



2016

71st Annual Meeting

North Central Weed Science Society

www.ncwss.org

December 12 - 15, 2016

Des Moines Marriott, Downtown

Des Moines, IA

Please bring this program to the conference

President's Welcome

2016 North Central Weed Science Society Meeting

Welcome to Des Moines for the 71st annual North Central Weed Science Society meeting. This event is an important venue for all of us to discuss the latest research, education, and outreach activities in the field of weed science. It provides a great opportunity to learn new technologies, share information and experiences with many of the leading experts in weed management, and to catch up with old or new friends. I look forward to visiting with many of you soon!

Mike Owen and the Local Arrangements Committee have been working hard with the Des Moines Marriott Downtown hotel to prepare for our meeting. The venue is excellent and I anticipate they will meet all our expectations.

Program Chair, Greg Dahl, has assembled an excellent program. He has organized some new and interesting symposia and events, such as the Public Issues and Communication Issues/Extension discussion as well as New Technology Presentations. This is in addition to our regular slate of poster and paper presentations. We will also be going Mobile! In addition to the program booklet, we will be using the Guidebook App to assist you in planning your schedule for the annual meeting.

I will be organizing our 3rd 'Women in Weed Science' Networking Breakfast with Marji Alaniz, Founder and President of FarmHer, Inc., sharing about her advocating work in agriculture. This year's Industry Breakfast will feature Rodney Williamson, Director of Research and Development with Iowa Corn. Rodney will be discussing the Des Moines Waterworks Lawsuit, and implications for agriculture. The Industry Breakfast is open to all attendees at the meeting, and tickets for the event can still be purchased on site.

I encourage you to become involved in the North Central Weed Science Society, to ensure its continued success. This is through your attendance at the meeting and giving presentations. Also, your service on one or more of our many committees is very welcome. 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. Be sure to let the committee chair or Greg Dahl know that you would like to join. Committee assignments for 2017 will be made soon after the meeting. Volunteering is one of the best things you can do for the Society and for yourself.

Thank you for this opportunity to serve you as President of the North Central Weed Science Society. I continue to meet new people in my role as President, and I am excited to see how we continue to make significant contributions to weed science and to the NCWSS. If there is anything I can do to make a better NCWSS annual meeting, please let me know. I look forward to seeing you in Des Moines.

Anita Dille, President

General Information

Conference Headquarters

All sessions of the conference and the meeting events will be held at the Des Moines Marriott, Downtown, 700 Grand Avenue, Des Moines, IA 50309; Phone 515-245-5500.

Registration

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

Pre-registration is **\$240** (includes banquet). Registration after Nov. 12 or at the conference is **\$290**. Honorary members and Fellows pre-registration is **\$170**; registration after Nov. 20 or at the conference is **\$220**.

Student pre-registration is **\$120**; student registration after Nov. 20 or at the conference is **\$170**.

Industry Breakfast tickets are available to everyone for **\$35**.

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

Registration Hours

The registration desk is in the **Foyer on the 3rd 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, and Thursday 7:30 to 10 am.

Local Arrangements Headquarters: Waterloo Room

Meeting Rooms

All sessions and meetings will be on the 2nd and 3rd floors of the hotel. Additional meetings may be arranged any time during the conference by contacting Mike Owen, Local Arrangements Chair.

Proceedings

2016 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 Des Moines Exhibit Hall. 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 have it recorded at the conference.

Program Symbols

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

Meetings of the Society 2016

Board of Directors

Monday, 1:00 pm	Cedar Rapids & Council Bluffs
Wednesday, 7:00 pm	Salon D

Local Arrangements

Monday, 11:00 am	Waterloo
Thursday, noon (with 2017 committee)	Davenport & Dubuque

Contest Judges for Paper and Poster Contests

Judges breakfast, Tuesday, 7:00 am	Cedar Rapids
Judges, Tuesday, 7:15 am	Cedar Rapids
Paper Judges, Tuesday, 5:00 pm	Sioux City
Poster Judges, Tuesday, 6:30 pm	Sioux City

Meal Functions

Breaks

Tuesday, 2:45– 3:15 pm	Exhibit Hall (3rd Floor)
Wednesday, 9:45 – 10:15 am	Second Floor
Wednesday, 3:00 – 3:45 pm	Second Floor
Thursday, 9:45 – 10:30 am	Exhibit Hall (3rd Floor)

Student Mixer and Quiz Bowl

Sponsored by BASF Corporation – Open to all attendees

Monday, 6:30 pm	Iowa Ballroom
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Student Luncheon/Business Meeting

Sponsored by Dow AgroSciences – Open to all students

Tuesday, 12:00 – 1:15 pm	Cedar Rapids & Council Bluffs
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Women in Weed Science Networking

Breakfast – Open to all women

Wednesday 6:30-8:00 am	Cedar Rapids
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Society Awards Luncheon

MC: Mike Moechnig

Wednesday, 12:00 am	Des Moines Exhibit Hall
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Society Social

Wednesday, 5:30 – 7:00 pm	Des Moines Exhibit Hall
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Sponsored by Industry – Open to all attendees

Industry Breakfast (Cost \$35)

Thursday, 7:00 am	Cedar Rapids & Council Bluffs
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Meetings of the Society 2016

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 2018. 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*) Sioux City

Distinguished Achievement Award

Tuesday, 12:00 pm Waterloo

Strategic Planning

Monday, 5:30 pm Sioux City

Paper Judges

Tuesday, 7:00 am Cedar Rapids

Tuesday, 5:00 pm Sioux City

Poster Judges

Tuesday, 7:00 am Cedar Rapids

Tuesday, 6:30 pm Sioux City

Finance, Steering, & Policy

Tuesday, 5:30 pm Cedar Rapids

Future Site Selection

Tuesday, 5:30 pm Council Bluffs

Nominating

Tuesday, 5:30 pm Davenport

Resident Education, Summer Contest, and

Contest Rules Joint meeting

Tuesday, 6:00 pm Dubuque

Extension (Committee and Business Meeting)

Wednesday, 11:30 am Salon F, G & H

NCWSS Fellow

Wednesday, 5:00 pm Sioux City

Resolutions & Necrology

Wednesday, 5:00 pm Waterloo

Invasive Plants

Wednesday, 2:45 pm Davenport & Dubuque

Industry (committee and Business Meeting)

Thursday, 8:00 am Cedar Rapids & Council Bluffs

Meetings of the Society 2016

Program Section Business Meetings

Rangeland, Pastures, and Industrial Vegetation Management	
Wednesday, 2:30 pm	Davenport & Dubuque
Agronomic Crops I (Corn, Sorghum, Cereals)	
Wednesday, 10:45 am	Salon E
Agronomic Crops II (Soybeans, Dry Beans, Sugar Beets)	
Wednesday, 11:15 am	Salon D
Equipment and Application Methods	
Thursday, 11:15 am	Salon E, F, G, & H
Extension	
Wednesday, 11:30 am	Salon F, G & H
Herbicide Physiology	
Wednesday, 2:30 pm	Cedar Rapids & Council Bluffs
Specialty Crops	
Wednesday, 9:30 am	Davenport & Dubuque
Poster Session	
Monday, 6:00 pm	Des Moines Exhibit Hall
Weed Biology, Ecology & Management	
Tuesday, 4:45 pm	Salon A, B & C
Invasive Plants	
Wednesday, 2:45 pm	Davenport & Dubuque

Special Interest Groups

Graduate Students (at luncheon)	
Tuesday, 12:00 pm	Cedar Rapids & Council Bluffs
Women in Weed Science Networking Breakfast	
Wednesday 6:30 am	Cedar Rapids
Industry (at breakfast)	
Thursday, 7:00 am	Cedar Rapids & Council Bluffs

Symposia

Public Issues and Communication Issues	
Wednesday, 8:00 – 11:45 am	Salon F, G & H
New Technology Presentations	
Wednesday, 1:30 – 3:30 pm	Salon A, B, C & D
What's New in Industry?	
Wednesday, 3:30 – 5:00 pm	Salon A, B, C & D

Condensed Program – NCWSS 2016

Monday, December 12

1:00 – 5:00	Board of Directors Cedar Rapids /Council Bluffs
1:00 – 9:30	Poster Session Setup Exhibit Hall
6:30 pm	Student Mixer and Quiz Bowl Iowa Ballroom

Tuesday, December 13

8:00 – 9:45	Poster Session I	Des Moines Exhibit Hall
10:00 – 12:00	NCWSS General Session	Iowa Ballroom
12:00 – 1:15	Student Lunch	Cedar Rapids & Council Bluffs
1:15 – 4:45	Agronomic Crops II	Salon D
1:30 – 3:00	Equipment & Application Methods	Salon E
1:30 – 5:00	Weed Biology, Ecology, and Management	Salon AB&C
1:30 – 4:30	Herbicide Physiology	Salon FG&H
3:30 – 4:30	Agronomic Crops I	Salon E
5:00 – 6:30	Poster Session II	Exhibit Hall

Wednesday, December 14

6:30 – 8:00	Women in Weed Science Networking Breakfast	Cedar Rapids
8:15 – 11:30	Agronomic Crops II	Salon D
8:45 – 11:00	Agronomic Crops I	Salon E
8:00 – 11:45	Public & Communication Issues (Symposium)	Salon FG&H
8:30 – 10:00	Specialty/Minor Crops	Davenport & Dubuque
12:00 – 1:30	NCWSS Awards Luncheon	Exhibit Hall
1:30 – 3:30	New Technology Symposium	Salon ABC&D
1:30 – 2:45	Herbicide Physiology	Cedar Rapids & Council Bluffs
1:30 – 3:00	Invasive Weeds & Rangeland, Pasture Ind. & Veg. Management	Davenport & Dubuque
3:30 – 5:00	What's New in Industry?	Salon ABC&D
5:30 – 7:00	Society Social - (open to all attendees)	Des Moines Exhibit Hall
7:00 – 9:00	NCWSS Board of Directors	Salon D

Thursday, December 15

7:00 – 8:00	Industry Breakfast	Cedar Rapids & Council Bluffs
8:30 – 11:00	Agronomic Crops II	Salon ABC&D
8:15 – 11:30	Equipment and Application	Salon EFG&H
8:30 – 10:00	Weed Biology, Ecology and Management	Davenport & Dubuque

Poster Sessions

Room: Des Moines Exhibit Hall

Chairperson and Moderator: David Hillger

Poster Setup

Posters can be set up between 1:00 and 9:30 pm on Monday, December 12. All NCWSS posters will be on display on Tuesday, December 12 from 8:00 am until 6:30 pm.

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)

5:00 – 6:30 pm Poster Session II (non-contest authors present at even numbered posters)

Poster Removal

All posters must be removed between 6:30 and 8:00 pm on Tuesday.

NCWSS Sustaining Member Exhibitors

Tuesday & Wednesday

Exhibit Hall

Set up Monday afternoon.

Program Symbols

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

Agronomic Crops I (Corn, Sorghum, Cereals)

†**Preemergence Activity of Chloroacetamide Herbicides on a Multiple Herbicide-Resistant Population of Waterhemp (*Amaranthus tuberculatus*).** Seth A. Strom*, Aaron G. Hager, Dean Riechers; University of Illinois, Urbana, IL (1)

Evaluation of Postemergence Herbicides for Managing Horseweed (*Conyza canadensis*) in Corn. Chris Proctor*, Amit Jhala; University of Nebraska Lincoln, Lincoln, NE, (2)

Agronomic Crops I (Continued)

††**Effects of Clethodim and Dicamba Tank-mixtures on Control of Volunteer Corn (*Zea mays*) and Grain Sorghum (*Sorghum bicolor*).** Isidor Ceperkovic*, Andrea Rilakovic, Jeffrey A. Golus, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (3)

†**Grain Sorghum Response to Huskie™ following Treatment with Herbicide Mixtures Containing Mesotrione.** Seth Menzer*, Mithila Jugulam, Curtis R. Thompson; Kansas State University, Manhattan, KS (4)

†**Critical Period of Grass Weed Control in ALS-Resistant Sorghum.** Jeffrey J. Albers*¹, Anita Dille¹, Curtis R. Thompson¹, Phillip W. Stahlman²; ¹Kansas State University, Manhattan, KS, ²Kansas State Research and Extension, Hays, KS (5)

Biochemical Analysis and Transcript Profiling of Etiolated Sorghum Coleoptiles Following Safener or Oxylin Treatment. Rong Ma*, Patrick J. Brown, Kris N. Lambert, Anatoli V. Lygin, Mayandi Sivaguru, Stephen P. Moose, Dean E. Riechers; University of Illinois, Urbana, IL (6)

†**Weed Control in Spring Malting Barley.** Alyssa Lamb*, Mark M. Loux, Tony Dobbels; The Ohio State University, Columbus, OH (7)

Weed Control in Field Pennycress. Logan H. Bishop*, Kelly Nelson; University of Missouri - Columbia, Columbia, MO (8)

†**Preharvest Herbicide Effects on Winter Wheat.** Kelsey M. Rogers*, Christy L. Sprague; Michigan State University, East Lansing, MI (9)

†**Efficacy of Variable Rate Soil-applied Herbicides Based on Soil Electrical Conductivity and Organic Matter Differences.** Garrison J. Gundy*, Anita Dille, Antonio R. Asebedo; Kansas State University, Manhattan, KS (10)

Agronomic Crops II (Soybeans, Dry Beans/Sugar Beets)

†**Integration of Residual Herbicides and Cover Crops for Weed Control in a Soybean Production System.** Derek M. Whalen*, Mandy D. Bish, Meghan Biggs, Eric Oseland, Zach Trower, Blake R. Barlow, Shea Farrell, Kevin W. Bradley; University of Missouri, Columbia, MO (12)

Agronomic Crops II (Continued)

DuPont Herbicide Programs for Conventional-Till

Dicamba-Tolerant Soybeans. Keith A. Diedrick*¹, Kelly A. Backscheider², Eric Castner³, Richard Edmund⁴, Kevin L. Hahn⁵, Robert Rupp⁶, Dan Smith⁷, Charles E. Snipes⁸, Bruce V. Steward⁹, Robert Williams¹⁰, Victoria A. Kleczewski¹¹, Jeffery T. Krumm¹², Michael D. Meyer¹³, Scott E. Swanson¹⁴, Larry H. Hageman¹⁴, Keith D. Johnson¹⁵, Marsha J. Martin¹⁶; ¹DuPont Crop Protection, Madison, WI, ²DuPont Crop Protection, Shelbyville, IN, ³DuPont Crop Protection, Weatherford, TX, ⁴DuPont Crop Protection, Little Rock, AR, ⁵DuPont Crop Protection, Bloomington, IL, ⁶DuPont Crop Protection, Edmund, OK, ⁷DuPont Crop Protection, Madison, MS, ⁸DuPont Crop Protection, Greenville, MS, ⁹DuPont Crop Protection, Overland Park, KS, ¹⁰DuPont Crop Protection, Raleigh, NC, ¹¹DuPont Crop Protection, Middletown, DE, ¹²DuPont Crop Protection, Hastings, NE, ¹³DuPont Crop Protection, Johnston, IA, ¹⁴DuPont Crop Protection, Rochelle, IL, ¹⁵DuPont Crop Protection, Grand Forks, ND, ¹⁶DuPont Crop Protection, Columbus, OH (13)

††Evaluations of DuPont™ Basis Blend® Preemergence Herbicide Alone and in Tank-mix Combinations for use in BOLT™ Technology Soybeans.

Nickolas D. Theisen*¹, Larry H. Hageman², Scott E. Swanson², Kelly A. Backscheider³, Keith A. Deidrick⁴, Kevin L. Hahn⁵, David H. Johnson⁶, Michael D. Meyer⁶, Victoria A. Kleczewski⁷, Jeffery T. Krumm⁸, Marsha J. Martin⁹, Bruce V. Steward¹⁰; ¹University of Wisconsin- Platteville, Platteville, WI, ²DuPont Crop Protection, Rochelle, IL, ³DuPont Crop Protection, Shelbyville, IN, ⁴DuPont Crop Protection, DeForest, WI, ⁵DuPont Crop Protection, Bloomington, IL, ⁶DuPont Crop Protection, Johnston, IA, ⁷DuPont Crop Protection, Middletown, DE, ⁸DuPont Crop Protection, Hastings, NE, ⁹DuPont Crop Protection, Columbus, OH, ¹⁰DuPont Crop Protection, Overland Park, KS (14)

†Critical Time for Weed Removal in Soybeans is Influenced by Soil Applied Herbicides. Maxwell C. Oliveira*, Jon E. Scott, Stevan Knezevic; University of Nebraska-Lincoln, Concord, NE (15)

Tank Mix Partners with Paraquat for Enhanced Grass Control. Marshall M. Hay*, Dallas E. Peterson; Kansas State University, Manhattan, KS (16)

Agronomic Crops II (Continued)

†**Comparison of Weed Management Systems in Six Soybean Technologies.** Matthew C. Geiger*, Karla L. Gage; Southern IL University, Carbondale, IL (17)

†**Investigating Potential Interactions between Soil Applied Protoporphyrinogen Oxidase Inhibiting Herbicides and Soybean Seedling Diseases.** Nicholas J. Arneson*, Loren J. Giesler; University of Nebraska, Lincoln, NE (18)

Effect of Time of Day on Efficacy of Saflufenacil to Control Glyphosate Resistant Canada Fleabane in Soybean. Nader Soltani*, Chris Budd, Peter H. Sikkema; University of Guelph, Ridgetown, ON (19)

Soybean Injury from Dicamba and 2,4-D Tank Contamination. Nader Soltani*¹, Robert E. Nurse², Peter H. Sikkema¹; ¹University of Guelph, Ridgetown, ON, ²Agriculture Canada, Harrow, ON (20)

The Influence of Carrier Water Hardness on 2,4-D Choline Efficacy. Pratap Devkota*, William G. Johnson; Purdue University, West Lafayette, IN (21)

Enlist Soybean Weed Control Options for Controlling 5 Way Resistant Waterhemp Population in Illinois. David M. Simpson*¹, Kevin D. Johnson²; ¹Dow AgroSciences, Indianapolis, IN, ²Dow AgroSciences, Danville, IL (22)

†**Emergence Pattern of Palmer Amaranth in Response to Different Rates of Metribuzin and Sulfentrazone.** Matheus de Avellar*, Liberty Butts, Greg R. Kruger, Rodrigo Werle; University of Nebraska-Lincoln, North Platte, NE (23)

Greenhouse Screening of Soybean Variety Sensitivity to Soil-applied Metribuzin and Sulfentrazone. Liberty Butts*¹, Matheus de Avellar¹, Felipe Faleco², Rodrigo Werle¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²Sao Paulo State University, Botucatu, Brazil (24)

†**Effect of Soil Herbicides on a PPO-sensitive Soybean under Weed-free Conditions.** Rhett L. Stolte*¹, Ronald F. Krausz², Karla L. Gage¹; ¹Southern Illinois University, Carbondale, IL, ²Southern Illinois University, Belleville, IL (25)

Agronomic Crops II (Continued)

Managing Waterhemp in Soybeans with Layered Residual Herbicides. A Strategy for Controlling Herbicide Resistant Waterhemp in Minnesota. Lisa M. Behnken*¹, Fritz R. Breitenbach², Jeffrey L. Gunsolus³, Phyllis M. Bongard³; ¹University of Minnesota, Rochester, MN, ²University of Minnesota Extension, Rochester, MN, ³University of Minnesota Extension, St. Paul, MN (26)

†Palmer Amaranth Control in Double Crop Dicamba/Glyphosate Resistant Soybeans. Nathaniel R. Thompson*¹, Dallas E. Peterson¹, Gary L. Cramer², Chris M. Mayo³, Cathy L. Minihan¹; ¹Kansas State University, Manhattan, KS, ²Kansas State University, Hutchinson, KS, ³Monsanto, Gardner, KS (27)

†Rainfall Impacts the Residual Activity of Dicamba on Morningglory (*Ipomoea spp.*) and Common Waterhemp (*Amaranthus rudis*). Andy J. Luke*, Reid Smeda; University of Missouri, Columbia, MO (28)

Roundup Ready 2 Xtend Soybean Systems. Scott A. Nolte*; Monsanto, St. Louis, MO (29)

Roundup Ready^R Xtend Crop System: Stewardship in Practice. . Sara M. Allen*¹, Susan E. Curvey², Michelle R. Starke², Boyd J. Carey²; ¹Monsanto, Bonnie, IL, ²Monsanto, St. Louis, MO (30)

†Timing of Herbicide Applications and/or Tillage Affects Control of Glyphosate-resistant Horseweed in Soybean. Parminder S. Chahal*, Amit Jhala; University of Nebraska-Lincoln, Lincoln, NE (31)

Scheduled Herbicide Applications and Micro-rates: Is There a Fit in Herbicide-resistant Soybean? Mark L. Bernards*, Brent S. Heaton; Western Illinois University, Macomb, IL (32)

††Determining At-harvest Seed Retention of 3 Problematic Weed Species in Soybean. Drake J. Gleeson*, Eric G. Oseland, Meghan Biggs, Mandy D. Bish, Kevin W. Bradley; University of Missouri, Columbia, MO (33)

†Efficacy of Halauxifen-methyl Herbicide Programs for Management of Glyphosate-resistant Horseweed (*Conyza canadensis* L.) in Soybean. Marcelo Zimmer*, Bryan Young, William G. Johnson; Purdue University, West Lafayette, IN (34)

Agronomic Crops II (Continued)

Waterhemp Control in Edible Lima Bean Production in SE Minnesota. Fritz R. Breitenbach*¹, Lisa M. Behnken²;

¹University of Minnesota Extension, Rochester, MN,

²University of Minnesota, Rochester, MN (35)

†Examining Commercial Seed Mixtures for the Presence of Weed Species. Eric G. Oseland*, Meghan Biggs, Mandy Bish, Kevin W. Bradley; University of Missouri, Columbia, MO (36)

Equipment and Application Methods

Efficacy of Aim, Liberty and Cobra Applied through Twin Fan Nozzles. Annah Geyer*¹, Ronald Navarrete², Juan

Espinoza², Spencer L. Samuelson¹, Jeffrey A. Golus¹, Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE,

²Zamorano University, Tegucigalpa, Honduras (37)

††Influence of Nozzle Spacing, Boom Height and Nozzle Type on the Efficacy of Glufosinate, Dicamba, Glyphosate and Saflufenacil. Lucas Giorgianni Campos*, Kasey Schroeder, Jeffrey A. Golus, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (38)

†Influence of Spray Volume and Droplet Size on the Control of Palmer Amaranth (*Amaranthus palmeri*) and Horseweed (*Conyza canadensis*). Henrique Campos*, Bruno Canella Vieira, Thomas R. Butts, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (39)

Influence of StrikeLock on Herbicide Performance. Laura Hennemann*; Winfield United, River Falls, WI (40)

†Influence of Nozzle Type and Pressure on Droplet Size from Roundup PowerMax, Clarity, and Roundup PowerMax and Clarity Tank-mixtures. André de Oliveira Rodrigues*¹, Kasey Schroeder², Jeffrey A. Golus², Greg R. Kruger²; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, North Platte, NE (41)

Laboratory Methods for Determining Volatility Potential of Herbicides. David G. Ouse*, James M. Gifford; Dow AgroSciences, Indianapolis, IN (42)

†Which Factor Influences Dicamba Volatility the Greatest: Soil, Foliage or Adjuvant? Jamie L. Long*, Bryan Young; Purdue University, West Lafayette, IN (43)

Equipment and Application Methods **(Continued)**

†**Simulated Tank Contamination of 2,4-D with Combinations of Dicamba and Glyphosate Applied to Dicamba Tolerant Soybeans.** Brent C. Mansfield*, Marcelo L. Moretti, Bryan Young; Purdue University, West Lafayette, IN (44)

Sprayer Clinics: Adding to the Agronomy Toolbox. David J. Palecek*; Winfield United, River Falls, WI (45)

†**Change in Droplet Size from Plugged Air Induction Ports on Venturi Nozzles.** Débora de Oliveira Latorre*¹, Thomas R. Butts¹, Jesaelen G. Moraes², Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska-Lincoln, Lincoln, NE (46)

Extension

How Well Do Farmers Current Practices Fit with Upcoming Herbicide Resistant Crop Technologies? Lizabeth Stahl*¹, Lisa M. Behnken², Fritz R. Breitenbach³, Ryan P. Miller⁴, David Nicolai⁵; ¹University of MN Extension, Worthington, MN, ²University of Minnesota, Rochester, MN, ³University of Minnesota Extension, Rochester, MN, ⁴University of MN Extension, Rochester, MN, ⁵University of MN Extension, Farmington, MN (47)

Digital Books for Weed Identification. Bruce A. Ackley*; The Ohio State University, Columbus, OH (48)

Application Timing of PPO-inhibitor Herbicides Influences Level of Palmer Amaranth Control. Joey J. Rains*; Kansas State Weed Science Dept., Manhattan, KS (49)

Herbicide-Resistant Common Waterhemp and Palmer Amaranth in Wisconsin. Devin J. Hammer*, Nathan M. Drewitz, David E. Stoltenberg, Shawn P. Conley; University of Wisconsin-Madison, Madison, WI (50)

Weed Control Programs with Dicamba and Residuals in Dicamba Tolerant Soybeans. Jon E. Scott*, Stevan Knezevic; University of Nebraska-Lincoln, Concord, NE (51)

Extension(Continued)

††**Soybean Response to Current Herbicides.** Crystal Dau*, Anita Dille; Kansas State University, Manhattan, KS (52)

Burndown of Glyphosate-Resistant Marestalk in Northeast Nebraska. Jon E. Scott*, Stevan Knezevic; University of Nebraska-Lincoln, Concord, NE (53)

An AirTractor 502 Simulator for Training Agricultural Aviation Pilots on Pesticide Applications. Jeffrey A. Golus*, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (54)

Simulated Drift of Dicamba on Potentially Sensitive Crops. Stevan Knezevic*, Maxwell C. Oliveira, Jon E. Scott; University of Nebraska-Lincoln, Concord, NE (55)

Mobile Lab for Training Pesticide Applicators. Chandra J. Hawley*, Jeffrey A. Golus, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (56)

Alternatives to Glyphosate for Chemical Weed Control in Wheat Stubble. Dallas E. Peterson*, Curtis R. Thompson, Cathy L. Minihan; Kansas State University, Manhattan, KS (57)

Herbicide Physiology

†**Liquid Physical Properties and Droplet Size in Clethodim Applications.** Marcella Guerreiro de Jesus*¹, Jesaelen G. Moraes², Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska-Lincoln, Lincoln, NE (58)

Diverse Homoeolog Composition in Allohexaploid Wild Oat as Evidenced by Plastidic ACCase Gene Sequences. Michael J. Christoffers*, Robert P. Sabba; North Dakota State University, Fargo, ND (59)

††**Adjuvant Influence on Efficacy of Lactofen.** Rodger Farr*, Kasey Schroeder, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (60)

Control of Glyphosate-resistant Horseweed (*Conyza canadensis*) with Halauxifen-methyl versus Dicamba and 2,4-D. Cara L. McCauley*, Bryan Young; Purdue University, West Lafayette, IN (61)

Herbicide Physiology (Continued)

††Coevolution of Resistance to PPO Inhibitors in Palmer Amaranth and Waterhemp. Kathryn J. Lillie*¹, Darci Giacomini¹, James R. Martin², JD Green³, Patrick Tranel¹; ¹University of Illinois, Urbana, IL, ²University of Kentucky, Princeton, KY, ³University of Kentucky, Lexington, KY (62)

A Comparative Analysis of the Palmer Amaranth and Waterhemp Transcriptomes. Darci A. Giacomini*¹, Anita Kuepper², Todd A. Gaines², Roland Beffa³, Patrick Tranel¹; ¹University of Illinois, Urbana, IL, ²Colorado State University, Fort Collins, CO, ³Bayer CropScience, Frankfurt, Germany (63)

First Case of Glyphosate Resistance in Palmer Amaranth (*Amaranthus palmeri*) from Mexico. Javid Gherekhloo¹, Pablo T. Fernandez-Moreno*², Jose A. Dominguez-Valenzuela³, Hugo E. Cruz-Hipolito⁴, Reid Smeda⁵, Rafael A. De Prado²; ¹Department of Agronomy, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Iran, Gorgan, Iran, ²University of Cordoba, Cordoba, Spain, ³Department of Agricultural Parasitology, Chapingo Autonomous University, Road México, Texcoco Km. 38.5, 56230 Texcoco, México, Texcoco, Mexico, ⁴Bayer CropScience, Col. Ampl. Granada 11520, México D.F, México D.F, Mexico, ⁵University of Missouri, Columbia, MO (64)

Genetics of 2,4-D Resistance in an Illinois Waterhemp Population. Sebastián Sabaté*, Patrick Tranel, Aaron G. Hager; University of Illinois, Urbana, IL (65)

†High Temperature Enhances the Efficacy, Absorption and/or Translocation of 2,4-D or Glyphosate in Giant Ragweed. Zahoor A. Ganie*¹, Mithila Jugulam², Amit Jhala³; ¹University of Nebraska-Lincoln, Lincoln, NE, ²Kansas State University, Manhattan, KS, ³Assistant Professor, Lincoln, NE (66)

Rainfastness of 2,4-D, Roundup WeatherMax, Liberty and Cobra. Kasey Schroeder*¹, Juan Espinoza², Ronald Navarrete², André de Oliveira Rodrigues³, Jeffrey A. Golus¹, Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²Zamorano University, Tegucigalpa, Honduras, ³University of Nebraska-Lincoln, Lincoln, NE (67)

Herbicide Physiology (Continued)

†**Droplet Size and Deposition of Glyphosate and 2,4-D Drift in a Wind Tunnel.** Matthew R. Nelson*, Bruno Canella Vieira, Annah Geyer, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (68)

†**PPO-inhibitor-resistant Rigid Ryegrass (*Lolium rigidum*) and Wild Poinsettia (*Euphorbia heterophylla*) Response to Pre and Post Applied Oxyfluorfen.** Pablo T. Fernandez-Moreno*¹, Reid Smeda², Rafael A. De Prado¹; ¹University of Cordoba, Cordoba, Spain, ²University of Missouri, Columbia, MO (69)

Specialty/Minor Crops

†**What is the Role of Crop Interference in Integrated Weed Management of Edamame?** Laura Crawford*, Martin M. Williams; University of Illinois, Urbana, IL (70)

Bicyclopyrone: Major League Weed Control in Minor League Crops. Dain E. Bruns*¹, Cheryl L. Dunne², Gordon D. Vail³, Monika Saini³, Stott W. Howard⁴; ¹Syngenta Crop Protection, Marysville, OH, ²Syngenta Crop Protection, Vero Beach, FL, ³Syngenta Crop Protection, Greensboro, NC, ⁴Syngenta Crop Protection, Des Moines, IA (71)

Invasive Weeds

†**Callery Pear (*Pyrus calleryana*), an Invasive Urban Weed: Effective Control Methods.** Matthew R. Terry*, Reid Smeda; University of Missouri, Columbia, MO (72)

A Simulation to Predict the Spread of Road Dust in a Crop Field and its Potential Effects on Palmer Amaranth. Sydney Rissler¹, Teig Loge*²; ¹Simpson College, Ankeny, IA, ²Simpson College, Indianola, IA (73)

†**A Regional Monitoring Program for Herbicide Resistance in Shattercane and Johnsongrass Following Commercialization of Inzen Sorghum Hybrids.** Jake J. Ziggafoos*¹, Rodrigo Werle², Amit J. Jhala³, John Lindquist³, Brigitte Tenhumberg¹, Jeffrey Mower¹, Melinda Yerka¹; ¹University of Nebraska - Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, North Platte, NE, ³University of Nebraska-Lincoln, Lincoln, NE (74)

Weed Biology, Ecology, Management

††Effect of Growth Regulator Herbicide Injury to Common Milkweed on Ovipositioning by Monarch Butterflies. Brooke L. Hoey*, Sydney Lizotte-Hall, Bob Hartzler; Iowa State University, Ames, IA (75)

†Common Milkweed Injury due to Fomesafen Exposure and its Impact on Monarch Utilization. Sydney E. Lizotte-Hall*, Bob Hartzler; Iowa State University, Ames, IA (76)

Mechanisms of Weed Emergence Response to Tillage and Cover Cropping: Impacts of Herbicides and Fungal Pathogens. Markah Frost*, Daniel C. Brainard; Michigan State University, East Lansing, MI (77)

†Fitness Outcomes Related to Herbicide Resistance in Weeds: What Life History Stage to Examine? O. Adewale Osipitan*, Anita Dille; Kansas State University, Manhattan, KS (78)

†Antagonistic Effect of Glyphosate and Dicamba Tank-mix on Kochia Control. Junjun Ou*¹, Curtis R. Thompson¹, Phillip W. Stahlman², Mithila Jugulam¹; ¹Kansas State University, Manhattan, KS, ²Kansas State Research and Extension, Hays, KS (79)

†Environment and Hormone Effects on Seed Germination Behavior of Kochia. Anita Dille, Mithila Jugulam, Samida Khadka*; Kansas State University, Manhattan, KS (80)

†Effect of Common Ragweed (*Ambrosia artemisiifolia* L.) and Common Waterhemp (*Amaranthus rudis* Sauer) on Soybean (*Glycine max* L.) Growth. Koffi Badou Jeremie Kouame*; University of Nebraska-Lincoln, Lincoln, NE (81)

Distribution of Glyphosate-resistant Giant Ragweed (*Ambrosia trifida* L.) in Nebraska. Lia Marchi Werle*, Spencer L. Samuelson, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (82)

††Impact of Rainfall on Residual Activity of Dicamba on Foxtail (*Setaria spp.*) and Morningglory (*Ipomoea spp.*) Germination and Growth. Allen J. Scott*, Carey Page, Reid Smeda; University of Missouri, Columbia, MO (83)

Weed Biology, Ecology, Management
(Continued)

††Response of Waterhemp Populations from Nebraska to Soil Applied PSII and PPO Herbicides. Felipe Faleco*¹, Bruno Canella Vieira², Spencer L. Samuelson², Liberty Butts², Greg R. Kruger², Rodrigo Werle²; ¹Sao Paulo State University, Botucatu, Brazil, ²University of Nebraska-Lincoln, North Platte, NE (84)

†Palmer Amaranth (*Amaranthus palmeri*) Suppression with Half Rates of Dicamba and Atrazine with Increasing Sorghum (*Sorghum bicolor*) Density and Nitrogen Rate. Ivan B. Cuvaca*¹, Randall S. Currie², Mithila Jugulam¹, Anserd Foster²; ¹Kansas State University, Manhattan, KS, ²Kansas State University, Garden City, KS (85)

††Does Road Dust have the Potential to Impact Chemical Control of Waterhemp (*Amaranthus tuberculatus*)? Kayla Price*, Clint K. Meyer, Zoe G. Muehleip, Maggie E. Long, Rick Spellerberg; Simpson College, Indianola, IA (86)

†Density Dependent Johnsongrass (*Sorghum halepense*) Seed Production. Don G. Treptow*; University of Nebraska - Lincoln, Ithaca, NE (87)

Quantifying the Origin of Resistance. Federico Casale*¹, Patrick Tranel²; ¹University of Illinois at Urbana-Champaign, Champaign, IL, ²University of Illinois, Urbana, IL (88)

†Understanding Gender Determination In Dioecious *Amaranthus* Weeds. Ahmed Sadeque*¹, Patrick Brown², Patrick Tranel³; ¹University of Illinois at Urbana-Champaign, Urbana, IL, ²University of Illinois at Urbana-Champaign, Urbana, IL, ³University of Illinois, Urbana, IL (89)

Poster Withdrawn. (90)

Analysis of Weed Species Spectrum After a Four Year Corn and Soybean Rotation With Growth Regulator Herbicide Dependent Weed Control Programs. Travis Legleiter*, William G. Johnson; Purdue University, West Lafayette, IN (91)

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

†**Distribution of Glyphosate-resistant Common Waterhemp (*Amaranthus rudis*) in Nebraska.** Bruno Canella Vieira*¹, Spencer L. Samuelson¹, Jose H. Sanctis², Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²ESALQ-USP, Sao Paulo, Brazil (92)

†**Response of Palmer Amaranth (*Amaranthus palmeri*) to Glyphosate and PPO-inhibiting Herbicide Tank-mixtures.** Jesaelen G. Moraes*¹, Thomas R. Butts², Greg R. Kruger²; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, North Platte, NE (93)

††**Control of Palmer amaranth (*Amaranthus palmeri*) and Common Lambsquarters (*Chenopodium album*) with Tank-mixtures of Clethodim and Dicamba.** Andrea Rilakovic*, Isidor Ceperkovic, Kasey Schroeder, Jeffrey A. Golus, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (94)

Development of Codominant Markers for *Amaranthus* Species Identification. Brent P. Murphy*, Patrick Tranel; University of Illinois, Urbana, IL (95)

††**Response of Nebraska Horseweed (*Conyza canadensis*) Populations to Lactofen and Cloransulam-methyl.** Estefânia Gomiero Polli*, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (96)

Ability of *Clavibacter michiganensis* subsp. *nebraskensis*, Causal Agent of Goss's Wilt of Corn, to Overwinter in Alternative Host Debris and Seed. Joseph T. Ikley*, William G. Johnson, Kiersten A. Wise; Purdue University, West Lafayette, IN (97)

†**Survey of Field Practices, Environmental Factors, and Alternative Weed Hosts Influencing the Occurrence of Goss's Wilt.** Taylor M. Campbell*, Joseph T. Ikley, Kiersten A. Wise, William G. Johnson; Purdue University, West Lafayette, IN (98)

†**Seasonal Changes in Forage Quality of Common Pasture Weeds in Missouri.** Zach L. Trower*, Mandy D. Bish, Meghan Biggs, Kevin W. Bradley; University of Missouri, Columbia, MO (99)

General Session

Room: Iowa Ballroom

Moderator: Greg Dahl

***SPEAKER**

- 10:00 Welcome to Iowa.** Bill Northey*; Secretary of Agriculture, Iowa Department of Agriculture and Land Stewardship, Des Moines, IA (100)
- 10:15 Bridging to Better Times.** Dermot J. Hayes*; Pioneer Chair in Agribusiness, Iowa State University, Ames, IA (101)
- 11:00 Washington DC Report.** Lee Van Wychen*; National and Regional Weed Science Societies, Alexandria, VA (102)
- 11:15 NCWSS Presidential Address.** Anita Dille*; Kansas State University, Manhattan, KS (103)
- 11:30 Remembering Former NCWSS Members and Friends.** Aaron G. Hager*; University of Illinois, Urbana, IL (104)
- 11:45 Announcements.** Gregory K. Dahl*; Winfield United, River Falls, WI (105)

Student Luncheon/Business Meeting

Sponsored by Dow AgroSciences – Open to all students

12:00 – 1:15 pm Cedar Rapids & Council Bluffs

Agronomic Crops II (Soybeans, Dry Beans/Sugar Beets)

Room: Salon D

Moderator: Jeff Ellis

***SPEAKER † STUDENT CONTEST**

- 1:15 Survey of Nebraska Soybean Producers: Agronomic Practices and Weed Management Strategies.** Rodrigo Werle*¹, Joshua J. Miller²;
¹University of Nebraska-Lincoln, North Platte, NE,
²University of Nebraska - Lincoln, Lincoln, NE
(106)

Tuesday Papers 2016

- 1:30 †How 80 years of Soybean Breeding has Affected Competitiveness with Weeds.** Devin J. Hammer*, Shawn P. Conley, David E. Stoltenberg; University of Wisconsin-Madison, Madison, WI (107)
- 1:45 †Challenging Weeds Using Organic Practices in Soybean (*Glycine max*).** Ricardo Costa*, Kerry Clark, Reid Smeda; University of Missouri, Columbia, MO (108)
- 2:00 †Herbicide and Timing Options for Residual and Burndown Control of Pigweed (*Amaranthus spp*) for Double Crop Soybean.** Marshall M. Hay*, Dallas E. Peterson, Douglas E. Shoup; Kansas State University, Manhattan, KS (109)
- 2:15 †Evaluation of 2,4-D, Dicamba, Glyphosate, and Halauxifen-methyl Tank-mixtures on Broadleaf Weeds.** Marcelo Zimmer*, Bryan Young, William G. Johnson; Purdue University, West Lafayette, IN (110)
- 2:30 †Does Speed of Activity Translate to Final Efficacy for Paraquat Applications?** Garth W. Duncan*, Julie M. Young, Bryan Young; Purdue University, West Lafayette, IN (111)
- 2:45 †Preplant Burndown Herbicide Options for Control of Glyphosate-Resistant Common Ragweed (*Ambrosia artemisiifolia* L) in Glufosinate-Resistant Soybean.** Ethann Barnes*¹, Peter H. Sikkema², Stevan Knezevic³, John Lindquist¹, Amit Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Guelph, Ridgetown, ON, ³University of Nebraska-Lincoln, Concord, NE (112)
- 3:00 Break** Exhibit Hall (3rd Floor)
- 3:15 †Effects of Simulated Tank-Contamination with 2,4-D and Dicamba on Sugarbeet.** Michael A. Probst*, Christy L. Sprague; Michigan State University, East Lansing, MI (113)
- 3:30 †Comparison of Single and Multiple Sites of Herbicide Activity on a Mixed Population of Herbicide Resistant Palmer Amaranth and Waterhemp.** Nick Fleitz*¹, JD Green², James R. Martin³, Patrick Tranel⁴; ¹Graduate Student, Lexington, KY, ²University of Kentucky, Lexington, KY, ³University of Kentucky, Princeton, KY, ⁴University of Illinois, Urbana, IL (114)

Agronomic Crops II (Continued)

- 3:45 †Dry Bean and Sugarbeet Response to Bicyclopyrone Residues.** Daniel D. Wilkinson*, Christy L. Sprague; Michigan State University, East Lansing, MI (115)
- 4:00 †Interaction of Soil Residual PPO-Inhibiting Herbicides and S-Metolachlor on Selection of PPO-Resistant Waterhemp.** Brent C. Mansfield*, Haozhen Nie, Bryan Young; Purdue University, West Lafayette, IN (116)
- 4:15 †Investigating the Potential Effects of Pre-emergence Residual Herbicides and Seed Treatment in Soybean .** Blake R. Barlow*, Meghan Biggs, Mandy Bish, Kevin Bradley; University of Missouri, Columbia, MO (117)
- 4:30 †Integrating Soybean Row Width and a Cereal Rye Cover Crop to Manage Glyphosate-Resistant Palmer Amaranth.** Kelsey M. Rogers*, Christy L. Sprague, Karen A. Renner; Michigan State University, East Lansing, MI (118)

Equipment and Application Methods

Room: Salon E

Moderator: Travis Legleiter

***SPEAKER † STUDENT CONTEST**

- 1:30 †The Influence of Application Speed and Pressure on Weed Control.** André de Oliveira Rodrigues*¹, Lucas Giorgianni Campos², Greg R. Kruger²; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, North Platte, NE (119)
- 1:45 †The Impact of Nozzle Selection on the Efficacy of Glyphosate and PPO-inhibiting Herbicide Tank-mixtures.** Jesaelen G. Moraes*¹, Débora de Oliveira Latorre², Marcella Guerreiro de Jesus², Greg R. Kruger²; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, North Platte, NE (120)
- 2:00 †Spray Droplet Size and Nozzle Tip Pressure from a Pulse-width Modulation Sprayer.** Thomas R. Butts*, Liberty E. Butts, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (121)

Tuesday Papers 2016

- 2:15 †Equipment and Cleaning Agents Influence Dicamba Rinsate Damage to Soybeans (*Glycine max*).** Andy J. Luke*¹, Reid Smeda¹, Jason W. Weirich²; ¹University of Missouri, Columbia, MO, ²MFA Incorporated, Columbia, MO (122)
- 2:30 †Evaluation of Drift from a Field Application of Enlist Duo™.** Matthew R. Nelson*¹, W. C. Hoffmann², Brad K. Fritz², Jerome J. Schleier, III³, Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²USDA-ARS, College Station, TX, ³Dow AgroSciences LLC, Indianapolis, IN (123)
- 2:45 Is EPTC a Herbicide or an Adjuvant?** Richard K. Zollinger*; North Dakota State University, Fargo, ND (124)

Weed Biology, Ecology, Management

Room: Salon A, B & C

Moderator: Erin Haramoto

***SPEAKER † STUDENT CONTEST**

- 1:30 †Nicosulfuron as a Suppressant in a Living Mulch of Annual Ryegrass (*Lolium multiflorum* Lam.) in Corn (*Zea mays* L.).** Taïga Cholette*, Darren E. Robinson, David C. Hooker, Peter H. Sikkema; University of Guelph-Ridgetown, Ridgetown, ON (125)
- 1:45 †Effect of Cover Crop Species and Termination Strategies on Weed Suppression in a Corn and Soybean Production System.** Joshua J. Miller*¹, Rodrigo Werle²; ¹University of Nebraska - Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, North Platte, NE (126)
- 2:00 †The Wisconsin Integrated Cropping Systems Trial: Weed Communities in Conventional Corn and Soybean Production Systems After 27 Years.** Nathan M. Drewitz*, David E. Stoltenberg; University of Wisconsin-Madison, Madison, WI (127)
- 2:15 †Efficacy of PRE and POST applied Dicamba on Dicamba-Resistant Kochia.** Junjun Ou*¹, Curtis R. Thompson¹, Phillip W. Stahlman², Mithila Jugulam¹; ¹Kansas State University, Manhattan, KS, ²Kansas State Research and Extension, Hays, KS (128)

Tuesday Papers 2016
**Weed Biology, Ecology,
 Management (Continued)**

- 2:30** †**Transcriptome Expression Analysis of 4-hydroxyphenylpyruvate Dioxygenase Inhibitor Herbicide Resistance in *Amaranthus tuberculatus* using RNA-Sequencing.** Daniel R. Kohlhase*¹, Mike D. Owen¹, Michelle A. Graham²; ¹Iowa State University, Ames, IA, ²USDA-ARS, Ames, IA (129)
- 2:45** †**Biological Response of Palmer Amaranth (*Amaranthus palmeri*) and Common Waterhemp (*Amaranthus rudis*) to Herbicide Drift.** Bruno Canella Vieira*, Matthew R. Nelson, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (130)
- 3:00** **Break** Exhibit Hall (3rd Floor)
- 3:15** †**Temperature Effect on Efficacy of POST-Herbicides to Control Palmer Amaranth (*Amaranthus palmeri*) in Grain Sorghum.** Seth Menzer*, Mithila Jugulam, Curtis R. Thompson; Kansas State University, Manhattan, KS (131)
- 3:30** †**How Attitudes About Community Can Contribute to Herbicide Resistant Palmer Amaranth.** John A. Pauley*, Maggie E. Long, Zoe G. Muehleip; Simpson College, Indianola, IA (132)
- 3:45** †**Response of Three Alternative Weed Hosts and Two Corn Hybrids to Different Inoculum Levels of *Clavibacter michiganensis* subsp. *nebraskensis*, Causal Agent of Goss's Wilt.** Taylor M. Campbell*, Joseph T. Ikley, Kiersten A. Wise, William G. Johnson; Purdue University, West Lafayette, IN (133)
- 4:00** †**Herbicide Timing for Effective Control on Railroads in the Mid-West.** Matthew R. Terry*, Reid Smeda; University of Missouri, Columbia, MO (134)
- 4:15** †**Relationships Between Weed Incidence, Soil Fertility, and Soil pH in Missouri Pastures.** Zach L. Trower*, Mandy D. Bish, Meghan Biggs, Kevin W. Bradley; University of Missouri, Columbia, MO, (135)

Weed Biology, Ecology, Management (Continued)

- 4:30** †**Soybean (*Glycine max* L.) Yield Loss as Affected by Common Ragweed (*Ambrosia artemisiifolia* L.) and Common Waterhemp (*Amaranthus rudis* Sauer) in Nebraska.** Koffi Badou Jeremie Kouame*; University of Nebraska-Lincoln, Lincoln, NE (136)

4:45 Business Meeting

Herbicide Physiology

Room: Salon F, G & H

Moderator: Rong Ma

***SPEAKER † STUDENT CONTEST**

- 1:30** †**Overexpression of a Native Gene Encoding 5-enolpyruvylshikimate-3-phosphate synthase can Enhance Fecundity in *Arabidopsis thaliana*.** Zachery T. Beres*, Xiao Yang, Lin Jin, David M. Mackey, Jason T. Parrish, Wanying Zhao, Allison A. Snow; Ohio State University, Columbus, OH (137)
- 1:45** †**Physical Mapping of EPSPS Gene Copies in Glyphosate-Resistant Italian Ryegrass (*Lolium perenne* ssp. *multiflorum*).** Karthik Putta*¹, Dal-Hoe Koo¹, Vijaya k. Varanasi¹, Randall S. Currie², Nilda R. Burgos³, Mithila Jugulam¹; ¹Kansas State University, Manhattan, KS, ²Kansas State Univ., Garden City, KS, ³University of Arkansas, Fayetteville, AR (138)
- 2:00** †**Investigations into Target-Site and Non-Target-Site Resistance Mechanisms in HPPD Resistant Waterhemp from Nebraska.** Maxwell C. Oliveira*¹, Franck Dayan², Todd Gaines², Jon E. Scott¹, Stevan Knezevic¹; ¹University of Nebraska-Lincoln, Concord, NE, ²Colorado State University, Fort Collins, CO (139)
- 2:15** †**Safener Induced Expression of Tandemly Duplicated GSTs using Validated Reference Genes in Sorghum Shoots.** Loren V. Goodrich*; University of Illinois Urbana-Champaign, Savoy, IL (140)

Herbicide Physiology (Continued)

- 2:30 †How Much does Horseweed (*Conyza canadensis*) Height or Developmental Stage Influence the Efficacy of Halauxifen-methyl, Dicamba, and 2,4-D?** Cara L. McCauley*, Bryan Young; Purdue University, West Lafayette, IN (141)
- 2:45 †Occurrence of Glyphosate-resistant Horseweed (*Conyza canadensis*) in Rangeland Areas of West Central Nebraska.** Débora de Oliveira Latorre*¹, Spencer L. Samuelson¹, Jesaelen G. Moraes², Rodrigo Werle¹, Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska-Lincoln, Lincoln, NE (142)
- 3:00 Break** Exhibit Hall (3rd Floor)
- 3:15 †Atomization of Polymer Tank-mixtures with Picloram and 2,4-D.** Henrique Campos*, Bruno Canella Vieira, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (143)
- 3:30 †AtuGSTF2 Expression Strongly Correlates with Atrazine Resistance in a Segregating *Amaranthus tuberculatus* F2 Population.** Sarah O'Brien*; University of Illinois Weed Science Department, Urbana, IL (144)
- 3:45 †Evaluation of Carry Over and Drift with Growth Regulating Herbicides in *Armoracia rusticana*.** Kayla N. Wiedau*¹, Karla L. Gage¹, Ronald F. Krausz²; ¹Southern Illinois University, Carbondale, IL, ²Southern Illinois University, Belleville, IL (145)
- 4:00 †Multiple-resistance to Oxyfluorfen and Glyphosate in Different Populations of Rigid Ryegrass (*Lolium rigidum*) from Spain.** Pablo T. Fernandez-Moreno*¹, Julio Menendez², Reid Smeda³, Rafael A. De Prado¹; ¹University of Cordoba, Cordoba, Spain, ²Department of Agroforestry Science, University of Huelva,, Huelva, Spain, ³University of Missouri, Columbia, MO (146)
- 4:15 †Multiple Resistance to Chlorimuron, Fomesafen, and Glyphosate in Palmer Amaranth from Indiana.** Douglas J. Spaunhorst*, William G. Johnson; Purdue, West Lafayette, IN (147)

Agronomic Crops I (Corn, Sorghum, Cereals)

Room: Salon E
Moderator: Curtis Thompson

***SPEAKER † STUDENT CONTEST**

- 3:30 †Evaluations of Herbicide Programs in ALS Resistant Grain Sorghum.** Eric A. VanLoenen^{*1}, Curtis R. Thompson¹, Anita Dille¹, Gary L. Cramer², Bruce V. Steward³, Phillip W. Stahlman⁴, Ken L. Carlson⁵, Cathy L. Minihan¹, Alan J. Schlegel⁶; ¹Kansas State University, Manhattan, KS, ²Kansas State University, Hutchinson, KS, ³DuPont Crop Protection, Overland Park, KS, ⁴Kansas State Research and Extension, Hays, KS, ⁵DuPont Crop Protection, Johnston, IA, ⁶Kansas State University, Tribune, KS (148)
- 3:45 †Effect of Single Mode of Action Postemergence Herbicides on Severity of Goss's wilt in Corn.** Joseph T. Ikley^{*}, William G. Johnson, Kiersten A. Wise; Purdue University, West Lafayette, IN (149)
- 4:00 †Critical Cover Crop-Free Period in Corn.** Aaron P. Brooker^{*}, Karen A. Renner, Christy L. Sprague; Michigan State University, East Lansing, MI (150)
- 4:15 †Interaction between herbicides on volunteer corn (*Zea mays* L.) control using different nozzle types.** Marcella Guerreiro de Jesus^{*}, Jeffrey A. Golus, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (151)

Agronomic Crops II (Soybeans, Dry Beans/Sugar Beets)

Room: Salon D
Moderator: Jeff Ellis

***SPEAKER**

- 8:15 Utilizing Isoxaflutole for Weed Management in HPPD Tolerant Soybeans.** Michael L. Weber*¹, Jayla Allen², Mark Waddington³; ¹Bayer CropScience, Indianola, IA, ²Bayer CropScience, Carrollton, MO, ³Bayer CropScience, RTP, NC (152)
- 8:30 Managing Waterhemp in Soybeans with Layered Residual Herbicides. A Strategy for Controlling Herbicide Resistant Waterhemp in Minnesota.** Lisa M. Behnken*¹, Fritz R. Breitenbach², Jeffrey L. Gunsolus³, Phyllis M. Bongard³; ¹University of Minnesota, Rochester, MN, ²University of Minnesota Extension, Rochester, MN, ³University of Minnesota Extension, St. Paul, MN (153)
- 8:45 Utility of Elevore™ Herbicide with Arylex Active™ for Preplant Burndown Applications.** Jeff M. Ellis*¹, Mark A. Peterson², Kristin K. Rosenbaum³, Laura A. Campbell⁴, Kevin D. Johnson⁵, Sunil S. Tewari⁶; ¹Dow AgroSciences, Smithville, MO, ²Dow AgroSciences, Indianapolis, IN, ³Dow AgroSciences, Crete, NE, ⁴Dow AgroSciences, Carbondale, IL, ⁵Dow AgroSciences, Danville, IL, ⁶Dow AgroSciences, West Lafayette, IN (154)
- 9:00 The Contribution of Metribuzin to Preemergence Herbicide Mixtures for Control of Glyphosate-Resistant Palmer Amaranth (*Amaranthus palmeri*).** J. Andrew Kendig*¹, Karla L. Gage²; ¹UPI, St. Louis, MO, ²Southern Illinois University, Carbondale, IL (155)
- 9:15 An Introduction to Zidua PRO Herbicide for Soybean.** Duane P. Rathmann¹, Brady F. Kappler², Jared M. Roskamp*³, Gery S. Welker⁴, Vince M. Davis⁵; ¹BASF, Waseca, MN, ²BASF, Eagle, NE, ³BASF, Sutter, IL, ⁴BASF, Fishers, IN, ⁵BASF, Verona, WI (156)

Agronomic Crops II (Continued)

- 9:30 A New S-metolachlor plus Dicamba Premix as an Effective Tool in an Integrated Weed Management Program in Dicamba Tolerant Soybeans.** Brett R. Miller*¹, Adrian J. Moses², Don J. Porter³, Timothy L. Trower⁴, James C. Holloway⁵; ¹Syngenta, Minnetonka, MN, ²Syngenta, Gilbert, IA, ³Syngenta, Greensboro, NC, ⁴Syngenta, Baraboo, WI, ⁵Syngenta, Jackson, TN (157)
- 9:45 The Value of Using a Systems Approach with Engenia Herbicide in Dicamba Tolerant Soybeans.** Brady F. Kappler¹, Jared M. Roskamp², Vince M. Davis*³, Gery S. Welker⁴, Duane P. Rathmann⁵; ¹BASF, Eagle, NE, ²BASF, Sutter, IL, ³BASF, Verona, WI, ⁴BASF, Fishers, IN, ⁵BASF, Waseca, MN (158)
- 10:00 Break** Second Floor
- 10:15 Evaluation of Lactofen plus Glufosinate Tank-mixes in Glufosinate Tolerant Soybean.** Eric J. Ott*¹, Dawn E. Refsell², Lowell D. Sandell³, Ronald E. Estes⁴, Trevor D. Israel⁵, John A. Pawlak⁶; ¹Valent USA Corporation, Greenfield, IN, ²Valent USA Corporation, Lathrop, MO, ³Valent USA Corporation, Lincoln, NE, ⁴Valent USA Corporation, Champaign, IL, ⁵Valent USA Corporation, Sioux Falls, SD, ⁶Valent USA Corporation, Lansing, MI (159)
- 10:30 Weed Control in the Xtend Crop System.** Ryan J. Rector*; Monsanto, St. Louis, MO (160)
- 10:45 Herbicide Strategies for Palmer Amaranth Management in Illinois.** Lanae Ringler*; University of Illinois, Urbana, IL (161)
- 11:00 Factors Influencing Off Target Movement of New Herbicide Formulations.** David M. Simpson*¹, Jerome J. Schleier, III², Mei Li¹, David G. Ouse¹, James M. Gifford¹; ¹Dow AgroSciences, Indianapolis, IN, ²Dow AgroSciences LLC, Indianapolis, IN (162)
- 11:15 Business Meeting**

Wednesday Papers 2016

Agronomic Crops I (Corn, Sorghum, Cereals)

Room: Salon E
Moderator: Curtis Thompson
*SPEAKER

- 8:45 Control of Glyphosate Resistant Canada Fleabane in Corn/Soybean/Wheat Rotation.** Peter H. Sikkema*, Nader Soltani; University of Guelph, Ridgetown, ON (163)
- 9:00 Talinor™ Herbicide: Introducing a New Postemergence Herbicide for Broadleaf Weed Control in Cereals.** Aaron S. Franssen*¹, Pete C. Forster², Don J. Porter³, Monika Saini³; ¹Syngenta Crop Protection, Pleasant Dale, NE, ²Syngenta Crop Protection, Eaton, CO, ³Syngenta Crop Protection, Greensboro, NC (164)
- 9:15 Johnsongrass (*Sorghum halepense*) Demography in Response to Different Herbicide Programs.** Don G. Treptow*; University of Nebraska - Lincoln, Ithaca, NE (165)
- 9:30 Effect of Formulation on Pyroxasulfone Dissipation in a Wheat Field Soil Environment.** Thomas C. Mueller*; University of Tennessee, Knoxville, TN (166)
- 9:45 The Effects of Increasing Rates of Dicamba for Palmer Amaranth Control in Fallow.** Randall S. Currie*¹, Ivan B. Cuvaca¹, Mithila Jugulam²; ¹Kansas State Univ., Garden City, KS, ²Kansas State University, Manhattan, KS (167)
- 10:00 Break** Second Floor
- 10:15 Evaluation of Herbicide Treatments for the Termination of Common Cover Crop Species.** Derek M. Whalen*¹, Mandy D. Bish¹, Jason Norsworthy², Shawn Conley³, Bryan Young⁴, Kevin W. Bradley¹; ¹University of Missouri, Columbia, MO, ²University of Arkansas, Fayetteville, AR, ³University of Wisconsin, Madison, WI, ⁴Purdue University, West Lafayette, IN (168)

Agronomic Crops I (Corn, Sorghum, Cereals)
(Continued)

- 10:30 Exploring the Monsanto Trait Development Process by Way of Dicamba and Glufosinate Tolerant Corn Event MON 87419.** Michael Goley*¹, Jintai Huang¹, Oscar Sparks¹, Aihua Shao¹, Martin Stoecker¹, Mark Groth², Tracy Klingaman¹, Susan Martino-Catt², Rita Varagona¹; ¹Monsanto Company, Chesterfield, MO, ²Monsanto Company, Creve Coeur, MO (169)

Public Issues and Communication Issues
(Extension)

Room: Salon F, G & H

Moderator: Amit Jhala

***SPEAKER**

- 8:00 Stewardship: What is Our Role?** Arlene Cotie*; Bayer CropScience, Research Triangle Park, NC (170)
- 8:20 Palmer Amaranth: Uninvited Guest to Conservation Plantings.** Bob Hartzler¹, Meaghan J. Anderson*²; ¹Iowa State University, Ames, IA, ²Iowa State University, Iowa City, IA (171)
- 8:40 A Season to Remember: Our Experiences with Off-target Movement of Dicamba in Missouri.** Kevin W. Bradley*; University of Missouri, Columbia, MO (172)
- 9:00 Science Policy Outlook for 2017.** Lee Van Wychen*; National and Regional Weed Science Societies, Alexandria, VA (173)
- 9:15 Regulatory Challenges to the Continued Availability of Herbicides and their Utility.** Michael Barrett, University of Kentucky, WSSA Liaison to the EPA Office of Pesticide Programs, Lexington, KY (174)
- 9:30 Discussion**
- 9:45 Break** Second Floor

Public Issues and Communication Issues **(Extension)(Continued)**

- | | |
|-------|--|
| 10:00 | Millenials in Agricultural Industry. Brandy Tannahill*; Research Designed 4 Agriculture, Yuma, AZ (176) |
| 10:45 | Experiences and Impressions Using New Technology and Methods in Weed Education and Outreach. Andrew R. Kniss*; University of Wyoming, Laramie, WY (177) |
| 11:15 | Discussion. |
| 11:30 | Business Meeting |

Specialty/Minor Crops

Room: Davenport & Dubuque
Moderator: Doug Doohan

***SPEAKER**

- 8:30 Controlling Weeds in Strawberry Throughout the Year.** Bernard H. Zandstra*, Colin J. Phillippo; Michigan State University, East Lansing, MI (179)
- 8:45 Managing Weeds in Pepper and Tomato with New Herbicides.** Colin J. Phillippo*, Bernard H. Zandstra; Michigan State University, East Lansing, MI (180)
- 9:00 Processing Potato Responses to Sublethal Doses of Glyphosate and Dicamba.** Harlene M. Hatterman-Valenti*, Andrew Robinson, Collin Auwarter, Eric Brandvik; North Dakota State University, Fargo, ND (181)

Wednesday Papers 2016

- 9:15 Weed Control Strategies with Early Killed Rye in Processing Legumes.** James L. Moody*¹, Martin M. Williams², Nicholas E. Hausman³; ¹USDA/ARS, Champaign-Urbana, IL, ²University of Illinois, Urbana, IL, ³USDA/ARS, Urbana, IL (182)

9:30 Business Meeting

New Technology Presentations

Room: Salon A, B, C & D

Moderator: Travis Legleiter

***SPEAKER**

- 1:30 Overview to New Technology.** Travis Legleiter*; Purdue University, West Lafayette, IN (183)
- 1:35 Applying New Molecular Techniques to Address Issues Related to Herbicide Resistance, Invasive Species and the Genetics of Non-model Organisms.** Eric Patterson, Colorado State University, Fort Collins, Co (184)
- 1:55 Technology and Intelligent Weed and Farm Management.** Joel Wipperfurth*; Winfield, St. Paul, MN (185)
- 2:15 UAS Data Analysis and Outcomes: Best Practice and Use Cases.** Orlando Saez,*; Aker Company, Winnebago, MN (186)
- 2:35 Technology Presentations from Sustaining Members, Exhibitors and Technology Companies.**

Herbicide Physiology

Room: Cedar Rapids & Council Bluffs

Moderator: Rong Ma

***SPEAKER**

- 1:30 Environmental Factors Moderate the Glyphosate-Induced Antagonism of Tank-Mix Herbicides on Rapid Necrosis Glyphosate-Resistant Giant Ragweed.** Nick T. Harre*, Steve Weller, William G.

Wednesday Papers 2016

Johnson, Bryan Young; Purdue University, West Lafayette, IN, (193)

- 1:45 Implications for Glyphosate Resistant Palmer Amaranth and Kochia which Now Comingle in Colorado.** Philip Westra*, Todd A. Gaines, Franck Dayan; Colorado State University, Fort Collins, CO (194)
- 2:00 Feasibility of AMS Replacement Adjuvants in the New Glyphosate Plus Phenoxy Herbicide Systems.** Scott Parrish*¹, Jim Daniel², Philip Westra³; ¹AGRASYST, Logan, UT, ²AGRASYST, Hudson, CO, ³Colorado State University, Fort Collins, CO (195)
- 2:15 Molecular Basis of Herbicide Resistance in a Multiple-resistant Waterhemp (*Amaranthus rudis*) Population from Missouri.** Lovreet S. Shergill*, Mandy D. Bish, Kevin W. Bradley; University of Missouri, Columbia, MO, (196)
- 2:30 Business Meeting**

Invasive Weeds and Rangeland, Pasture, Industrial and Vegetation Management

Room: Davenport & Dubuque
Moderator: Roger Becker

***SPEAKER**

- 1:45 Effects of PGRs and Mowing Management on Roadside Tall Fescue.** Joe Omielan*, Michael Barrett; University of Kentucky, Lexington, KY (197)
- 2:00 Modeling the Spread of Palmer Amaranth Across Iowa and the Midwest Cornbelt States.** Tre B. Loge*, Park Mikelis, Leslie Decker, Andrea Van Wyk, Maggie E. Long; Simpson College, Indianola, IA (198)
- 2:15 Impact of Herbicides on Saltcedar and Associated Vegetation.** Walter H. Fick*; Kansas State University, Manhattan, KS (199)
- 2:30 Business Meeting**

What's New in Industry?

Room: Salon A, B, C & D

Moderator: Paul Marquardt

Time: 3:30 – 5:00 pm

Society Social

5:30 – 7:00 pm Des Moines Exhibit Hall

Sponsored by Industry – Open to all attendees

Industry Breakfast (Cost \$35)

Room: Cedar Rapids & Council Bluffs
Moderator: Paul Marquardt

7:00 Breakfast

Presentation: The Des Moines Waterworks Lawsuit. Rodney Williamson, Director of Research and Development, Iowa Corn Growers Association, Johnston, IA

8:00 Business Meeting

Agronomic Crops II (Soybeans, Dry Beans/Sugar Beets)

Room: Salon A, B, C & D
Moderator: Jeff Ellis

***SPEAKER**

- 8:30 Planned Commercial Formulations Containing VaporGrip Technology for Use in the Roundup Ready 2 Xtend Crop System.** Alison MacInnes*; Monsanto Company, St Louis, MO (200)
- 8:45 DuPont Herbicide Programs for Marestalk Control in Dicamba-Tolerant Soybean.** Kelly A. Backscheider*¹, David H. Johnson², Kevin L. Hahn³, Bruce V. Steward⁴, Jeffery T. Krumm⁵, Victoria A. Kleczewski⁶, Michael D. Meyer²; ¹DuPont Crop Protection, Shelbyville, IN, ²DuPont Crop Protection, Johnston, IA, ³DuPont Crop Protection, Bloomington, IL, ⁴DuPont Crop Protection, Overland Park, KS, ⁵DuPont Crop Protection, Hastings, NE, ⁶DuPont Crop Protection, Middletown, DE (201)

Agronomic Crops II (Continued)

- 9:00 DuPont Herbicide Programs for Waterhemp and Palmer Amaranth Control in Dicamba-Tolerant Soybeans.** David Johnson*¹, Jeffery T. Krumm², Michael D. Meyer³, Kelly A. Backscheider⁴, Kevin L. Hahn⁵, Richard Edmund⁶, Bruce V. Steward⁷, Robert Rupp⁸, Dan Smith⁹, Eric Castner¹⁰, Victoria A. Kleczewski¹¹; ¹DuPont Crop Protection, Des Moines, IA, ²DuPont Crop Protection, Hastings, NE, ³DuPont Crop Protection, Johnston, IA, ⁴DuPont Crop Protection, Shelbyville, IN, ⁵DuPont Crop Protection, Bloomington, IL, ⁶DuPont Crop Protection, Little Rock, AR, ⁷DuPont Crop Protection, Overland Park, KS, ⁸DuPont Crop Protection, Edmund, OK, ⁹DuPont Crop Protection, Madison, MS, ¹⁰DuPont Crop Protection, Weatherford, TX, ¹¹DuPont Crop Protection, Middletown, DE (202)
- 9:15 2,4-D Choline and Glufosinate Weed Control Options in Enlist Soybean.** Mike Moechnig*¹, David M. Simpson², Dave Ruen³, Kristin K. Rosenbaum⁴, Kevin Johnson⁵, Laura A. Campbell⁶, Eric Scherder⁷, Sunil S. Tewari⁸; ¹Dow AgroSciences, Brookings, SD, ²Dow AgroSciences, Indianapolis, IN, ³Dow AgroSciences, Lanesboro, MN, ⁴Dow AgroSciences, Crete, NE, ⁵Dow AgroSciences, Danville, IL, ⁶Dow AgroSciences, Carbondale, IL, ⁷Dow AgroSciences, Huxley, IA, ⁸Dow AgroSciences, West Lafayette, IN (203)
- 9:30 What is a Temperature Inversion? Identifying, Characterizing, and Analyzing the Frequency of Surface Temperature Inversions in Missouri.** Mandy D. Bish*, Kevin W. Bradley; University of Missouri, Columbia, MO (204)
- 9:45 Break** Exhibit Hall (3rd Floor)
- 10:00 An Overview on the Influence of Carrier Water Quality on POST Herbicides Performance.** Pratap Devkota*, William G. Johnson; Purdue University, West Lafayette, IN (205)

Agronomic Crops II (Continued)

- 10:15 Effect of S-metolachlor at Various Application Rates on Sugarbeet Crop Safety as Influenced by Different Environmental Conditions.** Andrew B. Lueck*, Thomas J. Peters; North Dakota State University, Fargo, ND (206)
- 10:30 Weed Control with Glufosinate in Soybean in a Cropping Sequence that includes Sugarbeet.** Thomas J. Peters*, Andrew B. Lueck; North Dakota State University, Fargo, ND (207)
- 10:45 Management of Volunteer Winter Wheat in Summer Seeded Alfalfa.** Chris Bloomingdale*¹, Richard Proost¹, Mike Ballweg², Mark Renz¹;
¹University of Wisconsin-Madison, Madison, WI,
²University of Wisconsin - Extension, Sheboygan, WI (208)

Equipment and Application Methods

Room: Salon E, F, G & H
Moderator: Travis Legleiter

***SPEAKER**

- 8:15 Visualization of Deposition and Drift of Aerially Applied Spray Mixtures.** Raymond L. Pigati*¹, Eric P. Spandl¹, Gregory K. Dahl², Anthony Goede¹, JoAnna A. Gillilan³, Ryan J. Edwards², Joe V. Gednalske²; ¹Winfield United, Shoreview, MN, ²Winfield United, River Falls, WI, ³Winfield United, Springfield, TN (209)
- 8:30 Spray Droplet Size and Carrier Volume Effect on Dicamba and Glufosinate Efficacy.** Thomas R. Butts*¹, Chase A. Samples², Darrin M. Dodds², Dan B. Reynolds², Jason W. Adams³, Richard K. Zollinger³, Kirk A. Howatt³, Greg R. Kruger¹;
¹University of Nebraska-Lincoln, North Platte, NE,
²Mississippi State University, Mississippi State, MS,
³North Dakota State University, Fargo, ND (210)
- 8:45 Evaluation of Drop Size Spectra of Spray Nozzles and Tank Mixes Proposed for use with the Roundup Xtend Crop System.** Thomas B. Orr*, Collin E. Beachum; Monsanto Company, St. Louis, MO (211)

Equipment and Application Methods (Continued)

- 9:00 Investigation of Nozzle Erosion from Commercial Application Equipment, a Multi-Year Approach.** Andrea Clark*, Lillian Magidow; Winfield United, River Falls, WI (212)
- 9:15 Application Technology Update.** Robert E. Wolf*; Wolf Consulting & Research LLC, Mahomet, IL (213)
- 9:30 Introduction of StrikeLock; a Novel Adjuvant System.** Ryan J. Edwards*¹, Gregory K. Dahl¹, JoAnna A. Gillilan², Raymond L. Pigati³, Andrea Clark¹, Eric P. Spandl³, Joe V. Gednalske¹; ¹Winfield United, River Falls, WI, ²Winfield United, Springfield, TN, ³Winfield United, Shoreview, MN (214)
- 9:45 Break** Exhibit Hall (3rd Floor)
- 10:00 VaporGrip Technology; How it Works and its Benefits.** Alison MacInnes*; Monsanto Company, St Louis, MO (215)
- 10:15 Determining the Effect of Adjuvant on Dicamba Volatility in a Controlled Environment.** Jamie L. Long*, Julie M. Young, Bryan Young; Purdue University, West Lafayette, IN (216)
- 10:30 Ramifications in Applying Volatile Growth Regulator Herbicides.** Donald Penner*, Jan Michael; Michigan State University, East Lansing, MI (217)
- 10:45 Comparison of Tank Cleaning Products to Remove Residues of Auxin-type Herbicides from Spray Equipment.** Thomas C. Mueller*¹, Mark L. Bernards²; ¹University of Tennessee, Knoxville, TN, ²Western Illinois University, Macomb, IL (218)
- 11:00 Herbicide Deposition on Glyphosate-Resistant Giant Ragweed and Horseweed as Influenced by Spray Nozzle Design.** Travis Legleiter*, Bryan Young, William G. Johnson; Purdue University, West Lafayette, IN (219)
- 11:15 Business Meeting**

Weed Biology, Ecology, Management

Room: Davenport & Dubuque

Moderator: Erin Haramoto

***SPEAKER**

- 8:30 Horseweed Management in the Eastern Cornbelt.** Stephanie DeSimini*¹, William G. Johnson¹, Mark Loux², Tony Dobbels²; ¹Purdue University, West Lafayette, IN, ²Ohio State University, Columbus, OH (220)
- 8:45 Do ALS-inhibiting Herbicides Have Any Value When Targeting Fields with Weeds Resistant to Those Herbicides?** Jodi E. Boe*, Bryan Young, Haozhen Nie; Purdue University, West Lafayette, IN (221)
- 9:00 Winter Cover Crop Species, Seeding Rate Affects Winter Annual Weeds.** Erin Haramoto*; University of Kentucky, Lexington, KY (222)
- 9:15 A Draft Genome of *Kochia scoparia*.** Eric L. Patterson*¹, Karl Ravet¹, Dean Pettinga¹, Phil Westra¹, Dan Sloan¹, Chris Saski², Todd A. Gaines¹; ¹Colorado State University, Fort Collins, CO, ²Clemson University, Clemson, SC (223)
- 9:30 Modelling Pollen-Mediated Gene Flow from Herbicide-Resistant Weeds: Common Waterhemp as an Example.** Debalin Sarangi*¹, Andrew J. Tyre¹, Eric L. Patterson², Todd A. Gaines², Suat Irmak³, Stevan Knezevic⁴, John Lindquist¹, Amit J. Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²Colorado State University, Fort Collins, CO, ³University of Nebraska-Lincoln, Lincoln, NE, ⁴University of Nebraska-Lincoln, Concord, NE (224)
- 9:45 Humidome: A New Method to Determine Volatility of Pesticides.** Walter K. Gavlick*; Monsanto, St Louis, MO (225)

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2016 Program Committee

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North Central Weed Science Society Information

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NCWSS Special Committees

Presentation Recording Committee

Angela Kazmierczak	Chair	218-789-7197	angela.kazmierczak@bayer.com
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Poster Session

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Graduate Student Poster Awards

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Undergraduate Student Poster Awards

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Agronomic Crops I (Corn, Sorghum, Cereals)

Curtis Thompson	Chair	785-532-5776	cthompson@ksu.edu
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Brett Miller	Past Chair	612-656-8464	brett.miller@syngenta.com

Agronomic Crops II (Soybeans, Dry Beans, Sugarbeets)

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

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Specialty / Minor Crops

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North Central Weed Science Society Information

Honorary Members/Fellows

Honorary Members

1948	L.W. Dephart *
1949	A.H. Larson *
1950	J.W. Zahnley *
1951	R.W. Fuelleman *
	(posthumous citation)
	Ted F. Yost *
	(posthumous citation)
1952	Henry E. Wood *
1953	George Briggs *
	Walter C. Dutton *
1954	A.L. Bakke *
1955	Charles J. Willard *
1956	R.S. Dunham *
1957	P.J. Olson *
1958	L.W. Melander
	T.K. Pavlychenko *
	(posthumous citation)
1959	E.A. Helgeson *
1960	Oliver C. Lee *
1962	Sig Bjerken *
1964	K.P. Buchholtz *
	E.P. Sylwester *
1966	Robert C. Beatty *
	Clare Buskirk *
1967	J.K. Freeman *
1968	E.K. Alban *
	H.A. Friesen *
1969	Lawrence Southwick
	David W. Staniforth *
1970	Delbert D. Hemphill *
	George Frederick Warren *
1971	Fred W. Slife *
1972	Thomas Victor Beck
	O. Hale Fletchall *
1973	Richard Behrens
	Lawrence H. Hannah
1974	William Lobay
1975	John D. Furrer *
1976	Lyle A. Derscheid *
	LeRoy G. Holm *
1977	James W. Divall
	James L. Williams, Jr. *
1978	Melwin K. McCarty *
	Robert E. Nylund
1979	Ellery L. Knake *
	Kenneth W. Bradfield *
1980	John D. Nalewaja
	O.C. Burnside
1981	Rodney J. Fink
	Juett C. Hogancamp *
	Larry W. Mitich *
1982	W.D. Carpenter
	James W. Herron *
	William F. Meggitt
1983	Robert N. Andersen

	Dale E. Bush *
	Ronald E. Doersch
1984	Edward W. Stroube *
	Oliver E. Strand *
	Gail A. Wicks *
1985	Robert Hiltibrant *
1986	Elroy J. Peters *
	Deane W. Finnerty *
	Oliver G. Russ
1987	Ralph Althaus *
	William M. Phillips
	Gerald R. Miller
1988	Robert Benson
	Calvin Messersmith
	Edward Stoller
1989	Lloyd M. Wax
	Alan R. Putman
1990	Alan G. Dexter
	Russel L. Nash
1991	George Kapusta *
	Marshall McGlamery *
	Russell Moomaw
	Don Penner
1992	R. Gordon Harvey, Jr. *
	Larry K. Binning
	Alex R. Martin
	Don Taylor
1993	Merrill A. Ross, Jr.
	Robert G. Wilson
	Jerry D. Doll
1994	Ted R. Warfield
	William W. Witt

Fellows¹

1995	Charles R. Fenster
	Leon J. Wrage
1996	Thomas T. Bauman *
	Earl W. Chamberlain
	Richard S. Fawcett
	William E. Lueschen
1997	Stephen D. Miller
	M.D.K. Owen
	Fred W. Roeth
1998	Paul J. Ogg *
	James P. Worthington
1999	Michael Barrett
	Norman J. Probst
2000	Douglas D. Buhler
	Bill Miller
	Philip L. Orwick
	Stephen C. Weller
2001	LeRoy R. Cobia
2002	James J. Kells
2003	Karen Ann Renner
	Charles Slack
	Phillip Stahlman

North Central Weed Science Society Information

Honorary Members/Fellows (continued)

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

* 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 Presidents

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

* Deceased

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
	Kirk Howatt – Education
2013	Mark Renz – Education
	Patrick Tranel – Research
	Stevan Knezevic – Research
	Christy Sprague - Service
	Rodrigo Werle – Graduate Student
	Greg Kruger – Young Scientist
2014	Ryan Lins – Young Scientist
	Dawn Refsell – Industry
	Jeff Golus – Professional Staff
	Collin Auwarter – Professional Staff
	Jessica Bugg – Graduate Student
	Brian Jenks – Service
2015	Doug Nord – Service
	Marvin Schultz – Industry
	Bruce Ackley – Professional Staff

Distinguished Achievement Awards (continued)

2015 Darren Robinson – Research
 Cody F. Creech – Graduate Student

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

Author Index

Ackley, Bruce A.	48
Adams, Jason W.	210
Albers, Jeffrey J.	5
Allen, Jayla	152
Allen, Sara M.	30
Anderson, Meaghan	171
Arneson, Nicholas	18
Asebedo, Antonio R.	10
Auwarter, Collin	181
Backscheider, Kelly	13, 14, 201, 202
Ballweg, Mike	208
Barlow, Blake R.	12, 117
Barnes, Ethann	112
Barrett, Michael	174, 197
Beachum, Collin E.	211
Beffa, Roland	63
Behnken, Lisa M.	26, 35, 47, 153
Beres, Zachery T.	137
Bernards, Mark L.	32, 218
Biggs, Meghan	12, 33, 36, 99, 117, 135
Bish, Mandy D.	12, 33, 36, 99, 117, 135, 168, 196, 204
Bishop, Logan H.	8
Bloomingtondale, Chris	208
Boe, Jodi E.	221
Bongard, Phyllis M.	26, 153
Bradley, Kevin W.	12, 33, 36, 99, 117, 135, 168, 172, 196, 204
Brainard, Daniel C.	77
Brandvik, Eric	181
Breitenbach, Fritz R.	26, 35, 47, 153
Brooker, Aaron P.	150
Brown, Patrick J.	6, 89
Bruns, Dain E.	71
Budd, Chris	19
Burgos, Nilda R.	138
Butts, Liberty E.	23, 24, 84, 121
Butts, Thomas R.	39, 46, 93, 121, 210
Campbell, Laura A.	154, 203
Campbell, Taylor M.	98, 133
Campos, Henrique	39, 143
Canella Vieira, Bruno	39, 68, 84, 92, 130, 143
Carey, Boyd J.	30
Carlson, Ken L.	148
Casale, Federico	88
Castner, Eric	13, 202

Ceperkovic, Isidor	3, 94
Chahal, Parminder	31
Cholette, Taïga	125
Christoffers, Michael J.	59
Clark, Andrea	212, 214
Clark, Kerry	108
Conley, Shawn	168
Conley, Shawn P.	50, 107
Costa, Ricardo	108
Cotie, Arlene	170
Cramer, Gary L.	27, 148
Crawford, Laura	70
Cruz-Hipolito, Hugo	64
Currie, Randall S.	85, 138, 167
Curvey, Susan E.	30
Cuvaca, Ivan B.	85, 167
Dahl, Gregory K.	209, 214
Daniel, Jim	195
Dau, Crystal	52
Davis, Vince M.	156, 158
Dayan, Franck	139, 194
de Avellar, Matheus	23, 24
de Oliveira Latorre, Débora	46, 120, 142
de Oliveira Rodrigues, André	41, 67, 119
De Prado, Rafael A.	64, 69, 146
Decker, Leslie	198
DeSimini, Stephanie	220
Devkota, Pratap	21, 205
Diedrick, Keith A.	13, 14
Dille, Anita	5, 10, 52, 78, 80, 103, 148
Dobbels, Tony	7, 220
Dodds, Darrin M.	210
Dominguez- Valenzuela, Jose A.	64
Drewitz, Nathan M.	50, 127
Duncan, Garth W.	111
Dunne, Cheryl L.	71
Edmund, Richard	13, 202
Edwards, Ryan J.	209, 214
Ellis, Jeff M.	154
Espinoza, Juan	37, 67
Estes, Ronald E.	159
Faleco, Felipe	24, 84
Farr, Rodger	60
Farrell, Shea	12

Fernandez-Moreno, Pablo T.	64, 69, 146
Fick, Walter H.	199
Fleitz, Nick	114
Forster, Pete C.	164
Foster, Anserd	85
Franssen, Aaron S.	164
Fritz, Brad K.	123
Frost, Markah	77
Gage, Karla L.	17, 25, 145, 155
Gaines, Todd A.	63, 139, 194, 223, 224
Ganie, Zahoor A.	66
Gavlick, Walter K.	225
Gednalske, Joe V.	209, 214
Geiger, Matthew C.	17
Geyer, Annah	37, 68
Gherekhloo, Javid	64
Giacomini, Darci A.	62, 63
Giesler, Loren J.	18
Gifford, James M.	42, 162
Gillilan, JoAnna A.	209, 214
Giorgianni Campos, Lucas	38, 119
Gleeson, Drake J.	33
Goede, Anothony	209
Goley, Michael	169
Golus, Jeffrey A.	3, 37, 38, 41, 54, 56, 67, 94, 151
Gomiero Polli, Estefânia	96
Goodrich, Loren V.	140
Graham, Michelle A.	129
Green, JD	62, 114
Groth, Mark	169
Guerreiro de Jesus, Marcella	58, 120, 151
Gundy, Garrison J.	10
Gunsolus, Jeffrey L.	26, 153
Hageman, Larry H.	13, 14
Hager, Aaron G.	1, 65, 104
Hahn, Kevin L.	13, 14, 201, 202
Hammer, Devin J.	50, 107
Haramoto, Erin	222
Harre, Nick T.	193
Hartzler, Bob	75, 76, 171
Hatterman-Valenti, Harlene M.	181
Hausman, Nicholas	182
Hawley, Chandra J.	56
Hay, Marshall M.	16, 109

Hayes, Dermot J.	101
Heaton, Brent S.	32
Hennemann, Laura	40
Hoey, Brooke L.	75
Hoffmann, W. C.	123
Holloway, James C.	157
Hooker, David C.	125
Howard, Stott W.	71
Howatt, Kirk A.	210
Huang, Jintai	169
Ikley, Joseph T.	97, 98, 133, 149
Irmak, Suat	224
Israel, Trevor D.	159
Jhala, Amit J.	2, 31, 66, 74, 112, 224
Jin, Lin	137
Johnson, David H.	14, 201, 202
Johnson, Keith D.	13
Johnson, Kevin D.	22, 154, 203
Johnson, William G.	21, 34, 91, 97, 98, 110, 133, 147, 149, 193, 205, 219, 220
Jugulam, Mithila	4, 66, 79, 80, 85, 128, 131, 138, 167
Kappler, Brady F.	156, 158
Kendig, J. Andrew	155
Khadka, Samida	80
Kleczewski, Victoria	13, 14, 201, 202
Klingaman, Tracy	169
Knezevic, Stevan	15, 51, 53, 55, 112, 139, 224
Kniss, Andrew R.	177
Kohlhase, Daniel R.	129
Koo, Dal-Hoe	138
Kouame, Koffi Badou Jeremie	81, 136
Krausz, Ronald F.	25, 145
Kruger, Greg R.	3, 23, 37, 38, 39, 41, 46, 54, 56, 58, 60, 67, 68, 82, 84, 92, 93, 94, 96, 119, 120, 121, 123, 130, 142, 143, 151, 210
Krumm, Jeffery T.	13, 14, 201, 202
Kuepper, Anita	63
Lamb, Alyssa	7
Lambert, Kris N.	6
Legleiter, Travis	91, 183, 219
Li, Mei	162
Lillie, Kathryn J.	62
Lindquist, John	74, 112, 224
Lizotte-Hall, Sydney	75, 76
Loge, Teig B.	73, 198
Long, Jamie L.	43, 216
Long, Maggie E.	86, 132, 198
Loux, Mark M.	7, 220

Lueck, Andrew B.	206, 207
Luke, Andy J.	28, 122
Lygin, Anatoli V.	6
Ma, Rong	6
MacInnes, Alison	200, 215
Mackey, David M.	137
Magidow, Lillian	212
Mansfield, Brent C.	44, 116
Marchi Werle, Lia	82
Martin, James R.	62, 114
Martin, Marsha J.	13, 14
Martino-Catt, Susan	169
Mayo, Chris M.	27
McCauley, Cara L.	61, 141
Menendez, Julio	146
Menzer, Seth	4, 131
Meyer, Clint K.	86
Meyer, Michael D.	13, 14, 201, 202
Michael, Jan	217
Mikels, Park	198
Miller, Brett R.	157
Miller, Joshua J.	106, 126
Miller, Ryan P.	47
Minihan, Cathy L.	27, 57, 148
Moechnig, Mike	203
Moody, James L.	182
Moose, Stephen P.	6
Moraes, Jesaelen G.	46, 58, 93, 120, 142
Moretti, Marcelo L.	44
Moses, Adrian J.	157
Mower, Jeffrey	74
Muehleip, Zoe G.	86, 132
Mueller, Thomas C.	166, 218
Murphy, Brent P.	95
Navarrete, Ronald	37, 67
Nelson, Kelly	8
Nelson, Matthew R.	68, 123, 130
Nicolai, David	47
Nie, Haozhen	116, 221
Nolte, Scott A.	29
Norsworthy, Jason	168
Northey, Bill	100
Nurse, Robert E.	20
O'Brien, Sarah	144
Oliveira, Maxwel C.	15, 55, 139
Omielan, Joe	197
Orr, Thomas B.	211

Oseland, Eric G.	12, 33, 36
Osipitan, O. Adewale	78
Ott, Eric J.	159
Ou, Junjun	79, 128
Ouse, David G.	42, 162
Owen, Mike D.	129
Page, Carey	83
Palecek, David J.	45
Parrish, Jason T.	137
Parrish, Scott	195
Patterson, Eric L.	184, 223, 224
Pauley, John A.	132
Pawlak, John A.	159
Penner, Donald	217
Peters, Thomas J.	206, 207
Peterson, Dallas E.	16, 27, 57, 109
Peterson, Mark A.	154
Pettinga, Dean	223
Phillippo, Colin J.	179, 180
Pigati, Raymond L.	209, 214
Porter, Don J.	157, 164
Price, Kayla	86
Probst, Michael A.	113
Proctor, Chris	2
Proost, Richard	208
Putta, Karthik	138
Rains, Joey J.	49
Rathmann, Duane P.	156, 158
Ravet, Karl	223
Rector, Ryan J.	160
Refsell, Dawn E.	159
Renner, Karen A.	118, 150
Renz, Mark	208
Reynolds, Dan B.	210
Riechers, Dean E.	1, 6
Rilakovic, Andrea	3, 94
Ringler, Lanae	161
Rissler, Sydney	73
Robbinson, Andrew	181
Robinson, Darren E.	125
Rogers, Kelsey M.	9, 118
Rosenbaum, Kristin	154, 203
Roskamp, Jared M.	156, 158
Ruen, Dave	203
Rupp, Robert	13, 202
Sabaté, Sebastián	65
Sabba, Robert P.	59

Sadeque, Ahmed	89
Saez, Orlando	186
Saini, Monika	71, 164
Samples, Chase A.	210
Samuelson, Spencer	37, 82, 84, 92, 142
Sanctis, Jose H.	92
Sandell, Lowell D.	159
Sarangi, Debalin	224
Saski, Chris	223
Scherder, Eric	203
Schlegel, Alan J.	148
Schleier, III, Jerome	123, 162
Schroeder, Kasey	38, 41, 60, 67, 94
Scott, Allen J.	83
Scott, Jon E.	15, 51, 53, 55, 139
Shao, Aihua	169
Shergill, Lovreet S.	196
Shoup, Douglas E.	109
Sikkema, Peter H.	19, 20, 112, 125, 163
Simpson, David M.	22, 162, 203
Sivaguru, Mayandi	6
Sloan, Dan	223
Smeda, Reid	28, 64, 69, 72, 83, 108, 122, 134, 146
Smith, Dan	13, 202
Snipes, Charles E.	13
Snow, Allison A.	137
Soltani, Nader	19, 20, 163
Spandl, Eric P.	209, 214
Sparks, Oscar	169
Spaunhorst, Douglas	147
Spellerberg, Rick	86
Sprague, Christy L.	9, 113, 115, 118, 150
Stahl, Lizabeth	47
Stahlman, Phillip W.	5, 79, 128, 148
Starke, Michelle R.	30
Steward, Bruce V.	13, 14, 148, 201, 202
Stoecker, Martin	169
Stolte, Rhett L.	25
Stoltenberg, David	50, 107, 127
Strom, Seth A.	1
Swanson, Scott E.	13, 14
Tannahill, Brandy	176
Tenhumberg, Brigitte	74
Terry, Matthew R.	72, 134
Tewari, Sunil S.	154, 203
Theisen, Nickolas D.	14
Thompson, Curtis R.	4, 5, 57, 79, 128, 131, 148

Thompson, Nathaniel R.	27
Tranel, Patrick	62, 63, 65, 88, 89, 95, 114
Treptow, Don G.	87, 165
Trower, Timothy L.	157
Trower, Zach L.	12, 99, 135
Tyre, Andrew J.	224
Vail, Gordon D.	71
Van Wychen, Lee	102, 173
Van Wyk, Andrea	198
VanLoenen, Eric A.	148
Varagona, Rita	169
Varanasi, Vijaya k.	138
Waddington, Mark	152
Weber, Michael L.	152
Weirich, Jason W.	122
Welker, Gery S.	156, 158
Weller, Steve	193
Werle, Rodrigo	23, 24, 74, 84, 106, 126, 142
Westra, Philip	194, 195, 223
Whalen, Derek M.	12, 168
Wiedau, Kayla N.	145
Wilkinson, Daniel	115
Williams, Martin M.	70, 182
Williams, Robert	13
Wipperfurth, Joel	185
Wise, Kiersten A.	97, 98, 133, 149
Wolf, Robert E.	213
Yang, Xiao	137
Yerka, Melinda	74
Young, Bryan	34, 43, 44, 61, 110, 111, 116, 141, 168, 193, 216, 219, 221
Young, Julie M.	111, 216
Zandstra, Bernard H.	179, 180
Zhao, Wanying	137
Ziggafoos, Jake J.	74
Zimmer, Marcelo	34, 110
Zollinger, Richard	124, 210

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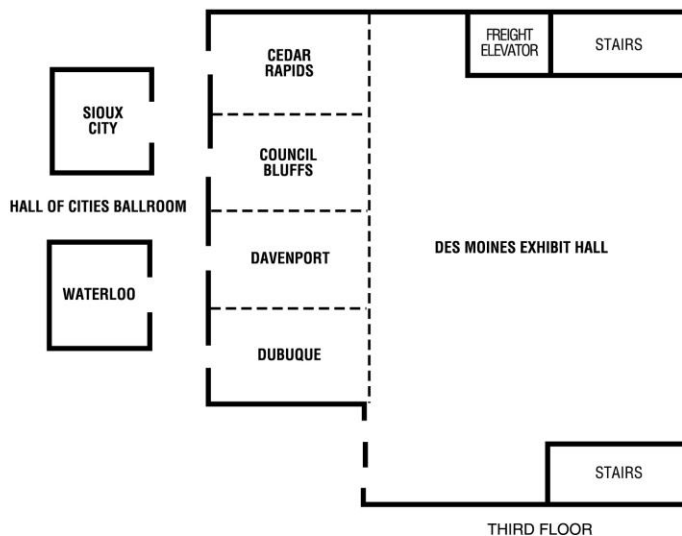
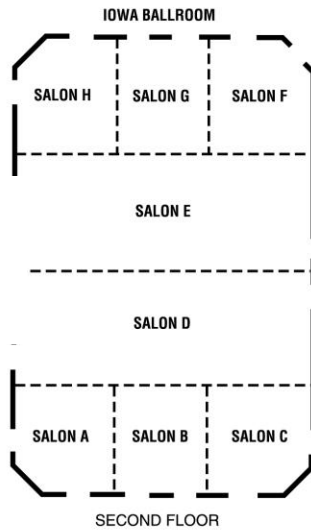
Future NCWSS Annual Meeting Sites

2017 – December 4-7 in St. Louis, MO
2018 – December 3-6 in Milwaukee, WI

Time Schedule

Mark papers and meetings in the appropriate space.

Time	Tuesday	Wednesday	Thursday
8:00	Poster Session I		
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		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		What's New In Industry	
3:45			
4:00			
4:15			
4:30			
4:45			
5:00	Poster Session II		
5:15			
5:30		Society Social	
5:45			
6:00			
6:30			



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