**; student registration after Nov. 19 or at the conference is **\$180**.

Industry Breakfast tickets are available to everyone for **\$45**.

Register for the Women in Weed Science Networking breakfast to save your seat, no cost.

Registration Hours

The registration desk is at the **Regency Prefunction** on the **2nd floor**, and will be open Monday 4 to 6:30 pm, Tuesday 7:30 am to 4 pm, Wednesday 8 to 11 am and 2 to 4 pm.

Local Arrangements Headquarters: Solomon Juneau

Meeting Rooms

All sessions and meetings will be on the 2nd floor of the hotel. Additional meetings may be arranged any time during the conference by contacting Richard Proost, Local Arrangements Chair.

Proceedings

2018 NCWSS Proceedings will be available following the meeting online at the NCWSS website. Hard copies of the Proceedings may be ordered from Curran Associates (<http://www.proceedings.com/>).

Sustaining Members

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

No Smoking in the sessions.

No photographs or videos

Do not take pictures or videos of any presentations without prior permission from the presenter. Many presentations will be available online after the conference, by those that agreed to upload pdf versions of their presentations.

Program Symbols

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

Meetings of the Society 2018

Board of Directors

Monday, 1:00 pm	Vue East
Wednesday, 7:00 pm	Vue North

Local Arrangements

Monday, 11:00 am	Solomon Juneau
Thursday, 10:30 am (with 2018 committee)	Crystal Room

Poster Session Setup

Monday, 11:00 am	Atrium
------------------	--------

Contest Judges for Paper and Poster Contests

Judges breakfast, Tuesday, 7:00 am	Regency Ballroom C&D
Judges, Tuesday, 7:15 am	Regency Ballroom C&D
Paper Judges, Wednesday, 11:30 am	Milwaukee Ballroom A
Poster Judges, Wednesday, 11:30 am	Milwaukee Ballroom A

Meal Functions

Breaks

Tuesday, 9:45– 10:00 am	Atrium
Tuesday, 3:00– 3:15 pm	Atrium
Wednesday, 9:30 – 9:45 am	Atrium
Wednesday, 3:30 pm	Atrium

Student Mixer and Quiz Bowl

Sponsored by BASF Corporation – Open to all attendees

Monday, 6:30 pm	Regency Ballroom C&D
-----------------	----------------------

Student Luncheon/Business Meeting

Sponsored by Dow AgroSciences – Open to all students

Tuesday, 12:00 – 1:15 pm	Regency Ballroom C&D
--------------------------	----------------------

Women in Weed Science Networking Breakfast –

Open to all women

Wednesday 6:30-8:00 am	Regency Ballroom C&D
------------------------	----------------------

Society Awards Luncheon

MC: Dawn Refsell

Wednesday, 12:00 noon	Regency Ballroom C&D
-----------------------	----------------------

Society Social and Contest Awards

Sponsored by Sustaining Members – Open to all

Wednesday, 5:30 – 7:30 pm	Regency Ballroom C&D
---------------------------	----------------------

Industry Breakfast (Cost \$45)

Thursday, 7:00 am	Regency Ballroom C&D
-------------------	----------------------

Meetings of the Society 2018

The following meetings will take place for conducting the business of each respective committee and to elect a new Vice Chair to serve as Chair in 2021. Most meetings are open to members. Please see the committee chair or attend the committee meeting if you are interested in serving the society by being a committee member.

NCWSS Committee Meetings

Program

Monday, 7:30 pm (*section moderators*) Crystal Room

Distinguished Achievement Award

Tuesday, 12:00 pm Milwaukee Room B

Communications Working Group

Monday, 5:00 pm Milwaukee Room

Strategic Planning

Monday, 5:30 pm Milwaukee Room

Paper Judges

Tuesday, 7:00 am Regency C&D

Wednesday, 11:30 am Milwaukee Room

Poster Judges

Tuesday, 7:00 am Regency C&D

Wednesday, 11:30 am Milwaukee Room

Finance, Steering, & Policy

Tuesday, 5:15 pm Crystal Room

Future Site Selection

Tuesday, 5:15 pm Pere Marquette

Nominating

Tuesday, 5:15 pm Executive C

Resident Education, Summer Contest, and

Contest Rules Joint meeting

Tuesday, 5:15 pm Executive D

Extension (Committee and Business Meeting)

Wednesday, 5:00 pm Milwaukee Room

NCWSS Fellow

Wednesday, 5:00 pm Executive D

Resolutions & Necrology

Wednesday, 5:00 pm Pere Marquette

Industry (Committee and Business Meeting)

Thursday, 10:00 am Milwaukee Room

Meetings of the Society 2018

Program Section Business Meetings

Poster Session I

Tuesday, 8:00 a.m. Atrium

Herbicide Physiology

Wednesday, 9:30 a.m. Lakeshore B

Agronomic and Specialty Crops

Wednesday, 10:15 a.m. Lakeshore A

Invasive Weeds, Rangeland and Vegetation Management

Wednesday, 11:30 am Executive A&B

Agronomic Crops I (Corn)

Tuesday, 5:00 p.m. Regency B

Agronomic Crops II (Soybeans)

Tuesday, 5:00 p.m. Executive A&B

Equipment and Application Methods

Tuesday, 4:15 a.m. Lakeshore A&B

Weed Biology, Ecology & Management

Tuesday, 5:00 p.m. Regency A

Extension

Wednesday, 5:00 p.m. Milwaukee Room

Special Interest Groups

Graduate Students (at luncheon)

Tuesday, 12:00 p.m. Regency C&D

Women in Weed Science Networking Breakfast

Wednesday, 6:30 a.m. Regency C&D

Industry

Thursday, 10:00 a.m. Regency C&D

Symposia

Essential Communication in Weed Science: Within and Beyond our Society

Wednesday, 8:00 – 11:45 a.m. Regency B

Atmospheric Considerations for Making On-Target Herbicide Applications

Wednesday, 1:30 – 5:00 p.m. Regency B

Making Data Meaningful: A Guide to Presenting Data at Scientific Meetings – Statistics in Weed Science

Wednesday, 3:00 – 5:00 p.m. Regency A

What's New in Industry?

Thursday, 8:30 – 10:15 a.m. Regency A&B

Condensed Program – NCWSS 2018

Monday, December 3

1:00 – 5:00	Board of Directors	Vue East (21 st Floor)
1:00 – 9:30	Poster Setup	Atrium
6:30 p.m.	Student Mixer and Quiz Bowl	Regency C&D

Tuesday, December 4

8:00 – 9:45	Poster Session I	Atrium
10:00 – 12:00	NCWSS General Session	Regency A&B
12:00 – 1:15	Student Lunch	Regency C&D
1:15 – 5:00	Equipment & Application Methods Lakeshore A&B	
1:15 – 5:00	Weed Biology, Ecology, and Management	Regency A
1:15 – 5:00	Agronomic Crops I - Corn	Regency B
5:30 – 6:30	Poster Session II	Atrium

Wednesday, December 5

6:30 – 7:45	Women in Weed Science Networking Breakfast	Regency C&D
1:15 – 5:00	Herbicide Physiology	Lakeshore B
8:00 – 10:30	Agronomic & Specialty Crops	Lakeshore A
8:00 – 11:30	Essential Communication in Weed Science: Within and Beyond our Society (Symposium)	Regency B
10:00 – 11:45	Invasive Weeds, Rangeland and Vegetation Management	Executive A&B
8:00 – 11:45	Agronomic Crops II - Soybean	Regency A
12:00 – 1:30	NCWSS Awards Luncheon	Regency C&D
1:30 – 3:45	Weed Biology, Ecology, and Management	Grand A
1:30 – 5:00	Atmospheric Considerations for Making On-Target Herbicide Applications (Symposium)	Regency B
3:00 – 5:00	Making Data Meaningful: A Guide to Presenting Data at Scientific Meetings – Statistics in Weed Science (Symposium)	Regency A
5:30 – 7:30	Society Social & Contest Awards (<i>open to all attendees</i>)	Regency C&D
7:00 – 9:00 Floor)	NCWSS Board of Directors	Vue North (21 st Floor)

Thursday, December 7

7:00 – 8:15	Industry Breakfast	Regency C&D
8:30 – 10:00	What's New in Industry? (Symposium)	Regency A&B

Poster Sessions

Room: Atrium (2nd Floor)

Chairperson and Moderator: Dan Smith

Poster Setup

Posters can be set up between 1:00 and 9:30 p.m. on Monday, December 3. All NCWSS posters will be on display on Tuesday, December 4 from 8:00 a.m. until 6:30 p.m. and on Wednesday, December 5 from 8:00 a.m. until 5:00 p.m. Posters must be removed by 5:00 p.m. on Wednesday, December 5.

Students in the Poster Contest must be with their posters during the two Poster Sessions (I and II) on Tuesday for judging. Students in the poster contest are required to bring letter-sized copies of your posters to hand out.

Tuesday, December 12

8:00 – 9:45 am Poster Session I (non-contest authors present at odd numbered posters)

5:30 – 6:30 pm Poster Session II (non-contest authors present at even numbered posters)

Poster Removal

All posters must be removed by 5:00 p.m. on Wednesday, December 5.

NCWSS Sustaining Member Exhibitors

Tuesday & Wednesday

Atrium

Set up Monday afternoon.

Program Symbols

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

Agronomic and Specialty Crops Posters (All other agronomic and horticultural crops)

Tolerance of Dry Bean to Herbicides Applied Preplant for Glyphosate-Resistant Horseweed Control in a Strip-Tillage Cropping System. Nader Soltani*, Christy Shropshire, Peter H. Sikkema; University of Guelph, Ridgetown, ON (1)

Response of Winter Wheat to Herbicide Plus Fungicide Plus Ammonium Thiosulphate Tankmixes. Nader Soltani*, David C. Hooker, Peter H. Sikkema; University of Guelph, Ridgetown, ON (2)

†Temporal and Varietal Impacts of Overseeded Cover Crops on Main Crop Yield and Winter Annual Weeds. Renee L. Adler*¹, Kelly Nelson²; ¹University of Missouri, Novelty, MO, ²University of Missouri, Novelty, MO (3)

†Assessment of MultispeQ Photosynthetic Meter to Detect Herbicide Injury on Dry Bean. Justine Fisher*¹, Scott R. Bales², Christy Sprague³; ¹Michigan State University, East Lansing, MI, ²Michigan State University, East Lansing, MI, ³Michigan State University, E Lansing, MI (4)

†Plant Growth Regulator Effects on Intermediate Wheatgrass-Weed Communities. Joseph W. Zimbric*, David E. Stoltenberg; University of Wisconsin-Madison, Madison, WI (5)

3D Models for Weed Identification Education. Bruce A. Ackley*; The Ohio State University, Columbus, OH (6)

Weed Control and Strawberry Response to Indaziflam. Sushila Chaudhari*, Katherine M. Jennings, Mathew Waldschmidt; North Carolina State University, Raleigh, NC (7)

Herbicide Physiology Posters

†Expression Analysis of 12-Oxophytodienoic Acid Reductases in Response to Post-Emergence Cloquintocet-mexyl in *Triticum aestivum*. Olivia A. Obenland*, Kris N. Lambert, Dean E. Riechers; University of Illinois, Urbana, IL (8)

Herbicide Physiology Posters (continued)

Physiological and Molecular Analysis of Glyphosate Resistance in Non-Rapid Response Giant Ragweed from Wisconsin. Courtney E. Wilson¹, Hudson K. Takano², Christopher R. Van Horn², Melinda Yerka³, Phil Westra⁴, David E. Stoltenberg*¹; ¹University of Wisconsin-Madison, Madison, WI, ²Colorado State University, Fort Collins, CO, ³University of Nebraska-Lincoln, Lincoln, NE, ⁴Colorado State University, Ft Collins, CO (9)

†ACCase-Inhibitor and Growth Regulator Herbicides Applied in Tank Mixtures. Ely Anderson*¹, Kasey Schroeder², Jeffrey Golus², Thomas R. Butts³, Bruno Canella Vieira⁴, Andre de Oliveira Rodrigues¹, Bonheur Ndayishimiye⁵, Greg R Kruger¹; ¹University of Nebraska, North Platte, NE, ²University of Nebraska-Lincoln, North Platte, NE, ³University of Wisconsin-Madison, Madison, WI, ⁴University of Nebraska, Lincoln, NE, ⁵University of Nebraska-Lincoln, Lincoln, NE (10)

Glyphosate, Glufosinate, Dicamba and 2,4-D Applied in Tank-Mixtures on Glyphosate-Resistant, 2,4-D-Resistant and Susceptible Waterhemp Populations. Kasey Schroeder*¹, Barbara Vukoja¹, Bruno Canella Vieira², Jeffrey Golus¹, Greg R Kruger³; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska, Lincoln, NE, ³University of Nebraska, North Platte, NE (11)

†Efficacy of Trifludimoxazin, a New Protoporphyrinogen Oxidase-Inhibiting Herbicide, on PPO-Resistant *Amaranthus* Biotypes. Nicholas R. Steppig*¹, Samuel D. Willingham², Bryan G. Young¹; ¹Purdue University, West Lafayette, IN, ²BASF, Seymour, IL (12)

†Response of Atrazine-Resistant Palmer amaranth (*Amaranthus palmeri*) to PRE-Applied Atrazine. Dakota Came*¹, Junjun Ou², Mithila Jugulam¹; ¹Kansas State University, Manhattan, KS, ²Corteva Agriscience, Manhattan, KS (13)

Herbicide Physiology Posters (continued)

†Efficacy of Glufosinate, Glyphosate and Dicamba Applied in Tank Mixtures. Rodger Farr*¹, Kasey Schroeder¹, Jesaelen Gizotti de Moraes¹, Jeffrey Golus¹, Greg R Kruger²; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska, North Platte, NE (14)

Gene-Edited Acetolactate Synthase in Yeast and Response to Herbicides. Michael J. Christoffers*; North Dakota State University, Fargo, ND (15)

Molecular and Greenhouse Validation of Field-Evolved Resistance to Glyphosate and PPO-Inhibitors in Palmer Amaranth. Maxwel C. Oliveira*¹, Darci Giacomini², Patrick Tranel³, Gustavo De Souza Vieira⁴, Nikola Arsenijevic⁴, Rodrigo Werle¹; ¹University of Wisconsin-Madison, Madison, WI, ²University of Illinois, Urbana, IL, ³University of Illinois, Urbana, IL, ⁴University of Nebraska Lincoln, North Platte, NE (16)

A High-Quality Whole-Genome Assembly of Waterhemp (*Amaranthus tuberculatus*). Darci Giacomini*¹, Julia M. Kreiner², Bridgit Waithaka³, Felix Bemm³, Christa Lanz³, Julia Hildebrandt³, Julian Regalado³, Peter Sikkema⁴, John R. Stinchcombe², Stephen I. Wright², Detlef Weigel³, Patrick Tranel⁵; ¹University of Illinois, Urbana, IL, ²University of Toronto, Toronto, ON, ³Max Planck Institute for Developmental Biology, Tuebingen, Germany, ⁴University of Guelph, Ridgetown, ON, ⁵University of Illinois, Urbana, IL (17)

Association between Metabolic Resistances to Atrazine and Mesotrione in a Multiple-Resistant Waterhemp (*Amaranthus tuberculatus*) Population. Kip E. Jacobs*¹, Brendan V. Jamison¹, Rong Ma², Sarah R. O'Brien³, Dean E. Riechers²; ¹University of Illinois at Urbana-Champaign, Urbana, IL, ²University of Illinois, Urbana, IL, ³University of Illinois at Urbana-Champaign, Urbana, IL (18)

Agronomic Crops I – Corn Posters

Issues with Volunteer Corn Control in Dicamba-Tolerant Soybean. Jon E Scott*¹, O. Adewale Osipitan², Stevan Knezevic³; ¹University of Nebraska, Wakefield, NE, ²University of Nebraska-Lincoln, Lincoln, NE, ³University of Nebraska, Wayne, NE (19)

†Herbicide Selection for Interseeding Cover Crops in Corn.

Aaron P. Brooker*¹, Christy Sprague², Karen Renner²;
¹Michigan State University, East Lansing, MI, ²Michigan State University, E Lansing, MI (20)

†Influence of Cover Crop Selection on Weed Suppression and Subsequent Corn Yield in Semi-Arid Rainfed Cropping

Systems of Western Nebraska. Italo Kaye Pinho de Faria*¹, Alexandre Tonon Rosa², Liberty E. Butts³, Cody F. Creech⁴, Roger Elmore², Daran Rudnick¹, Rodrigo Werle⁵; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska-Lincoln, Lincoln, NE, ³University of Nebraska Lincoln, North Platte, NE, ⁴University of Nebraska-Lincoln, Scottsbluff, NE, ⁵University of Wisconsin-Madison, Madison, WI (21)

†Impact of Wheat Stubble Management and Cover Crop Selection on Weed Demographics and Corn Productivity in Semi- Arid Cropping Systems of Western Nebraska.

Alexandre Tonon Rosa*¹, Italo Kaye Pinho de Faria², Roger Elmore¹, Chuck Burr², Strahinja Stepanovic³, Daran Rudnick², Cody F. Creech⁴, Rodrigo Werle⁵; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, North Platte, NE, ³University of Nebraska-Lincoln, Grant, NE, ⁴University of Nebraska-Lincoln, Scottsbluff, NE, ⁵University of Wisconsin-Madison, Madison, WI (22)

†Influence of Crimson Clover and Cereal Rye Termination Timings on Corn Yield. Wyatt S. Petersen*, William G.

Johnson; Purdue University, West Lafayette, IN (23)

Impact of Organic Herbicides in Corn. Betzy Valdez*, Kerry M. Clark, Reid Smeda; University of Missouri, Columbia, MO (24)

Agronomic Crops I – Corn Posters (continued)

†Interactive Impact of Weed Removal Timing and Pre Herbicides on Growth and Yield of Corn. Ayse Nur Ulusoy*¹, O. Adewale Osipitan², Jon E Scott³, Stevan Knezevic⁴; ¹University of Nebraska-Lincoln, Concord, NE, ²University of Nebraska-Lincoln, Lincoln, NE, ³University of Nebraska, Wakefield, NE, ⁴University of Nebraska, Wayne, NE (25)

†Effects of Shading on Weed and Cover Crop Growth Parameters. Adam L. Constine*¹, Karen Renner², Aaron P. Brooker¹; Michigan State University, East Lansing, MI, Michigan State University, E Lansing, MI (26)

†Postemergence Control of Velvetleaf in Popcorn. Ethann R. Barnes*¹, Suat Irmak¹, Stevan Knezevic², Nevin C. Lawrence³, Oscar Rodriguez⁴, Amit Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska, Wayne, NE, ³University of Nebraska, Scottsbluff, NE, ⁴Conagra Brands, Inc, Brookston, IN (27)

A Short Course on Herbicide Modes of Action and Herbicide Resistance. Peter H. Sikkema*¹, Patrick Tranel², Thomas Mueller³; ¹University of Guelph, Ridgetown, ON, ²University of Illinois, Urbana, IL, ³University of Tennessee, Knoxville, TN (28)

Corn Ear Size as Influenced by Proximity to Winter Annual Weeds at Emergence and Side-dress Nitrogen Rate. Brent Heaton*¹, Mark L. Bernards²; ¹Western Illinois University, Industry, IL, ²Western Illinois University, Macomb, IL (29)

Invasive Weeds, Rangeland, Pasture, and Vegetation Management Posters

†Amaranthus Germination in Road Ditches: Potential Implications for the Spread of Palmer Amaranth. Cole Sigler*¹, Lauren Villafuerte¹, Manoj Rai¹, Clint Meyer¹, John Pauley²; ¹Simpson College, Indianola, IA, ²Simpson college, Indianola, IA (30)

**Invasive Weeds, Rangeland, Pasture, and
Vegetation Management Posters
(continued)**

†Weed Species Diversity in Railroad Right-of-Ways. Andrew W. Osburn*, Mark Loux, Emilie Regnier, Kent Harrison; The Ohio State University, Columbus, OH (31)

Vastlan - A Novel Low Volatile Formulation of Triclopyr. David G. Ouse*, James Gifford, Byron Sleugh, Stephen Strachan, Dave Barenkow; Corteva, Indianapolis, IN (32)

PGR Options for Roadside Tall Fescue Management (2017-2018). Joe Omielan*, Michael Barrett; University of Kentucky, Lexington, KY (33)

Generations: Understanding Weed-Herbivore Interactions using Python. Mary Marek-Spartz*¹, Kyle Marek-Spartz², George Heimpel¹, Roger Becker³; ¹University of Minnesota, St. Paul, MN, ²Consultant, St. Paul, MN, ³University of Minnesota, St Paul, MN (34)

Host Specificity of *Hadroplotus litura* on native *Cirsium* Species. Elizabeth Katovich*¹, Roger Becker², Mary Marek-Spartz¹; ¹University of Minnesota, St. Paul, MN, ²University of Minnesota, St Paul, MN (35)

Biological Control of Garlic Mustard: No Impact of *Ceutorhynchus scrobicollis* on Two Endangered Brassicaceae. Elizabeth Katovich*¹, Roger Becker², Mary Marek-Spartz¹, Laura Van Riper³, Ghislaine Cortat⁴, Harriet Hinz⁴; ¹University of Minnesota, St. Paul, MN, ²University of Minnesota, St Paul, MN, ³Minnesota Dept. of Natural Resources, Saint Paul, MN, ⁴CABI, Delémont, Switzerland (36)

Agronomic Crops II – Soybeans Posters

WSSA Advocates for Weed Controls that Protect Soybean Export Value. Carroll M. Moseley*¹, Lee Van Wychen², Heather Curlett³, Jill Schroeder⁴, Patsy D. Laird⁵, Shawn P. Conley⁶; ¹Syngenta Crop Protection, Greensboro, NC, ²WSSA, Alexandria, VA, ³APHIS-USDA, Washington, DC, ⁴USDA Office of Pest Management Policy, Washington, DC, ⁵Syngenta Crop Protection, LLC, Greensboro, NC, ⁶University of Wisconsin-Madison, Madison, WI (37)

†Crop Safety of Preplant Applications of Halauxifen-Methyl on Soybean. Marcelo Zimmer*¹, Bryan G. Young¹, Bill Johnson²; ¹Purdue University, West Lafayette, IN, ²Purdue University, W Lafayette, IN (38)

Winter Annual Weed Control in Soybean with Haulaxifen-Methyl. Anthony F Dobbels*, Mark Loux; The Ohio State University, Columbus, OH (39)

The Spatial and Temporal Distribution of Horseweed in Ohio Soybean Fields from 2013 to 2017. Alyssa Lamb*, Mark Loux, Bruce A. Ackley, Anthony F Dobbels; The Ohio State University, Columbus, OH (40)

Alternative Sites of Action for Residual Control of Multiple-Resistant Horseweed in Soybeans. Bryan Reeb*, Mark Loux; The Ohio State University, Columbus, OH (41)

†Control of Glyphosate-Resistant Palmer Amaranth in Isoxafultole/Glufosinate-Resistant Soybean in Nebraska. Jasmine Mausbach*¹, Parminder Chahal², Kevin Watteyne³, Amit Jhala²; ¹University of Nebraska- Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, Lincoln, NE, ³Bayer CropScience, Lincoln, NE (42)

†Tillage Effects on Waterhemp Population Dynamics in Michigan. Scott R. Bales*¹, Christy Sprague²; ¹Michigan State University, East Lansing, MI, ²Michigan State University, E Lansing, MI (43)

Tuesday Papers 2018
Agronomic Crops II – Soybeans Posters
(continued)

†Importance of Residual Herbicides for Control of Glyphosate-Resistant Palmer Amaranth in Dicamba/Glyphosate- Resistant Soybean. Adam Leise*, Parminder Chahal, Ethann R. Barnes, Amit Jhala; University of Nebraska-Lincoln, Lincoln, NE (44)

Control of Palmer Amaranth with Preemergence Dicamba in Soybean. Dakota Came*, Marshall M. Hay, Dallas E Peterson; Kansas State University, Manhattan, KS (45)

†Weed Control and Response of Dicamba-Resistant Soybean to a Premix of Dicamba and Pyroxasulfone. Amy D. Hauver*¹, Ethann R. Barnes², Brady Kappler³, Amit Jhala²; ¹University of Nebraska- Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, Lincoln, NE, ³BASF Corporation, Eagle, NE (46)

Weed Management Systems in Xtend Flex Soybean. Brian Stiles II*¹, Christy Sprague²; ¹Michigan State University, East Lansing, MI, ²Michigan State University, E Lansing, MI (47)

†Effect of Low Tank-Contamination Rates of 2,4-D and Dicamba on Sensitive Soybean Yield, Seed Viability, and Seedling Growth. Cade Hayden*¹, Julie Young¹, Jason K. Norsworthy², Bryan G. Young¹; ¹Purdue University, West Lafayette, IN, ²University of Arkansas, Fayetteville, AR (48)

†Screening of Soybean Variety Tolerance to PRE-Emergence Herbicides Sulfentrazone (PPO) and Metribuzin (PSII). Nikola Arsenijevic*¹, Sarah Striegel², Victor Hugo V. Ribeiro², Maxwell C. Oliveira², Rodrigo Werle²; ¹University of Nebraska Lincoln, North Platte, NE, ²University of Wisconsin-Madison, Madison, WI (49)

†Spectrum of Weed Species Controlled by Various PRE-Emergence Soybean Herbicides in Wisconsin. Victor Hugo V. Ribeiro*¹, Maxwell C. Oliveira¹, Daniel Smith², Jose Barbosa dos Santos³, Rodrigo Werle¹; ¹University of Wisconsin-Madison, Madison, WI, ²UW Madison NPM, Madison, WI, ³UFVJM, Diamantina, Brazil (50)

**Agronomic Crops II – Soybeans Posters
(continued)**

†Enlist One and Enlist Duo dose response on glyphosate tolerant and non-glyphosate tolerant soybeans. Estefania G. Polli*¹, Kasey Schroeder¹, Jeffrey Golus¹, Bruno Canella Vieira², Greg R Kruger³; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska, Lincoln, NE, ³University of Nebraska, North Platte, NE (51)

†Soybean Response to Timing of Rye Termination. Amin I. Rahhal*, Daniel L. Atherton, Mark L. Bernards; Western Illinois University, Macomb, IL (52)

†A Multi-State Survey of Tall Waterhemp Discovers a Broad Range of Sensitivity to PPO-Inhibiting Herbicides and Points to Mechanisms Other than the $\Delta G210$ Target Site Mutation. Brent C. Mansfield*¹, Haozhen Nie², Julie Young¹, Kevin W Bradley³, Bryan G. Young¹; ¹Purdue University, West Lafayette, IN, ²Purdue University, West Lafayette, IN, ³University of Missouri, Columbia, MO (53)

†Soybean Response to Simulated Dicamba Drift with Varying Application Rates and Timings. Tyler P. Meyeres*¹, Dallas E Peterson², Vipin Kumar³; ¹Kansas State University, Manhattan, KS, ²Kansas State University, Manhattan, KS, ³Kansas State University, Hays, KS (54)

Relative Sensitivity of Conventional Soybean to Dicamba Based Herbicides at Three Growth Stages. O. Adewale Osipitan¹, Jon E Scott*², Stevan Knezevic³; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska, Wakefield, NE, ³University of Nebraska, Wayne, NE (55)

Impact of Different Dicamba Herbicides on Glufosinate-Tolerant Soybean. O. Adewale Osipitan¹, Jon E Scott², Stevan Knezevic³, Ayse Ulusoy*⁴; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska, Wakefield, NE, ³University of Nebraska, Wayne, NE, ⁴University of Nebraska, Lincoln, NE (56)

Agronomic Crops II – Soybeans Posters (continued)

Sensitivity of DT-Soybean to Micro-Rates of 2,4-D. O.

Adewale Osipitan*¹, Jon E Scott², Stevan Knezevic³;
¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska, Wakefield, NE, ³University of Nebraska, Wayne, NE (57)

Response of Glyphosate-Tolerant Soybean to Dicamba Based Herbicides. O.

Adewale Osipitan*¹, Jon E Scott², Stevan Knezevic³; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska, Wakefield, NE, ³University of Nebraska, Wayne, NE (58)

Agronomic Crops II – Soybeans Posters (continued)

Effects of Dicamba Ultra Micro-Rates on Soybean Yield:

Hormesis or Not? Stevan Knezevic*¹, Luka G. Milosevic², O. Adewale Osipitan³, Jon E Scott⁴; ¹University of Nebraska, Wayne, NE, ²University of Nebraska-Lincoln, Lincoln, NE, ³University of Nebraska-Lincoln, Lincoln, NE, ⁴University of Nebraska, Wakefield, NE (59)

Effects of Dicamba Ultra Micro-Rates on Soybean Growth.

Stevan Knezevic¹, Luka G. Milosevic*², O. Adewale Osipitan³, Jon E Scott⁴; ¹University of Nebraska, Wayne, NE, ²University of Nebraska-Lincoln, Lincoln, NE, ³University of Nebraska-Lincoln, Lincoln, NE, ⁴University of Nebraska, Wakefield, NE (60)

Critical Time of Weed Removal in Glyphosate-Tolerant Soybean Across Three Locations in Nebraska.

Stevan Knezevic*¹, Pavle Pavlovic², O. Adewale Osipitan³, Ethann R. Barnes⁴, Clint W. Beiermann⁵, Nevin C. Lawrence⁶, Jon E Scott⁷, Amit Jhala⁴; ¹University of Nebraska, Wayne, NE, ²University of Nebraska-Lincoln, Concord, NE, ³University of Nebraska-Lincoln, Lincoln, NE, ⁴University of Nebraska-Lincoln, Lincoln, NE, ⁵University of Nebraska-Lincoln, Scottsbluff, NE, ⁶University of Nebraska, Scottsbluff, NE, ⁷University of Nebraska, Wakefield, NE (61)

Agronomic Crops II – Soybeans Posters (continued)

Extending Critical Time of Weed Removal in Dicamba-Tolerant Soybean with Residual Herbicides. Stevan Knezevic¹, Pavle Pavlovic*², O. Adewale Osipitan³, Jon E Scott⁴; ¹University of Nebraska, Wayne, NE, ²University of Nebraska-Lincoln, Concord, NE, ³University of Nebraska-Lincoln, Lincoln, NE, ⁴University of Nebraska, Wakefield, NE (62)

Control of Volunteer Glyphosate-Tolerant Alfalfa in No-Till Roundup Ready 2 Xtend and Enlist E3 Soybean. Lisa M. Behnken*¹, Fritz Breitenbach¹, Ryan P. Miller², Jamie Gehling³; ¹University of Minnesota Extension, Rochester, MN, ²University of Minnesota, Rochester, MN, ³University of Minnesota Extension, Grand Meadow, MN (63)

†Injury and Symptomology Caused by Simulated Drift of Dicamba-Containing Herbicides on Soybean. Rosa Soriano*¹, Guilherme Sousa Alves², Jeffrey Golus¹, Greg R Kruger²; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska, North Platte, NE (64)

†Influence of Application Timing, Surface Temperature Inversions, and New Formulations on Dicamba Air Concentrations Following Treatment. Shea T. Farrell*¹, Robert N. Lerch², Mandy Bish¹, Kevin W Bradley¹; ¹University of Missouri, Columbia, MO, ²USDA, Columbia, MO (65)

†Impact of Simulated Dicamba Drift on Sensitive Soybeans. Jerri L. Henry*¹, Jason Weirich², Reid Smeda¹; ¹University of Missouri, Columbia, MO, ²MFA Inc., Columbia, MO (66)

Herbicide Programs for Managing Glyphosate- and Dicamba-Resistant Kochia in Roundup Ready 2 Xtend Soybeans. Vipin Kumar*¹, Edinaldo A. Borgato¹, Prashant Jha², Phillip Stahlman¹; ¹Kansas State University, Hays, KS, ²Montana State University, Huntley, MT (67)

†Influence of Wheat Cover Crop on Waterhemp Control in an Xtend Soybean System. Alexander Mueth*¹, Madison Decker¹, Karla L. Gage¹, Ron Krausz²; ¹Southern Illinois University, Carbondale, IL, ²Southern Illinois University, Belleville, IL (68)

Tuesday Papers 2018
**Weed Biology, Ecology, Management
Posters**

†POST Herbicide Efficacy as Influenced by Severity of Waterhemp Injury from Prior Herbicide Applications. Jesse A. Haarmann*, Bryan G. Young, William G. Johnson; Purdue University, West Lafayette, IN (69)

†Apomixis or Auto-Pollination? Seed Production in Isolated *Amaranthus tuberculatus* Females. Brent P. Murphy*¹, Patrick Tranel²; ¹University of Illinois, Urbana, IL, ²University of Illinois, Urbana, IL (70)

†Influence of Nitrogen Rate and Form on Palmer Amaranth Growth. Lindsey Gastler*, Anita Dille; Kansas State University, Manhattan, KS (71)

Waterhemp Seed Production and Viability Following Dicamba Application During Vegetative or Flowering Growth Stages. Allyson M. Rumler*¹, Brent Heaton², Mark L. Bernards¹; ¹Western Illinois University, Macomb, IL, ²Western Illinois University, Industry, IL (72)

†Dioecy in Amaranth: Why Are There Female-Specific DNA Sequences? Jacob S. Montgomery*¹, Ahmed Sadeque¹, Darci Giacomini¹, Patrick Brown¹, Patrick Tranel²; ¹University of Illinois, Urbana, IL, ²University of Illinois, Urbana, IL (73)

†Time of Johnsongrass (*Sorghum halepense*) Seedling Emergence in Nebraska. Don G. Treptow*¹, Rodrigo Werle², Amit Jhala³, Melinda Yerka³, Brigitte Tenhumberg¹, John Lindquist⁴; ¹University of Nebraska - Lincoln, Lincoln, NE, ²University of Wisconsin-Madison, Madison, WI, ³University of Nebraska-Lincoln, Lincoln, NE, ⁴University of Nebraska, Lincoln, NE (74)

Post-dispersal fate of Johnsongrass (*Sorghum halepense*) seeds in Nebraska. Don G. Treptow*¹, Rodrigo Werle², Amit Jhala³, Melinda Yerka³, Brigitte Tenhumberg¹, John Lindquist⁴; ¹University of Nebraska - Lincoln, Lincoln, NE, ²University of Wisconsin-Madison, Madison, WI, ³University of Nebraska-Lincoln, Lincoln, NE, ⁴University of Nebraska, Lincoln, NE (75)

Tuesday Papers 2018
**Weed Biology, Ecology, Management
Posters (continued)**

The Weediness of Pollinator Habitat in Agricultural Field Borders 3 Years After Establishment. Samuel N. Ramirez*, David F. Barfknecht, Karla L. Gage; Southern Illinois University, Carbondale, IL (76)

†Role of Cover Cropping and Herbicide Use on Maretail Control: A Regional Perspective. Ryan J. Collins*, Erin Haramoto; University of Kentucky, Lexington, KY (77)

"Cover Crop Lite" Reduces Summer Annual Weed Density and Biomass in Soybean. Erin Haramoto*; University of Kentucky, Lexington, KY (78)

†Effects of Rye Termination Timings on Soybeans. Luke Chism*¹, Kraig Roozeboom¹, Gretchen Sassenrath², Anita Dille¹; ¹Kansas State University, Manhattan, KS, ²Kansas State University, Parsons, KS (79)

Influence of Management Decisions Relating to Cover Crops on Weed Suppression: A Meta-Analysis. O. Adewale Osipitan¹, Anita Dille*², Jon E Scott³, Stevan Knezevic⁴; ¹University of Nebraska-Lincoln, Lincoln, NE, ²Kansas State University, Manhattan, KS, ³University of Nebraska, Wakefield, NE, ⁴University of Nebraska, Wayne, NE (80)

†Characterizing Horseweed Emergence Patterns from Populations Across Four States. Larry J. Rains*¹, Karla L. Gage², Erin Haramoto³, Reid Smeda⁴, Anita Dille¹; ¹Kansas State University, Manhattan, KS, ²Southern Illinois University, Carbondale, IL, ³University of Kentucky, Lexington, KY, ⁴University of Missouri, Columbia, MO (81)

Comparison of Fall and Spring Burndown Programs for Managing Glyphosate Resistant Horseweed in Soybeans. Kaitly Wilmes*, Christopher Proctor, Amit Jhala; University of Nebraska-Lincoln, Lincoln, NE (82)

The Interaction of Plant Cutting and Herbicide Application on Horseweed Control. Colton P. Carmody*¹, Ron Krausz², Karla L. Gage¹; ¹Southern Illinois University, Carbondale, IL, ²Southern Illinois University, Belleville, IL (83)

Tuesday Papers 2018
**Weed Biology, Ecology, Management
Posters (continued)**

†**Functional Diversity of Summer Cover Crop Mixes for Organic Transition Weed Suppression.** Joseph Hamrock*, Emilie Regnier, Mark Loux; The Ohio State University, Columbus, OH (84)

†**Efficacy of POST Applied Dicamba at Different Timings in RR2Xtend Soybean Systems in Wisconsin.** Sarah Striegel*¹, Ryan P. DeWerff², David E. Stoltenberg¹, Rodrigo Werle¹; ¹University of Wisconsin-Madison, Madison, WI, ²Agricultural Research of Wisconsin, LLC, Madison, WI (85)

Effects of Tillage and Fertility on the Weed Seedbank over 49 Years in Southern Illinois. Sarah J. Dintelmann*¹, Ron Krausz², Karla L. Gage¹; ¹Southern Illinois University, Carbondale, IL, ²Southern Illinois University, Belleville, IL (86)

†**Effects of Herbicide Management Practices on the Density and Richness of the Soil Seedbank in Dicamba and 2,4-D Resistant Cropping Systems in Indiana.** Connor L. Hodgskiss*¹, Travis R. Legleiter², William G. Johnson¹; ¹Purdue University, West Lafayette, IN, ²University of Kentucky, Princeton, KY (87)

†**Evaluation of Cereal Rye and Canola Termination Timing on Horseweed and Giant Ragweed Control.** Stephanie DeSimini*, William G. Johnson; Purdue University, West Lafayette, IN (88)

†**Impact of herbicide programs targeting pigweed species on grasses and large seeded broadleaves.** Allen J. Scott*¹, Reid Smeda¹, Aaron Hager², Jason K. Norsworthy³, Bryan G. Young⁴; ¹University of Missouri, Columbia, MO, ²University of Illinois, Urbana, IL, ³University of Arkansas, Fayetteville, AR, ⁴Purdue University, West Lafayette, IN (89)

Tuesday Papers 2018
**Equipment and Application Methods
Posters**

†Effect of Adjuvants on Physical Properties of Glyphosate and PPO-Inhibiting Herbicide Spray Mixtures. Jesaelen Gizotti de Moraes*¹, Greg R Kruger²; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska, North Platte, NE (90)

†Physical Properties of Various Glyphosate Formulations as Critical Components for Common Lambsquarters (*Chenopodium album* L.) Control. Milos Zaric*¹, Jesaelen Gizotti de Moraes¹, Greg R Kruger²; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska, North Platte, NE (91)

Spray Drift from Dicamba in Tank-Mixtures with Adjuvants Sprayed Through Flat-Fan Nozzles. Guilherme Sousa Alves*¹, Bruno Canella Vieira², Greg R Kruger¹, Joao Paulo R. da Cunha³; ¹University of Nebraska, North Platte, NE, ²University of Nebraska, Lincoln, NE, ³Federal University of Uberlandia, Uberlandia, Brazil (92)

†Comparison of Air Sampler Flow Rate and Filtration Media on Detecting Off-Target Movement of Dicamba. Tomas F. Delucchi*, Marcelo Zimmer, Julie Young, Bryan G. Young; Purdue University, West Lafayette, IN (93)

The Influence of Polymer Behavior and Pump Shear on Drift Reduction Adjuvants. Lee A. Boles*¹, Daniel C. Bissell¹, Annie D. Makepeace², Andrea Clark³, Gregory K. Dahl¹, Ryan J. Edwards⁴; ¹Winfield United, River Falls, WI, ²Winfield United, Shoreview, MN, ³Winfield Solutions, LLC, River Falls, WI, ⁴Winfield Solutions, River Falls, WI (94)

†Impact of Carrier Volume Rate on PRE-Emergence Herbicide Efficacy in Wisconsin Cropping Systems. Rachel Renz*¹, Sarah Striegel², Ryan P. DeWerff³, Nikola Arsenijevic⁴, Victor Hugo V. Ribeiro², Maxwel C. Oliveira², Brian Luck², Rodrigo Werle²; ¹University of Wisconsin-River Falls, River Falls, WI, ²University of Wisconsin-Madison, Madison, WI, ³Agricultural Research of Wisconsin, LLC, Madison, WI, ⁴University of Nebraska Lincoln, North Platte, NE (95)

Tuesday Papers 2018
**Equipment and Application Methods
Posters (continued)**

†Influence of Spray Nozzle and Boom Height on Herbicide Drift. Catlin M. Young*¹, Travis R. Legleiter²; ¹Murray State University, Princeton, KY, ²University of Kentucky, Princeton, KY (96)

†Interference of Clethodim on Glyphosate for Broadleaf Weed Control as Affected by Surfactant Adjuvants. Sofija Petrovic*¹, Isidor Ceperkovic², Kasey Schroeder¹, Jeffrey Golus¹, Greg R Kruger³; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska-Lincoln, North Platte, NE, ³University of Nebraska, North Platte, NE (97)

†Grass Weed Control from Glyphosate and Clethodim Applications as Affected by Surfactants. Isidor Ceperkovic*¹, Sofija Petrovic², Jeffrey Golus², Kasey Schroeder², Greg R Kruger³; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska-Lincoln, North Platte, NE, ³University of Nebraska, North Platte, NE (98)

†Interference of Clethodim on Glyphosate for Broadleaf Weed Control as Affected by Oil Based Adjuvants. Thais Uany de Souza*¹, Camila Chiaranda Rodrigues¹, Kasey Schroeder¹, Jeffrey Golus¹, Greg R Kruger²; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska, North Platte, NE (99)

Influence of Tank Cleanout Products and Practices to Remove Dicamba from Commercial Spray Equipment." David J. Palecek*¹, Ryan J. Edwards², Gregory K. Dahl¹, Joshua Skelton³, Dustyn Sawall⁴, Laura Hennemann², Andrea Clark⁵, Lee A. Boles¹; ¹Winfield United, River Falls, WI, ²Winfield Solutions, River Falls, WI, ³WinField United, River Falls, WI, ⁴Ag Precision Formulators, Middleton, WI, ⁵Winfield Solutions, LLC, River Falls, WI (100)

†Grass Weed Control from Glyphosate and Clethodim Applications as Affected by Oil Based Adjuvants. Camila Chiaranda Rodrigues*¹, Thais Uany de Souza¹, Jeffrey Golus¹, Kasey Schroeder¹, Greg R Kruger²; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska, North Platte, NE (101)

Tuesday Papers 2018
**Equipment and Application Methods
Posters (continued)**

†Spray Drift from Mesotrione and Isoxaflutole Through Different Nozzle Types. Andrea Rilakovic*¹, Guilherme Sousa Alves², Bruno Canella Vieira³, Thalyson Medeiros de Santana¹, Rosa Soriano¹, Greg R Kruger²; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska, North Platte, NE, ³University of Nebraska, Lincoln, NE (102)

†Particle Drift Potential from Dicamba-Containing Herbicides in a Wind Tunnel. Thalyson Medeiros de Santana*¹, Bruno Canella Vieira², Guilherme Sousa Alves³, Andrea Rilakovic¹, Greg R Kruger³; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska, Lincoln, NE, ³University of Nebraska, North Platte, NE (103)

†Spray Particle Drift of Different Dicamba Formulations in a Wind Tunnel. Bruno Canella Vieira*¹, Guilherme Sousa Alves², Thalyson Medeiros de Santana³, Camila Chiaranda Rodrigues³, Vinicius Velho³, Greg R Kruger²; ¹University of Nebraska, Lincoln, NE, ²University of Nebraska, North Platte, NE, ³University of Nebraska-Lincoln, North Platte, NE (104)

Extension Posters

Detection and Frequency of Low-Level Temperature Inversions in Minnesota. David Nicolai*¹, Jared J. Goplen², Ryan P. Miller³, Andrew A. Thostenson⁴; ¹University of Minnesota, Farmington, MN, ²University of Minnesota, Morris, MN, ³University of Minnesota, Rochester, MN, ⁴North Dakota State University, Fargo, MN (105)

The Influence of Preemergence Herbicides and Mechanical Incorporation on Cover Crop Establishment and Grain Yield in *Zea mays*. Lizabeth Stahl*¹, Ryan P. Miller², Jared J. Goplen³, Lisa M. Behnken⁴; ¹University of Minnesota, Worthington, MN, ²University of Minnesota, Rochester, MN, ³University of Minnesota, Morris, MN, ⁴University of Minnesota Extension, Rochester, MN (106)

Extension Posters (continued)

Farmer Survey Results Highlight Trends in Weed

Management Practices. Elizabeth Stahl*¹, Lisa M. Behnken², Fritz Breitenbach², Ryan P. Miller³, David Nicolai⁴; ¹University of Minnesota, Worthington, MN, ²University of Minnesota Extension, Rochester, MN, ³University of Minnesota, Rochester, MN, ⁴University of Minnesota, Farmington, MN (107)

†2018 Wisconsin Cropping Systems Weed Science Survey -

Where are we at? Lina Liu*, Maxwell C. Oliveira, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI (108)

Herbicide Resistance in Wisconsin: An Overview.

Joseph W. Zimbric*, David E. Stoltenberg, Mark Renz, Rodrigo Werle; University of Wisconsin-Madison, Madison, WI (109)

Demonstrating SOA Components of an Herbicide as an

Extension Teaching Tool. Ryan P. Miller*¹, Lisa M. Behnken²; ¹University of Minnesota, Rochester, MN, ²University of Minnesota Extension, Rochester, MN (110)

†Assessment of Cover Crop Planting Date on Winter Annual

Weed Suppression. Kolby R. Grint*, Christopher Proctor, Joshua S. Wehrbein; University of Nebraska-Lincoln, Lincoln, NE (111)

Use of Tableau to Visualize Invasive Plant Distribution in

Wisconsin. Niels A. Jorgensen*¹, Mark Renz²; ¹University of Wisconsin, Madison, WI, ²University of Wisconsin-Madison, Madison, WI (112)

Survey of Nebraska and Wisconsin soybean producers on

dicamba use during 2017 and 2018. Rodrigo Werle*¹, Christopher Proctor², Paul Mitchell¹, Amit Jhala²; ¹University of Wisconsin-Madison, Madison, WI, ²University of Nebraska-Lincoln, Lincoln, NE (113)

General Session

LOCATION: Regency Ballroom A&B

MODERATOR: Aaron Hager

- 10:00 Milwaukee, a Brief History.** Steve Schaffer*; Milwaukee Historical Society, Milwaukee, WI (114)
- 10:45 Does a Liability Jury Decision Change the Toxicology of Roundup?** Allan Felsot*; Washington State University, Richland, WA (115)
- 11:30 Presidential Address.** Christy Sprague*; Michigan State University, E Lansing, MI (116)
- 11:30 NCWSS Presidential Address.** Gregory K. Dahl*; Winfield United, River Falls, WI (119)
- 11:50 Remembering Former NCWSS Members and Friends. Necrology Report.** Cody Evans*; Monsanto, Murrayville, IL (117)
- 11:55 Announcements.** Aaron Hager*; University of Illinois, Urbana, IL (118)

Student Luncheon – Business Meeting

Sponsored by Corteva Agriscience – Open to all students

12:00 – 1:15 pm

Regency C&D

Equipment and Application Methods

LOCATION: Lakeshore Ballroom A&B

MODERATOR: Thomas Butts

1:15

New Findings on Ultra-Coarse Sprays and Test Methods. Daniel C. Bissell*¹, Chris Hogan², Bernard Olson², Lillian c. Magidow¹, Gregory K. Dahl¹, Joe V. Gednalske¹; ¹Winfield United, River Falls, WI, ²University of Minnesota, Minneapolis, MN (119)

1:30

Liquid LogicNew Sprayer Technology that Drastically Reduces the Time Required for Sprayer Cleanout and Solves Boom Priming Issues. Craig Jorgensen*; AGCO Corp, Jackson, MN (120)

1:45

Reducing Spray Drift and Increasing Spray Days with Redball-Hooded™ Sprayers - A Drift Comparison of a Redball-Hooded Boom Versus an Open Boom, and an Overview of Available Legal Spray Days in 2018. Steve W. Claussen*; Willmar Fabrication, LLC, Benson, MN (121)

2:00

†Spray Particle Drift Mitigation Using Field Corn as a Drift Barrier. Bruno Canella Vieira*¹, Thomas R. Butts², Andre de Oliveira Rodrigues³, Jeffrey Golus⁴, Kasey Schroeder⁴, Greg R Kruger³; ¹University of Nebraska, Lincoln, NE, ²University of Wisconsin-Madison, Madison, WI, ³University of Nebraska, North Platte, NE, ⁴University of Nebraska- Lincoln, North Platte, NE (122)

2:15

Advanced Spray System Technology from John Deere. Yancy E. Wright*; John Deere, Shawnee, KS (123)

2:30

†Nozzle Selection and Adjuvant Impact on the Efficacy of Glyphosate and Glufosinate Tank-Mixed with PPO- Inhibiting Herbicides. Jesaelen Gizotti de Moraes*¹, Camila Chiaranda Rodrigues¹, Debora O. Latorre¹, Greg R Kruger²; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska, North Platte, NE (124)

Equipment and Application Methods (continued)

- 2:45 Large Scale Drift Trials to Assess Off-Target Movement of Dicamba.** Greg R Kruger*¹, Guilherme Sousa Alves¹, Dan Reynolds², Bryan G. Young³, Peter Sikkema⁴, Christy Sprague⁵, Rodrigo Werle⁶, Jason K. Norsworthy⁷, Ryan Rector⁸; ¹University of Nebraska, North Platte, NE, ²Mississippi State University, Mississippi State, MS, ³Purdue University, West Lafayette, IN, ⁴University of Guelph, Ridgetown, ON, ⁵Michigan State University, E Lansing, MI, ⁶University of Wisconsin-Madison, Madison, WI, ⁷University of Arkansas, Fayetteville, AR, ⁸Bayer Crop Science, St. Charles, MO (125)
- 3:00 Break**
- 3:15 †Influence of Spray Nozzle Design and Weed Density on Herbicide Coverage and Deposition.** Madison D. Kramer*¹, Zachary K. Perry¹, Travis R. Legleiter²; ¹University of Kentucky, Lexington, KY, ²University of Kentucky, Princeton, KY (126)
- 3:30 Partitioning Off-Target Movement of Dicamba Between Particles and Vapors: A First Attempt.** Greg R Kruger*¹, Guilherme Sousa Alves¹, Jeffrey Golus², Kasey Schroeder², Dan Reynolds³, Darrin Dodds⁴, Bradley K. Fritz⁵, Clint Hoffmann⁶, Ashli Brown Johnson⁷, Ashley Meredith⁷; ¹University of Nebraska, North Platte, NE, ²University of Nebraska-Lincoln, North Platte, NE, ³Mississippi State University, Mississippi State, MS, ⁴Mississippi State University, Starkville, MS, ⁵USDA:ARS, College Station, TX, ⁶Prology Consulting, College Station, TX, ⁷Mississippi State Chemical Laboratory, Mississippi State, MS (127)
- 3:45 Redesigning HSMSO Adjuvants: Novel Terpene Polymer Containing Formulation.** Patrick M. McMullan*¹, Mike Fiery²; ¹Ramulus LLC, Grimes, IA, ²Miller Chemical & Fertilizer, LLC, Hanover, PA (128)

Equipment and Application Methods (continued)

- 4:00 **Compliance with Pesticide Labels on Spray Droplet Size and Carrier Rate to Maximize Pesticide Efficacy and Manage Spray Drift.** Robert N Klein*; University of Nebraska, North Platte, NE (129)
- 4:15 **Business Meeting**

Weed Biology, Ecology, Management

LOCATION: Regency Ballroom A
MODERATOR: Christopher Proctor

- 1:15 **†Influence of Plant Growth Stage on Dicamba Efficacy to Control Palmer Amaranth.** Ivan B. Cuvaca*¹, Randall S Currie², Mithila Jugulam¹; ¹Kansas State University, Manhattan, KS, ²Kansas State University, Garden City, KS (130)
- 1:30 **Effect of Different Defoliant/Desiccants on Seed Viability of Palmer Amaranth.** Debalin Sarangi*¹, Kaisa M. Werner¹, Bojana Pilipovich¹, Peter A. Dotray², Muthukumar Bagavathiannan¹; ¹Texas A&M University, College Station, TX, ²Texas A&M University, Lubbock, TX (131)
- 1:45 **†Efficacy of Soybean Herbicide Respray Applications on Palmer Amaranth and Waterhemp.** Jesse A. Haarmann*, Bryan G. Young, William G. Johnson; Purdue University, West Lafayette, IN (132)
- 2:00 **Hindering Horseweed: An Integrated Approach for Soybeans in Kentucky.** Austin D. Sherman*; University of Kentucky, Lexington, KY (133)
- 2:15 **†Direct Comparisons of Sensitivity and Resistance to PPO Inhibitors in Waterhemp and Palmer Amaranth Populations.** Kathryn Lillie*¹, Darci Giacomini¹, Patrick Tranel²; ¹University of Illinois, Urbana, IL, ²University of Illinois, Urbana, IL (134)

Weed Biology, Ecology, Management (continued)

- 2:30** †Do Varying Antioxidant Enzyme Levels Following a PPO Herbicide Application Help Explain the Resulting Variable Herbicide Response in Tall Waterhemp? Brent C. Mansfield*¹, Haozhen Nie², Yiwei Jiang¹, Bryan G. Young¹; ¹Purdue University, West Lafayette, IN, ²Purdue University, West Lafayette, IN (135)
- 2:45** Overwintering of *Camelina sativa* Cultivars and Congeneric Species in the Northeastern US. Chuan-Jie Zhang*; University of Connecticut, Storrs, CT (136)
- 3:00** Break
- 3:15** †Fomesafen Resistance in *Amaranthus retroflexus*. Brent P. Murphy*¹, Mark Loux², Bruce A. Ackley², Patrick Tranel³; ¹University of Illinois, Urbana, IL, ²The Ohio State University, Columbus, OH, ³University of Illinois, Urbana, IL (137)
- 3:30** Regional Perspective on Grain Sorghum Yield Losses Because of Weed Interference. Anita Dille*¹, Nader Soltani², Peter H. Sikkema², Phillip Stahlman³, Curtis R Thompson¹; ¹Kansas State University, Manhattan, KS, ²University of Guelph, Ridgetown, ON, ³Kansas State University, Hays, KS (138)
- 3:45** †Evaluation of Waterhemp Populations Using 2,4-D, Dicamba, Mesotrione and Imazethapyr. Estefania G. Polli*¹, Rosa Soriano¹, Julia Maria Rodrigues¹, Kasey Schroeder¹, Jeffrey Golus¹, Bruno Canella Vieira², Greg R Kruger³; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska, Lincoln, NE, ³University of Nebraska, North Platte, NE (139)
- 4:00** Impacts of Drought Tolerant Corn Hybrid Competition and Water Stress on Weed Community Composition and Corn Performance. Erin E. Burns*, Maninder Singh; Michigan State University, East Lansing, MI (140)

**Weed Biology, Ecology, Management
(continued)**

- 4:15 †Johnsongrass (*Sorghum halepense*) Demography in Nebraska.** Don G. Treptow*¹, Rodrigo Werle², Amit Jhala³, Melinda Yerka³, Brigitte Tenhumberg¹, John Lindquist⁴; ¹University of Nebraska - Lincoln, Lincoln, NE, ²University of Wisconsin-Madison, Madison, WI, ³University of Nebraska-Lincoln, Lincoln, NE, ⁴University of Nebraska, Lincoln, NE (141)
- 4:30 Evaluation of Canola and Cereal Rye Termination Timing on Crop Yield and Summer Annual Weed Control in the Eastern Cornbelt.** Stephanie DeSimini*, William G. Johnson; Purdue University, West Lafayette, IN (142)
- 4:45 †Effect of Winter Annual Cover Crop Planting Date and Herbicide Program on Weed Suppression in Corn- Soybean Cropping Systems.** Joshua S. Wehrbein*, Christopher Proctor; University of Nebraska-Lincoln, Lincoln, NE (143)
- 5:00 Business Meeting**

Agronomic Crops II – Soybeans

LOCATION: Executive A&B

MODERATOR: Eric Riley

- 1:15 †Effects of Soil-Applied Protoporphyrinogen Oxidase Inhibitor Herbicides, Fungicide Seed Treatment, and Cultivar Herbicide Sensitivity on Seedling Disease Severity in Nebraska.** Nicholas Arneson*¹, Loren J. Giesler², Rodrigo Werle³, Sydney Everhart²; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska, Lincoln, NE, ³University of Wisconsin-Madison, Madison, WI (144)
- 1:30 Benefits of Mesotrione in the Residual Control of ALS-Resistant Giant Ragweed in MGI Soybean.** Benjamin C. Westrich*, Brent C. Mansfield, Bryan G. Young; Purdue University, West Lafayette, IN (145)
- 1:45 †Impact of PPO and PSII Soil-Applied Herbicides on Early Season Soybean Development and Grain Yield.** Nikola Arsenijevic*¹, Matheus de-Avellar², Alexandre Tonon Rosa³, Gustavo De Souza Vieira¹, Liberty E. Butts¹, Rodrigo Werle⁴; ¹University of Nebraska Lincoln, North Platte, NE, ²University of Nebraska-Lincoln, North Platte, NE, ³University of Nebraska-Lincoln, Lincoln, NE, ⁴University of Wisconsin-Madison, Madison, WI (146)
- 2:00 Evaluation of Trifludimoxazin Alone and in Combination with Saflufenacil for Soil-Residual and Foliar Control of PPO Inhibitor-Resistant Tall Waterhemp.** Nicholas R. Steppig*¹, Samuel D. Willingham², Bryan G. Young¹; ¹Purdue University, West Lafayette, IN, ²BASF, Seymour, IL (147)
- 2:15 Waterhemp Management in West Central Ohio.** Jeff M. Stachler*; The Ohio State University, Wapakoneta, OH (149)

Agronomic Crops II – Soybeans (continued)

- 2:30** †**Utilizing Cereal Rye and Crimson Clover for Weed Suppression Within, and Outside of, Buffer Areas in Dicamba and 2,4-D Resistant Soybeans.** Connor L. Hodgskiss*, William G. Johnson; Purdue University, West Lafayette, IN (150)
- 2:45** †**One in a Million? Empirical Determination of Mutation Frequency for Herbicide Resistance.** Federico Casale*, Patrick Tranel; University of Illinois, Urbana, IL (156)
- 3:00** **Break**
- 3:15** †**Investigations of the Effects of Soil pH on the Volatility of Dicamba Formulations.** Eric G. Oseland*¹, Mandy Bish², Kevin W Bradley²; ¹University of Missouri, Columbia, IL, ²University of Missouri, Columbia, MO (151)
- 3:30** †**Waterhemp Resistant to Four Herbicide Sites of Action in Nebraska: Confirmation and Mechanism of Resistance.** Debalin Sarangi*¹, Trey Stephens², Abigail Barker³, Eric L. Patterson³, Todd Gaines³, Amit Jhala²; ¹Texas A&M University, College Station, TX, ²University of Nebraska-Lincoln, Lincoln, NE, ³Colorado State University, Fort Collins, CO (152)
- 3:45** †**Evaluation of the Influence of Dicamba Exposure on Canopy Closure of Glufosinate-Resistant Soybean.** Zachary K. Perry*¹, Madison D. Kramer¹, Travis R. Legleiter²; ¹University of Kentucky, Lexington, KY, ²University of Kentucky, Princeton, KY (153)
- 4:00** †**Managing PPO-Resistant *Amaranthus* Sp. in Roundup Ready 2 Xtend® Soybeans.** Neha Rana*¹, Rod Stevenson², Ryan E. Rapp³, Blake R. Barlow⁴, Alejandro Perez-Jones¹, Chenxi Wu⁵; ¹Bayer CropScience, Chesterfield, MO, ²Bayer CropScience, Plainwell, MI, ³Bayer CropScience, Mitchell, SD, ⁴Bayer CropScience, Columbia, MO, ⁵Bayer CropScience, Urbana, IL (154)

Agronomic Crops II – Soybeans (continued)

- 4:15 †Critical Period of Parmer Amaranth Removal Affected by Pre-emergence Herbicides in Dicamba-Resistant Soybean.** Jose H. Scarparo de Sanctis*¹, Stevan Knezevic², Vipin Kumar³, Amit Jhala⁴;
¹University of Nebraska- Lincoln, Lincoln, NE, ²University of Nebraska, Wayne, NE, ³Kansas State University, Hays, KS, ⁴University of Nebraska-Lincoln, Lincoln, NE (155)
- 4:30 Control of Two *Amaranthus* Species in a Soybean Variety Tolerant to Glyphosate, Glufosinate, and Dicamba.** Travis R. Legleiter*¹, J D Green²;
¹University of Kentucky, Princeton, KY, ²University of Kentucky, Lexington, KY (156)
- 4:45 Dicamba Volatility from Plants vs. Soils.**
Donald Penner*¹, Jan Michael²; ¹Michigan State University, E Lansing, MI, ²Michigan State University, East Lansing, MI (157)
- 5:00 Business Meeting**

Agronomic Crops I - Corn

LOCATION: Regency Ballroom B

MODERATOR: Helen Flanigan

- 1:15 †Efficacy of HPPD-Inhibiting Herbicides Applied Preemergence or Postemergence for Control of Multiple Resistant Waterhemp (*Amaranthus tuberculatus* var. *rudis*).** Lauren Benoit*¹, Peter Sikkema², Darren Robinson², Dave Hooker²; ¹University of Guelph, Kirkton, ON, ²University of Guelph, Ridgetown, ON (158)
- 1:30 Management of Glyphosate- and HPPD Inhibitor-Resistant Palmer amaranth in Corn.** Vipin Kumar*, Ednaldo A. Borgato, Phillip Stahlman; Kansas State University, Hays, KS (159)
- 1:45 †Characterization of Two Multiple Herbicide-Resistant Waterhemp Populations from Illinois to Group 15 Herbicides.** Seth Strom*, Lisa Gonzini, Charlie Mitsdarfer, Adam S. Davis, Dean E. Riechers, Aaron Hager; University of Illinois, Urbana, IL (160))
- 2:00 Predicting the Relative Long-Term Effectiveness of Herbicide Programs Using Syngenta's Resistance Fighter Model.** R. Joseph Wuerffel*¹, Cheryl L. Dunne¹, Ethan T. Parker¹, Eric Palmer², Dane L. Bowers², Deepak Kaundun³, Chun Liu³; ¹Syngenta Crop Protection, Vero Beach, FL, ²Syngenta Crop Protection, Greensboro, NC, ³Syngenta Crop Protection, Bracknell, England (161)
- 2:15 †Control of Multiple Herbicide-Resistant Horseweed (*Conyza canadensis* L. Cronq.) and Waterhemp (*Amaranthus tuberculatus* var. *rudis*) with tolpyralate.** Brendan A. Metzger*¹, Nader Soltani², Alan J. Raeder³, Dave Hooker², Darren Robinson², Peter Sikkema²; ¹University of Guelph - Ridgetown, Ridgetown, ON, ²University of Guelph, Ridgetown, ON, ³ISK Biosciences, Concord, OH (162)

Agronomic Crops I – Corn (continued)

- 2:30 Permeate: A New NPE-Free Non-Ionic Surfactant with UV Protection.** Thomas A. Hayden*¹, Gregory K. Dahl², Ryan J. Edwards³, Jo A. Gillilan⁴, Lillian c. Magidow², Joe V. Gednalske², Annie D. Makepeace⁵; ¹Winfield United, Owensboro, KY, ²Winfield United, River Falls, WI, ³Winfield Solutions, River Falls, WI, ⁴Winfield United, Springfield, TN, ⁵Winfield United, Shoreview, MN (163)
- 2:45 †Response of White and Yellow Popcorn Hybrids to Glyphosate, 2,4-D/Glyphosate, or Dicamba.** Ethann R. Barnes*¹, Stevan Knezevic², Nevin C. Lawrence³, Oscar Rodriguez⁴, Suat Irmak¹, Amit Jhala¹; ¹University of Nebraska- Lincoln, Lincoln, NE, ²University of Nebraska, Wayne, NE, ³University of Nebraska, Scottsbluff, NE, ⁴Conagra Brands, Inc, Brookston, IN (164)
- 3:00 Break**
- 3:15 Tank mixture of Glyphosate with 2,4-D Accentuates 2,4-D Injury in Glyphosate-Resistant Corn.** Peter Sikkema*, Christy Shropshire, Nader Soltani; University of Guelph, Ridgetown, ON (165)
- 3:30 †Control of Glufosinate/Glyphosate-Resistant Volunteer Corn in Enlist™ Corn.** Adam Striegel*¹, Nevin C. Lawrence², Stevan Knezevic³, Amit Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska, Scottsbluff, NE, ³University of Nebraska, Wayne, NE (166)
- 3:45 Development of Robust FOPs and Synthetic Auxin Herbicide Tolerance Traits for GM Crops.** Clayton Larue*, Michael Goley, Oscar C. Sparks, Christine Ellis, Marguerite J. Varagona; Bayer Crop Science, Chesterfield, MO (167)
- 4:15 Interactions Between Residual Herbicides and Termination Timing in Cereal Rye on Summer Annual Weeds in Indiana Corn Systems.** Wyatt S. Petersen*, William G. Johnson; Purdue University, West Lafayette, IN (169)

Agronomic Crops I – Corn (continued)

- 4:30** †**Effects of Cover Crop Planting and Termination Time on Weed Demographics and Corn Productivity in Semi- Arid Rainfed Cropping Systems of Western Nebraska.** Alexandre Tonon Rosa*¹, Italo Kaye Pinho de Faria², Liberty E. Butts³, Cody F. Creech⁴, Roger Elmore¹, Daran Rudnick², Rodrigo Werle⁵;
¹University of Nebraska-Lincoln, Lincoln, NE,
²University of Nebraska-Lincoln, North Platte, NE,
³University of Nebraska Lincoln, North Platte, NE,
⁴University of Nebraska-Lincoln, Scottsbluff, NE,
⁵University of Wisconsin-Madison, Madison, WI
(170)
- 4:45** **Weed Control in Corn with Increasing Levels of Irrigation with and Without a Wheat Cover Crop.** Randall S Currie*, Patrick Geier; Kansas State University, Garden City, KS (171)
- 5:00** **Business Meeting**

Agronomic Crops II – Soybeans

LOCATION: Regency Ballroom A

MODERATOR: Eric Riley

- 8:00 †Organic Herbicides as a Weed Management Tool in Soybeans.** Betzy Valdez*, Kerry M. Clark, Reid Smeda; University of Missouri, Columbia, MO (172)
- 8:15 Palmer Amaranth and Waterhemp Control with Integrated Strategies in Glufosinate-Resistant Soybean.** Marshall M. Hay*, Anita Dille, Dallas E Peterson; Kansas State University, Manhattan, KS (173)
- 8:30 †Dicamba Simulated Tank-Contamination Injury from Post-Emergence Herbicide Applications on Non-Dicamba- Tolerant Soybean.** Milos Zaric*¹, Bruno Canella Vieira², Guilherme Sousa Alves³, Jeffrey Golus¹, Greg R Kruger³; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska, Lincoln, NE, ³University of Nebraska, North Platte, NE (174)
- 8:45 Effect of Row Spacing and Herbicide Programs on Glyphosate-Resistant Palmer Amaranth Control in Dicamba- Resistant Soybean in Nebraska.** Parminder Chahal*¹, Carl W. Coburn², Amit Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²Bayer Crop Science, Gothenburg, NE (175)
- 9:00 †Response of Insect Pest and Beneficial Species to the Timing and Severity of Dicamba Injury in Soybean.** William A. Tubbs*, Kevin Rice, Mandy Bish, Kevin W Bradley; University of Missouri, Columbia, MO (176)
- 9:15 Tolerance of Midwest Soybean Cultivars to Preemergent Applications of Metribuzin and Sulfentrazone.** Thomas R. Butts*¹, Maxwell C. Oliveira¹, Nikola Arsenijevic², Shawn P. Conley¹, Rodrigo Werle¹; ¹University of Wisconsin- Madison, Madison, WI, ²University of Nebraska Lincoln, North Platte, NE (177)
- 9:30 Break**

Agronomic Crops II – Soybeans (continued)

- 9:45 †Integrating Fall-Seeded Cereal Cover Crops for Horseweed Management in No-Tillage Soybean.** John A. Schramski*¹, Christy Sprague², Karen Renner²; ¹Michigan State University, East Lansing, MI, ²Michigan State University, E Lansing, MI (178)
- 10:00 What Not to do When Multiple Herbicide-Resistant Soybean Technology Coexist.** Amit Jhala*; University of Nebraska-Lincoln, Lincoln, NE (179)
- 10:15 †Control of Annual Weeds in Isoxaflutole-Resistant Soybean.** Andrea Smith*¹, Allan C. Kaastra², David C. Hooker¹, Darren Robinson¹, Peter H. Sikkema¹; ¹University of Guelph, Ridgetown, ON, ²Bayer CropScience, Guelph, ON (180)
- 10:30 Tavium™ Plus VaporGrip® Technology – A Tool for Weed Management in Conventional and No-Till Dicamba Tolerant Soybean.** Aaron Franssen*¹, Brett Miller², Tom Beckett³, Don Porter³; ¹Syngenta Crop Protection, Pleasant Dale, NE, ²Syngenta Crop Protection, Fargo, ND, ³Syngenta Crop Protection, Greensboro, NC (181)
- 10:45 EFAME - A New Class of EPA Approved Surfactants for Agricultural Use.** Kevin Crosby*¹, Tim Anderson²; ¹Adjuvants Unlimited, LLC, Memphis, TN, ²BASF, Cincinnati, OH (182)
- 11:00 Gramoxone Magnum: A New Option for Burndown and Residual Weed Control.** Ryan Lins*¹, Adrian J Moses², Monika Saini³, Dane L. Bowers³; ¹Syngenta Crop Protection, Rochester, MN, ²Syngenta Crop Protection, Gilbert, IA, ³Syngenta Crop Protection, Greensboro, NC (183)

Agronomic Crops II – Soybeans (continued)

- 11:15** **A New Residual Herbicide for Dicamba-Tolerant Soybeans.** Chad Asmus*¹, Kyle Keller²; ¹BASF Corporation, Newton, KS, ²BASF Corporation, Raleigh, NC (184)
- 11:30** **Engenia Herbicide Research Update.** Chad Asmus*¹, Sanjeev Bangarwa²; ¹BASF Corporation, Newton, KS, ²BASF Corporation, Raleigh, NC (185)

Agronomic and Specialty Crops (All other agronomic and horticultural crops)

LOCATION: Lakeshore Ballroom A

MODERATOR: Tate Castillo

- 8:00** †**Dry Edible Bean Sensitivity to Reduced Rates of Dicamba and 2,4-D.** Scott R. Bales*¹, Christy Sprague²; ¹Michigan State University, East Lansing, MI, ²Michigan State University, E Lansing, MI (186)
- 8:15** **Crop Safety from Acifluorfen in Sugarbeet.** Tom J. Peters*, Alexa L. Lystad, Nathan H. Haugrud; North Dakota State University, Fargo, ND (187)
- 8:30** †**The Influence of Planting Date and Herbicide Program on Late Emerging Weeds in Dry Bean.** Clint W. Beiermann*¹, Cody F. Creech¹, Amit Jhala², Stevan Knezevic³, Robert Harveson¹, Nevin C. Lawrence⁴; ¹University of Nebraska-Lincoln, Scottsbluff, NE, ²University of Nebraska-Lincoln, Lincoln, NE, ³University of Nebraska, Wayne, NE, ⁴University of Nebraska, Scottsbluff, NE (188)
- 8:45** **Axial Bold: The Next Step Up for Grass Control in Wheat and Barley.** Brett Miller*¹, Pete C. Forster², Don Porter³, Monika Saini³; ¹Syngenta Crop Protection, Fargo, ND, ²Syngenta Crop Protection, Eaton, CO, ³Syngenta Crop Protection, Greensboro, NC (189)

**Agronomic and Specialty Crops (All other agronomic and horticultural crops)
(continued)**

- 9:00 †Investigations of the Sensitivity of Various Tree and Ornamental Species to Driftable Fractions of 2,4-D and Dicamba.** Brian R. Dintelmann*, Michele Warmund, Mandy Bish, Kevin W Bradley; University of Missouri, Columbia, MO (190)
- 9:15 Inter-row Cultivation Timing Effect on Sugarbeet Yield and Quality.** Nathan H. Haugrud*, Tom J. Peters; North Dakota State University, Fargo, ND (191)
- 9:30 Break**
- 9:45 †Growth and Reproductive Response of Vidal Blanc Grapes to Dicamba.** Sarah E. Dixon*, Reid Smeda; University of Missouri, Columbia, MO (192)
- 10:00 †Mapping of Genes Involved in Mesotrione Tolerance using BSR-Seq in Grain Sorghum.** Balaji Aravindhan Pandian*, Vara Prasad PV, Sanzhen Liu, Tesfaye Tesso, Mithila Jugulam; Kansas State University, Manhattan, KS (193)
- 10:15 Business Meeting**

Essential Communication in Weed Science: Within and Beyond our Society - Symposium

LOCATION: Regency Ballroom B

MODERATOR: Renee Adler

- 8:00 Communications symposium introduction.** Renee L. Adler*¹, Kelley D. Mazur²; ¹University of Missouri, Novelty, MO, ²SWSS and NCWSS, Westminster, CO (194)
- 8:20 Importance of Communication in Agriculture - Industry.** Janet Person*; Bayer Crop Science, St. Louis, IL (195)
- 8:50 Are Ad Hominem Arguments About Funding Sources Consistent with Skeptical Inquiry?** Allan Felsot*; Washington State University, Richland, WA (196)
- 9:20 Break**
- 9:30 Panel discussion**
- 10:00 Communication Across Generations.** Bader Rutter*; Bader Rutter, Milwaukee, WI (197)
- 10:30 Interactions with Agriculture Media.** Pam Smith*; DTN/The Progressive Farmer, Decatur, IL (198)
- 11:00 Impact Statement Mini-Workshop.** Heidi Zoerb*; University of Wisconsin-Madison, Madison, WI (199)

Herbicide Physiology

LOCATION: Lakeshore Ballroom B
MODERATOR: Daniela Ribeiro

- 8:00 †Dew Increases Dicamba Volatility from Soybean.** Jerri L. Henry*, Reid Smeda; University of Missouri, Columbia, MO (200)
- 8:15 Palmer Amaranth and Kochia Impacts and Research in Colorado.** Phil Westra*¹, Todd Gaines², Eric L. Patterson², Eric Westra², Neeta Soni², Olivia Todd³; ¹Colorado State University, Ft Collins, CO, ²Colorado State University, Fort Collins, CO, ³Colorado State University, Ft. Collins, CO (201)
- 8:30 †Herbicide Resistance Mechanisms Inform Herbicide Recommendations for Marestalk Control.** Sarah Miller*¹, Marisa DeForest², John Pauley², Clint Meyer¹; ¹Simpson College, Indianola, IA, ²Simpson college, Indianola, IA (202)
- 8:45 †Inheritance of Multiple Herbicide Resistance in Palmer Amaranth (*Amaranthus palmeri*).** Chandrima Shyam*¹, Sridevi Nakka¹, Karthik Putta¹, Ivan B. Cuvaca¹, Randall S Currie², Mithila Jugulam¹; ¹Kansas State University, Manhattan, KS, ²Kansas State University, Garden City, KS (203)
- 9:00 2, an Endogenous Tassel-Specific siRNA-Mediated Glyphosate Inducible Male Sterility System for Hybrid Seed Production.** Heping Yang, Youlin Qi, Michael Goley*, Jintai Huang, Sergey Ivashuta, Yuanji Zhang, Oscar C. Sparks, Jiyan Ma, Brook Van Scoyoc, Amy Caruano-Yzermans, Jennifer King-Sitzes, Xin Li, Aihong Pan, Martin Stoecker, Elizabeth Wiggins, Valerie No, Sunran Kim, Marguerite J. Varagona; Bayer Crop Science, Chesterfield, MO (204)
- 9:15 †Analysis of the Transcriptome Following 2,4-D Treatment in Susceptible and Tolerant Red Clover (*Trifolium pratense*) Lines.** Lucas P. Araujo*¹, Michael Barrett¹, Linda D. Williams¹, Gene Olson¹, Randy Dinkins², Troy Bass²; ¹University of Kentucky, Lexington, KY, ²USDA-ARS-FAPRU, Lexington, KY (205)
- 9:30 Business Meeting**

Invasive Weeds, Rangeland, Pasture, and Vegetation Management

LOCATION: Grand Ballroom C

MODERATOR: Mike Weber

- 10:00 Monitoring Garlic Mustard in Minnesota - Now You See Them, Now You Don't.** Roger Becker*¹, Laura Van Riper², Lori Knosalla³, Rebecca Montgomery⁴, Mary Marek-Spartz³, Elizabeth Katovich³; ¹University of Minnesota, St Paul, MN, ²Minnesota Dept. of Natural Resources, Saint Paul, MN, ³University of Minnesota, St. Paul, MN, ⁴University of Minnesota, St. Paul, MN (206)
- 10:15 †The Influence of Soil Fertility and pH on Pasture Weed Occurrence.** Gatlin E. Bunton*, Kevin W Bradley; University of Missouri, Columbia, MO (207)
- 10:30 Housing Development Impacts on Herbicide Resistant Weed Pressure and Productivity Potential: a Case Study in Warren County, Iowa.** Lake Baird*¹, Drew Roen¹, Clint Meyer¹, John Pauley²; ¹Simpson College, Indianola, IA, ²Simpson college, Indianola, IA (208)
- 10:45 Control of Saltcedar Using Herbicides.** Walter H. Fick*; Kansas State University, Manhattan, KS (209)
- 11:00 Field Validation of 15 Invasive Plant Ensemble Habitat Suitability Models in Wisconsin Using Citizen Science Observations.** Niels A. Jorgensen*¹, Mark Renz²; ¹University of Wisconsin, Madison, WI, ²University of Wisconsin- Madison, Madison, WI (210)
- 11:15 Current Distribution, Suitable Habitat, and Control of Common Valerian (*Valeriana officinalis* L.) in Wisconsin.** Mark Renz*¹, Niels A. Jorgensen²; ¹University of Wisconsin-Madison, Madison, WI, ²University of Wisconsin, Madison, WI (211)
- 11:30 Business Meeting**

Atmospheric Considerations for Making On-Target Herbicide Applications - Symposium

LOCATION: Regency Ballroom B

MODERATOR: David Simpson

- 1:30 Atmospheric Conditions for On-Target Applications: Introduction.** David Simpson*; Corteva Agriscience, Zionsville, IN (212)
- 1:40 A Fact Check of Temperature Inversion Understanding.** Vernon Hofman*¹, Andrew A. Thostenson²; ¹North Dakota State University, Fargo, ND, ²North Dakota State University, Fargo, MN (213)
- 2:00 Navigating the Maze of Weather Data Sources and Avoiding Pitfalls.** Dennis Todey*; USDA-ARS-NLAE, Ames, IA (214)
- 2:20 A Meteorologist Perspective on Kansas Mesonet Inversions.** Christopher Redmond*; Kansas State University, Manhattan, KS (215)
- 2:40 Temperature Inversion Findings from a Multi-State Weed Science Project.** Kevin W Bradley*, Mandy Bish; University of Missouri, Columbia, MO (216)
- 2:55 What's Behind Smartphone Temperature Inversion Apps.** Eric Snodgrass*; University of Illinois, Urbana, IL (217)
- 3:10 Break**
- 3:25 Ground-Truthing Smartphone Temperature Inversion and Wind Speed Apps.** Joe Ikley*, William G. Johnson; Purdue University, West Lafayette, IN (218)
- 3:40 Regulatory Challenges of Interpreting & Documenting Wind Speed Language on Labels.** Dave Scott*; Office of Indiana State Chemist, West Lafayette, IN (219)
- 3:55 Deposition and Dispersion of Spray Droplets in Normal Conditions.** Jerome J. Schleier*; Corteva Agriscience, Indianapolis, IN (220)

Wednesday Papers 2018

4:10 Dispersion of Particles in Temperature Inversions.

David Kristovich*¹, April Hiscox², Junming Wang³;
¹University of Illinois, Urbana, IL, ²University of South Carolina, Columbia, SC, ³ISWS, Prairie Research Institute, Champaign, IL (221)

4:30 Panel Discussion

Making Data Meaningful: A Guide to Presenting Statistics at Scientific Meetings - Symposium

LOCATION: Regency Ballroom A

MODERATOR: Dawn Refsell

2:00 Making Data Meaningful: Introduction. Marty Williams*; USDA-ARS, Urbana, IL (222)

2:20 Critical Period of Weed Control. Stevan Knezevic*; University of Nebraska, Wayne, NE (223)

2:40 Weed Ecology. Anita Dille*; Kansas State University, Manhattan, KS (224)

3:00 Break

3:15 Biologically Effective Dose. Stevan Knezevic*; University of Nebraska, Wayne, NE (225)

3:35 Molecular Weed Science. Patrick Tranel*¹, Darci Giacomini²; ¹University of Illinois, Urbana, IL, ²University of Illinois, Urbana, IL (226)

3:55 Roundtable discussion

NCWSS Awards Luncheon

Distinguished Achievement and Fellow Awards

12:00 – 1:15 pm

Wednesday Papers 2018

NCWSS Society Social

Sponsored by Sustaining Members – Open to all attendees

Graduate and Undergraduate Paper and Poster Awards

5:30 – 7:30 pm

Gateway East & Terrace
(18th floor)

Industry Breakfast (Tickets required)

7:00 – 8:15 am Regency Ballroom C&D

Presentation: **Communicating Agricultural Innovation to a Concerned Public.** Dr. Kevin Folta, Professor and Chairmen of the Horticultural Sciences Department, University of Florida, Gainesville, FL (248)

What is New in Industry? - Symposium

LOCATION: Regency Ballroom A&B

MODERATOR: J. Andrew Kendig

TIME: 8:30 – 10:15 a.m.

10:00 Industry Business Meeting

North Central Weed Science Society Information

2018 Officers/Executive Committee

President

Christy Sprague Michigan State University
517-353-0224
sprague1@msu.edu

President-Elect

Aaron Hager University of Illinois
217-333-4424
hager@illinois.edu

Vice-President

Stott Howard Syngenta
515-321-7469
stott.howard@syngenta.com

Past President

Greg Dahl Winfield United
651-261-1817
GKDahl@landolakes.com

Secretary/Treasurer

David Simpson Corteva Agriscience
317-337-3959
dmsimpson@dow.com

Editor, NCWSS Proceedings

Greg Kruger University of Nebraska
308-696-6715
gkruger2@unl.edu

Editor, NCWSS Communications

Vince Davis BASF
608-208-4251
vince.davis@basf.com

WSSA Representative

Greg Elmore Bayer
314-694-1744
greg.elmore@bayer.com

CAST Representative

Lowell Sandell Valent U.S.A.
402-432-2683
lowell.sandell@valent.com

Executive Secretary

Kelley Mazur 303-327-8016
kelley@imigroup.org

North Central Weed Science Society Information

Directors at Large

Debalin Sarangi	Extension 402-416-6647 debalin.sarangi@huskers.unl.edu
Marcelo Zimmer	Graduate Students 765-476-3860 zimmer6@purdue.edu
Andy Kendig	Industry 314-580-8202 andy.kendig@adama.com
Neha Rana	Resident Education 636-737-3476 neha.rana@bayer.com
Dawn Refsell	Strategic Planning 816-206-3919 dawn.refsell@valent.com
Tim Trower	Central (2017) 217-762-9030 tim.trower@syngenta.com
Kelly Barnett	Eastern (2019) 317-478-6974 kelly.a.barnett@dupont.com
Brady Kappler	Western (2017) 402-432-1469 brady.kappler@basf.com

NCWSS Interest Group Committees

Extension

Debalin Sarangi, Chair	402-416-6647	debalin.sarangi@huskers.unl.edu
Travis Legleiter, Vice Chair	270-365-7541x218	travis.legeiter@uky.edu
Chris Proctor, Past Chair	402-472-5411	caproctor@unl.edu

Graduate Student Committee

Marcelo Zimmer, Chair	765-476-3860	zimmer6@pudue.edu
Ethan Barnes, Vice Chair	308-672-4464	ethann.barnes@unl.edu
Thomas Butts, Past Chair	608-214-4215	tbutts@huskers.unl.edu

Industry

Andy Kendig, Chair	314-580-8202	andy.kendig@adama.com
Lowell Sandell, Vice Chair	402-432-2683	lowell.sandell@valent.com
Joe Wuerffel, Past Chair	618-363-6231	joe.wuerffel@syngenta.com

Resident Education

Neha Rana, Chair	636-288-2609	neha.rana@bayer.com
Daniela Ribeiro, 1st Vice Chair	662-347-5060	daniela.n.ribeiro@monsanto.com
Rodrigo Werle, 2nd Vice chair	402-937-2887	rwerle@wisc.edu
Mayank Malik, Past Chair	662-402-9030	mayank.s.malik@monsanto.com
Brian Olson, 2018 Summer Contest Host	785-443-5634	brian.olson@monsanto.com
Greg Kruger, 2018 Summer Contest Host	308-530-8942	gkruger2@unl.edu
Mark Reiman	605-690-0522	mark.reiman@monsanto.com
Carl Coburn	513-257-4120	carl.coburn@monsanto.com
Jeff Golus	308-520-2410	jeff.golus@unl.edu
Kasey Schroeder	308-520-2535	kasey.schroeder@unl.edu
Daljit Singh	662-402-7232	daljit.singh@monsanto.com
Mark Bernards	309-313-5917	ml-bernards@wiu.edu
Tate Castillo	785-213-8979	tate.castillo@bayer.com
Bruce Ackley	740-225-2014	ackley.19@osu.edu
Fritz Koppatschek	317-431-3295	fkoppatschek@abgagservices.com
Cheryl Dunne	772-563-7288	cheryl.dunne@syngenta.com
Anita Dille	785-532-7240	dieleman@ksu.edu

North Central Weed Science Society Information

Resident Education (continued)

John Hinz	515-733-9250	john.hinz@bayer.com
Doug Nord	620-285-3380	dwnord@gbta.net
Helen Flanigan	317-459-9650	helen.n.flanigan@monsanto.com
Dawn Refsell	816-206-3919	Dawn.refsell@valent.com
Andy Kendig	314-580-8202	andy.kendig@adama.com
Troy Klingaman	217-778-2929	Troy.Klingaman@basf.com
Jess Spotsanski	402-366-9230	jess@midwestresearchinc.com
Chris Proctor	402-472-5411	caproctor@unl.edu
Sandeep Rana	479-871-4309	ssrana@monsanto.com
Dave Johnson	515-535-7234	david.h.johnson@poineer.com
Vince Davis	608-262-1392	vince.davis@basf.com

Resident Education-Contest Rules Subcommittee

Neha Rana, Chair	636-288-2609	neha.rana@bayer.com
Daniela Ribeiro, 1st Vice Chair	662-347-5060	daniela.n.ribeiro@monsanto.com
Rodrigo Werle, 2nd Vice Chair	402-937-2887	rwerle@wisc.edu
Brian Olson, 2018 Summer Contest Host	785-443-5634	brian.olson@monsanto.com
Greg Kruger, 2018 Summer Contest Host	308-530-8942	gkruger2@unl.edu

Strategic Planning

Dawn Refsell (MO), Chair	816-206-3919	dawn.refsell@valent.com
Bruce Ackley (OH), Vice Chair	740-225-2014	ackley.19@osu.edu
<i>Central Region</i>		
Tim Trower (WI) (Director)	608-393-9371	Tim.Trower@syngenta.com
Mike Weber (IA)	515-962-9214	Michael.weber3@bayer.com
Mark Bernards (IL)	309-298-1569	ML-Bernards@wiu.edu
Dave Ruen (MN)	507-259-7095	DCRUEN@dow.com
<i>Eastern Region</i>		
Kelly Backscheider (IN) (Director)	317-478-6974	Kelly.A.Barnett@dupont.com
Erin Burns (MI)	517-353-0223	burnser5@msu.edu
Nader Soltani (ON)		soltanin@uoguelph.ca
Erin Haramoto (KY)	859-218-0745	erin.haramoto@uky.edu
<i>Western Region</i>		
Brady Kappler (NE) (Director)	402-432-1469	brady.kappler@basf.com
Phil Westra (CO/WY)		Philip.Westra@colostate.edu
Doug Shoup (KS)	602-212-2399	dshoup@ksu.edu
Tom Peters (ND)	701-231-8131	thomas.j.peters@ndsu.edu
Trevor Israel (SD)	605-679-0297	trevor.israel@valent.com

Summer Contest Subcommittee of Resident Education

Brian Olson, 2018 Summer Contest Host	785-443-5634	brian.olson@monsanto.com
Greg Kruger, 2018 Summer Contest Host	308-530-8942	gkruger2@unl.edu
Neha Rana, Chair	636-288-2609	neha.rana@monsanto.com
Daniela Ribeiro, 1st Vice Chair	662-347-5060	daniela.n.ribeiro@monsanto.com
Mayank Malik, Past Chair	662-402-9030	mayank.s.malik@monsanto.com

NCWSS Standing Committees

Distinguished Achievement Award

Greg Dahl, Chair	651-261-1817	gkdahl@landolakes.com
Christy Sprague, Vice Chair	517-353-0224	sprague1@msu.edu
Anita Dille, Past Chair	785-532-7240	dieleman@ksu.edu
John Hinz	515-733-9250	john.hinz@bayer.com
Mithila Jugulam	785-532-5501	mithila@ksu.edu
Doug Doohan	330-202-3593	doohan.1@osu.edu
Steve Bowe	919-547-2559	steven.bowe@basf.com
Peter Sikkema	519-674-1500	psikkema@uoguelph.ca
Doug Nord	620-285-3380	dwnord@gbta.net
Larry Hageman	815-562-7570	larry.h.hageman@dupont.com
Julie Young	765-494-0891	young294@purdue.edu
Vipan Kumar	785-625-3425x214	vkumar@ksu.edu

Distinguished Achievement Awards, Graduate Student subcommittee

Anita Dille, Chair	785-532-7240	dieleman@ksu.edu
Greg Dahl, Vice Chair	651-261-1817	gkdahl@landolakes.com
John Hinz, Past Chair	515-733-9250	john.hinz@bayer.com
Meaghan Anderson	319-331-0058	mjanders@iastate.edu
Pat Tranel	217 333-1531	tranel@illinois.edu
Eric Miller	618-559-9459	ericmiller1@siu.edu
Travis Legleiter	270-365-7541x218	travis.legleiter@uky.edu

Fellow Committee

Dave Johnson, Chair	515-535-7234	david.h.johnson@dupont.com
JD Green, Vice Chair	859-257-4898	jdgreen@uky.edu
Richard Zollinger, Past Chair	701-231-8157	r.zollinger@ndsu.edu
Duane Rathmann	507-835-2580	duane.rathmann@basf.com
J. D. Green	859-257-4898	jdgreen@uky.edu
Mark Peterson	317-337-7704	mapeterson@dow.com

North Central Weed Science Society Information

Finance Steering and Policy Committee

David Simpson	Chair	317-337-3959	dmsimpson@dow.com
Harlene Hatterman-Valenti		701-231-8536	h.hatterman.valenti@ndsu.edu
Kelly Nelson		660-739-4410	nelsonke@missouri.edu
Christy Sprague		517-353-0224	sprague1@msu.edu
Greg Kruger		308-696-6715	gkruger2@unl.edu
Eric Spandl		651-375-4292	epsandl@landolakes.com
Phil Banks		575-527-1888	marathonag@zianet.com

Future Site Selection Committee

Mark Loux, Chair	614-292-9081	loux.1@osu.edu
Charles Slack, Vice Chair	859-227-3355	cslack@uky.edu
Greg Dahl, Past President	651-261-1817	gkdahl@landolakes.com

Invasive Plants Committee

Reid Smeda, Chair	573-882-1329	smedar@missouri.edu
Roger Becker, Vice Chair	612-625-5753	becke003@umn.edu
Mark Renz, Past Chair	608-263-7437	mrenz@wisc.edu
Walt Fick	785-532-7223	whfick@ksu.edu
Joe Omielan	859-967-6205	joe.omielan@uky.edu

Local Arrangements: 2018 Milwaukee, WI

Richard Proost, Chair	608-262-7845	rproost@wisc.edu
Tim Trower, Chair	608-393-9371	Tim.Trower@syngenta.com
Mark Loux, Vice Chair	614-292-9081	loux.1@osu.edu
Greg Elmore, Past Chair	314-308-6181	greg.elmore@bayer.com

Nominating Committee

Tom Peters, Chair	701-231-8131	thomas.j.peters@ndsu.edu
Reid Smeda, Past Chair	573-882-1329	smedar@missouri.edu
Bert Schou	319-277-6661	BertSchou@gmail.com
Peter Sikkema	519-674-1500	psikkema@uoguelph.ca
Stott Howard	515-222-4809	stott.howard@syngenta.com
Bernie Zandstra	517-353-6637	zandstra@msu.edu
Karen Renner	517-355-0271	renner@msu.edu
Gary Finn	317-337-4781	gafinn@dow.com
Rick Schmenk	734-845-0925	weedklr@aol.com

Program Committee 2018

Aaron Hager, Chair	217-333-4424	hager@illinois.edu
Stott Howard, Vice Chair	515-321-7469	stott.howard@syngenta.com
Tim Trower, Local Arr. Co-Chair	608-393-9371	Tim.Trower@syngenta.com
Richard Probst, Local Arr. Co-Chair	608-262-7845	rproost@wisc.edu
David Simpson, Sect/Treas	317-337-3959	dmsimpson@dow.com
Greg Kruger, Editor, Proceedings	308-696-6715	gkruger2@unl.edu
Neha Rana, Resident Education	636-288-2609	neha.rana@monsanto.com
Debalin Sarangi, Extension	402-416-6647	debalin.sarangi@huskers.unl.edu
Andy Kendig, Industry	314-580-8202	andy.kendig@adama.com
Marcelo Zimmer, Graduate Student	765-476-3860	zimmer6@purdue.edu
Christy Sprague, Pres. (ex officio)	517-353-0224	sprague1@msu.edu

Resolutions and Necrology Committee

Cody Evans, Chair	217-371-9777	cody.matthew.evans@monsanto.com
Devin Hammer, Vice Chair	217-821-3426	devin.j.hammer@monsanto.com
Chris Kamienski, Past Chair	309-532-4405	christopher.d.kamienski@monsanto.com
Donald Penner	517-355-0271	pennerd@msu.edu
Pat Tranel	217-333-1531	tranel@illinois.edu

NCWSS Special Committees

Communications Working Group

Renee L. Adler, Chair	rflawd2@mail.missouri.edu
Dawn Refsell, Vice Chair	Dawn.Resfell@valent.com
Marcelo Zimmer	zimmer6@purdue.edu
Orlando Saez	osaez@aker.ag
Zach Trower	Zachary.trower@syngenta.com
Bruce Ackely	ackley.19@osu.edu
Aaron Hager	hager@uiuc.edu
Matt Nelson	matthew.r.nelson@monsanto.com
Vince Davis	vince.davis@basf.com
Jamie Long	Jamie.long@burrusseed.com
Greg Kruger	greg.kruger@unl.edu
Thomas Peters	Thomas.j.peters@ndsu.edu
Trevor Israel	trevor.israel@valent.com
Travis Legleiter	travis.legleiter@uky.edu

North Central Weed Science Society Information

Section Program Chairs

General Program

Aaron Hager Chair 217-333-4424 hager@illinois.edu

Poster Session

David Ouse Chair 317-337-4423 dgouse@dow.com

Marquardt Past Chair 514-602-0905 paul.marquardt@dupont.com

Graduate Student Paper Awards

Daniela Ribeiro Chair 662-347-5060 daniela.n.ribeiro@monsanto.com

Graduate Student Poster Awards

Rodrigo Werle Chair 402-937-2887 rwerle@wisc.edu

Undergraduate Student Poster Awards

Neha Rana Chair 636-288-2609 neha.rana@monsanto.com

Agronomic Crops I (Corn)

Helen Flanigan Chair 317-459-9650 helen.a.flanigan@dupont.com

Debalin Sarangi Vice Chair 402-416-6647 debalin.sarangi@huskers.unl.edu

Mark Waddington Past Chair 618-334-6789 mark.waddington@bayer.com

Agronomic Crops II (Soybeans)

Eric Riley, Chair 573-795-9084 eric.riley@monsanto.com

Nick Harre, Vice Chair 618-314-0581 nharre4@gmail.com

Mike Weber, Past Chair 515-962-9214 michael.weber3@bayer.com

Agronomic and Specialty Crops

Tate Castillo Chair 785-213-8979 tate.castillo@bayer.com

Colin Phillippo Past Chair phill394@msu.edu

Equipment and Application Methods

Thomas Butts Chair 608-214-4215 tbutts@huskers.unl.edu

Marshall Hay Vice Chair 641-891-3017 MMHay@ksu.edu

Ryan Edwards Chair 651-319-6479 rjedwards@landolakes.com

Extension

Debalin Sarangi Chair 402-416-6647 debalin.sarangi@huskers.unl.edu

Travis Legleiter Vice Chair 270-365-7541x218 travis.legleiter@uky.edu

Chris Proctor Past Chair 402-472-5411 caproctor@unl.edu

Herbicide Physiology

Daniela Ribeiro Chair 662-347-5060 daniela.n.ribeiro@monsanto.com

Vipan Kumar Vice Chair 406-591-4470 ykumar@ksu.edu

Nick Harre Past Chair 618-314-0581 nharre@purdue.edu

Invasive Weeds, Rangeland, Pasture & Vegetation Management

Reid Smeda Chair 573-882-1329 smedar@missouri.edu

Roger Becker Vice Chair 612-625-5753 becke003@umn.edu

Mark Renz Past Chair 608-263-7437 mrenz@wisc.edu

Weed Biology, Ecology and Management

Chris Proctor Chair 402-472-5411 caproctor@unl.edu

Mark Bernards Vice Chair 309-313-5917 ml-bernards@wiu.edu

Rodrigo Werle Past Chair 308-696-6712 rodrigo.werle@unl.edu

North Central Weed Science Society Information

Honorary Members/Fellows

Honorary Members

1948	L.W. Dephart *		Dale E. Bush *
1949	A.H. Larson *		Ronald E. Doersch
1950	J.W. Zahnley *	1984	Edward W. Stroube *
1951	R.W. Fuelleman *		Oliver E. Strand *
	(posthumous citation)	1985	Gail A. Wicks *
	Ted F. Yost *	1986	Robert Hiltibran *
	(posthumous citation)		Elroy J. Peters *
1952	Henry E. Wood *		Deane W. Finnerty *
1953	George Briggs *	1987	Oliver G. Russ *
	Walter C. Dutton *		Ralph Althaus *
1954	A.L. Bakke *		William M. Phillips
1955	Charles J. Willard *	1988	Gerald R. Miller
1956	R.S. Dunham *		Robert Benson
1957	P.J. Olson *		Calvin Messersmith
1958	L.W. Melander *	1989	Edward Stoller
	T.K. Pavlychenko *		Loyd M. Wax
	(posthumous citation)	1990	Alan R. Putman
1959	E.A. Helgeson *		Alan G. Dexter
1960	Oliver C. Lee *	1991	Russell L. Nash *
1962	Sig Bjerken *		George Kapusta *
1964	K.P. Buchholtz *		Marshall McGlamery *
	E.P. Sylwester *		Russell Moomaw
1966	Robert C. Beatty *	1992	Don Penner
	Clare Buskirk *		R. Gordon Harvey, Jr. *
1967	J.K. Freeman *		Larry K. Binning
1968	E.K. Alban *		Alex R. Martin
	H.A. Friesen *	1993	Don Taylor
1969	Lawrence Southwick *		Merrill A. Ross, Jr. *
	David W. Staniforth *		Robert G. Wilson
1970	Delbert D. Hemphill *	1994	Jerry D. Doll
	George Frederick Warren *		Ted R. Warfield
1971	Fred W. Slife *		William W. Witt
1972	Thomas Victor Beck *	Fellows¹	
	O. Hale Fletchall *	1995	Charles R. Fenster
1973	Richard Behrens	1996	Leon J. Wrage
	Lawrence H. Hannah *		Thomas T. Bauman *
1974	William Lobay *		Earl W. Chamberlain
1975	John D. Furrer *		Richard S. Fawcett
1976	Lyle A. Derscheid *	1997	William E. Lueschen
	LeRoy G. Holm *		Stephen D. Miller
1977	James W. Divall		M.D.K. Owen
	James L. Williams, Jr. *	1998	Fred W. Roeth
1978	Melwin K. McCarty *		Paul J. Ogg *
	Robert E. Nylund	1999	James P. Worthington
1979	Ellery L. Knake *		Michael Barrett
	Kenneth W. Bradfield *	2000	Norman J. Probst
1980	John D. Nalewaja		Douglas D. Buhler
	O.C. Burnside *		Bill Miller
1981	Rodney J. Fink		Philip L. Orwick
	Juett C. Hogancamp *	2001	Stephen C. Weller
	Larry W. Mitich *	2002	LeRoy R. Cobia
1982	W.D. Carpenter	2003	James J. Kells
	James W. Herron *		Karen Ann Renner
	William F. Meggitt		Charles Slack
1983	Robert N. Andersen		Phillip Stahlman

North Central Weed Science Society Information

Honorary Members/Fellows (continued)

2004	Duane Rathman David Regehr		Harlene Hatterman-Valenti Gordon K. Roskamp
2005	Dallas E. Peterson	2012	Peter H. Sikkema
2006	James R. Martin Bernard H. Zandstra		Bob Hartzler Roger Becker
2007	Chris M. Boerboom Michael J. Horak	2013	Bryan Young
2008	Thomas J. Peters Jeffrey Gunsolus Kassim Al-Khatib	2014	Adrian Moses David Stoltenberg
2009	J.D. Green Thomas B. Threewitt Robert N. Klein	2015	Dave Johnson Mark Wrucke
2010	No nominations	2016	David Simpson Curtis Thompson
2011	Bill Johnson	2017	John Hinz Patrick J. Tranel

* Deceased

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

North Central Weed Science Society Information

North Central Weed Science Society Presidents

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

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 Jeffrey Stachler - Professional Staff

Distinguished Achievement Awards (continued)

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

Distinguished Achievement Awards (continued)

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

North Central Weed Science Contest Locations

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

2016	Purdue University	West Lafayette, IN
2017	Iowa State University FEEL	Ames, IA
2018	Monsanto Water Utilization Learning Center	Gothenburg, NE

Author Index

Ackley, Bruce A.	6, 40, 137
Adler, Renee L.	3, 194
Anderson, Ely	10
Anderson, Tim	182
Araujo, Lucas P.	205
Arneson, Nicholas	144
Arsenijevic, Nikola	16, 49, 95, 146, 177
Asmus, Chad	184, 185
Atherton, Daniel L.	52
Bagavathiannan, Muthukumar	131
Baird, Laken	208
Bales, Scott R.	4, 43, 186
Bangarwa, Sanjeev	185
Barbosa dos Santos, Jose	50
Barenkow, Dave	32
Barfknecht, David F.	76
Barker, Abigail	152
Barlow, Blake R.	154
Barnes, Ethann R.	27, 44, 46, 61, 164
Barrett, Michael	33, 205
Bass, Troy	205
Becker, Roger	34, 35, 36, 206
Beckett, Tom	181
Behnken, Lisa M.	63, 106, 107, 110
Beiermann, Clint W.	61, 188
Bemm, Felix	17
Benoit, Lauren	158
Bernards, Mark L.	29, 52, 72
Bish, Mandy	65, 151, 176, 190, 216
Bissell, Daniel C.	94, 119
Boles, Lee A.	94, 100
Borgato, Edinaldo A.	67, 159
Bowers, Dane L.	161, 183
Bradley, Kevin W	53, 65, 151, 176, 190, 207, 216

Breitenbach, Fritz	63, 107
Brooker, Aaron P.	20, 26
Brown, Patrick	73
Brown Johnson, Ashli	127
Bunton, Gatlin E.	207
Burns, Erin E.	140
Burr, Chuck	22
Butts, Liberty E.	21, 146, 170
Butts, Thomas R.	10, 122, 177
Came, Dakota	13, 45
Canella Vieira, Bruno	10, 11, 51, 92, 102, 103, 104, 122, 139, 174
Carmody, Colton P.	83
Caruano-Yzermans, Amy	204
Ceperkovic, Isidor	97, 98
Chahal, Parminder	42, 44, 175
Chaudhari, Sushila	7
Chiaranda Rodrigues, Camila	99, 101, 124
Chiaranda Rodrigues, Camila	104
Chism, Luke	79
Christoffers, Michael J.	15
Clark, Andrea	94, 100
Clark, Kerry M.	24, 172
Claussen, Steve W.	121
Coburn, Carl W.	175
Collins, Ryan J.	77
Conley, Shawn P.	37, 177
Constine, Adam L.	26
Cortat, Ghislaine	36
Creech, Cody F.	21, 22, 170, 188
Crosby, Kevin	182
Curlett, Heather	37
Currie, Randall S	130, 171, 203
Cuvaca, Ivan B.	130, 203
da Cunha, Joao Paulo R.	92
Dahl, Gregory K.	94, 100, 119, 163
Davis, Adam S.	160
de Oliveira Rodrigues, Andre	10, 122
De Souza Vieira, Gustavo	16, 146
de-Avellar, Matheus	146
Decker, Madison	68
DeForest, Marisa	202
Delucchi, Tomas F.	93
DeSimini, Stephanie	88, 142

DeWerff, Ryan P.	85, 95
Dille, Anita	71, 79, 80, 81, 138, 173, 224
Dinkins, Randy	205
Dintelmann, Brian R.	190
Dintelmann, Sarah J.	86
Dixon, Sarah E.	192
Dobbels, Anthony F	39, 40
Dodds, Darrin	127
Dotray, Peter A.	131
Dunne, Cheryl L.	161
Edwards, Ryan J.	94, 100, 163
Ellis, Christine	167
Elmore, Roger	21, 22, 170
Evans, Cody	117
Everhart, Sydney	144
Farr, Rodger	14
Farrell, Shea T.	65
Felsot, Allan	115, 196
Fick, Walter H.	209
Fiery, Mike	128
Fisher, Justine	4
Forster, Pete C.	189
Franssen, Aaron	181
Fritz, Bradley K.	127
Gage, Karla L.	68, 76, 81, 83, 86
Gaines, Todd	152, 201
Gastler, Lindsey	71
Gednalske, Joe V.	119, 163
Gehling, Jamie	63
Geier, Patrick	171
Giacomini, Darci	16, 17, 73, 134, 226
Giesler, Loren J.	144
Gifford, James	32
Gillilan, Jo A.	163
Gizotti de Moraes, Jesaelen	14, 90, 91, 124
Goley, Michael	167, 204
Golus, Jeffrey	10, 11, 14, 51, 64, 97, 98, 99, 101, 122, 127, 139, 174
Gonzini, Lisa	160
Goplen, Jared J.	105, 106
Green, J D	156
Grint, Kolby R.	111
Haarmann, Jesse A.	69, 132
Hager, Aaron	89, 118, 160
Hamrock, Joseph	84

Haramoto, Erin	77, 78, 81
Harrison, Kent	31
Harveson, Robert	188
Haugrud, Nathan H.	187, 191
Hauver, Amy D.	46
Hay, Marshall M.	45, 173
Hayden, Cade	48, 148
Hayden, Thomas A.	163
Heaton, Brent	29, 72
Heimpel, George	34
Hennemann, Laura	100
Henry, Jerri L.	66, 200
Hildebrandt, Julia	17
Hinz, Hariet	36
Hiscox, April	221
Hodgskiss, Connor L.	87, 150
Hoffmann, Clint	127
Hofman, Vernon	213
Hogan, Chris	119
Hooker, Dave	158, 162
Hooker, David C.	2, 180
Huang, Jintai	204
Ikley, Joe	?, 218
Irmak, Suat	27, 164
Ivashuta, Sergey	204
Jacobs, Kip E.	18
Jamison, Brendan V.	18
Jennings, Katherine M.	7
Jha, Prashant	67
Jhala, Amit	27, 42, 44, 46, 61, 74, 75, 82, 113, 141, 152, 155, 164, 166, 175, 179, 188
Jiang, Yiwei	135
Johnson, Bill	38
Johnson, William G.	?, 23, 69, 87, 88, 132, 142, 150, 169, 218
Jorgensen, Craig	120
Jorgensen, Niels A.	112, 210, 211
Jugulam, Mithila	13, 130, 193, 203
Kaastra, Allan C.	180
Kappler, Brady	46
Katovich, Elizabeth	35, 36, 206
Kaundun, Deepak	161
Keller, Kyle	184
Kim, Sunran	204
King-Sitzes, Jennifer	204
Klein, Robert N	129

Knezevic, Stevan	19, 25, 27, 55, 56, 57, 58, 59, 60, 61, 62, 80, 155, 164, 166, 168, 188, 223, 225
Knosalla, Lori	206
Kramer, Madison D.	126, 153
Krausz, Ron	68, 83, 86
Kreiner, Julia M.	17
Kristovich, David	221
Kruger, Greg R	10, 11, 14, 51, 64, 90, 91, 92, 97, 98, 99, 101, 102, 103, 104, 122, 124, 125, 127, 139, 174
Kumar, Vipin	54, 67, 155, 159
Laird, Patsy D.	37
Lamb, Alyssa	40
Lambert, Kris N.	8
Lanz, Christa	17
Larue, Clayton	167
Latorre, Debora O.	124
Lawrence, Nevin C.	27, 61, 164, 166, 188
Legleiter, Travis R.	87, 96, 126, 153, 156
Leise, Adam	44
Lerch, Robert N.	65
Li, Xin	204
Lillie, Kathryn	134
Lindquist, John	74, 75, 141
Lins, Ryan	183
Liu, Chun	161
Liu, Lina	108
Liu, Sanzhen	193
Loux, Mark	31, 39, 40, 41, 84, 137
Luck, Brian	95
Lystad, Alexa L.	187
Ma, Jiyan	204
Ma, Rong	18
Magidow, Lillian c.	119, 163
Makepeace, Annie D.	94, 163
Mansfield, Brent C.	53, 135, 145
Marek-Spartz, Kyle	34
Marek-Spartz, Mary	34, 35, 36, 206
Mausbach, Jasmine	42
Mazur, Kelley D.	194
McMullan, Patrick M.	128
Medeiros de Santana, Thalyson	102, 103, 104
Meredith, Ashley	127
Metzger, Brendan A.	162
Meyer, Clint	30, 202, 208
Meyeres, Tyler P.	54

Michael, Jan	157
Miller, Brett	181, 189
Miller, Ryan P.	63, 105, 106, 107, 110
Miller, Sarah	202
Milosevic, Luka G.	59, 60
Mitchell, Paul	113
Mitsdarfer, Charlie	160
Montgomery, Jacob S.	73
Montgomery, Rebecca	206
Moseley, Carroll M.	37
Moses, Adrian J	183
Mueller, Thomas	28
Mueth, Alexander	68
Murphy, Brent P.	70, 137
Nakka, Sridevi	203
Ndayishimiye, Bonheur	10
Nelson, Kelly	3
Nicolai, David	105, 107
Nie, Haozhen	53, 135
No, Valerie	204
Norsworthy, Jason K.	48, 89, 125
Nur Ulusoy, Ayse	25, 168
O'Brien, Sarah R.	18
Obenland, Olivia A.	8
Oliveira, Maxwel C.	16, 49, 50, 95, 108, 177
Olson, Bernard	119
Olson, Gene	205
Omielan, Joe	33
Osburn, Andrew W.	31
Oseland, Eric G.	151
Osipitan, O. Adewale	19, 25, 55, 56, 57, 58, 59, 60, 61, 62, 80, 168
Ou, Junjun	13
Ouse, David G.	32
Palecek, David J.	100
Palmer, Eric	161
Pan, Aihong	204
Pandian, Balaji Aravindhhan	193
Parker, Ethan T.	161
Patterson, Eric L.	152, 201
Pauley, John	30, 202, 208
Pavlovic, Pavle	61, 62
Penner, Donald	157
Perez-Jones, Alejandro	154
Perry, Zachary K.	126, 153
Person, Janet	195

Peters, Tom J.	187, 191
Petersen, Wyatt S.	169
Peterson, Dallas E.	11, 12, 47, 48, 139, 149, 154, 157, 175, 185
Petrovic, Sofija	97, 98
Pilipovich, Bojana	131
Pinho de Faria, Italo Kaye	21, 22, 170
Polli, Estefania G.	51, 139
Porter, Don	181, 189
Proctor, Christopher	82, 111, 113, 143
Putta, Karthik	203
PV, Vara Prasad	193
Qi, Youlin	204
Raeder, Alan J.	162
Rahhal, Amin I.	52
Rai, Manoj	30
Rains, Larry J.	81
Ramirez, Samuel N.	76
Rana, Neha	154
Rapp, Ryan E.	154
Rector, Ryan	125
Redmond, Christopher	215
Reeb, Bryan	41
Regalado, Julian	17
Regnier, Emilie	31, 84
Renner, Karen	20, 26, 178
Renz, Mark	109, 112, 210, 211
Renz, Rachel	95
Reynolds, Dan	125, 127
Ribeiro, Victor Hugo V.	49, 50, 95
Rice, Kevin	176
Riechers, Dean E.	8, 18, 160
Rilakovic, Andrea	102, 103
Robinson, Darren	158, 162, 180
Rodrigues, Julia Maria	139
Rodriguez, Oscar	27, 164
Roen, Drew	208
Roozeboom, Kraig	79
Rudnick, Daran	21, 22, 170
Rumler, Allyson M.	72
Rutter, Bader	197
Sadeque, Ahmed	73
Saini, Monika	183, 189
Sarangi, Debalin	131, 152
Sassenrath, Gretchen	79
Sawall, Dustyn	100

Scarparo de Sanctis, Jose H.	155
Schaffer, Steve	114
Schleier, Jerome J.	220
Schramski, John A.	178
Schroeder, Jill	37
Schroeder, Kasey	10, 11, 14, 51, 97, 98, 99, 101, 122, 127, 139
Scott, Allen J.	89
Scott, Dave	219
Scott, Jon E	19, 25, 55, 56, 57, 58, 59, 60, 61, 62, 80, 168
Sherman, Austin D.	133
Shropshire, Christy	1, 165
Shyam, Chandrima	203
Sigler, Cole	30
Sikkema, Peter	17, 125, 158, 162, 165
Sikkema, Peter H.	1, 2, 28, 138, 180
Simpson, David	212
Singh, Maninder	140
Skelton, Joshua	100
Sleugh, Byron	32
Smeda, Reid	24, 66, 81, 89, 172, 192, 200
Smith, Andrea	180
Smith, Daniel	50
Smith, Pam	198
Snodgrass, Eric	217
Soltani, Nader	1, 2, 138, 162, 165
Soni, Neeta	201
Soriano, Rosa	64, 102, 139
Sousa Alves, Guilherme	64, 92, 102, 103, 104, 125, 127, 174
Sparks, Oscar C.	167, 204
Sprague, Christy	4, 20, 43, 47, 116, 125, 178, 186
Stachler, Jeff M.	149
Stahl, Lizabeth	106, 107
Stahlman, Phillip	67, 138, 159
Stepanovic, Strahinja	22
Stephens, Trey	152
Steppig, Nicholas R.	12, 147
Stevenson, Rod	154
Stiles II, Brian	47
Stinchcombe, John R.	17
Stoecker, Martin	204
Stoltenberg, David E.	5, 9, 85, 109
Strachan, Stephen	32
Striegel, Adam	166
Striegel, Sarah	49, 85, 95
Strom, Seth	160

Takano, Hudson K.	9
Tenhumberg, Brigitte	74, 75, 141
Tesso, Tesfaye	193
Thompson, Curtis R	138
Thostenson, Andrew A.	105, 213
Todd, Olivia	201
Todey, Dennis	214
Tonon Rosa, Alexandre	21, 22, 146, 170
Tranel, Patrick	16, 17, 28, 70, 73, 134, 137, 226
Treptow, Don G.	74, 75, 141
Tubbs, William A.	176
Uany de Souza, Thais	99, 101
Ulusoy, Ayse	56
Valdez, Betzy	24, 172
Van Horn, Christopher R.	9
Van Riper, Laura	36, 206
Van Scoyoc, Brook	204
Van Wychen, Lee	37
Varagona, Marguerite J.	167, 204
Velho, Vinicius	104
Villafuerte, Lauren	30
Vukoja, Barbara	11
Waithaka, Bridgit	17
Waldschmidt, Mathew	7
Wang, Junming	221
Warmund, Michele	190
Watteyne, Kevin	42
Wehrbein, Joshua S.	111, 143
Weigel, Detlef	17
Weirich, Jason	66
Werle, Rodrigo	16, 21, 22, 49, 50, 74, 75, 85, 95, 108, 109, 113, 125, 141, 144, 146, 170, 177
Werner, Kaisa M.	131
Westra, Eric	201
Westra, Phil	9, 201
Westrich, Benjamin C.	145
Wiggins, Elizabeth	204
Williams, Linda D.	205
Williams, Marty	222
Willingham, Samuel D.	12, 147
Wilmes, Kaity	82
Wilson, Courtney E.	9
Wright, Stephen I.	17
Wright, Yancy E.	123
Wu, Chenxi	154
Wuerffel, R. Joseph	161

Yang, Heping	204
Yerka, Melinda	9, 74, 75, 141
Young, Bryan G.	12, 38, 48, 53, 69, 89, 93, 125, 132, 135, 145, 147, 148
Young, Caitlin M.	96
Young, Julie	48, 53, 93
Zaric, Milos	91, 174
Zhang, Chuan-Jie	136
Zhang, Yuanji	204
Zimbric, Joseph W.	5, 109
Zimmer, Marcelo	38, 93
Zoerb, Heidi	199

NCWSS Sustaining Members

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

Gold

BASF Corporation
Bayer CropScience
Corteva Agriscience
Syngenta Crop Protection
Valent USA Corp
Winfield United

Silver

Dow Agrosiences
FMC Corporation
Helena

Bronze

ABG Ag Services
ADAMA
Blue River Technology
Chemorse
Greenleaf Technologies
Midwest research
Pentair Hypro
UPI
Willmar Fabrication, LLC

Notes



Notes

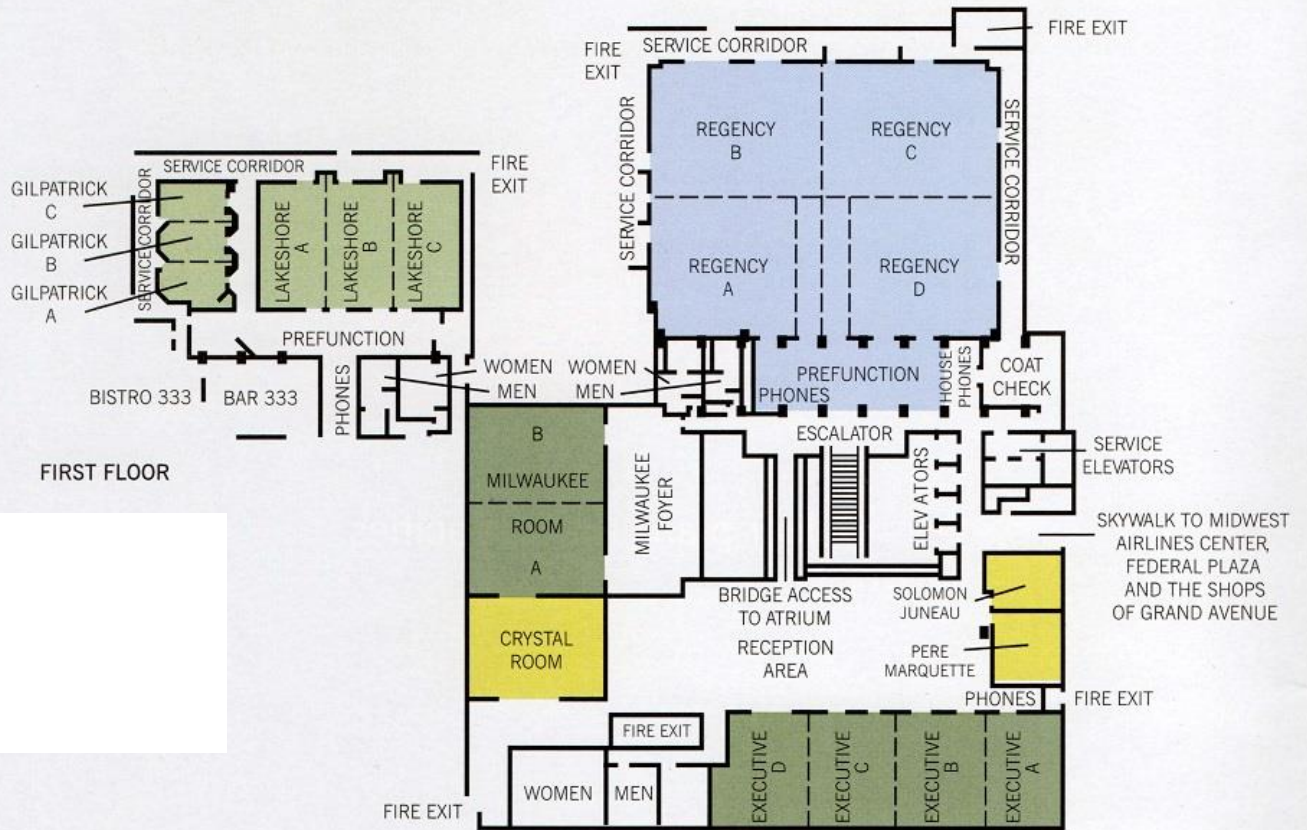


Time Schedule

Mark papers and meetings in the appropriate space.

Time	Tuesday	Wednesday	Thursday
8:00	Poster Session I		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			
3:00			
3:15			
3:30			
3:45			
4:00			
4:15			
4:30			
4:45			
5:00			
5:15			
5:30	Poster Session II	Society Social	
5:45			
6:00			
6:30			

Meeting Space - Hyatt Regency, Milwaukee, WI



& ALL MEETING ROOMS, PHONES AND RESTROOMS ARE WHEELCHAIR ACCESSIBLE, PHONES ARE EQUIPPED FOR HEARING IMPAIRED