Wisconsin Crop Manager

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Contents

2016 Soil, Water, & Nutrient Management Meetings

Francisco Arriaga, Assistant Professor and Extension Specialist, Dept. of Soil Science

The Department of Soil Science, in conjunction with University of Wisconsin-Cooperative Extension will host eight Soil, Water, & Nutrient Management Meetings around the state, starting Tuesday, November 29 through Friday, December 9. The purpose of these meetings is to provide research updates in the field of soil fertility, nutrient management, soil and water conservation, and water quality. Discussion topics will include: What's new in nitrogen management for corn and wheat; Recurring soil fertility questions filling my inbox; Update on plant tissue analysis research; Reviewing the benefits of soil biological additives; Behold the power of legumes (as a nitrogen source); Taking care of soil compaction issues during and after a wet fall; Managing Wisconsin's soils for improved health; Proper plant tissue sampling and result interpretations; Nutrient management update: Rule revision, plan reviews and new 590. Speakers include Wis. DATCP staff and Matt Ruark, Robert Florence, Francisco Arriaga, and Carrie Laboski from UW-Madison Department of Soil Science. The following CEUs for Certified Crop Advisers have been requested: 2 CEUs in soil & water management and 2 CEUs in nutrient management.

Each meeting will begin at 10:00 am and end at 3:00 pm. A $45.00 registration fee (which includes lunch) will be charged for the meeting. Noon meal reservations should be made with the host agent. The information packet will contain PowerPoint summaries of talks and other useful reference materials. Organizers request participants to pre-register with the host agent at least 1 week before the meeting they wish to attend.

The schedule for the 2016 Soil, Water, & Nutrient Management Meetings is:

- Tues., Nov. 29, Dane Co., Madison, Heidi Johnson, fyi.uwex.edu/danecountyag or 608-224-3716
- Wed., Nov. 30, Monroe Co., Sparta, Bill Halfman, 608-269-8722
- Thurs., Dec. 1, Eau Claire Co., Eau Claire, Mark Hagedorn, 715-839-4712
- Fri., Dec. 2, Adams Co.y, Marshfield, Richard Halopka, 715-743-5121
- Tues., Dec. 6, Sheboygan Co., Kiel, Mike Ballweg, 920-459-5904
- Wed., Dec. 7, Shawano Co., Cecil, Jamie Patton, , 715-526-6136
- Thurs., Dec. 8, Iowa Co., Dodgeville, Gene Schriefer, 608-930-9850
- Fri., Dec. 9, Dodge Co., Juneau, Loretta Ortiz-Ribbing, 920-386-3790

Find the full brochure at the end of this publication.

UW Discovery Farms Conference on December 13, 2016

Callie Herron, 715.983.5668, callie.herron@ces.uwex.edu

Pigeon Falls, WI. – On December 13, 2016 in Wisconsin Dells, UW Discovery Farms will host its 5th annual conference that is geared towards farmers and emphasizes strategies that work on farms and for water quality. The conference will bring together farmers, farm advisors and experts to apply science and experience to today's hot topics. All in attendance can expect to leave with new ideas and practical tips that can be applied to their situation.

Two farmer panels and four speakers will cover the hot topics of soil health, cover crops, tile drainage, and manure management. Hear researchers from Canada, Iowa, Minnesota, and Wisconsin dive into data and pull out thought provoking and applicable information. Innovative Farmers will continue the discussion with panels on solutions to common cover crop problems and examples of innovative ways to handle liquid and solid manure. This conference will provide valuable information to all farmers interested in continuing to improve soil and water resources while preserving farm productivity and profitability.

The conference will be held on December 13th from 9:00am to 3:45pm at the Glacier Canyon Conference Center, Wilderness Resort in Wisconsin Dells. Registration is $40 for members of sponsoring organizations or $50 for non-members and includes a noon meal. Registration is now open. For up-to-date information follow Discovery Farms on facebook and twitter. Questions? emailcallie.herron@ces.uwex.edu or call 715.983.5668.

About UW Discovery Farms

For 15 years, UW Discovery Farms has worked with Wisconsin farmers to identify the water quality impacts of different farming systems around the state. The program, which is part of UW-Extension, is under the direction of a farmer-led steering committee and takes a real-world approach to finding the most economical solutions to agriculture's environmental challenges. If you are interested in learning more about UW Discovery Farms, visit www.uwdiscoveryfarms.org or email us at uwdiscoveryfarmsorg@gmail.com.

Wisconsin Soybean Marketing Board Continues Free Nematode Testing Program for 2016

Shawn P. Conley, Soybean and Wheat Extension Specialist

Four out of every five animals on earth today is a nematode so it is not surprising that agricultural fields are home to many nematode species. Fortunately, most nematodes are beneficial to crop growth and soil health because their activities help decompose crop residues and cycle nitrogen and other nutrients. Pest nematodes do not threaten yield if their numbers remain low. The key to avoiding population explosions of nematode pests is to be proactive – know what the situation is and take appropriate measures when nematode numbers indicate a problem is brewing.

The WSMB sponsors free nematode testing to help producers stay ahead of the most important nematode pest of soybean, the soybean cyst nematode (SCN) (Figure 1).

Eggs of SCN persist in the soil between soybean crops so a sample can be submitted any time that is convenient. The soil test report indicates the number of eggs in the sample and is useful for selecting the right variety for the next soybean crop. Retests of fields planted with SCN-resistant varieties over multiple years shows how the nematode population is responding to variety resistance and provides an early warning should the nematode population adapt to host genetics.

In 2016, the WSMB is again offering the expanded nematode testing program to include other pest nematodes in addition to SCN. These nematodes are less damaging to soybean than SCN but can cause enough yield loss to warrant treatment. As is the case for SCN, there are no rescue treatments for nematodes so the primary purpose of this year's soil test is to plan for next year's crop. Soil samples collected in corn for nematode analysis have predictive value for explaining yield if they are collected before the corn V6 growth stage. Sampling early in the season will provide information about the risk potential for the current corn crop AND the next soybean crop.

The assays used to recover nematode pests other than SCN in soil require that the nematodes are alive. So, it is important to keep the samples moist and at least room temperature cool. Collecting a sample that includes multiple cores ensures that there will be plenty of root pieces to assay. It is not necessary to include live plants in the sample. The soil test report will indicate which pest nematodes are present and at what quantities and their damage potential to soybean and corn based on the numbers recovered.

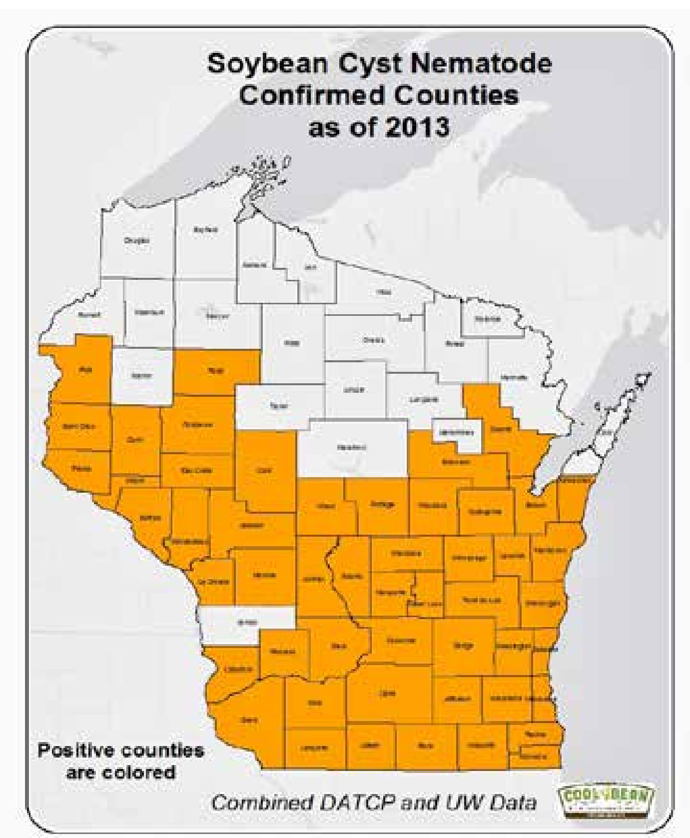

Figure 1. WI Counties Confirmed to Have SCN as of 2013.

Free soil sample test kits are available now and can be requested at (freescntest@mailplus.wisc.edu).

For more information on SCN testing and management practices to help reduce the losses from this pest, please contact: Shawn Conley: spconley@wisc.edu; 608-262-7975 or visit www.coolbean.info.

Delineating Optimal Soybean Maturity Groups Across the United States

Shawn P. Conley, Soybean and Wheat Extension Specialist

Soybean is the most important oilseed crop in the U.S., and its cultivated area is the second largest after corn (USDA, 2016). The cultivated area includes a wide range of environments that extend from northern North Dakota to south Texas and from western South Dakota to northeastern New York.

Soybean maturity is classified in different groups (MGs) ranging from 000 for the very early maturing varieties to 9 for the later. Gradations within MGs are also commonly noted by adding a decimal to the MG number. A variety is classified to a specific MG according to the length of period from planting to maturity. This phenological attribute is determined by two abiotic factors: photoperiod and temperature (Cober et al., 2001), and these factors can dictate the most suitable MG for a particular geographical location.

More than 45 years ago, Scott and Aldrich (1970), delineated optimum MG zones across the U.S. A more recent study redefined the optimum MG zones using variety trial yield data from 1998-2003 and found that adaptation regions for varieties with MG 0 to MG 3 had not changed from the work done in 1970. Whereas, varieties in the MG 4 to MG 6 range, adaptation zones are much broader than previously thought (Zhang et al., 2007). Nevertheless, there have been significant changes in soybean germplasm and management practices since 2003, and the climate has changed over the past 80 years across the U.S. (Mourtzinis et al., 2015). Therefore, the objective of this study was to delineate soybean MG adaptation zones across the U.S. using current soybean genetics and climate conditions.

Click here to view the full PDF.

2016 Wisconsin Corn Performance Trials – Grain
USDA-NASS Wisconsin Yield= 177 bu/A (2016Oct10)

Location	2006-2015 N	2006-2015 Yield	2016 N	2016 Yield	Percent change
Arlington	1501	232	127	258	11
Janesville	1497	231	127	240	4
Lancaster/Montfort	1501	215	127	244	13
Fond du Lac	1216	203	131	221	9
Galesville	1372	215	131	226	5
Hancock	1373	215	131	227	6
Chippewa Falls	1100	171	127	198	16
Marshfield	1893	169	186	205	21
Seymour	1297	179	118	200	12
Valders	1455	190	127	214	13
Coleman/Rhinelander	543	180	59	198	10
Spooner	1742	145	177	201	38

Early 2016 Corn Grain Yields Look Promising for Wisconsin

Joe Lauer, Wisconsin Corn Agronomist

We have never had a year like 2016 for high grain yields in the UW Corn Performance Trials. Every location had yields above the 10-year average (see below). For example, at Arlington over the previous 10-years (2006 and 2015) we have tested 1501 corn hybrids with an overall yield average of 232 bu/A. In 2016 we tested 127 hybrids which produced an average yield of 258 bu/A, an 11% increase over the previous 10-year average. This year corn hybrids at Arlington, Montfort, Chippewa Falls, Marshfield, Seymour, Valders, Coleman and Spooner produced a yield increase of more than 10% over the 10-year average.

This year is unique because usually at one or more locations, corn yields are below the 10-year average and the percent change column is negative. Stay tuned for publication results of individual hybrids and the top performances of 2016.

Calculating The Soybean Yield Gap for WI Soybean Farmers

Shawn P. Conley, Soybean and Wheat Extension Specialist

We are embarking on Year #2 of a State-Wide Project aimed at generating baseline producer data on current soybean management practices in Wisconsin's production systems. This project is funded by the Wisconsin Soybean Marketing Board and the North Central Soybean Research Program (NCSRP). The project goal is to **identify the key factors that preclude the State's Soybean Producers from obtaining yields that should be potentially possible on their respective individual farms. The term used for the difference between what yield is possible on your farm each year and what you yield you actually achieve is called a "Yield Gap".**

We are therefore asking Crop Producers in Wisconsin to provide us with yield and other agronomic data specific to their soybean production fields. You can find the survey below. With that data, we will then conduct an in-depth analysis of what on-farm factors might be causing a Yield Gap on producer farms. We intend to provide annual reports to all crop producers informing them of what factors we may have identified that, based on our analysis of the data collected from farms, are likely limiting you from achieving soybean yields closer to yield potential that is likely possible on your farms! These results will be presented at our 2017 Area Soybean meetings held in January 2017 and at Corn Soy Expo! Here is a link to the introductory data we collected in 2015! 2015 Yield Gap Summary Data

Below please find links that are also on my webpage that describe the process, the guidelines for data collection, as well as the data collection form. Please know that this data will not be shared individually and your information will be held strictly confidential. Please let me know if you have any questions or concerns regarding this request. Please return all completed forms to my address below! Due to several requests I have also attached a fillable pdf version for ease of data entry.

- Yield Gap: Letter to WI Soybean Producers
- Yield Gap: Guidelines for Data Collection
- Yield Gap: Data Collection Form

Summary for Soybean 2016 PDF.

Multiple Resistance to ALS- and HPPD-inhibiting Herbicides in Palmer Amaranth from Iowa County, Wisconsin

Nathan Drewitz, Devin Hammer, Shawn Conley, and Dave Stoltenberg, Department of Agronomy, University of Wisconsin-Madison

Increasing Concern over Palmer Amaranth

Palmer amaranth (Amaranthus palmeri) has become a challenging weed management problem in the southern U.S. and has recently spread to the upper Midwest (Legleiter and Johnson 2013; Sprague 2013). Palmer amaranth is a highly competitive weed that has become more difficult to manage due to herbicide resistance. Several populations have evolved resistance to one or more of six herbicide sites of action (Heap 2016). Many of the populations in the southern U.S. show multiple resistance to ALS-inhibiting herbicides and glyphosate.

The northward movement of Palmer amaranth has been attributed to several mechanisms including the spreading of contaminated manure from animal operations that have fed cottonseed feed by-products transported from southern U.S. production fields, transport of seed on field equipment, and contaminated seed mixes used for prairie restorations.

Palmer amaranth is dioecious (male and female reproductive organs on separate plants) and capable of producing 600,000 seeds per female plant (Figure 1). These traits increase the likelihood of resistance spread through pollen and seed dispersal.

Palmer Amaranth in Wisconsin

The first occurrence of Palmer amaranth in Wisconsin was documented in Dane County in 2013 (Davis and Recker 2014). This population was subsequently confirmed resistant to glyphosate (Butts and Davis 2015). Since that time, Palmer amaranth has been found in Iowa (2014), Grant (2015), and Sauk counties (2015). Screening results from the University of Illinois Plant Clinic found that the Sauk County population is resistant to glyphosate. In contrast, research at the University of Wisconsin-Madison determined that the Grant County population is sensitive to glyphosate, ALS-, and HPPD-inhibiting herbicides (data not shown).

For Palmer amaranth from Iowa County, we have determined that this population is sensitive to glyphosate (data not shown). However field observations suggested that this population may be resistant to other herbicide sites of action. Consequently, we conducted research to determine the response of the Iowa County population to the ALS-inhibiting herbicides imazethapyr (Pursuit) and thifensulfuron (Harmony SG), and the HPPD-inhibiting herbicide tembotrione (Laudis).

Screening for Herbicide Resistance

Imazethapyr, thifensulfuron, and tembotrione dose-response experiments were conducted under greenhouse conditions using mature seed collected from suspected herbicide-resistant female plants located in Iowa County. A known herbicide-sensitive population from Nebraska was used for comparison to the Iowa County population. Imazethapyr was applied to 4- to 6-inch tall plants at six rates ranging from

Figure 1. Female Palmer amaranth plant in Grant County, WI.

0 to 6.25 lb ai ac-1 (400 fl oz Pursuit ac-1, 100 times the labelled rate). Thifensulfuron was applied to 4-inch tall plants at seven rates from 0 to 0.039 lb ai ac-1 (1.25 oz Harmony SG ac-1, 10 times the labelled rate). Tembotrione was applied to 4- to 6-inch tall plants at seven rates from 0 to 0.82 lb ai ac-1 (30 fl oz Laudis ac-1, 10 times the labelled rate). All herbicide treatments included recommended adjuvants.

Weed shoot biomass was collected 28 days after treatment. Separate experiments were conducted for each herbicide. The experimental design was a randomized complete block with eight to 10 replications of each herbicide treatment. Each experiment was conducted three times. The effective herbicide dose that reduced shoot dry biomass by 50% (ED50) compared to non-treated plants was used to determine if there was a differential response between the Iowa County and Nebraska populations.

Results: Multiple Resistance to ALS- and HPPD-inhibiting Herbicides

The Iowa County Palmer amaranth population displayed a high-level of resistance to the ALS-inhibiting herbicide imazethapyr compared to the sensitive Nebraska population (Figures 2 and 3). At the labelled rate of 0.063 lb ai ac-1 (4 fl oz Pursuit ac-1) rate, most plants (96%) of the Iowa County population survived and grew to an average height four times greater than at the time of treatment (Figure 2). The imazethapyr ED50 for the Iowa County population was estimated to be greater than the highest rate applied (6.3 lb ai ac-1, 400 fl oz Pursuit ac-1 or 100 times the labelled rate). In contrast, the ED50 for the Nebraska population was 0.04 lb ai ac-1. Consequently, the ratio of Iowa County to Nebraska ED50 values indicates a greater than 150-fold level of imazethapyr resistance in the Iowa County population (Figure 3).

We found that the Iowa County Palmer amaranth showed a low level of resistance to the ALS-inhibiting herbicide thifensulfuron (Figure 4). Thifensulfuron ED50 values were 0.00058 lb ai ac-1 and 0.00012 lb ai ac-1 for the Iowa County and Nebraska populations, respectively. The ratio of Iowa County to Nebraska ED50 values indicated a 4.9-fold level of thifensulfuron resistance (p-value = 0.07) in the Iowa County population.

The Iowa County Palmer amaranth population was also found to have a low level of resistance to the HPPD-inhibiting herbicide tembotrione (Figure 5). At the labelled rate of 0.082 lb ai ac-1 (3 fl. oz. Laudis ac-1) 50% of all treated plants survived and grew to a height approximately 1.4 times greater than height at the time of treatment. The ED50 values were 0.0056 lb ai ac-1 and 0.0008 lb ai ac-1 for the Iowa County and Nebraska populations, respectively, indicating a 7.0-fold level of tembotrione resistance (p-value = 0.04) in the Iowa County population.

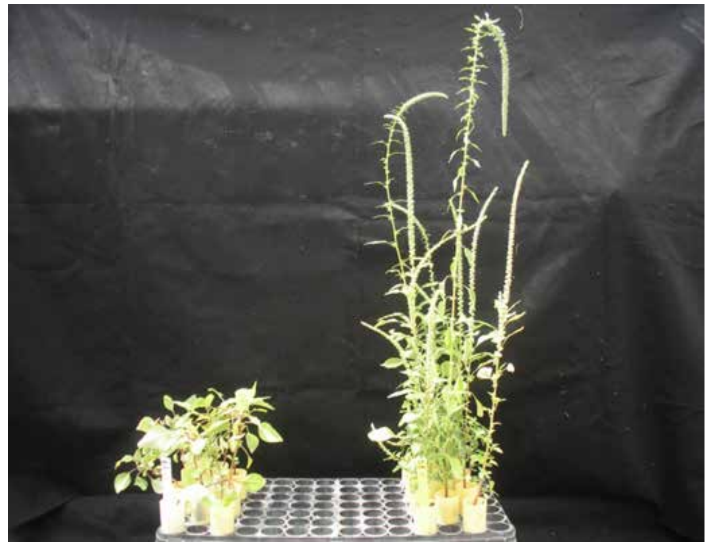

Figure 2. Response of Nebraska (left) and Iowa County Palmer amaranth (right) to 0.063 lb ai ac-1 imazethapyr

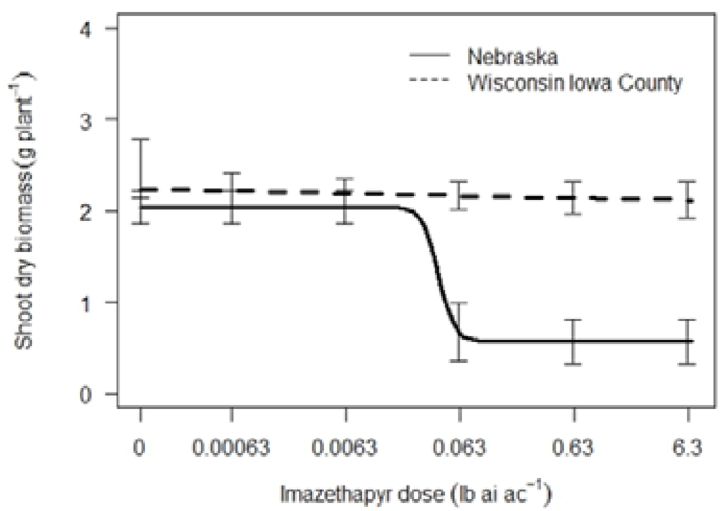

Figure 3. Response of Iowa County and Nebraska Palmer amaranth populations to i.mazethapyr (Pursuit) 28 days after treatment. The labelled rate (1X) is 0.063 lb ai ac-1

Conclusions

These results confirm the first case of multiple herbicide resistance in Wisconsin Palmer amaranth. Although we found that the Iowa County Palmer amaranth was sensitive to glyphosate, this population demonstrated a high-level of resistance to the ALS-inhibiting herbicide imazethapyr, a low-level of resistance to the ALS-inhibit-

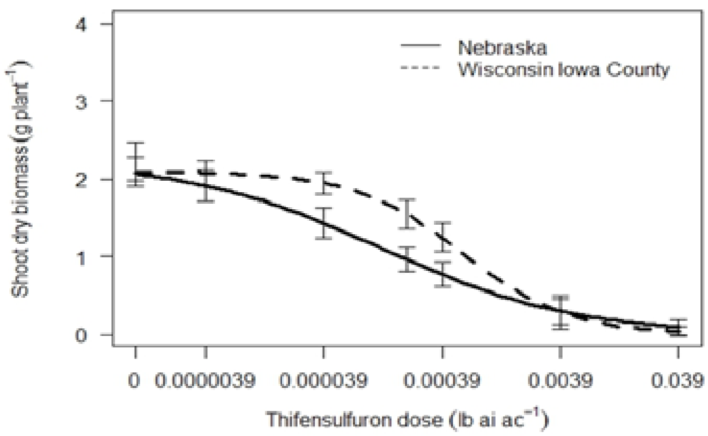

Figure 4. Response of Iowa County and Nebraska Palmer amaranth populations to thifensulfuron (Harmony SG) 28 days after treatment. The labelled rate (1X) is 0.0039 lb ai

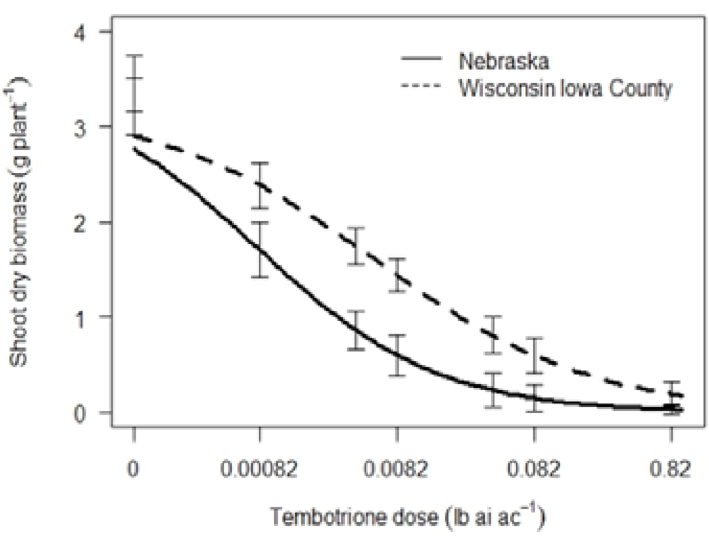

Figure 5. Response of Iowa County and Nebraska Palmer amaranth populations to tembotrione (Laudis) 28 days after treatment. The labelled rate (1X) is 0.082lb ai ac-1.

ing herbicide thifensulfuron, and a low-level of resistance to the HPPD-inhibiting herbicide tembotrione. At this site in Iowa County, it is suspected that herbicide-resistant Palmer amaranth seeds were transported on field equipment used previously in infested fields out of state.

Resistance management strategies are key to reduce the selection for herbicide-resistant weeds, and if present, to reduce their persistence and spread. These strategies include:

- Understanding the biology of weeds present and using a diversified approach to managing those weeds with the intent to prevent weed-seed production.
- Using weed-free crop seed and planting into weed-free fields.
- Scouting fields routinely to aid in identifying potential weed management issues.
- Using appropriate cultural practices that increase crop competitiveness with weeds.
- Using multiple herbicide sites of action applied at the labeled rates and at recommended weed heights.
- Cleaning equipment after use to prevent spread of weed-seed from field to field.

More information on management of Palmer amaranth and other herbicide-resistant weeds can be found at http://takeactiononweeds.com and http://wssa.net/wssa/weed/resistance.

Acknowledgment

The authors thank Vince Davis and Tommy Butts for previous contributions to this research.

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Common Waterhemp (Amaranthus rudis): Confirmed Herbicide Resistance and Spread Across Wisconsin

Devin Hammer, Nathan Drewitz, Shawn Conley, and Dave Stoltenberg

Department of Agronomy, University of Wisconsin-Madison

Herbicide resistance is not new to Wisconsin, but is spreading.

Common waterhemp (Amaranthus rudis) has become an increasing concern in Wisconsin in recent years. A close relative to redroot pigweed (Amaranthus retroflexus) and Powell amaranth (Amaranthus powellii), common waterhemp is infamous for its abundant seed production and propensity for developing herbicide resistance (Bradley 2013), which are two things growers do not want happening in their fields.

Herbicide-resistant common waterhemp was first confirmed in Wisconsin in 1999, when a population was found to be resistant to acetolactate synthase (ALS)-inhibitors (Heap 2016). More recently, glyphosate-resistant waterhemp was found in Pierce and Eau Claire counties (Butts and Davis 2015). Since that time, efforts have been made to monitor the spread of waterhemp in the state, especially those populations that may be resistant to glyphosate and other herbicide sites of action (SOA). Nationally, waterhemp management has become increasingly challenging as this species has developed resistance to six unique SOAs, with 18 states reporting resistance to at least one herbicide SOA (Heap 2016). Six of those states also have waterhemp cases of multiple herbicide resistance of up to four different SOAs.

Dose-response experiments were conducted to determine glyphosate resistance.

Responding to widespread concern of possible glyphosate-resistant waterhemp in 2014 and 2015, we collected seed heads from several mature female plants that had survived exposure to glyphosate in the field. Six populations were sampled from Chippewa, Outagamie, Sheboygan, and Waupaca counties in 2014, and five populations were sampled from Crawford, Lafayette, and Walworth counties in 2015. Once dried and threshed, seeds were stratified (cold treated) for 6 weeks, planted, and grown in the greenhouse for whole-plant herbicide dose-response experiments. Five to 10 plants per population were treated at each of eight rates of glyphosate ranging from 0 to 12.4 lb ae acre-1 (up to 16x the labelled rate) plus 17 lb ammonium sulfate 100 gal-1 water. Each suspected resistant population was tested in two screenings to determine resistance.

Shoot dry biomass was collected 28 days after glyphosate application, dried, and weighed. Comparisons between a known susceptible population and suspected resistant populations were made based on the predicted dose required to reduce shoot biomass by 50% (ED50) compared to non-treated plants (Knezevic et al. 2007). Some populations were also tested for resistance at the University of Illinois Plant Clinic using a molecular screening methodology for specific genetic markers (Bell et al. 2013).

Since 2013, herbicide-resistant waterhemp populations have been found in 16 Wisconsin counties.

Dose-response experiments confirmed glyphosate resistance in waterhemp populations from Chippewa, Crawford, Lafayette, Outagamie, Sheboygan, Walworth, and Waupaca counties (Table 1). The majority of plants across these populations survived the 1x rate of glyphosate (0.77 lb ae acre-1) and grew to approximately three times their height 28 days after treatment compared to their height at the time of treatment (see Figure 1 for responses of populations from Crawford and Walworth counties). Dose-response curves (examples shown in Figures 2 and 3) allowed us to estimate ED50 values (Table 1) for each suspected resistant population for comparison to a known susceptible population (Wisc-S).

Results from testing at the University of Illinois Plant Clinic confirmed glyphosate resistance in waterhemp populations from Brown, Jackson, Jefferson, Monroe, Pepin, Richland, and Sauk Counties. The population from Monroe County was also found to be resistant to PPO-inhibiting herbicides making it the first confirmed case of multiple resistance to these two herbicide SOAs in Wisconsin. In total, herbicide resistant waterhemp populations have been confirmed in 16 Wisconsin counties since 2013 (Figure 4).

Managing herbicide-resistant weeds moving forward.

It is important to utilize diverse strategies when combating herbicide-resistant weeds. Tank-mixing multiple, effective herbicide SOAs has been shown to reduce selection for herbicide resistance in common waterhemp than simply rotating SOAs year to year (Evans et al. 2015). It is also crucial to make the most of the critical weed-free period during crop growth, so early planting when possible in conjunction with pre-emergence herbicides will allow for canopy closure with minimal weed interference. This also reduces selection pressure on weed

Table 1. Glyphosate effective dose (ED_{50}) values for suspected resistant (R) and known susceptible (S) populations tested in greenhouse dose-response experiments.			
Collection Year	Population	ED_{50} [lb ae acre^{-1}]	ED_{50} R:S ratio
2014	Wisc-S	0.34	---
2014	Chippewa-R	0.58	1.7*
2014	Outagamie-R	1.83	5.3*
2014	Sheboygan-R1	0.78	2.3*
2014	Sheboygan-R2	0.79	2.3*
2014	Sheboygan-R3	2.61	7.6*
2014	Waupaca-R	4.15	12.1*
2015	Wisc-S	0.16	---
2015	Crawford-R	2.66	17.0*
2015	Lafayette-R1	1.28	8.2*
2015	Lafayette-R2	0.59	3.8*
2015	Walworth-R1	2.48	15.9*
2015	Walworth-R2	3.42	21.9*

* Significant at α=0.1

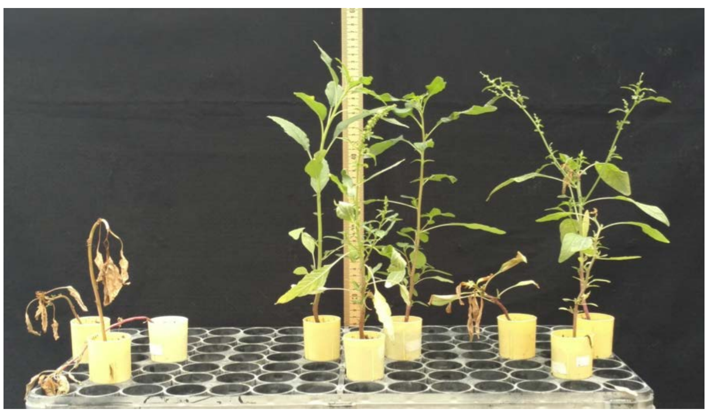

Figure 1. Common waterhemp plants from susceptible, Crawford County, and Walworth County populations 28 days after treatment with glyphosate at 0.77 lb ae acre-1.

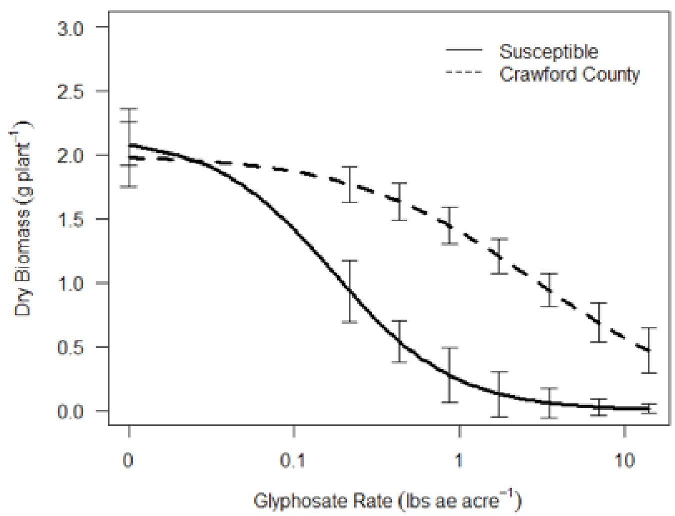

Figure 2. Glyphosate dose-response curves for Crawford County and known susceptible common waterhemp populations 28 days after treatment.

populations in the field that are exposed to herbicides applied postemergence (POST). Make sure to apply the full labeled herbicide rates at recommended weed sizes and scout fields following POST herbicide applications to determine herbicide efficacy. Any weed escapes can then be removed by hand. It should also be noted that ALS-inhibiting herbicides are not recommended for sole management of common waterhemp. While ALS-inhibiting herbicides can offer effective management of certain weed species, it has been well-documented that resistance to that class of herbicides has become the norm in pigweed species (Tranel et al. 2011).

Proper cleaning of tillage and harvest equipment can also help to prevent spreading of weed seeds from field to field. Alternative crop traits (e.g. glufosinate-resistant varieties) may also be utilized which allow for an additional herbicide SOA to be used. Further information on herbicide resistance management may be found at: http://www.takeactiononweeds.com/ and http://wssa.net/wssa/weed/resistance/

If you suspect that herbicide resistance is an issue in your fields, contact your local county extension agent.

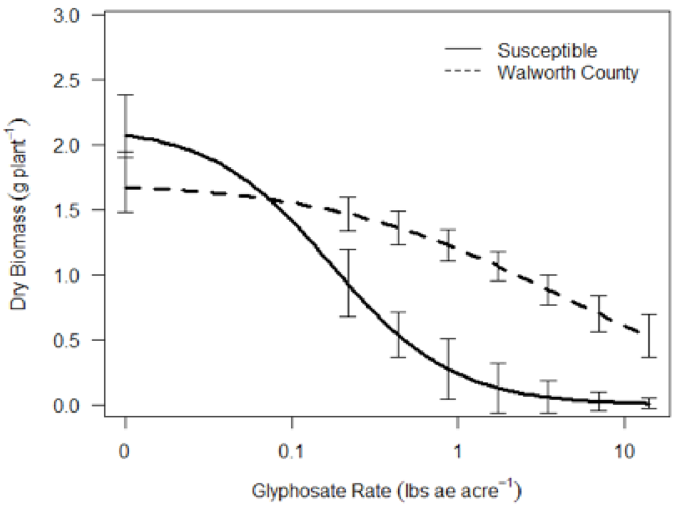

Figure 3. Glyphosate dose-response curves for Walworth County and known susceptible common waterhemp populations 28 days after treatment.

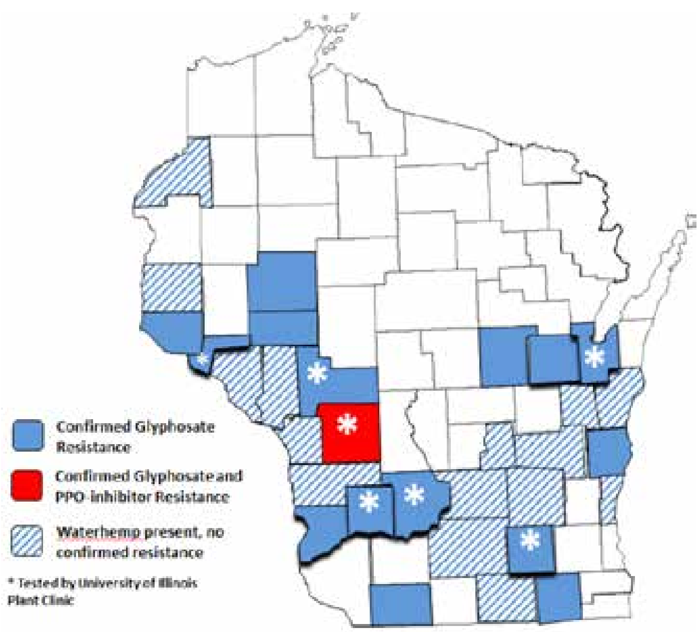

Figure 4. Common waterhemp reported distribution and herbicide resistance in Wisconsin.

Acknowledgment

The authors thank Vince Davis, Tommy Butts, and Ross Recker for previous contributions to this research.

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UW-Madison/Extension Plant Disease Diagnostic Clinic (PDDC) Update

Brian Hudelson, Sean Toporek, Jake Kurczewski and Ann Joy

The PDDC receives samples of many plant and soil samples from around the state. The following diseases/disorders have been identified at the PDDC from October 8, 2016 through October 14, 2016.

Plant/Sample Type, Disease/Disorder, *Pathogen*, County

Fruit Crops
Raspberry, Late Leaf Rust, *Arthuriomyces peckianus*, Dunn
Raspberry, Raspberry Leaf Spot, *Cylindrosporium rubi,* Dunn
Raspberry, Root/Crown Rot, *Pythium sp.*, Dunn

Soil
Soybean Soil, Soybean Cyst Nematode, *Heterodera glycines,* Dane, Fond du Lac, Pierce, Rock, Trempealeu

For additional information on plant diseases and their control, visit the PDDC website at pddc.wisc.edu.

UW-Madison/Extension Plant Disease Diagnostic Clinic (PDDC) Update

Brian Hudelson, Sean Toporek, Jake Kurczewski and Ann Joy

The PDDC receives samples of many plant and soil samples from around the state. The following diseases/disorders have been identified at the PDDC from October 15, 2016 through October 24, 2016.

Plant/Sample Type, Disease/Disorder*, Pathogen,* County

Field Crops
Corn, Gibberella Stalk Rot, *Fusarium graminearum*, Dodge
Corn, Goss' Wilt, *Clavibacter michiganesis subsp. nebraskensis,* Dodge
Soybean, Green Stem Syndrome, *Miscellaneous viral pathogens*, Rock

Fruit Crops
Apple, Flyspeck, *Schizothyrium pomi,* Oneida
Apple, Russet, None, Oneida
Apple, Sooty Blotch, *Miscellaneous sooty blotch fungi,* Oneida

Vegetable Crops
Garlic, Fusarium Bulb Rot, *Fusarium sp.,* Dane
Garlic, Penicillium Bulb Rot, *Penicillium sp.,* Dane

For additional information on plant diseases and their control, visit the PDDC website at pddc.wisc.edu.

UW-Madison/Extension Plant Disease Diagnostic Clinic (PDDC) Update

Brian Hudelson, Sean Toporek, Jake Kurczewski and Ann Joy

The PDDC receives samples of many plant and soil samples from around the state. The following diseases/disorders have been identified at the PDDC from October 22, 2016 through October 28, 2016.

Plant/Sample Type, Disease/Disorder*, Pathogen,* County

Vegetable Crops
Pepper, Syringae Leaf Spot, *Pseudomonas syringae pv. syringae,* Dane
Spinach, Downy Mildew, *Peronospora sp.,* Dane

Soil
Soybean Soil, Soybean Cyst Nematode, *Heterodera glycines*, Adams, Columbia, Dodge, Fond du Lac, Iowa, Jefferson

For additional information on plant diseases and their control, visit the PDDC website at pddc.wisc.edu.

Follow us on

Other Programs of Interest

December 2016 CCA Exam Review Training Webinars

For more details, contact Bryan Jensen (bmjense1@wisc.edu)

<u>And</u>

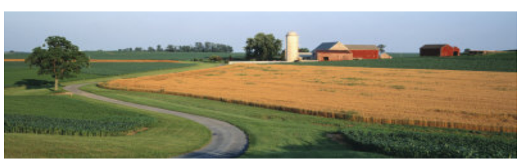
2017 Wisconsin Agribusiness Classic (formerly the Wisconsin Crop Management Conference

January 10-12, 2017

Alliant Energy Center, Madison

For more details, see

http://wiagribusiness.org/tradeshow.php



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2016 SOIL, WATER & NUTRIENT MANAGEMENT MEETINGS

November 29 through December 9, 2016

Discussion Topics

SPEAKER	PRESENTATION TITLES
Carrie Laboski	(1) What's new in nitrogen management for corn and soybeans (2) Recurring soil fertility questions filling my inbox (3) Update on plant tissue analysis research
Robert Florence	Proper plant tissue sampling and result interpretation
Matt Ruark	(1) Reviewing the benefits of soil biological additives (2) Behold the power of legumes (as a nitrogen source)
Francisco Arriaga	(1) Taking care of soil compaction issues during and after a wet fall (2) Managing Wisconsin's soils for improved soil health
DATCP staff	Nutrient management update: Rule revision, plan reviews and new 590

Schedule and Contacts

Tuesday, Nov. 29 – Comfort Inn-DeForest, 5025 County Hwy V, DeForest. **HOST:** Heidi Johnson, Dane Co. UWEX, 5201 Fen Oak Dr. Ste. 138, Madison, WI 53718-8827, fyi.uwex.edu/danecountyag or 608-224-3716.

Wednesday, Nov. 30– Sparta, Jake's Northwoods, 1132 Angelo Rd., Hwy 21, Sparta. **HOST:** Bill Halfman, Monroe Co. UWEX, 14345 County Hwy. B, Room 1, Sparta, WI 54656, 608-269-8722

Thursday, Dec. 1 – Eau Claire, Clarion Hotel, 2703 Craig Road, Eau Claire. **HOST:** Mark Hagedorn, Eau Claire Co. UWEX, 227 1st Street, Altoona, WI 54720, 715-839-4712

Schedule and Contacts
(continued)

Friday, Dec. 2 – Marshfield, Marshfield Ag Research Station, 2611 E. 29th Street. **HOST:** Richard Halopka, Adams Co. UWEX, 569 N. Cedar Street, Ste. 3, Adams, WI 53910, 608-339-4237

Tuesday, Dec. 6 – Kiel, Millhome Super Club, 3 miles East on Hwy. 57/31, Kiel, WI. **HOST:** Mike Ballweg, Sheboygan Co. UWEX, 5 University Drive, Sheboygan, WI 53081, 920-459-5904

Wednesday, Dec. 7 – Cecil, The Main Event, 206 North Lemke Street, Cecil, WI. **HOST:** Jamie Patton, Shawano Co UWEX, Courthouse, Room 101, 311 N. Main Street, Shawano, WI 54166, 715-526-6136

Thursday, Dec. 8 – Dodgeville, Iowa Co. Health & Human Services Bldg., 303 W. Chapel Street, **HOST:** Gene Schriefer, Iowa Co. UWEX, Iowa Co. Health & Human Services Bldg., 303 W. Chapel Street, Ste. 1200, Dodgeville, WI, 608-930-9850

Friday, Dec. 9 – Juneau, Dodge Co. Admin Bldg., 127 Oak Street. **HOST:** Loretta Ortiz-Ribbing, Dodge Co. UWEX, Dodge Co. Admin Bldg., 127 Oak Street, Juneau, WI 53039, 920-386-3790

UW Extension
University of Wisconsin-Extension

Department of Soil Science
Univ. of Wisconsin-Madison

- The Department of Soil Science, in conjunction with University of Wisconsin-Cooperative Extension, will conduct eight Soil, Water, and Nutrient Management Meetings in 2016 (from November 29 to December 9).
- Each meeting will run from 10:00 am until 3:00 pm, with lunch from noon to 1:00 pm.
- The purpose of these meetings is to provide research updates in the field of soil, water, and nutrient management.
- Francisco Arriaga, Matt Ruark, Robert Florence, Carrie Laboski, and Wis. DATCP staff will present current soil, water, and nutrient management information.
- A uniform fee of $45 will be charged at all locations; this includes lunch and all materials. Check out the schedule in this brochure and make reservations with the host agent at least 1 week before the meeting you wish to attend.
- Certified Crop Adviser CEU credits (2.0 in soil & water management and 2.5 in nutrient management) have been requested.

For program content questions, contact

- Francisco Arriaga
- Email: francisco.arriaga@wisc.edu
- Phone: 608-263-3913