



2015

70th Annual Meeting

North Central Weed Science Society

www.ncwss.org

**Midwest Invasive Plant Network
Symposium**

December 7 - 10, 2015

Hyatt Regency

Indianapolis, IN

Please bring this program to the conference

President's Welcome

2015 North Central Weed Science Society Meeting

The Society's Officers, Board of Directors, our Program Committee and Local Arrangements Committee welcome you to Indianapolis and to the 70th annual North Central Weed Science Society meeting. This year, it is a joint meeting with the Midwest Invasive Plant Network (MIPN). Please feel free to attend any of the MIPN sessions that are of interest.

The NCWSS meeting is always a good time to see and reacquaint with people you may not have seen since the last meeting. It is also a great venue to discuss the latest findings in the field of weed science. Some of the leading experts in weed management are in attendance at this meeting.

President-Elect Anita Dille has assembled an excellent program. Be sure to look at the talks in the Graduate Student symposium entitled 'Molecular Techniques in Weed Science'. Attend any of the talks that interest you. Ryan Lee and the Local Arrangements Committee have been working hard with the hotel to prepare for our meeting. The Indianapolis Hyatt Regency is an excellent facility and I anticipate they will meet all our expectations. Anita Dille is organizing a 'Women in Weed Science' Networking Breakfast again this year. The Industry Breakfast will feature Dave Gustafson from the ILSI Research Foundation. Dave will present a timely talk entitled 'Future Shock Now – Current Climate Change Impacts on the Agri-Food System'. The Industry breakfast is open to all, and tickets for the event can be purchase on site.

I encourage you all to become involved in the NCWSS. If you have interest in one of the committees, please attend the committee meeting. All meetings are open to everyone. If you are interested in the work of a committee, volunteer to be on that committee. Visit with the committee chair and let them know that you would like to be on the committee. Also be sure to inform Anita Dille that you would like to join that committee. She will be making 2016 committee assignments soon. Volunteering is one of the best things you can do for the Society and for yourself.

Thank you once again for giving me the privilege of serving as President of the North Central Weed Science Society. I will always fondly remember the experience and the wonderful people I have met and worked with during my time as President. If there is anything I can do to make a better NCWSS meeting, please see me at the meeting. I look forward to seeing you in Indianapolis.

John Hinz
President

General Information

Conference Headquarters

All sessions of the conference and the banquet will be held at the Hyatt Regency, One South Capitol Avenue, Indianapolis, IN 46204; Phone 317-632-1234.

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. 12 or at the conference is **\$220**.

Student pre-registration is **\$120**; student registration after Nov. 12 or at the conference is **\$170**.

For those just attending the Midwest Invasive Plant Network (MIPN) Symposium, pre-registration is **\$150** for both days or **\$100** for one day (either Wed or Thurs), and **\$50** for students. After Nov. 12 or at the conference each registration will increase by **\$50**.

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 will be located at the **Studio Lounge** on 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

Studio Six

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 Ryan Lee, Local Arrangements Chair.

Proceedings

2015 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 Cosmopolitan Foyer. No other displays are allowed.

No Smoking

Smoking is not permitted in the sessions.

No photographs or video recordings

Do not take pictures or video recordings 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 2015

Board of Directors

Monday, 1:00 pm	Discovery A
Wednesday, 7:00 pm	Discovery A

Local Arrangements

Monday, 11:00 am	Studio Six
Thursday, noon (with 2016 committee)	Studio Six

Contest Judges for Paper and Poster Contests

Judges breakfast, Tuesday, 7:00 am	Concept D
Judges, Tuesday, 7:15 am	Concept A,B,C
Paper Judges, Tuesday, 5:00 pm	Concept A,B,C
Poster Judges, Tuesday, 6:00 pm	Concept A,B,C

Meal Functions

Breaks

Tuesday, 2:30– 3:15 pm	Cosmopolitan Foyer
Wednesday, 9:45 – 10:30 am	
Wednesday, 3:00 – 3:45 pm	
Thursday, 9:45 – 10:30 am	

Student Mixer and Quiz Bowl

Sponsored by BASF Corporation – Open to all attendees

Monday, 6:30 pm	Regency AB
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Student Luncheon/Business Meeting

Sponsored by Dow AgroSciences – Open to all students

Tuesday, 12:00 – 1:15 pm	Regency CD
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Women in Weed Science Networking

Breakfast – Open to all women

Wednesday 6:30-8:00 am	Vision
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NCWSS Awards Luncheon

Wednesday, 11:30 am	Regency AB
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Society Socials

Tuesday, 5:00 – 7:00 pm	Cosmopolitan B
<i>Sponsored by Dow AgroSciences – Open to all attendees</i>	

Wednesday, 5:30 – 7:00 pm	Regency A-D
<i>Sponsored by Industry – Open to all attendees</i>	

Industry Breakfast (Cost \$35)

Thursday, 7:00 am	Regency AB
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Meetings of the Society 2015

The following meetings will take place for the purpose of conducting the business of each respective committee and to elect a new Vice Chair to serve as Chair in 2017. 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, 8:00 pm (*section moderators*) Studio One

Strategic Planning

Monday, 5:30 pm Studio One

Distinguished Achievement Award

Tuesday, 12:00 pm Studio Four

Paper Judges

Tuesday, 5:00 pm Concept A-C

Poster Judges (Grad and Undergrad)

Tuesday, 6:00 pm Concept A-C

Finance, Steering, & Policy

Tuesday, 5:30 pm Studio One

Future Site Selection

Tuesday, 5:30 pm Studio Four

Nominating

Tuesday, 5:30 pm Studio Five

Resident Education, Summer Contest, and Contest Rules Joint meeting

Wednesday, 4:00 pm Studio One

Extension (Committee and Section Meeting)

Wednesday, 2:45 Cosmopolitan A

NCWSS Fellow

Wednesday, 5:00 pm Studio Four

Resolutions & Necrology

Wednesday, 5:00 pm Studio Five

Industry (Committee and Section Meeting)

Thursday, 8:00 am Regency AB

Meetings of the Society 2015

Program Section Meetings

Program Committee – all NCWSS Moderators

Monday, 8:00 pm	Studio One
Agronomic Crops I (Corn, Sorghum, Cereals)	
Wednesday, 10:45am	Cosmopolitan B
Agronomic Crops II (Soybeans, Dry Beans, Sugar Beets)	
Thursday, 9:45 am	Cosmopolitan B
Equipment and Application Methods	
Tuesday, 4:30 pm	Cosmopolitan B
Extension	
Wednesday, 2:45 pm	Cosmopolitan A
Herbicide Physiology	
Tuesday, 4:30 pm	Discovery AB
Horticulture & Ornamentals	
Wednesday, 10:45 am	Cosmopolitan A
Poster Session	
Monday, 6:00 pm	Cosmopolitan Foyer
Weed Biology, Ecology & Management	
Tuesday, 5:00 pm	Cosmopolitan CD
Rangeland, Pastures, and Industrial Vegetation Management (part of MIPN: Session G)	
Thursday, 10:15 pm	Cosmopolitan A

Special Interest Groups

Graduate Students (at luncheon)	
Tuesday, 12:00 pm	Regency CD
Industry (at breakfast)	
Thursday, 7:00 am	Regency AB

Symposia

Molecular Techniques in Weed Science	
Wednesday, 8:45 – 11:30 am	Regency EF
What's New in Industry?	
Wednesday, 3:30 – 5:00 pm	Cosmopolitan AB
MIPN Symposium	
Wednesday and Thursday, 8:00 – 5:00 pm	Discovery AB Cosmopolitan CD

Condensed Program – NCWSS 2015

Monday, December 7

1:00 – 5:00	NCWSS Board of Directors	Discovery A
1:00 – 9:30	Poster Session Setup	Cosmopolitan Foyer
6:30 pm	Student Mixer and Quiz Bowl	Regency AB

Tuesday, December 8

8:00 – 10:15	Poster Session I	Cosmopolitan Foyer
10:30 – 12:00	NCWSS General Session	Cosmopolitan AB
12:00 – 1:15	Graduate Student Luncheon	Regency CD
1:15 – 4:30	Agronomic Crops I & II	Cosmopolitan A
1:15 – 5:15	Weed Biology, Ecology, Management	Cosmopolitan CD
1:15 – 4:45	Herbicide Physiology and Extension	Discovery AB
1:15 – 4:30	Equip & Appl. Methods	Cosmopolitan B
5:00 – 6:00	Poster Session II	Cosmopolitan Foyer
5:00 – 7:00	Society Social - Sponsored Dow AgroSciences [<i>open to all attendees</i>]	Cosmopolitan B

Wednesday, December 9

8:30 – 11:00	Hort., Ornamentals, and Sugarbeet	Cosmopolitan A
8:30 – 11:00	Agronomic Crops I	Cosmopolitan B
8:45 – 11:30	Symp Molecular Techniques	Regency EF
10:00 – 12:00	MIPN Plenary Session 1	Discovery AB
11:30 - 1:15	NCWSS Awards Luncheon	Regency AB
1:30 – 3:00	Extension	Cosmopolitan A
1:30 – 3:15	Equipment & Application Methods	Cosmopolitan B
1:30 – 5:00	MIPN: Sessions A and C	Cosmopolitan CD
1:30 – 5:00	MIPN: Sessions B and D	Discovery AB
3:30 – 5:00	What's New in Industry?	Cosmopolitan AB
5:30 – 7:00	Society Social - [<i>open to all attendees</i>]	Regency A-D
7:00 – 9:00	NCWSS Board of Directors	Discovery A

Thursday, December 10

7:00 – 8:15	Industry Breakfast	Regency AB
8:00 – 10:00	MIPN Plenary Session 2	Discovery AB
8:15 – 11:30	Agronomic Crops II	Cosmopolitan B
8:30 – 10:00	Herbicide Physiology	Regency EF
10:30 – 12:00	MIPN: Session E	Cosmopolitan CD
10:30 – 12:00	MIPN: Session F	Discovery AB
10:30 – 12:00	MIPN: Session G	Cosmopolitan A
1:00 – 3:00	MIPN: Session H	Cosmopolitan CD
1:00 – 5:30	MIPN: Sessions I and J	Discovery AB

Poster Sessions

Room: Cosmopolitan Foyer

Chairperson and Moderator: Helen Flanigan

Poster Setup

Posters can be set up between 1:00 and 9:30 pm on Monday, December 7. All NCWSS posters will be on display from 8:00 am Tuesday, December 8 through 4:00 pm Wednesday December 9.

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 8

8:00 – 10:15 am Poster Session I (non-contest authors present at odd numbered posters)

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

Poster Removal

All posters must be removed between 4:00 and 5:00 pm on Wednesday.

Exhibitors & Sustaining members

Tuesday to Thursday

Cosmopolitan Foyer

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)

Residual control of multiple-resistant Palmer amaranth with soil-applied herbicides in corn. Jonathon R. Kohrt*, Christy L. Sprague; Michigan State University, East Lansing, MI (1)

†Herbicide programs for control of atrazine- and HPPD inhibitors-resistant Palmer amaranth in glufosinate-resistant corn. Parminder S. Chahal*¹, Suat Irmak¹, Todd Gaines², Keenan Amundsen¹, Kevin Watteyne³, Amit J. Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²Colorado State University, Fort Collins, CO, ³Bayer CropScience, Lincoln, NE (2)

Evaluation of new corn herbicides in Northeast Nebraska. Jon E. Scott*¹, Aaron S. Franssen², Gail G. Stratman³, Dennis J. Tonks⁴, Kevin Watteyne⁵, Stevan Z. Knezevic¹; ¹University of Nebraska-Lincoln, Concord, NE, ²Syngenta Crop Protection, Seward, NE, ³FMC Corporation, Stromsburg, NE, ⁴ISK Biosciences, Kearney, NE, ⁵Bayer CropScience, Lincoln, NE (3)

†Evaluation of herbicide programs in ALS resistant sorghum. Eric A. VanLoenen*¹, Anita Dille¹, Curtis R. Thompson¹, Bruce V. Steward³, Kenneth L. Carlson⁴, Philip W. Stahlman⁵, Jennifer Jester⁵, Alan J. Schlegel⁶, Gary Cramer⁷; ¹Kansas State University, Manhattan, KS, ³DuPont Crop Protection, Overland Park, KS, ⁴DuPont Crop Protection, Johnston, IA, ⁵Kansas State University, Hays, KS, ⁶Kansas State University, Tribune, KS, ⁷Kansas State University, Hutchinson, KS (4)

Enlist Weed Control Programs in Enlist Corn. David Ruen*¹, Joe Q. Armstrong², Olena O. Castello³; ¹Dow AgroSciences, Lanesboro, MN, ²Dow AgroSciences, Fresno, CA, ³Dow AgroSciences, Lancaster, PA (5)

†Amaranthus Control and Enhanced Tolerance to Split Preemergence Applications of Pyroxasulfone with Seed-applied Safeners in Grain Sorghum. Loren V. Goodrich*, Patrick Brown, Dean E. Riechers; University of Illinois Urbana-Champaign, Urbana, IL (6)

Control of Field Horsetail (*Equisetum arvense* L.) in Corn. Nader Soltani*¹, Kris McNaughton¹, Peter H. Sikkema¹; ¹University of Guelph, Ridgeway, ON (7)

Agronomic Crops I (continued)

Effect of nozzle selection on herbicide efficacy of four winter grasses. J Connor Ferguson*¹, Rodolfo G. Chechetto², Andrew J. Hewitt³, Bhagirath S. Chauhan⁴, Steve W. Adkins¹, Greg R. Kruger⁵, Chris C. O'Donnell¹; ¹University of Queensland, Gatton, Australia, ²University of Queensland, São Paulo State University - FCA, Gatton, Australia, ³University of Queensland, Gatton, Australia & University of Nebraska-Lincoln, North Platte, NE, ⁴Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland, Toowoomba, Australia, ⁵University of Nebraska-Lincoln, North Platte, NE (8)

Introducing DuPont™ Sentrallas™ and DuPont™ Travallas™ New Liquid Sulfonylurea Herbicides for Cereals. Keith A. Diedrick*¹, Keith D. Johnson², Jeffrey T. Krumm³, Bruce V. Steward⁴, Robert N. Rupp⁵, Kenneth L. Carlson⁶; ¹DuPont Crop Protection, Madison, WI, ²DuPont Crop Protection, Grand Forks, ND, ³DuPont Crop Protection, Hastings, NE, ⁴DuPont Crop Protection, Overland Park, KS, ⁵DuPont Crop Protection, Edmond, OK, ⁶DuPont Crop Protection, Johnston, IA (9)

So, What Is Industry Doing To Protect Bees? A Non-traditional Weed Science Topic. James Gifford*, David G. Ouse; Dow AgroSciences, Indianapolis, IN (10)

Does poultry litter influence weed dynamics in corn and soybeans in western Kentucky? Erin Haramoto*¹, Edwin Ritchey², Jesse Gray²; ¹University of Kentucky, Lexington, KY, ²University of Kentucky Research and Education Center, Princeton, KY (11)

Biologically Effective Dose of Glyphosate as Influenced by Weed Size in Corn. Nader Soltani*¹, Robert E. Nurse², Peter H. Sikkema¹; ¹University of Guelph, Ridgetown, ON, ²Agriculture Canada, Harrow, ON (12)

Agronomic Crops II (Soybeans, Dry Beans/Sugarbeet)

Volunteer Corn Control in Dicamba – Tolerant Soybeans using Glyphosate + Dicamba + Quizalofop- P ethyl. Larry H. Hageman*¹, Scott E. Swanson¹, Craig M. Alford², Keith A. Diedrick³, Kevin L. Hahn⁴, David H. Johnson², Keith D. Johnson⁵, Jeffrey T. Krumm⁶, Michael D. Meyer², Charles E. Snipes⁷; ¹DuPont Crop Protection, Rochelle, IL, ²DuPont Crop Protection, Johnston, IA, ³DuPont Crop Protection, Madison, WI, ⁴DuPont Crop Protection, Bloomington, IL, ⁵DuPont Crop Protection, Grand Forks, ND, ⁶DuPont Crop Protection, Hastings, NE, ⁷DuPont Crop Protection, Greenville, MS (13)

Control of Enlist corn with clethodim tank-mixed with Enlist Duo. Eric J. Ott*¹, Lowell D. Sandell², John A. Pawlak³; ¹Valent USA Corporation, Greenfield, IN, ²Valent USA Corporation, Lincoln, NE, ³Valent USA Corporation, Lansing, MI (14)

††Antagonism of clethodim tank-mixed with dicamba or 2,4-D: Response of common grass weeds. Kyle Russell*, Attilio Kandrotas Bercht, Mark L. Bernards; Western Illinois University, Macomb, IL (15)

Weed control, crop tolerance and potential tank contamination in dicamba resistant soybeans. Jon E. Scott*¹, Leo D. Charvat², Stevan Z. Knezevic¹; ¹University of Nebraska-Lincoln, Concord, NE, ²BASF Corporation, Lincoln, NE (16)

Herbicide Programs for Conventional Till Dicamba-Tolerant Soybeans. Keith A. Diedrick*¹, Kelly A. Backscheider², Michael D. Meyer³, Scott E. Swanson⁴, Kevin L. Hahn⁵, Keith D. Johnson⁶, Jeffrey T. Krumm⁷, Donald D. Ganske⁸, Victoria A. Kleczewski⁹, Robert W. Williams¹⁰, Bruce V. Steward¹¹, Richard M. Edmund¹², Eric Castner¹³, Dan Smith¹⁴, Michael T. Edwards¹⁵, Robert Rupp¹⁶; ¹DuPont Crop Protection, Madison, WI, ²DuPont Crop Protection, Shelbyville, IN, ³DuPont Crop Protection, Johnston, IA, ⁴DuPont Crop Protection, Rochelle, IL, ⁵DuPont Crop Protection, Bloomington, IL, ⁶DuPont Crop Protection, Grand Forks, ND, ⁷DuPont Crop Protection, Hastings, NE, ⁸DuPont Crop Protection, Winchester, VA, ⁹DuPont Crop Protection, Middletown, DE, ¹⁰DuPont Crop Protection, Raleigh, NC, ¹¹DuPont Crop Protection, Overland Park, KS, ¹²DuPont Crop Protection, Little Rock, AR, ¹³DuPont Crop Protection, Weatherford, TX, ¹⁴DuPont Crop Protection,

Agronomic Crops II (continued)

Madison, MS, ¹⁵DuPont Crop Protection, Pierre Part, LA,
¹⁶DuPont Crop Protection, Edmond, OK (17)

††Monitoring Factors Associated with the Risk of Off-target Movement of Synthetic Auxin Herbicides in Missouri. Wyatt Coffman*, Mandy D. Bish, Kevin W. Bradley; University of Missouri, Columbia, MO (18)

†Impact of Tank Cleaning Agents on Ameliorating Dicamba Damage to Soybean (*Glycine max*). Andy J. Luke*¹, Jason W. Weirich², Reid J. Smeda¹; ¹University of Missouri, Columbia, MO, ²MFA Incorporated, Columbia, MO (19)

Soybean Response to Preplant Applications of Dicamba and Dicamba + 2,4-D Premixes. Nick Fleitz*¹, JD Green¹, James R. Martin², Jesse Gray³; ¹University of Kentucky, Lexington, KY, ²University of Kentucky, Princeton, KY, ³University of Kentucky Research and Education Center, Princeton, KY (20)

Response of Soybean Following the Application of Lactofen, Gibberellic Acid and Foliar Nutrient Combinations. Lowell D. Sandell*¹, Kevin D. Forney²; ¹Valent USA Corporation, Lincoln, NE, ²Valent USA, Bakersfield, CA (21)

***Conyza canadensis* control programs in Enlist soybean.** Kristin Rosenbaum*¹, David Simpson², Leah Granke³, Laura A. Campbell⁴, Marcos Baez Buchanan⁵; ¹Dow AgroSciences, Crete, NE, ²Dow AgroSciences, Indianapolis, IN, ³Dow AgroSciences, Columbus, OH, ⁴Dow AgroSciences, Carbonale, IL, ⁵Dow AgroSciences, Entre Rios, Argentina (22)

Palmer Amaranth Control Options in Enlist Soybean. Michael Moechnig*¹, Kristin Rosenbaum², Leah Granke³, Larry Walton⁴, Bobby Haygood⁵, Sunil Tewari⁶; ¹Dow AgroSciences, Toronto, SD, ²Dow AgroSciences, Crete, NE, ³Dow AgroSciences, Columbus, OH, ⁴Dow AgroSciences, Tupelo, MS, ⁵Dow AgroSciences, Memphis, TN, ⁶Dow AgroSciences, West Lafayette, IN (23)

†Control of *Amaranthus* spp. in Double Crop Soybean. Marshall M. Hay*, Dallas E. Peterson, Doug E. Shoup; Kansas State University, Manhattan, KS (24)

Agronomic Crops II (continued)

Evaluation of new herbicide tolerant crops: Bolt Beans and Balance Beans. Stevan Z. Knezevic^{*1}, Jeffrey T. Krumm², Kevin Watteyne³, Jon E. Scott¹; ¹University of Nebraska-Lincoln, Concord, NE, ²DuPont Crop Protection, Hastings, NE, ³Bayer CropScience, Lincoln, NE (25)

BOLT™ Technology Soybeans for Improved Plant-Back Flexibility after DuPont™ Finesse® Herbicide Application to Wheat. Kelly A. Backscheider^{*1}, Larry H. Hageman², Jeffrey T. Krumm³, Scott E. Swanson⁴, Bruce V. Steward⁵, Michael T. Edwards⁶, Robert N. Rupp⁷, Robert W. Williams⁸, Richard M. Edmund⁹, Victoria A. Kleczewski¹⁰, David H. Johnson¹¹; ¹DuPont Crop Protection, Shelbyville, IN, ²DuPont Crop Protection, ROCHELLE, IL, ³DuPont Crop Protection, Hastings, NE, ⁴DuPont Crop Protection, Rochelle, IL, ⁵DuPont Crop Protection, Overland Park, KS, ⁶DuPont Crop Protection, Pierre Part, LA, ⁷DuPont Crop Protection, Edmond, OK, ⁸DuPont Crop Protection, Raleigh, NC, ⁹DuPont Crop Protection, Little Rock, AR, ¹⁰DuPont Crop Protection, Middletown, DE, ¹¹DuPont Crop Protection, Johnston, IA (26)

Glufosinate (LibertyLink) and Glyphosate (Roundup Ready/GT) Weed Control Programs for SOA 2- and SOA 9-Resistant Giant Ragweed in Soybean. Lisa M. Behnken^{*1}, Fritz R. Breitenbach², Jeffrey L. Gunsolus³; ¹University of Minnesota, Rochester, MN, ²University of Minnesota Extension, Rochester, MN, ³University of Minnesota Extension, St. Paul, MN (27)

†Control of Glyphosate-Resistant Common Ragweed (*Ambrosia artemisiifolia* L) in Glufosinate-Resistant Soybean. Ethann R. Barnes^{*1}, Peter H. Sikkema², Stevan Z. Knezevic³, John L. Lindquist¹, Amitkumar J. Jhala¹; ¹University of Nebraska- Lincoln, Lincoln, NE, ²University of Guelph, Ridgetown, ON, ³University of Nebraska-Lincoln, Concord, NE (28)

††S.T.O.P Weeds with Glufosinate - Best Management Practices. Aaron M. Helbling^{*1}, Kevin B. Thorsness¹, Angela J. Kazmierczak¹, John B. Christianson¹, Bill Shores², Arlene Cotie³; ¹Bayer CropScience, Fargo, ND, ²Bayer CropScience, Fergus Fall, MN, ³Bayer Crop Science, Raleigh, NC (29)

Agronomic Crops II (continued)

Use of weed screens to evaluate PRE and POST herbicide concepts in soybean. Stevan Z. Knezevic*¹, David A. Feist², Steve Eskelsen³, Jon E. Scott¹; ¹University of Nebraska-Lincoln, Concord, NE, ²ADAMA, Fort Collins, CO, ³ADAMA, Kennewick, WA (30)

Introduction of Surveil® herbicide for preplant and preemergence weed control in soybean. Joe Armstrong¹, Jeffrey Ellis*², Chris Voglewede³, Mark Peterson³; ¹Dow AgroSciences, Davenport, IA, ²Dow AgroSciences, Sterlington, LA, ³Dow AgroSciences, Indianapolis, IN (31)

Managing Waterhemp in Soybeans with Layered Residual Herbicides. A Strategy for Controlling Glyphosate Resistant Waterhemp in Minnesota. Lisa M. Behnken*¹, Fritz R. Breitenbach², Jeffrey L. Gunsolus³; ¹University of Minnesota, Rochester, MN, ²University of Minnesota Extension, Rochester, MN, ³University of Minnesota Extension, St. Paul, MN (32)

†Season-Long Control of Glyphosate-Resistant Common Waterhemp as Influenced by Split-Applications of Very Long Chain Fatty Acid Synthesis Inhibitors in Soybean. Debalin Sarangi*¹, Lowell D. Sandell², Stevan Z. Knezevic³, John L. Lindquist¹, Suat Irmak¹, Amit J. Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²Valent USA Corporation, Lincoln, NE, ³University of Nebraska-Lincoln, Concord, NE (33)

†Has Soybean Breeding Over 80 Years Selected for Increased Competitiveness with Weeds? Devin Hammer*, Shawn Conley; University of Wisconsin-Madison, Madison, WI (34)

††Soybean yield as affected by planting date and relative removal time of cover crop or winter annual weeds. Kristina Simmons*, Brent S. Heaton, Mark L. Bernards; Western Illinois University, Macomb, IL (35)

†Weed Management Techniques for Organic Soybeans (*Glycine max*). Ricardo C. Silva*, Carey F. Page, Reid J. Smeda; University of Missouri, Columbia, MO (36)

Equipment and Application Methods

Methods for Assessing Rainfastness of Herbicide / Safener Combinations. David G. Ouse*¹, Roger Gast¹, James Gifford¹, Andrea McVeigh¹, Debbie Bingham-Burr²; ¹Dow AgroSciences, Indianapolis, IN, ²Kelly Scientific, Indianapolis, IN (37)

†Establishing Drift Reduction Ratings for Ground Nozzles and Tank-mixtures Using the EPA's Guidelines. Ryan S. Henry*¹, William E. Bagley², Jerome J. Schleier III³, Patrick L. Havens³, Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²Bagley Enterprises, San Antonio, TX, ³Dow AgroSciences, Indianapolis, IN (38)

Effect of spray droplet size on rainfastness of glyphosate (Roundup PowerMax) applied to velvetleaf, common lambsquarter and grain sorghum. Jeffrey A. Golus*, Chandra J. Hawley, Desarae Catlett, Greg R. Kruger; University of Nebraska, Lincoln, North Platte, NE (39)

†Droplet size distribution produced by CP nozzles for aerial applications of glyphosate using different pressures and deflection angles. Guilherme Sousa Alves*¹, Fernando Kassis Carvalho¹, Bruno Canella Vieira¹, Joao Paulo A.R. da Cunha², Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²Federal University of Uberlandia, Uberlandia, Brazil (40)

†Droplet size distribution comparison between nozzles used in ground and aerial applications in a high-speed wind tunnel. Fernando Kassis Carvalho*¹, Guilherme Sousa Alves¹, Bruno Canella Vieira¹, Ulisses R. Antuniassi², Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²FCA-UNESP, Botucatu, Brazil (41)

†Wide Range of Droplet Size Distributions from Non-Venturi Nozzles. Thomas R. Butts*, Annah M. Geyer, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (42)

††Carrier Volume and Nozzle Type Effect on Efficiency of Tank-mixtures of Glufosinate and Dicamba. Frederico da Silva Guimaraes*, Luis Andre Tobias Cardoso Pinto, Thomas R. Butts, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (43)

Equipment and Application Methods (continued)

††Effect of glufosinate and dicamba rates on control of grasses and small seeded broadleaf weeds. Luis Andre Tobias Cardoso Pinto*, Frederico da Silva Guimaraes, Thomas R. Butts, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (44)

†The Influence of Nozzle Design on Glyphosate Plus 2,4-D or Dicamba Efficacy on Glyphosate-Resistant Weeds in Narrow Row Soybean. Travis Legleiter*, William G. Johnson, Bryan Young; Purdue University, West Lafayette, IN (45)

†Influence of Spray Water pH, Foliar Fertilizers, and Ammonium Sulfate on Efficacy of a 2,4-D plus Glyphosate Formulation. Pratap Devkota*, William G. Johnson; Purdue University, West Lafayette, IN (46)

†Effect of Nozzles on Glyphosate-Resistant *Amaranthus palmeri* Control with Postemergence Herbicides. Matthew C. Geiger*¹, Karla L. Gage¹, Ronald Krausz²; ¹Southern Illinois University Carbondale, Carbondale, IL, ²Southern Illinois University Carbondale, Belleville, IL (47)

††Impact of nozzle type and adjuvant on the performance of clethodim on volunteer corn (*Zea mays*). Andjela Obradovic*, Ryan S. Henry, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (48)

†Effect of Cleanout Method on the Persistence of Auxinic Herbicide Residue. Kevin R. McGregor*¹, Michael D. Owen²; ¹Iowa State University, Ankeny, IA, ²Iowa State University, Ames, IA (49)

Extension

2015 National Weed Contest. Bruce A. Ackley*; The Ohio State University, Columbus, OH (50)

Digital Book for Weed Identification. Bruce A. Ackley*; The Ohio State University, Columbus, OH (51)

Distribution of Glyphosate-resistant Kochia in North America. Phillip W. Stahlman*¹, Ian Heap²; ¹Kansas State University, Hays, KS, ²WeedSmart LLC, Corvallis, OR (52)

The Global Herbicide Resistance Action Committee Auxin Working Group - Purpose and Projects. Mark A. Peterson*¹, Arlene Cotie², Michael J. Horak³, Andreas Landes⁴, Don Porter⁵; ¹Dow AgroSciences, West Lafayette, IN, ²Bayer Crop Science, Raleigh, NC, ³Monsanto, St. Louis, MO, ⁴BASF, Limburgerhof, Germany, ⁵Syngenta Crop Protection, Raleigh, NC (53)

†The Preemergence Mode-of-Action Experience. Joshua Miller*, Rodrigo Werle; University of Nebraska-Lincoln, Lincoln, NE (54)

Herbicide Physiology

†Correlating Phenotype with GST Expression in Atrazine-Resistant and -Sensitive *Amaranthus*

***tuberculatus* Segregating F2 Lines.** Sarah O'Brien*, Anton F. Evans, Janel Huffman, Patrick Tranel, Rong Ma, Kris N. Lambert, Dean E. Riechers; University of Illinois Urbana-Champaign, Urbana, IL (55)

Evaluation of Candidate Cytochrome P450 Expression in Mesotrione-Resistant, -Sensitive and Segregating F2 Waterhemp (*Amaranthus tuberculatus*) Populations. Rong Ma*, Janel Huffman, Aaron G. Hager, Patrick Tranel, Kris N. Lambert, Dean E. Riechers; University of Illinois Urbana-Champaign, Urbana, IL (56)

†Mechanism(s) of Resistance to PS II and ALS inhibitors in Mesotrione Resistant Palmer Amaranth. Sridevi Betha*, Curtis R. Thompson, Dallas E. Peterson, Mithila Jugulam; Kansas State University, Manhattan, KS (57)

†What is the mutation rate for herbicide resistance? Federico Casale*, Patrick Tranel; University of Illinois, Urbana, IL (58)

†HPPD resistance in Waterhemp from Nebraska: Evidence for multiple genes conferring enhanced metabolism. Maxwell C. Oliveira*¹, Todd Gaines², Amit J. Jhala¹, Stevan Z. Knezevic³; ¹University of Nebraska-Lincoln, Lincoln, NE, ²Colorado State University, Fort Collins, CO, ³University of Nebraska-Lincoln, Concord, NE (59)

†Evolution of glyphosate resistance: tangling of EPSPS amplification, mutation and translocation based Non-target-site Resistance? Chenxi Wu*¹, Patrick Tranel, Adam S. Davis²; ¹University of Illinois at Champaign-Urbana, Urbana, IL, ²USDA-ARS, Urbana, IL (60)

†Development of Glyphosate-Resistant *Arabidopsis* Line to Examine Fitness Effects of Over-Expressing epsps. Zachery T. Beres*, Lin Jin, Xiao Yang, Jason T. Parrish, Allison A. Snow, David M. Mackey; Ohio State University, Columbus, OH (61)

Herbicide Physiology (continued)

†Efficacy of foliar applications of halauxifen-methyl compared to 2,4-D and dicamba on glyphosate-resistant horseweed (*Conyza canadensis*). Cara L. McCauley*, Julie M. Young, Bryan Young; Purdue University, West Lafayette, IN (62)

†Influence of Environmental Factors on the Efficacy of Paraquat. Garth W. Duncan*, Julie M. Young, Bryan Young; Purdue University, West Lafayette, IN (63)

††Control of common lambsquarters (*Chenopodium album*) using different glyphosate formulations. Milos Zaric*, Ryan S. Henry, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (64)

Horticulture and Ornamentals

†Control of Volunteer Horseradish with Dicamba and Glyphosate. Matthew E. Jenkins*¹, Ronald F. Krausz², Alan Walters¹, Sara M. Allen³; ¹Southern Illinois University, Carbondale, IL, ²Researcher, Belleville, IL, ³Monsanto Company, Bonnie, IL (65)

†Marketability Effects From Simulated Glyphosate Drift Injury to Red Norland Potato. Amanda Crook*; NDSU, Fargo, ND (66)

Evaluating herbicides for use in Juneberry (*Amelanchier alnifolia*). Harlene M. Hatterman-Valenti*, Collin Auwarter; North Dakota State University, Fargo, ND (67)

Rangeland, Pasture, and Industrial Vegetation Management

†Relationships Between Weed Incidence, Soil Fertility, and Soil pH in Missouri Pastures . Zach L. Trower*, Mandy D.

Bish, Alex R. Long, Meghan E. Biggs, Kevin W. Bradley;

University of Missouri, Columbia, MO (68)

†Residual Herbicides for Weed Management on Midwest Railroad Right-of-ways. Matthew R. Terry*, Reid J. Smeda;

University of Missouri, Columbia, MO (69)

Weed Biology, Ecology, Management

Competition of wild oat (*Avena fatua*) and wheat under field condition. Kulsoom Umm-E*¹, Muhammad A. Khan¹, Amit J. Jhala²; ¹University of Agriculture Peshawar, Peshawar, Pakistan, ²University of Nebraska-Lincoln, Lincoln, NE (70)

†Weed Community Composition and Emergence in Long-Term No-Tillage, Strip-Tillage, and Chisel Plow Corn and Soybean Systems. Nathaniel M. Drewitz*, David E.

Stoltenberg; University of Wisconsin-Madison, Madison, WI (71)

†Influence of Tillage Methods on Management Of *Amaranthus* Species In Soybean. Jaime A. Farmer*¹, Vince M.

Davis², Larry Steckel³, William G. Johnson⁴, Mark Loux⁵, Jason Norsworthy⁶, Kevin W. Bradley¹; ¹University of Missouri,

Columbia, MO, ²BASF Corporation, Verona, WI, ³University of Tennessee, Knoxville, TN, ⁴Purdue University, West

Lafayette, IN, ⁵The Ohio State University, Columbus, OH,

⁶University of Arkansas, Fayetteville, AR (72)

†Shortening Physiological Dormancy of Giant Ragweed Seed Enables Rapid Germination for Research. Nick T. Harre*,

John A. Hettinga, Stephen C. Weller, Bryan G. Young; Purdue University, West Lafayette, IN (73)

†Phenology of five waterhemp populations grown in a common environment. Joey M. Heneghan*, William G.

Johnson; Purdue University, West Lafayette, IN (74)

Weed Biology, Ecology, Management (continued)

Preventing Late Season Emergence of Waterhemp (*Amaranthus rudis*) Reduces Seed Bank Contributions. Heidi R. Davis*, Carey F. Page, Reid J. Smeda; University of Missouri, Columbia, MO (75)

††Influence of multiple herbicide resistances on relative growth rate and seed production in waterhemp (*Amaranthus tuberculatus*). Eric Jones*; Iowa State University, Ames, IA (76)

†Survey of Alternative Hosts and Cultural Practices in Indiana Fields Infected with Goss's Wilt . Taylor M. Campbell*, Joseph T. Ikley, Kiersten A. Wise, William G. Johnson; Purdue University, West Lafayette, IN (77)

††Waterhemp density and biomass as affected by soybean planting date and removal time of cover crop or winter annual weeds. Kenneth Tryggstad*, Brent S. Heaton, Mark L. Bernards; Western Illinois University, Macomb, IL (78)

†Cover Crops: Do they Really Contribute to the Control of Palmer amaranth? Douglas J. Spaunhorst*, William G. Johnson; Purdue University, West Lafayette, IN (79)

†Effects of cover crop and herbicide program on *Amaranthus palmeri* in no-till soybeans. Chelsea M. Ahlquist*, Dallas Peterson, Anita Dille, Stewart Duncan; Kansas State University, Manhattan, KS (80)

†Herbicide Carryover Evaluation in Cover Crops Following Wheat Herbicides. Daniel H. Smith*¹, Vince M. Davis²;
¹University of Wisconsin-Madison, Madison, WI, ²BASF Corporation, Verona, WI (81)

†Emergence and postemergence herbicide response of horseweed (*Conyza canadensis*) populations in eastern Kansas. Garrison J. Gundy*, Chelsea M. Ahlquist, Anita Dille; Kansas State University, Manhattan, KS (82)

†Glyphosate-resistance and distribution of Nebraska horseweed (*Conyza canadensis*) populations. Spencer L. Samuelson*, Bruno Canella Vieira, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (83)

Weed Biology, Ecology, Management (continued)

†Response of *Amaranthus retroflexus* populations from western Nebraska to glyphosate. Matthew R. Nelson*, Bruno Canella Vieira, Spencer L. Samuelson, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (84)

†Distribution of glyphosate-resistant Palmer amaranth (*Amaranthus palmeri*) in western Nebraska. Bruno Canella Vieira*, Spencer L. Samuelson, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (85)

†Heritability of 4-Hydroxyphenylpyruvate Dioxygenase Inhibitor Herbicide Resistance in *Amaranthus tuberculatus*. Daniel Kohlhas*, Michael D. Owen; Iowa State University, Ames, IA (86)

†Pollen-mediated Gene Flow from Glyphosate-Resistant to Susceptible Giant Ragweed (*Ambrosia trifida*) under Field Conditions. Zahoor A. Ganie*, Amit J. Jhala; University of Nebraska-Lincoln, Lincoln, NE (87)

††Cross resistance of auxin herbicides in a 2,4-D-resistant waterhemp population. Mica Grujic*, Ryan S. Henry, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (88)

Six-year Summary of Multiple Resistance Testing in Illinois Populations of Waterhemp and Palmer Amaranth: So What's the Good News? Chance W. Riggins*, Aaron G. Hager, Patrick Tranel; University of Illinois, Urbana, IL (89)

†Application Timing Effects On a Novel Five-Way Resistant Population of Waterhemp (*Amaranthus Tuberculatus*). Cody M. Evans*¹, Patrick Tranel¹, Dean E. Riechers¹, Adam S. Davis², Doug Maxwell¹, Lisa Gonzini¹, Aaron G. Hager¹; ¹University of Illinois Champaign-Urbana, Urbana, IL, ²USDA-ARS, Urbana, IL (90)

Effect of Postemergence Herbicides on Disease Severity of Goss's wilt in Corn. Joseph T. Ikley*, Kiersten A. Wise, William G. Johnson; Purdue University, West Lafayette, IN (91)

†Kochia Response to PRE and POST Applied Dicamba. Junjun Ou*¹, Curtis R. Thompson¹, Mithila Jugulam¹, Philip W. Stahlman²; ¹Kansas State University, Manhattan, KS, ²Kansas State University, Hays, KS (92)

General Session

70th NCWSS Annual Meeting

Room: Cosmopolitan AB

Moderator: Anita Dille

***SPEAKER**

10:30 Welcome to Indianapolis. (93)

10:45 How The North Central Weed Control Conference Shaped Agricultural Aviation in the Grasslands.
David D. Vail*; Kansas State University, Manhattan, KS (94)

11:30 NCWSS Presidential Address. John Hinz*; Bayer CropScience, Story City, IA (95)

11:45 Necrology Report. Aaron Hager*; University of Illinois, Urbana, IL (96)

12:00 – 1:15 Regency CD
Graduate Student Luncheon
and Business Meeting

Sponsored by Dow AgroSciences

Agronomic Crops I and II

Room: Cosmopolitan A
Moderators: Brett Miller & Joe Ikley

*SPEAKER † STUDENT CONTEST

- 1:15 Comparisons of winter versus early spring preemergence herbicide applications for kochia control in fallow.** Randall S. Currie^{*1}, Patrick Geier¹, Curtis R. Thompson²; ¹Kansas State University, Garden City, KS, ²Kansas State University, Manhattan, KS (97)
- 1:30 †Preharvest Herbicide Application Effects on Winter Wheat Harvestability.** Kelsey Rogers^{*}, Christy L. Sprague; Michigan State University, East Lansing, MI (98)
- 1:45 †Evaluation of Herbicide Programs for the Termination of Eight Different Cover Crop Species in the Spring.** Cody D. Cornelius^{*}, Kevin W. Bradley, Mandy D. Bish, Alex R. Long, Meghan E. Biggs, David L. Kleinsorge; University of Missouri, Columbia, MO (99)
- 2:00 †Cover Crop Interseeding in Grain Corn using a Modified Grain Drill.** Daniel H. Smith^{*1}, Matthew D. Ruark¹, Francisco J. Arriaga¹, Vince M. Davis²; ¹University of Wisconsin-Madison, Madison, WI, ²BASF Corporation, Verona, WI (100)
- 2:15 †Sulfentrazone Tank-mix Partners for Grass Control in Ontario Dry Beans (*Phaseolus vulgaris* L.).** Allison N. Taziar^{*}, Peter H. Sikkema, Darren E. Robinson; University of Guelph, Ridgetown, ON (101)
- 2:30 †Halosulfuron Tank Mixes Applied PPI and PRE in White Bean.** Zhenyi Li^{*1}, Rene Van Acker¹, Darren E. Robinson², Nader Soltani², Peter H. Sikkema²; ¹University of Guelph, Guelph, ON, ²University of Guelph, Ridgetown, ON (102)

Agronomic Crops I and II (continued)

- 2:45 †Sonic and SureStart II for Palmer Amaranth control in Agronomic Crops.** Alinna Umphres-Lopez^{*1}, Bobby Haygood², Tony W. Weiss³, Zachary Lopez⁴, Thomas C. Mueller¹; ¹University of Tennessee, Knoxville, TN, ²Dow AgroSciences, Memphis, TN, ³Dow AgroSciences, Raleigh, NC, ⁴Dow AgroSciences, Bishop, TX (103)
- 3:00 Break**
- 3:15 †Preplant herbicide programs utilizing halauxifen-methyl for management of glyphosate-resistant horseweed (*Conyza canadensis* L.) in soybean.** Marcelo Zimmer*, Bryan Young, William G. Johnson; Purdue University, West Lafayette, IN (104)
- 3:30 †How to Improve the Consistency of Glyphosate-resistant Canada fleabane (*Conyza canadensis* L. Cronq.) Control with Saflufenacil: An Investigation of Tank Mix Partners and Optimal Time of Day Application.** Christopher M. Budd^{*1}, Peter H. Sikkema¹, Darren E. Robinson¹, David C. Hooker¹, Robert T. Miller²; ¹University of Guelph, Ridgetown, ON, ²BASF Canada, Mississauga, ON (105)
- 3:45 †Investigations of the Potential Interactions Between Pre-emergence Residual Herbicides and Seed Treatments in Corn and Soybean.** Blake R. Barlow*, Alex R. Long, Meghan E. Biggs, Mandy D. Bish, Kevin W. Bradley; University of Missouri, Columbia, MO (106)
- 4:00 †Soybean yields and critical time for weed removal as influenced by soil applied herbicides.** Maxwell C. Oliveira^{*1}, Icaro F. Oliveira e Freitas², Jon E. Scott², Stevan Z. Knezevic²; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, Concord, NE (107)
- 4:15 Control of Glyphosate-Resistant *Amaranthus palmeri* with Soil- and Foliar-Applied Herbicides in Glufosinate-Resistant Soybean.** Kayla N. Wiedau^{*1}, Ronald F. Krausz², Karla L. Gage¹; ¹Southern Illinois University, Carbondale, IL, ²Researcher, Belleville, IL (108)

Equipment and Application Methods

Room: Cosmopolitan B

Moderator: Dave Hillger

*SPEAKER † STUDENT CONTEST

- 1:15 Dicamba Droplet Retention on Common Lambsquarters and Soybean Leaves as Influenced by Nozzle Type, Application Pressure, and Adjuvant.** Cody F. Creech*¹, Ryan S. Henry², Greg R. Kruger²; ¹University of Nebraska-Lincoln, Scottsbluff, NE, ²University of Nebraska-Lincoln, North Platte, NE (109)
- 1:30 †Spray Solution Deposition and Retention on Glyphosate-Resistant Weeds in Narrow Row Soybean as Influenced by Spray Nozzle Design.** Travis Legleiter*, William G. Johnson, Bryan Young; Purdue University, West Lafayette, IN (110)
- 1:45 †Pulse-Width Modulation Duty Cycle and Application Pressure Effect on Droplet Size.** Thomas R. Butts*, Annah M. Geyer, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (111)
- 2:00 †Evaluation Spray Pattern Uniformity of Ground Nozzles Using Laboratory and Field Techniques.** Ryan S. Henry*¹, Joe D. Luck², Brad K. Fritz³, W. C. Hoffmann³, Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²University of Nebraska-Lincoln, Lincoln, NE, ³USDA-ARS, College Station, TX (112)
- 2:15 †Effect of Carrier Water Hardness and Ammonium Sulfate on Efficacy of a 2,4-D and Glyphosate Formulation.** Pratap Devkota*, William G. Johnson; Purdue University, West Lafayette, IN (113)
- 2:30 †Effects of spray solutions on the application of Enlist Duo.** Matthew R. Nelson*¹, Ryan S. Henry¹, Jerome J. Schleier III², Thomas R. Butts¹, Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²Dow AgroSciences, Indianapolis, IN (114)
- 2:45 Break**

Equipment and Application Methods (continued)

- 3:00 What Have We Learned and How Will We Spray in the Era of Herbicide Tolerant Crops?** Robert E. Wolf*¹, Scott M. Bretthauer²; ¹Wolf Consulting & Research LLC, Mahomet, IL, ²University of Illinois, Urbana, IL (115)
- 3:15 †Drift caused by glyphosate and 2,4-D amine sprayed by different nozzles under several wind speed conditions.** Guilherme Sousa Alves*¹, Ryan S. Henry¹, Joao Paulo A.R. da Cunha², Bruno Canella Vieira¹, Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²Federal University of Uberlandia, Uberlandia, Brazil (116)
- 3:30 †Influence of application speed on droplet size distribution in aerial applications of glyphosate and adjuvants.** Bruno Canella Vieira*, Fernando Kassis Carvalho, Guilherme Sousa Alves, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (117)
- 3:45 †Atrazine formulations and adjuvants effect on droplet size distribution in aerial applications.** Fernando Kassis Carvalho*¹, Bruno Canella Vieira¹, Guilherme Sousa Alves¹, Ryan S. Henry¹, Ulisses R. Antuniassi², William E. Bagley³, Greg R. Kruger¹; ¹University of Nebraska-Lincoln, North Platte, NE, ²FCA-UNESP, Botucatu, Brazil, ³Bagley Enterprises, San Antonio, TX (118)
- 4:00 †Influence of Adjuvants on Dicamba Volatility and Efficacy.** Jamie L. Long*, Bryan Young, Julie M. Young; Purdue University, West Lafayette, IN (119)
- 4:15 Adjuvants with Nano-Technology.** Rich Zollinger*¹, Kirk Howatt¹, Tom Peters¹, Bryan Young², Dallas Peterson³, Mark Bernards⁴; ¹North Dakota State University, Fargo, ND, ²Purdue University, West Lafayette, IN, ³Kansas State University, Manhattan, KS, ⁴Western Illinois University, Macomb, IL (120)
- 4:30 Section Meeting**

Weed Biology, Ecology, Management

Room: Cosmopolitan CD

Moderator: Neha Rana

*SPEAKER † STUDENT CONTEST

- 1:15 Weed seed dormancy and persistence in the soil seedbank are related.** Adam S. Davis*¹, Xianhui Fu²;
¹USDA-ARS, Urbana, IL, ²University of Illinois, Urbana, IL (121)
- 1:30 †Influence of tillage, soil moisture and soil temperature on waterhemp emergence.** Joey M. Heneghan*, William G. Johnson; Purdue University, West Lafayette, IN (122)
- 1:45 †Does Waterfowl Migration = Weed Seed Distribution?** Jaime A. Farmer*, Mandy D. Bish, Alex R. Long, Meghan E. Biggs, Kevin W. Bradley;
¹University of Missouri-Columbia, Columbia, MO (123)
- 2:00 †Kochia (*Kochia scoparia*) and Russian thistle (*Salsola tragus*): glyphosate-resistance and distribution in western Nebraska.** Spencer L. Samuelson*, Bruno Canella Vieira, Chandra J. Hawley, Greg R. Kruger; University of Nebraska-Lincoln, North Platte, NE (124)
- 2:15 †Fitness Differences Among Glyphosate-Resistant and -Susceptible Kochia Populations in Western Kansas.** O. Adewale Osipitan*¹, Anita Dille¹, Philip W. Stahlman², David C. Hartnett¹, Allan K. Fritz¹;
¹Kansas State University, Manhattan, KS, ²Kansas State University, Hays, KS (125)
- 2:30 †Pollen-Mediated Gene Flow from Glyphosate-Resistant to -Susceptible Common Waterhemp under Field Conditions.** Debalin Sarangi*¹, Stevan Z. Knezevic², John L. Lindquist¹, Suat Irmak¹, Amit J. Jhala¹; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, Concord, NE (126)

Weed Biology, Ecology, Management (continued)

- 2:45** **†Characterization of A Novel Five-Way Resistant Population of Waterhemp *Amaranthus tuberculatus*.** Cody M. Evans*¹, Patrick Tranel¹, Dean E. Riechers¹, Adam S. Davis², Doug Maxwell¹, Lisa Gonzini¹, Aaron G. Hager¹; ¹University of Illinois Urbana-Champaign, Urbana, IL, ²USDA-ARS, Urbana, IL (127)
- 3:00** **Break**
- 3:15** **†Significance of Crop Seed Size and Cover Crop Residues on Edamame (*Glycine max*)-Weed Interactions.** Laura E. Crawford*¹, Martin Williams II², Samuel Wortman¹; ¹University of Illinois, Urbana, IL, ²USDA-ARS, Urbana, IL (128)
- 3:30** **†Critical duration of grass weed interference in grain sorghum.** Gared E. Shaffer*, Anita Dille; Kansas State University, Manhattan, KS (129)
- 3:45** **†Modeling Shattercane Population Dynamics in a Herbicide-Tolerant Sorghum Cropping System.** Rodrigo Werle*, Brigitte Tenhumberg, John L. Lindquist; University of Nebraska- Lincoln, Lincoln, NE (130)
- 4:00** **†Ability of *Clavibacter michiganensis* subsp. *nebraskensis*, Causal Agent of Goss's wilt of Corn, to Overwinter on Alternative Hosts.** Joseph T. Ikley*, Kiersten A. Wise, William G. Johnson; Purdue University, West Lafayette, IN (131)
- 4:15** **†Alternative Hosts Response to Inoculum Levels of *Clavibacter michiganensis* subsp. *nebraskensis* .** Taylor M. Campbell*, Joseph T. Ikley, Kiersten A. Wise, William G. Johnson; Purdue University, West Lafayette, IN (132)

Weed Biology, Ecology, Management (continued)

- 4:30 Influence of Spring Tillage on Common Ragweed (*Ambrosia artemisiifolia* L) Emergence in Nebraska.**
Ethann R. Barnes*¹, Rodrigo Werle¹, Lowell D. Sandell², Peter H. Sikkema³, Stevan Z. Knezevic⁴, John L. Lindquist¹, Amit J. Jhala¹; ¹University of Nebraska- Lincoln, Lincoln, NE, ²Valent USA Corporation, Lincoln, NE, ³University of Guelph, Ridgetown, ON, ⁴University of Nebraska-Lincoln, Concord, NE (133)
- 4:45 Effects of Spring Tillage on Giant Ragweed (*Ambrosia trifida*) Emergence.** Jared J. Goplen*¹, Jeffrey L. Gunsolus², Craig C. Sheaffer¹, Lisa M. Behnken³, Fritz R. Breitenbach³; ¹University of Minnesota, St. Paul, MN, ²University of Minnesota Extension, St. Paul, MN, ³University of Minnesota Extension, Rochester, MN (134)
- 5:00 Section Meeting**

Herbicide Physiology and Extension (mixed papers)

Room: Discovery AB
Moderator: Mithila Jugulam

***SPEAKER † STUDENT CONTEST**

- 1:15 Characterization of Horseweed (*Conyza canadensis*) Tolerance to a PPO-Inhibiting Herbicide.** Joel E. Ream*, Li Wen, Paul Feng; Monsanto Company, Chesterfield, MO (135)
- 1:30 †Herbicide programs for control of atrazine- and HPPD inhibitors-resistant Palmer amaranth in seed corn.** Parminder S. Chahal*, Amit J. Jhala; University of Nebraska-Lincoln, Lincoln, NE (136)
- 1:45 †Confirmation and Control of Glyphosate-Resistant Common Ragweed (*Ambrosia artemisiifolia*) in Nebraska.** Zahoor A. Ganie*, Ethann Barnes, Amit J. Jhala; University of Nebraska- Lincoln, Lincoln, NE (137)
- 2:00 †Distinct Glyphosate-Resistant Phenotypes in Giant Ragweed Alter the Magnitude of Resistance.** Nick T. Harre*, William G. Johnson, Stephen C. Weller, Bryan G. Young; Purdue University, West Lafayette, IN (138)
- 2:15 †Influence of Weed Height on the Synergism Between Atrazine and HPPD-inhibitors in Triazine-resistant Palmer amaranth.** Jonathon R. Kohrt*, Christy L. Sprague; Michigan State University, East Lansing, MI (139)
- 2:30 †Response of Four Palmer amaranth Populations to 2,4-D Choline.** Douglas J. Spaunhorst*, William G. Johnson; Purdue University, West Lafayette, IN (140)
- 2:45 Break**
- 3:00 †Fitness costs of herbicide resistance traits in waterhemp.** Chenxi Wu*¹, Patrick Tranel¹, Adam S. Davis²; ¹University of Illinois at Champaign-Urbana, Urbana, IL, ²USDA-ARS, Urbana, IL (141)

Herbicide Physiology and Extension (continued)

- 3:15 †Discriminating Bob from Sue: Gender markers for waterhemp.** Ahmed Sadeque*, Patrick Brown, Patrick Tranel; University of Illinois Urbana-Champaign, Urbana, IL (142)
- 3:30 †Profiling safener-responsive GST expression in grain sorghum lines that differ in S-metolachlor tolerance.** Loren V. Goodrich*, Rong Ma, Patrick Brown, Dean E. Riechers; University of Illinois Urbana-Champaign, Urbana, IL (143)
- 3:45 †Influence of horseweed (*Conyza canadensis*) height on the efficacy of halauxifen-methyl, dicamba, and 2,4-D.** Cara L. McCauley*, Bryan Young; Purdue University, West Lafayette, IN (144)
- 4:00 †Response of ABC- and Cationic Amino Acid-transporters genes to Herbicide Stress in *Conyza* sp. Plants Resistant to Glyphosate and Paraquat.** Marcelo L. Moretti*, Rocio Alarcon-Reverte, Sarah Morran, Bradley D. Hanson; University of California, Davis, CA (145)
- 4:15 Correlation of Initial Herbicide Symptomology with Final Paraquat Efficacy on Multiple Weed Species.** Garth W. Duncan*, Julie M. Young, Bryan Young; Purdue University, West Lafayette, IN (146)
- 4:30 Section Meeting**

Horticulture, Ornamentals, and Sugarbeet

Room: Cosmopolitan A

Moderator: Harlene Hatterman-Valenti

- 8:30 Continued Challenge to Control Waterhemp in Sugarbeet.** Thomas J. Peters*, Andrew B. Lueck; North Dakota State University, Fargo, ND (147)
- 8:45 Edamame (*Glycine max*) Cultivar Tolerance to Pyroxasulfone.** Nicholas E. Hausman*, James Moody, Martin Williams II; USDA-ARS, Urbana, IL (148)
- 9:00 Herbicide Management Systems To Control Weeds in Commercial Edamame Production.** James L. Moody*, Nicholas E. Hausman, Martin Williams II; USDA-ARS, Urbana, IL (149)
- 9:15 Potato response to sublethal doses of glyphosate and dicamba.** Harlene M. Hatterman-Valenti*, Collin Auwarter; North Dakota State University, Fargo, ND (150)
- 9:30 Simulated glyphosate drift in Red Norland seed potato fields affects daughter tubers.** Amanda Crook*; NDSU, Fargo, ND (151)
- 9:45 Break**
- 10:00 Control of linuron-resistant pigweed in carrot.** Darren E. Robinson*¹, Clarence Swanton²; ¹University of Guelph, Ridgetown, ON, ²University of Guelph, Guelph, ON (152)
- 10:15 Bicyclopyrone Performance in Minor/Specialty Crops.** Cheryl L. Dunne*¹, Venance H. Lengkeek², Dain E. Bruns³, Thomas H. Beckett³, Gordon D. Vail³; ¹Syngenta Crop Protection, Vero Beach, FL, ²Syngenta Crop Protection, St. Johns, MI, ³Syngenta Crop Protection, Greensboro, NC (153)
- 10:30 Herbicide Combinations for Weed Control in Fruit Crops.** Colin J. Phillippo*¹, Bernard H. Zandstra²; ¹Michigan State University, East Lansing, MI, ²Michigan State University, Holt, MI (154)
- 10:45 Section Meeting**

Agronomic Crops I (Corn, Sorghum, Cereals)

Room: Cosmopolitan B
Moderator: Brett Miller

- 8:30 DuPont™ Zest™ herbicide: New Grass Control Option for Inzen™ Sorghum.** Jeffrey T. Krumm*¹, Kenneth L. Carlson², David W. Saunders², Robert N. Rupp³, Bruce V. Steward⁴, Keith D. Johnson⁵; ¹DuPont Crop Protection, Hastings, NE, ²DuPont Crop Protection, Johnston, IA, ³DuPont Crop Protection, Edmond, OK, ⁴DuPont Crop Protection, Overland Park, KS, ⁵DuPont Crop Protection, Grand Forks, ND (155)
- 8:45 Weed Management in Inzen Sorghum.** Rodrigo Werle*, John L. Lindquist; University of Nebraska-Lincoln, Lincoln, NE (156)
- 9:00 Utilizing Dicamba + Tembotrione for Weed Control in Corn.** Mark A. Waddington*¹, Mark Wrucke², Kevin Watteyne³; ¹Bayer CropScience, Owensboro, KY, ²Bayer CropScience, Minneapolis, MN, ³Bayer CropScience, Lincoln, NE (157)
- 9:15 Resicore™: A New Corn Herbicide from Dow AgroSciences.** Scott Ditmarsen*¹, Michael Moechnig², Mark Peterson³, David Ruen⁴, David Simpson³, Chris Voglewede³; ¹Dow AgroSciences, Madison, WI, ²Dow AgroSciences, Toronto, SD, ³Dow AgroSciences, Indianapolis, IN, ⁴Dow AgroSciences, Lanesboro, MN (158)
- 9:30 Acuron Flexi: A New Herbicide for Corn.** Ryan D. Lins*¹, Thomas H. Beckett², Gordon D. Vail²; ¹Syngenta Crop Protection, Rochester, MN, ²Syngenta Crop Protection, Greensboro, NC (159)
- 9:45 Break**

Agronomic Crops I (continued)

- 10:00 Acuron Herbicide: Raising the Bar for Weed Control.** Steven P. Mroczkiewicz*¹, Scott E. Cully², Thomas H. Beckett³, Gordon D. Vail³; ¹Syngenta Crop Protection, Attica, IN, ²Syngenta Crop Protection, Marion, IL, ³Syngenta Crop Protection, Greensboro, NC (160)
- 10:15 Glyphosate-resistant giant ragweed control in corn and wheat.** Peter H. Sikkema*, Nader Soltani; University of Guelph, Ridgetown, ON (161)
- 10:30 Survey of Multiple Herbicide Resistance in Central Kansas Palmer Amaranth.** Jennifer Jester*, Philip W. Stahlman; Kansas State University, Hays, KS (162)
- 10:45 Section Meeting**

Midwest Invasive Plant Network: Invasive Plant Symposium (see page 45)

Plenary Session 1 – Welcome

10:00 to 12:00 pm Discovery AB

Graduate Student Symposium - Molecular Techniques in Weed Science

Room: Regency EF

MODERATOR: Daniel Smith

- 8:45 Introduction**
- 9:00 Molecular approaches to study herbicide-resistant weeds.** Patrick Tranel*; University of Illinois, Urbana, IL (163)
- 9:30 RNAseq: a method for understanding signaling and responses of weeds to various stresses and their impact on crops.** David Horvath*¹, Dasheng Liu², Sharon Clay³, Munevver Dogramaci¹, Michael Foley¹, Wun Chao¹, James Anderson¹; ¹USDA-ARS-RRVARC, Fargo, ND, ²Shandong Institute of Environmental Science, Jinan, Peoples Republic, ³South Dakota State University, Brookings, SD (164)
- 10:00 Break**
- 10:15 Molecular Techniques: Transitioning from Graduate Student Theory to Real-World Applications.** R. Joseph Wuerffel*¹, Matthew Cutulle²; ¹Syngenta Crop Protection, St. Louis, MO, ²Syngenta Crop Protection, Vero Beach, FL (165)
- 10:45 Inferring the Evolution and Spread of Agricultural Weeds and Invasive Plants Using Molecular Tools.** Marie Jasieniuk*; University of California-Davis, Davis, CA (166)
- 11:15 Discussion**

**11:30 – 1:15 Regency AB
NCWSS Awards Luncheon**

Extension

Room: Cosmopolitan A
Moderator: Kelly Nelson

- 1:30 Introduction and Spread of Glyphosate-Resistant Palmer Amaranth and Waterhemp Across Kentucky - The Past Five Years.** JD Green*¹, James R. Martin²; ¹University of Kentucky, Lexington, KY, ²University of Kentucky, Princeton, KY (167)
- 1:45 Occurrence of common milkweed in Iowa agricultural land.** Bob Hartzler*, Sydney Lizotte-Hall; Iowa State University, Ames, IA (168)
- 2:00 Palmer amaranth education, are we losing the battle?** Curtis R. Thompson*; Kansas State University, Manhattan, KS (169)
- 2:15 Weeds Week: Herbicide Resistant Weed Management Education in Iowa.** Virgil Schmitt¹, Robert Hartzler², Meaghan Anderson*³, Angela Rieck-Hinz⁴, Paul Kassel⁵, Micheal Owen², Terrance Basol⁶, Brent Pringnitz²; ¹Iowa State University, Muscatine, IA, ²Iowa State University, Ames, IA, ³Iowa State University, Iowa City, IA, ⁴Iowa State University, Clarion, IA, ⁵Iowa State University, Spencer, IA, ⁶Iowa State University, Nashua, IA (170)
- 2:30 Winter Annual Weed Response to Nitrogen Sources and Application Timings Prior to a Burndown Corn Herbicide.** Kelly A. Nelson*; University of Missouri, Novelty, MO (171)
- 2:45 Section Meeting**

Equipment and Application Methods

Room: Cosmopolitan B

Moderator: Dave Hillger

- 1:30 Improving Canopy Penetration in Cereals and Canola: What Have We Learned Through our Intensive 2-year Studies in Australia?** J Connor Ferguson*¹, Chris C. O'Donnell¹, John H. Moore², Bhagirath S. Chauhan³, Steve W. Adkins¹, Greg R. Kruger⁴, Rodolfo G. Chechetto⁵, Andrew J. Hewitt⁶; ¹University of Queensland, Gatton, Australia, ²Department of Agriculture and Food Western Australia, Albany, Australia, ³Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland, Toowoomba, Australia, ⁴University of Nebraska-Lincoln, North Platte, NE, ⁵University of Queensland, São Paulo State University - FCA, Gatton, Australia, ⁸University of Queensland, Gatton, Australia & University of Nebraska-Lincoln, North Platte, NE (172)
- 1:45 Efficacy of Fomesafen +/- Dicamba Applied with Low-drift Nozzles in Simulated Commercial Applications.** Dain E. Bruns*, R. Joseph Wuerffel, Thomas H. Beckett, Donald J. Porter; Syngenta Crop Protection, Greensboro, NC (173)
- 2:00 Relative Volatility of 2,4-D Formulations Under Field Conditions.** Ethan T. Parker*, Thomas C. Mueller; University of Tennessee, Knoxville, TN (174)
- 2:15 Performance of certain herbicides as influenced by novel adjuvant systems.** Ryan J. Edwards*, Greg K. Dahl; WinField Solutions, River Falls, WI (175)
- 2:30 Enhancing Oil-based Adjuvant Activity.** Patrick M. McMullan*¹, Keith Rowley², Nongnuch Sutivisedsak²; ¹United Suppliers, Inc., Ames, IA, ²Ag Precision Formulators, Middleton, WI (176)

Equipment and Application Methods (continued)

- 2:45 Species Response to Dew, Herbicides and Adjuvants.** Donald Penner*, Jan Michael; Michigan State University, East Lansing, MI (177)
- 3:00 A comparison of tank cleaning chemicals to remove dicamba residues from spray equipment.** Thomas C. Mueller*¹, Frank Sexton²; ¹University of Tennessee, Knoxville, TN, ²Exacto, Inc, Sharon, WI (178)

What's New in Industry?

Room:	Cosmopolitan AB
Moderator:	Stott Howard
Time:	3:30 to 5:00 pm

Industry Breakfast (cost \$35)

Room: Regency AB

Moderator: Stott Howard

- 7:00** **“Future Shock Now” – Current Climate Change Impacts on the Agri-Food System.** Dave Gustafson*; ILSI Research Foundation, Washington, DC.
- 8:00** **Section Meeting**

Agronomic Crops II (Soybeans, Dry Beans/Sugarbeet)

Room: Cosmopolitan B

Moderator: Joe Ikley

- 8:15** **Herbicide Programs for Kochia Control in Dicamba-Tolerant Soybeans.** Jeffrey T. Krumm*¹, David H. Johnson², Keith D. Johnson³, Bruce V. Steward⁴, Robert N. Rupp⁵; ¹DuPont Crop Protection, Hastings, NE, ²DuPont Crop Protection, Johnston, IA, ³DuPont Crop Protection, Grand Forks, ND, ⁴DuPont Crop Protection, Overland Park, KS, ⁵DuPont Crop Protection, Edmond, OK (179)
- 8:30** **Herbicide Programs for Marestalk Control in Dicamba-Tolerant Soybeans.** Jessica R. Bugg*¹, Jeffrey T. Krumm², Keith A. Diedrick³, Kelly A. Backscheider⁴, Kevin L. Hahn⁵, David H. Johnson⁶; ¹DuPont Crop Protection, Marysville, OH, ²DuPont Crop Protection, Hastings, NE, ³DuPont Crop Protection, Madison, WI, ⁴DuPont Crop Protection, Shelbyville, IN, ⁵DuPont Crop Protection, Bloomington, IL, ⁶DuPont Crop Protection, Johnston, IA (180)

Agronomic Crops II (continued)

- 8:45 Engenia Herbicide: Optimizing Performance and Product Stewardship in Dicamba Tolerant Crops.** John Frihauf*¹, Chad Brommer², Joseph Zawierucha², Steven Bowe²; ¹BASF, Lincoln, NE, ²BASF, Research Triangle Park, NC (181)
- 9:00 Multi-crop Bioassay of Simulated Dicamba Residue in Soil.** Theresa A. Reinhardt*, Rich Zollinger; North Dakota State University, Fargo, ND (182)
- 9:15 Interaction Between Xtendimax™ and Group 1 Herbicides for Volunteer Corn Control in Soybean.** Matthew G. Underwood*; University of Guelph, Ridgetown, ON (183)
- 9:30 Efficacy of Sequential Herbicide Programs Containing Fomesafen and Seedling Shoot Inhibitors in Soybeans.** Timothy L. Trower*¹, Brett Miller², Donald J. Porter³, Thomas H. Beckett³; ¹Syngenta Crop Protection, Baraboo, WI, ²Syngenta Crop Protection, Minnetonka, MN, ³Syngenta Crop Protection, Greensboro, NC (184)
- 9:45 Section Meeting**
- 10:00 Break**
- 10:15 Refreshing residuals: value of metribuzin + flumioxazin for weed control in soybeans.** Dawn Refsell*¹, Lowell D. Sandell², Eric J. Ott³, Trevor M. Dale⁴, Ron Estes⁵, John A. Pawlak⁶; ¹Valent USA Corporation, Lathrop, MO, ²Valent USA Corporation, Lincoln, NE, ³Valent USA Corporation, Greenfield, IN, ⁴Valent USA Corporation, Minneapolis, MN, ⁵Valent USA Corporation, Champaign, IL, ⁶Valent USA Corporation, Lansing, MI (185)
- 10:30 Warrant Ultra: A New Residual and Postemergence Herbicide Option in Soybean.** Justin Pollard*¹, John Willis², Ryan Rapp³; ¹Monsanto, Lathrop, MO, ²Monsanto, Creve Coeur, MO, ³Monsanto, Mitchell, SD (186)

Agronomic Crops II (continued)

- 10:45 New Zero-Day Plant-Back Options for DuPont™ Basis® Blend and LeadOff® Herbicides in BOLT™ Technology Soybean** . Paul Marquardt*¹, Kevin L. Hahn², Michael D. Meyer³, Larry H. Hageman⁴, Kelly A. Backscheider⁵, Keith A. Diedrick⁶, Keith D. Johnson⁷, Scott E. Swanson⁴, Jeffrey T. Krumm⁸, Richard M. Edmund⁹, David H. Johnson³; ¹DuPont Crop Protection, Des Moines, IA, ²DuPont Crop Protection, Bloomington, IL, ³DuPont Crop Protection, Johnston, IA, ⁴DuPont Crop Protection, Rochelle, IL, ⁵DuPont Crop Protection, Shelbyville, IN, ⁶DuPont Crop Protection, Madison, WI, ⁷DuPont Crop Protection, Grand Forks, ND, ⁸DuPont Crop Protection, Hastings, NE, ⁹DuPont Crop Protection, Little Rock, AR (187)
- 11:00 Utility of Arylex™ Active Herbicide for Pre-Plant Burndown Applications.** Jeff M. Ellis*¹, Chris Voglewede², Joe Armstrong³, Leah Granke⁴, Laura A. Campbell⁵, Kristin Rosenbaum⁶, Mark A. Peterson⁷, David Simpson²; ¹Dow AgroSciences, Sterlington, LA, ²Dow AgroSciences, Indianapolis, IN, ³Dow AgroSciences, Davenport, IA, ⁴Dow AgroSciences, Columbus, OH, ⁵Dow AgroSciences, Carbonale, IL, ⁶Dow AgroSciences, Crete, NE, ⁷Dow AgroSciences, West Lafayette, IN (188)
- 11:15 Introducing BOLT™ Technology: A New Herbicide System for Cleaner Fields and Greater Management Flexibility in Soybeans.** David Johnson*¹, Helen A. Flanigan², Jeff Carpenter¹, Steven Strachan³, Steven Mitchell⁴, Andre Trepanier⁴, Mark Vogt⁴, Scott Sebastian⁴; ¹DuPont Crop Protection, Johnston, IA, ²DuPont, Greenwood, IN, ³DuPont Crop Protection, Newark, DE, ⁴DuPont Pioneer, Johnston, IA (189)

Herbicide Physiology

Room: Regency EF
Moderator: Mithila Jugulam

- 8:30 Examining the Tolerance Mechanism of Grass to Isoxaben.** Chad Brabham*, Seth Debolt; University of Kentucky, Lexington, KY (190)
- 8:45 Genomic and Molecular Findings in Kochia (Kochia scoparia).** Philip Westra*, Todd Gaines; Colorado State University, Fort Collins, CO (191)
- 9:00 Target and Non-Target Site Multiple Herbicide Resistance in Palmer amaranth (*Amaranthus palmeri*) from Kansas.** Vijay K. Varanasi*, Sridevi Betha, Curtis R. Thompson, Mithila Jugulam; Kansas State University, Manhattan, KS (192)
- 9:15 Distribution of EPSPS Copies in Metaphase Chromosomes of Glyphosate-Resistant Palmer Amaranth (*Amaranthus palmeri*).** Mithila Jugulam*, Dal-Hoe Koo, Karthik Putta, Dallas E. Peterson, Bernd Friebe, Bikram S. Gill; Kansas State University, Manhattan, KS (193)
- 9:30 Herbicide-resistance genes do not always show independent assortment.** Patrick Tranel*, Chenxi Wu, Ahmed Sadeque; University of Illinois at Champaign-Urbana, Urbana, IL (194)
- 9:45 Methiozolin, It May Not Work How You Think.** Chad Brabham*, Jarrad W. Gollihue, Seth Debolt, Michael Barrett; University of Kentucky, Lexington, KY (195)

Midwest Invasive Plant Network: Invasive Plants Symposium

Wednesday, December 9

Plenary Session I: Welcome

Room: Discovery AB
Moderator: Mark Renz

- 10:00** **Welcome by NCWSS, MIPN, and Indiana Invasive Species Council.** (167)
- 10:30** **Managing co-invaded forest ecosystems: lessons from research on co-occurring invasive plants.** Sara Kuebbing*; Yale University, New Haven, CT (168)
- 11:15** **Patterns and drivers of forest plant invasions revealed from FIA data.** Basil Iannone*; Purdue University, West Lafayette, IN (169)

12:00 to 1:30 - Lunch (on your own)

Concurrent Session A or B:

A) Bush Honeysuckle Control

Room: Cosmopolitan CD

Moderator: Steve Manning

- 1:00 Developing a short and long-term management plan for bush honeysuckle management.** Steve Manning*; Invasive Plant Control Inc., Nashville, TN (199)
- 1:30 Biology and management of Amur honeysuckle (*Lonicera maackii*).** Reid J. Smeda*; University of Missouri, Columbia, MO (200)
- 2:00 Aerial Treatment of Bush Honeysuckle (*Lonicera maackii*) in Illinois.** Andrew DiAllesandro*¹, Bob Caveny²; ¹U.S. Fish & Wildlife Service, Springfield, IL, ²Illinois Department of Natural Resources, Springfield, IL (201)
- 2:30 Rate limitation and efficacy trials for low-volume basal bark treatments of *Celastrus orbiculatus* and *Lonicera maackii* with aminopyralid and triclopyr.** Karla L. Gage*¹, Christopher W. Evans², Ernest S. Flynn³, David J. Gibson¹; ¹Southern Illinois University Carbondale, Carbondale, IL, ²Illinois Department of Natural Resources, Benton, IL, ³Dow AgroSciences, Ankeny, IA (202)
- 2:45 The Joy of Doing it the Hard Way: Using Manual Methods to Control Asian Bush Honeysuckle.** Jane Morse*; TREES Inc, Terre Haute, IN (203)
- 3:00 Break**

B) Prairie Restoration

Room: Discovery AB

Moderator: Roger Becker

- 1:00 Functional groups to resist invasion by Canada thistle (*Cirsium arvense*) during prairie establishment.** Roger L. Becker*¹, L. Klossner¹, M. Harr²; ¹University of Minnesota, St. Paul, MN, ²National Park Service (204)
- 1:30 Impact of Canada Thistle Cover on Plant Community Structure in Early Stage Prairie Restoration.** Mary Halstvedt¹, Byron Sleugh*², Roger L. Becker³, Paul Bockenstedt⁴; ¹Dow AgroSciences LLC, Billings, MT, ²Dow AgroSciences, Indianapolis, IN, ³University of Minnesota, St. Paul, MN, ⁴Plant Iowa Native, St. Paul, MN (205)
- 2:00 Can aminopyralid be applied in prairie establishment without impacting native forbs?** Mark Renz, Niels A. Jorgensen*; UW-Madison, Madison, WI (206)
- 2:30 Industry and Natural Area Manager Partnerships for Plant Community Restoration.** Jeff Nelson*¹, Ernest S. Flynn², Byron Sleugh¹, Robert Masters¹; ¹Dow AgroSciences, Indianapolis, IN, ²Dow AgroSciences, Ankeny, IA (207)
- 3:00 Break**

Concurrent Session C or D

C) Invasive Issues in Forests / Woodlands

Room: Cosmopolitan CD
Moderator: Heather Reynolds

- 3:30 Prevention and control of invasive plants: Lessons learned from family forest owners in Indiana.** Zhao Ma*, Mysha Clarke; Purdue University, West Lafayette, IN (208)
- 4:00 Joining Forces to Conserve Urban Woodland: One Model for Campus, Community and Commerce Collaborations.** Heather L. Reynolds*; Indiana University, Bloomington, IN (209)
- 4:30 Petition to release *Ceutorhynchus scrobicollis* for biological control of garlic mustard (*Alliaria petiolata*).** Roger L. Becker*¹, Elizabeth S. Katovich¹, Harriet L. Hinz², Laura C. Van Riper³, Richard Reardon⁴, Ghislaine Cortat², Mary E. Marek-Spartz¹; ¹University of Minnesota, St. Paul, MN, ²CABI Europe - Switzerland, Delémont, Switzerland, ³Minnesota Department of Natural Resources, St. Paul, MN, ⁴US Forest Service, Morgantown, PA (210)

D) Using Technology

Room: Discovery AB
Moderator: Mark Renz

- 3:30 Using technology to report invasive species in Indiana via EddMaps and the GLEDN smartphone/tablet app.** Rebekah Wallace*; University of Georgia, Tifton, GA (211)
- 4:00 IPC-connect, a resource for invasive species mapping and management in the Midwest.** Steve Manning*; Invasive Plant Control Inc., Nashville, TN (212)
- 4:30 Mapping Ecological Restoration Efforts In The Shawnee National Forest Using ESRI's Collector App.** Caleb Grantham*, Nick Seaton; The Nature Conservancy, Makanda, IL (213)

MIPN Invasive Plant Symposium

Midwest Invasive Plant Network: Invasive Plants Symposium

Thursday, December 10

Plenary Session 2:

State Updates on Spread of Invasive Plants

Room: Discovery AB

Moderator: Mark Renz

8:00 Welcome

8:15 State Updates on Spread of Invasive Plants - Ohio. Theresa Culley*; University of Cincinnati, Cincinnati, OH (214)

8:30 State Updates on Spread of Invasive Plants - Indiana. Ellen Jacquart*; Indiana TNC, Indianapolis, IN (215)

8:45 State Updates on Spread of Invasive Plants - Illinois. Karla L. Gage*; Southern Illinois University, Carbondale, IL (216)

9:00 State Updates on Spread of Invasive Plants - Wisconsin. Mark Renz*; University of Wisconsin-Madison, Madison, WI (217)

9:15 When good plants go bad; mechanisms and effects of invasion. Mike Jenkins*; Purdue University, West Lafayette, IN (218)

10:00 Break

Concurrent Sessions E / F / G:

E) Woody Invasive Species Control

Room: Cosmopolitan CD
Moderator: Ron Rathfon

- 10:30 Control of Callery Pear in Pastures, Right-of-Ways, and Natural Areas.** Ernest S. Flynn*; Dow AgroSciences, Ankeny, IA (219)
- 11:00 Prescribed grazing for non-native invasive brush control in a Midwest hardwood forest.** Ron Rathfon*; Purdue University, Dubois, IN (220)
- 11:30 Can the invasive tree *Ailanthus altissima* be tamed with a native *Verticillium* fungus?** Joanne Rebbeck*, Joan Jolliff, Tim Fox; Northern Research Station, Delaware, OH (221)

F) Invasives in Urban Areas

Room: Discovery AB
Moderator: David Gorden

- 10:30 Invasive plants in cities: a historical perspective based on the flora of Indianapolis.** Rebecca Dolan*; Butler University, Indianapolis, IN (222)
- 11:00 How Important are Ornamental Cultivars in Species Invasions?** Theresa Culley*, Ilana Vinnik, Yulia Vinnik; University of Cincinnati, Cincinnati, OH (223)
- 11:30 The Midwest Invasive Plant Network's Efforts to Reduce the Sale of Invasive Ornamental Plants.** Mark J. Renz*; University of Wisconsin-Madison, Madison, WI (224)

G) Invasive Plant Management in Grasslands

Room: Cosmopolitan A
Moderator: Joe Omielan

- 10:15 Section Meeting –
NCWSS Rangeland, Pastures, and Industrial
Vegetation Management**
- 10:30 Use of Imazapyr for Old World Bluestem Control.**
Walter H. Fick*; Kansas State University, Manhattan,
KS (225)
- 10:45 Effect of Mowing Timing on Johnsongrass Herbicide
Efficacy.** Joe Omielan*, Michael Barrett; University
of Kentucky, Lexington, KY (226)
- 11:00 Three Years of Mob Grazing Can Reduce Canada
Thistle Populations in Cool Season Grass Pastures.**
Mark Renz*; University of Wisconsin-Madison,
Madison, WI (227)
- 11:30 Restoring Floral Diversity to Non-Native Grass-
Infested Sedge Meadows.** Nathan Simons*; Blue
Heron Ministries, Inc, Angola, IN (228)

12:00 to 1:00 - Lunch (on your own)

Concurrent Sessions H or I:

H) Biotic Interactions with Invasive Species

Room: Cosmopolitan CD
Moderator: Chris May

- 1:00** **Effects of overabundant deer in the lower Midwest on native biodiversity and interactions with invasive species.** Keith Clay*; Indiana University, Bloomington, IN (229)
- 1:30** **Underplanting response to deer herbivory and Amur honeysuckle invasion in mixed hardwood forests.** Charlotte Freeman*, Mike Jenkins, Douglass Jacobs; Purdue University, West Lafayette, IN (230)
- 2:00** **The cascading effects of invasive alien plants on the structure of belowground food webs in woodland ecosystems.** Matthew McCary*; University of Illinois at Chicago, Chicago, IL (231)
- 2:30** **Do Soil Communities Differ Between Native and Invasive Dune Grasses on Great Lakes Sand Dunes?** Matthew L. Reid*, Sarah M. Emery; University of Louisville, Louisville, KY (232)
- 3:00** **Break**

I) Herbaceous Invasive Plant Management

Room: Discovery AB
Moderator: Tony Summers

- 1:00** **Purple loosestrife control with herbicides: 10 years of applications.** Stevan Z. Knezevic*, Jon E. Scott; University of Nebraska-Lincoln, Concord, NE (233)
- 1:30** **Purple loosestrife biological control in Indiana. Nineteen years of success and limitations.** Richard Dunbar*; Indiana Department of Natural Resources, Columbia City, IN (234)

MIPN Invasive Plant Symposium

- 2:00 From Lab To Landscape: What Factors Affect Japanese Knotweed Control.** Tony Summers*, Mark J. Renz; University of Wisconsin-Madison, Madison, WI (235)
- 2:30 *Achyranthes japonica*: A Growing Threat.** David J. Gibson, Travis Neal*, Lauren Schwartz; Southern Illinois University, Carbondale, IL (236)
- 3:00 Break**

J) CWMA Update / Interaction

Room: Discovery AB
Moderator: Mike Daab

- 3:30 Integrating prescribed fire and invasive species control across Southern Illinois.** Kevin Rohling*; RTR CWMA, Carbondale, IL (237)
- 3:45 Lakes Country Cluster.** Beth Williams*; , , (238)
- 4:00 Northern Indiana Cooperative Invasive Management (NICIM).** James Pothoff*; , , (239)
- 4:15 Southern Indiana Cooperative Invasive Management (SICIM).** Elizabeth Mizell*; The Nature Conservancy, Bloomington, IN (240)
- 4:30 Brown County Native Woodlands Project.** Ruth Ingraham*; Brown County Native Woodlands Project, Indianapolis, IN (241)
- 4:45 Indiana Coastal Cooperative Weed Management Area.** Susan MiHalo*; The Nature Conservancy, Merrillville, IN (242)
- 5:00 Monroe County – Identify and Reduce Invasive Species.** Ellen Jacquart*; Indiana TNC, Indianapolis, IN (243)

North Central Weed Science Society Information

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Note: all NCWSS graduate students members are welcome to this committee.

Industry

Stott Howard	Chair	515-222-4809	stott.howard@syngenta.com
Paul Marquardt	Vice Chair	514-602-0905	paul.marquardt@dupont.com
Mike Meyer	Past Chair	810-299-1522	michael-devin.meyer@dupont.com
Greg Dahl		651-490-4246	gkdahl@landolakes.com
Chris Kamienski		309-532-4405	Christopher.d.Kamienski@monsanto.com
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Dave Johnson		515-535-7234	david.h.johnson@pioneer.com
Aaron Waltz		608-758-3468	aaron.waltz@pioneer.com
Nick Vandervort		563-547-2886	nvandervort@wilburellis.com
Gary Schmitz		217-897-1939	gary.schmitz@basf.com
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Helen Flanigan		317-862-0578	helen.a.flanigan@usa.dupont.com
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Brent Neuberger		515-250-2566	Brent.Neuberger@fmc.com
Brady Kappler		402-432-1469	brady.kappler@basf.com
Alan Miller		608-845-7993	amagstat@td.net

Resident Education

Doug Nord	Chair	620-285-3380	dwnord@gbta.net
Mark Bernards	1st Vice Chair	309-298-1569	ML-Bernards@wiu.edu
Maynak Malik	2nd Vice Chair	602-402-9030	maynak.s.malik@monsanto.com
Tate Castillo	Past Chair	785-213-8979	tate.castillo@bayer.com
Bruce Ackley	2015 Summer Contest Chair		740-225-2014
	ackley.19@osu.edu		
Dave Johnson	Past Summer Contest Chair		515-535-7234
	david.h.johnson@pioneer.com		
Cheryl Dunne		772-794-7146	cheryl.dunne@syngenta.com
Anita Dille		785-532-7240	dieleman@ksu.edu
Fritz Koppatschek		317-413-3295	fkoppatschek@abgagservices.com
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Rodney Tocco		612-269-2291	RVTocco@landolakes.com
Deane Jorgenson		612-201-8413	deane.zahn@syngenta.com
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Vijay Varanasi		785-477-1162	varanasi@ksu.edu

Contest Rules Subcommittee of Resident Education

Mark Bernards	1st Vice Chair	309-298-1569	ML-Bernards@wiu.edu
Dave Johnson	Past Contest Host Chair	515-535-7234	david.h.johnson@pioneer.com
Bruce Ackley	2015 Summer Contest Chair		740-225-2014
	ackley.19@osu.edu		

North Central Weed Science Society Information

Summer Contest Subcommittee of Resident Education

Dave Johnson	Past Contest Host Chair	515-535-7234	david.h.johnson@pioneer.com
Tate Castillo	Chair Res. Ed.	785-213-8979	tate.castillo@bayer.com
Doug Nord	1st Vice Chair	620-285-3380	dwnord@gbta.net
Mark Bernards	2nd Vice Chair	309-298-1569	ML-Bernards@wiu.edu
Mayank Malik	2013 Past Host Vice Chair		602-402-9030
	mayank.s.malik@monsanto.com		
Cheryl Dunne	Past Res. Ed Chair	772-794-7146	cheryl.dunne@syngenta.com
Fritz Koppatschek		317-415-0553	fkoppatschek@abgagservices.com
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Vince Davis		608-262-1392	vmdavis@wisc.e

NCWSS Standing Committees

Distinguished Achievement Award

J.D. Green	Chair	859-257-4898	jdgreen@uky.edu
John Hinz	Vice Chair (President NCWSS)	515-733-9250	john.hinz@bayer.com
Dave Johnson	Past Chair	515-535-7234	david.h.johnson@pioneer.com
Jan Michael		517-655-6219	michae42@msu.edu
Bill Witt		859-333-3131	wwitt@uky.edu
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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

Fellow Committee

Duane Rathmann	Chair	507-835-2580	duane.rathmann@basf.com
Richard Zollinger	Vice Chair	701-231-8157	r.zollinger@ndsu.edu
Mike Owen		515-294-5936	mdowen@iastate.edu
James Martin		270-365-7541	james.martin@uky.edu
Mark Peterson		317-337-7704	mapeterson@dow.com

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		517-355-0271	sprague1@msu.edu
Greg Kruger		308-696-6715	gkruger2@unl.edu
Eric Spandl		651-375-4292	epspandl@landolakes.com
Phil Banks	Executive Secretary	575-527-1888	ncwss@marathonag.com

Future Site Selection Committee

Charles Slack	Chair	859-227-3355	cslack@uky.edu
JD Green	Past President	859-257-4898	jdgreen@uky.edu
Eric Spandl		651-375-4292	epspandl@landolakes.com
Kirk Howatt		701-231-7209	kirk.howatt@ndsu.edu
David Simpson		317-337-3959	dmsimpson@dow.com
Sara Carter		859-259-1914	sara.carter@uky.edu
Dennis Tonles			tonlesd@iskbc.com

Local Arrangements: 2014 Minneapolis, MN

Ryan Lee	Chair	317-337-5523	rmlee@dow.com
Eric Spandl	Past Chair	651-375-4292	epspandl@landolakes.com
Anita Dille	President Elect	785-532-7240	dieleman@ksu.edu
Phil Banks	Executive Secretary	575-527-1888	ncwss@marathonag.com
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Bruce Maddy		317-877-3100	bemaddy@dow.com
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Eric Ott		317-753-6268	eric.ott@valent.com
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Nominating Committee

Peter Sikkema	Chair	519-674-1500	psikkema@ridgetownc.uoguelph.ca
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Tom Peters		701-231-8131	thomas.j.peters@ndsu.edu

North Central Weed Science Society Information

Program Committee

Anita Dille	Chair	785-532-7240	dieleman@ksu.edu
Ryan Lee	LAC	317-337-5523	rmlee@dow.com
David Simpson	Secretary/Treasurer	317-337-3959	dmsimpson@dow.com
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Kelly Nelson	Extension	660-739-4410	nelsonke@missouri.edu
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Stott Howard	Industry	515-222-4809	stott.howard@syngenta.com
Roger Becker	Invasive Plants	612-625-5753	becke003@umn.edu
Reid Smeda	WSSA	573-882-1329	smedar@missouri.edu
John Hinz	President (ex officio)	515-733-9250	john.hinz@bayer.com

Resolutions and Necrology Committee

Aaron Hager	Chair	217-333-4424	hager@illinois.edu
Kirk Howatt	Vice Chair	701-231-7209	kirk.howatt@ndsu.edu
Joe Armstrong	Past Chair	563-726-2280	jqarmstrong@dow.com
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NCWSS Standing Committees (continued)

Invasive Plants Committee

Mark Renz	Chair	608-263-7437	mrenz@wisc.edu
Reid Smeda	Vice Chair	573-882-1329	smedar@missouri.edu
Steve Young		308-696-6712	syoung4@unl.edu
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Joe Omielan		859-967-6205	joe.omielan@uky.edu
Roger Becker		612-625-5753	becke003@umn.edu

NCWSS Special Committees

Presentation Recording Committee (2013)

Angela Kazmierczak	Chair	218-789-7197	angela.kazmierczak@bayer.com
Neha Rana	Vicew Chair	636-737-3476	neha.rana@monsanto.com
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Bruce Ackley		614-292-1339	ackley.19@osu.edu
Ryan Henry		308-696-6729	ryan.henry@unl.edu

Section Program Chairs

General Program

Anita Dille	Chair	785-532-7240	dieleman@ksu.edu
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Poster Session

Helen Flanigan	Chair	317-862-0578	helen.a.flanigan@usa.dupont.com
David Hilger	Vice Chair	317-504-6130	dehillger@dow.com
Dave Ruen	Past Chair	507-467-2375	dcruen@dow.com

Graduate Student Paper Awards

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

Graduate Student Poster Awards

Mark Bernards	Chair	309-298-1569	ML-Bernards@wiu.edu
Doug Nord	Past Chair	620-285-3380	downord@gbta.net

Agronomic Crops I (Corn, Sorghum, Cereals)

Brett Miller	Chair	612-656-8464	brett.miller@syngenta.com
Curtis Thompson	Vice Chair	785-532-3444	cthompson@ksu.edu

Agronomic Crops II (Soybeans, Dry Beans, Sugarbeets)

Joe Ikley	Chair	765-494-0891	jikley@purdue.edu
Jeff Ellis	Vice Chair	913-217-0097	jmellis2@dow.com

Equipment and Application Methods

Dave Hillger	Chair	317-504-6130	dehillger@dow.com
Travis Legleiter	Vice Chair	765-496-2121	tlegleit@purdue.edu

Extension

Kelly Nelson	Chair	660-739-4410	nelsonke@missouri.edu
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Herbicide Physiology

Mithila Jugulam	Chair	785-532-2755	mithila@ksu.edu
Rong Ma	Vice Chair	217-486-6938	rongma2010@yahoo.com

Invasive Weeds

Mark Renz	Chair	608-263-7437	mrenz@wisc.edu
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Rangeland, Pasture, and Industrial Vegetation Management

Joe Omielan	Chair	859-217-0744	joe.omielan@uky.edu
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Horticulture and Ornamentals

Harlene Hatterman-Valenti	Chair	701-231-8536	h.hatterman.valenti@ndsu.edu
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Neha Rana	Chair	638-288-2609	neha.rana@monsanto.com
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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
	Michael 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		Robert N. Klein
	David Regehr	2010	No nominations
2005	Dallas E. Peterson	2011	Bill Johnson
2006	James R. Martin		Harlene Hatterman-Valenti
	Bernard H. Zandstra		Gordon K. Roskamp
2007	Chris M. Boerboom	2012	Peter H. Sikkema
	Michael J. Horak		Bob Hartzler
2008	Thomas J. Peters		Roger Becker
	Jeffrey Gunsolus	2013	Bryan Young
	Kassim Al-Khatib	2014	Adrian Moses
2009	J.D. Green		David Stoltenberg
	Thomas B. Threewitt		

* 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	Bjerken 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

* Deceased

North Central Weed Science Society Information

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 Michael 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

North Central Weed Science Society Information

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
2006	Christy Sprague - Young Scientist
	Richard K. Zollinger - Education
	John R. Hinz - Industry
	Christy Shropshire - Professional Staff
	Glenn Nice - Service
2007	Dean E. Riechers - Young Scientist
	Douglas Doohan - Education
	Kevin Gibson - Young Scientist
	Martin M. Williams II - Young Scientist
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
2012	Chad Brabham - Graduate Student
	Dain Bruns - Industry
	Fritz Breitenbach - Professional Staff
	Timothy Trower - Professional Staff
	Erin Taylor-Hill - Professional Staff
2013	Paul Marquardt-Graduate Student
	Kirk Howatt – Education
	Mark Renz – Education
	Patrick Tranel – Research
	Stevan Knezevic – Research
2014	Christy Sprague - Service
	Rodrigo Werle – Graduate Student
	Greg Kruger – Young Scientist
	Ryan Lins – Young Scientist
	Dawn Refsell – Industry
	Jeff Golus – Professional Staff
	Collin Auwarter – Professional Staff
	Jessica Bugg – Graduate Student

North Central Weed Science Society Information

North Central Weed Science Contest Locations

YEAR	Company	Location
1981	<i>Agri-Growth</i>	<i>Hollandale, MN</i>
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

Author Index

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Future NCWSS Annual Meeting Sites

2016 – December 12-15 in Des Moines, IA
2017 – December 4-7 in St. Louis, MO

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			
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