WSSA
WEED SCIENCE SOCIETY OF AMERICA
Newsletter

Volume 44, No. 3
July, 2016

President's Message

I hope everyone's summer has been going well. I just got back from our summer board meeting in Tucson, Arizona, where plans for our annual meeting in February are coming together nicely. Janis McFarland has received an excellent batch of symposium proposals and I'm sure she will put these together into an interesting mix of topics that you won't want to miss. Our local arrangements chairs Bill McCloskey and Kai Umeda have also been working with Janis, Joyce Lancaster and Tony Ballard to put together some interesting tours for the meeting. I think you will all find this an interesting venue, and a great place to be in February!

WSSA continues to move forward to address the key weed science issues that impact our discipline, or that could impact us in the future. This spring and summer the WSSA Board of Directors and leadership have approved comment letters to EPA on their proposed 11-element resistance management plan; on their proposed tank-mix, buffer, and nozzle prohibitions included in the proposed dicamba registration packet; and on similar tank-mix prohibitions listed in the proposed halauxifen-methyl registration packet. None of this would have been possible without the efforts of Lee Van Wychen, Mike Barrett, the Science Policy committee, and the original special working group chaired by Larry Steckel. More information on these topics can be found in Lee's Washington Report elsewhere in this newsletter.

As usual, our EPA Liaison Mike Barrett has been working hard on behalf of our society. Mike spends a lot of time in Washington, D.C. responding to the many requests of EPA. This past February we had a significant presence of EPA staff at our annual meeting, which I attribute primarily to Mike's efforts and interactions with them over the past several years. More recently, Mike also worked with Lee and others to organize a seminar for the EPA's Office of Pesticide Programs (OPP) on herbicide interactions. Bryan Young from Purdue

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CALL FOR PAPERS
2017 GUIDELINES
(details inside on pages 3–7)

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University gave this seminar and did an excellent job. Donn Shilling is also actively working on behalf of WSSA as our NIFA Fellow. Donn is now beginning his second year as our Fellow. Most recently, Donn has been working with NIFA to develop a specific webpage that will help enhance weed scientists' understanding of NIFA grant opportunities, and has also submitted weed science research priorities to NIFA.

Obviously one of the primary issues that WSSA has been dealing with for many years is the problem of herbicide resistance in weeds. The Herbicide Resistance Education committee, under the leadership of David Shaw and several other members, has helped coordinate two herbicide resistant summits and two herbicide resistance tours in recent years with the goal of helping EPA personnel improve their understanding of the complex problems associated with herbicide resistance. This year the committee is organizing a series of regional workshop listening sessions around the country. Numerous weed scientists in each of our regional societies are helping with this effort and all of this information will serve as the foundation for the topics addressed in the next Herbicide Resistance Summit.

One other business item that the WSSA board addressed at our summer meeting was to vote on a new executive secretary for our society. A special search committee comprised of members from each regional society and the WSSA leadership has been working through this process for more than a year and held our final round of interviews this spring. There were a lot of great candidates and this was a tough decision, but the committee put forward a recommendation for the board to vote on at the summer meeting, and the board unanimously approved. Although details and contracts still need to be worked out, we intend to have this new company overlap with Joyce Lancaster in February to see all of the many things that she does for our society each and every day. Obviously, Joyce will be hard to replace, but we wish her well in retirement, and have some special plans in place to recognize her in Tucson.

I hope to see all of you at the meeting next February. I welcome your input on any weed science and WSSA-related issues at any time. Please don't hesitate to contact me, Joyce Lancaster, Lee Van Wychen, or any of the board members if you have questions, suggestions, or concerns regarding WSSA business or activities.

Kevin Bradley
President, WSSA

WSSA FUTURE MEETING SITES AND DATES

February 6–9, 2017
57th Annual Meeting
Hilton El Conquistador Golf and Tennis Resort
Tucson, Arizona
Janis McFarland, Chair
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WSSA HOME PAGE ACCESSED AT:
www.wssa.net

THINK NEWSLETTER
Deadline for October issue
September 1, 2016

WSSA NEWSLETTER

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CALL FOR PAPERS
2017 WSSA MEETING

Joint Annual Meeting of the WSSA
Tucson, Arizona • February 6–9, 2017

INVITATION

You are invited to submit titles and abstracts for papers and posters to be presented at the WSSA Meeting in Tucson, Arizona, February 6–9, 2017 Monday to Thursday. Volunteer papers may be presented orally in one of the section meetings or as a poster. An individual may personally present only one volunteer, non-poster paper. This rule will be strictly followed. In addition to the volunteer paper, an individual may present a poster, may be co-author of papers presented by other authors, and may present an invited symposium paper. The abstract submission site will be open September 1, 2016.

DEADLINE

Abstract Titles and Author Information must be submitted electronically by **October 4, 2016** to be considered. Those not submitted by this deadline will not be accepted. This deadline applies to symposium papers, as well as to volunteer papers and posters. Abstract texts must be submitted by January 16, 2017. The program will be posted on the WSSA website (http://www.wssa.net) and members will be informed when it is available by "List Serve" from Joyce Lancaster.

MEETING SCHEDULES

Volunteer papers will be presented within a **15-minute schedule**. Concurrent sessions dictate that the time schedule be strictly followed. To allow for introduction, transition of speakers, and questions, you should plan to present your paper in 12 or 13 minutes. Papers should report the results of completed research or other substantive information. Information should not have been presented at a previous WSSA national meeting. Ideally, research reported at the WSSA Meeting should be publishable in *Invasive Plant Science and Management*, *Weed Science*, *Weed Technology*, or a similar scientific journal.

SYMPOSIUM PAPERS

Speakers participate in symposia by invitation. Deadlines and procedures for preparing and submitting abstracts of symposium papers are the same as for volunteer papers, except that the author must send a copy of the abstract to the symposium organizer.

COMPUTER AND PROJECTION EQUIPMENT

The WSSA has adopted LCD projection for PowerPoint presentations as the standard and will be used exclusively during the annual meeting. LCD projectors and Windows PC laptop computers will be supplied by WSSA members and coordinated by section chairs. Presenters will **NOT** be allowed to use their own computers in the sessions. If possible, computers will be located on the podium in each session. If this is not possible, an infrared remote providing forward and backward control of the PowerPoint presentation will be provided in each session. Screens, microphones, carts, and extension cords will continue to be supplied by AV services and paid for by the Society. In order to make this process go as smoothly as possible, please follow the guidelines below.

FORMAT

All presentations **MUST** be in PowerPoint (any version) for MS Windows (PC compatible). PowerPoint 2010 will be the software used. MacIntosh/Apple formats will **NOT** be supported. Your presentation must be saved as a PowerPoint show file. **The section chairs have requested that ALL presentations be prepared and uploaded on the abstract submission site so that preloading prior to the meeting can be accomplished** (see Submission of Presentations). Please limit the size of presentations to less than 25 MB. If your presentation contains video clips or animation you must contact the section chair for approval one week **PRIOR** to sending your presentation to ensure compatibility with the equipment. Limit fonts used in the presentation to basic fonts, as not all machines may have the same choice of fonts. Examples of standard fonts are Times, Arial, Courier, Tahoma, or similar equivalents. Section chairs and computer operators are not responsible for changes in fonts, bullets, and other formatting at the time of presentation. Use up-to-date virus protection software to avoid infecting the computers provided by the section chairs.

SUBMISSION OF PRESENTATIONS

Presentations must be uploaded on the submission site prior to the meeting. Section chairs must receive the presentation at least one week in advance of the meeting (**no later than January 30, 2017**). Please coordinate with your section chair if you want to preview your presentation at the meeting to ensure that the formats/fonts are all as you intended them to be. Due to the limited time and equipment, last minute editing is highly discouraged. Submission of files at the time of the presentation or at any other time during the session will **NOT** be allowed.

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Be alert to changes, modifications, and refinements to these guidelines between now and the meeting. This information will be published in the October and January issues of the WSSA Newsletter. For non-WSSA members, the WSSA Newsletter is available on the WSSA website (http://www.wssa.net).

SUBMISSION OF ABSTRACT

Volunteer papers, posters, and symposium papers all require abstracts to be submitted electronically. To submit abstract titles/authors and abstract texts electronically, go to the Weed Science Society of America website (http://www.wssa.net).

- After **September 1, 2016**, you will be able to access the Title/Abstract Submission Page from the WSSA website. Additional instructions will be provided on the Title/Abstract Submission Page.

The Program will be printed exactly as submitted, other than format and font changes for uniformity; therefore, proofread your submission very carefully. Primary contact authors will receive an email indicating their abstract was received and a later email confirming the section/day/time when and where the paper will be presented.

STUDENT CONTEST INFORMATION

A. ELIGIBILITY

1. Any student who is a WSSA member and has registered to attend the current WSSA annual meeting is eligible to compete in the poster or oral presentation contest.
2. Students are eligible for participation in the Student Poster Contest and Oral Presentation Contest multiple times during a M.S. program and a Ph.D. program; however, **a student cannot** participate in both the oral presentation contest and poster presentation contest during the same annual meeting.
3. A student can only win 1st place in the poster or oral presentation contest once per degree program. Once a student places 1st in a given contest (i.e. oral or poster presentation contest), they are no longer eligible to compete in said contest during the course of their current degree program. A student my win 1st place in the poster presentation contest and 1st place in the oral presentation contest while in a M.S. or Ph.D. program; however, a student may not enter both contests at the same annual meeting. A student may win 1st place in the poster or oral presentation contest in the M.S. degree program and then compete and win 1st place for an oral or poster presentation while in a Ph.D. degree program.

B. RULES AND PROCEDURES

1. Notice of the contests will be included with the Call for Papers.
2. A contestant may enter the poster or oral presentation contest multiple years per degree program. Persons who have graduated from a degree program (M.S. or Ph.D.) and are actively pursuing an additional degree may only enter the contest for that degree program during the first annual meeting following graduation.
3. Contestants will indicate in the title submission that they wish to enter either the poster or oral presentation contest. Title and contest declaration must be turned in by the deadline that title submissions are due. If a contestant does not turn in a title and contest declaration by the time that title submissions are due, they will be ineligible for the contest unless the Student Program Chairperson declares the student eligible based on student's situation. ABSTRACTS FOR CONTEST PRESENTATIONS must be submitted electronically by January 16, 2017. This allows time for the committee to prepare copies or e-mail abstracts to the appropriate judges prior to the contest.
4. Evaluation forms and rules will be posted to the WSSA website.

PREPARATION OF ABSTRACT

Following are the guidelines for the preparation and submission of an abstract. Be alert to additional instructions that may appear on the site itself.

1. **Contents** – The abstract should include a brief overview of essential aspects of experimental procedures and should highlight significant results and their interpretation. Write the abstract so it consists entirely of information. Do not include statements such as "The results of the experiments will be presented" or "The significance of these results will be discussed."
2. **Formatting** – Typing and format instructions will be provided on the Title/Abstract Submission Page of the WSSA website. In the abstract, authors will be identified by occupational affiliation and location, not by mailing address. Therefore, please type the title, author(s), the affiliation (institution, agency or company), and location (city and state or country, but not the zip code). When authors are from different locations or affiliations, group authors by their affiliations/locations.

   Capitalize the first letter of all major words in the title and end the title with a period. Include both the common and scientific names of weeds and uncommon crop plants in the title (authorship of plants is not necessary), but only the common names of herbicides and well-known crop plants. **You do not need to type the title in bold-face;** the system will do that automatically. **First names followed by initial** (period after initial) **should be typed before last names of all authors.** The site will provide a method for indicating the presenter, be sure to **specify the presenting author.** Do not include departments, divisions or zip codes. Do not abbreviate the word "University" to "Univ."

   Example 1. **Role of Adjuvants on Sulfonylurea Herbicide Efficacy**. D. Sanyal*[1], P. C. Bhowmik[2], [1]Monsanto Company, St. Louis, MO, [2]University of Massachusetts, Amherst, MA.

   Example 2. **Evaluation of an In-Row Rotating Cultivar in Vegetable Crops.** S. A. Fennimore*[1], R. F. Smith[2], J. Rachuy[2], [1]University of California, Davis, CA, [2]University of California, Monterey County, CA.

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Example 3. **Teaching Weed Science in an Off-Campus Setting.** R. E. Whitesides*, C. V. Ransom; Utah State University, Logan, UT.

3. **E-mail Address** – For better communication among researchers, place the e-mail address of the senior author following the last sentence of abstract.
4. **Herbicide nomenclature** – A list of common and chemical names of herbicides approved by the WSSA is available at http://wssa.net/Weeds/Tools/Herbicides. When the common name refers to the parent acid, salt or ester forms used in the experiments should be identified at the first mention of the common name (e.g., methyl ester of diclofop). At the first mention of an herbicide application rate, list whether the weight is acid equivalent (ae) or active ingredient (ai) (e.g., kg ai ha^{-1}). If no common name is available, use its designation (trade name or code) followed by the full chemical name. If the chemistry is confidential, identify the source (company) in parentheses after designation.
5. **Adjuvant nomenclature** – Where possible, use the WSSA *Herbicide Handbook,* 10th edition (2014), p. 479–481; *Weed Science* (1985) 33 (Suppl. 1): 22–23; or the *WSSA Monograph* (1982) *Adjuvants for Herbicides.* Otherwise, use the most complete available chemical description of the adjuvant.
6. **Weed nomenclature** – Identify weeds by common names. At first mention of a weed, whether in the title or text, follow the common name with the scientific name (underlined and in parentheses). Do not repeat the scientific name in the text if given in the title. A list of WSSA approved common and Latin names of common weed species can be found at http://wssa.net/wssa/weed/composite-list-of-weeds/. If there is no WSSA-designated common name, use common scientific names from another source such as *Hortus Third Dictionary*.
7. **Crop nomenclature** – Scientific names for crop plants are optional. They are not needed for well known crops, but should be included for less common crops and whenever needed for clarity. Place scientific names, underlined and in parentheses, following first mention of the common name, whether in the title or text.
8. **Soil nomenclature** – Include the soil series with textural classification and the subgroup name using the terminology of the U.S. Dept. Agric. Natr. Res. Conserv. Serv. publication, *Soil Taxonomy,* U.S. Gov. Printing Office, Washington, D.C. 1988. For soils outside the U.S.A., use the local official terminology.
9. **Measurements** – Report all measurements in International System of units (SI). Abbreviate units of measure if preceded by a number. See *Weed Science* (2003) 51:1029–1033 for additional suggestions and WSSA *Herbicide Handbook,* 10th edition (2014), p. 488–491 for metric conversions.
10. **Abbreviations** – Use abbreviations as shown at http://wssajournals.org/userimages/ContentEditor/1358793440926/WSSA_Dir Contrib.pdf or CBE Style Manual.
11. **Numbers** – Use Arabic numerals for all numbers with two or more digits and for all measurements such as time, weight-length, area, quantity, or degree except when the number is the first word in the sentence. Spell out numbers when they are the first word in a sentence or when they are less than 10 and not measurements.
12. **Tables, figures, or literature citations** – There will be a system in place on the abstract submission site to add these.

SUBJECT INDEX

A subject index consisting of weed/crop names, herbicides, and other key words will be included in addition to the author index. Providing key words to be used in indexing will be the responsibility of the authors. Words in the title are not automatically indexed. Only key words provided by the authors will be used. The abstract submission site utilizes a new key word system. There are drop down boxes for each type of subject with a listing of choices. It is recommended that you utilize these pre-selected choices, but there is an area for authors to type in user defined key words that are not found in any of the selections.

1. A **maximum** of five key words per abstract will be indexed. Most abstracts should only require two or three words.
2. Prioritize key words based on the importance of a given subject, especially for abstracts containing more than five weeds and herbicides. Use a priority ranking of (a) weeds and/or crops, (b) herbicides, other chemicals (including adjuvants) and other types of weed control (e.g., cultural, biological), (c) additional topic words or phrases.
3. Use scientific name of weeds, without authority. Genus plus species is considered one key word.
4. Genera names may be used when more than one species in that genus is mentioned in the abstract.
5. Use common names of crops (for less common crops, use scientific names without authority).
6. Use common names of herbicides and other chemicals (including adjuvants) or code numbers for experimental compounds.
7. Chemical class names, e.g., sulfonylureas, should be used when more than one herbicide in that class is mentioned in the abstract.

POSTERS

The information presented as a poster is very similar to that presented as an oral paper, but it is presented on poster board rather than orally at the meeting. Directions for preparing a poster can be found under POSTER SESSION (see below). There are key differences between a poster and a commercial exhibit. The commercial exhibits are presented by Sustaining Members of WSSA and consist of

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educational information that may be of a promotional nature about products and/or services. Posters may be presented by personnel of the same sustaining member companies and may concern commercial products, but they must present results of completed research with these products rather than promotional material about them.

POSTERS

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POSTER SESSION

There may be split sessions for presentation of posters. In addition to specifying Poster Session, authors should indicate a category from Section 1 through 14. Poster presentations will be grouped by these categories.

1. Authors are expected to be at their poster during the period reserved for viewing the poster to answer questions and to discuss their research with interested parties.
2. Participants in Section 15, the Poster Session, will meet at a location designated in the program before the Poster Session begins to elect a chair-elect of the section for 2018 (Section Chair in 2018) and discuss recommendations for improvement of the Poster Session.
3. **Poster Boards. One board 48 x 48 inches will be provided for each poster. There will be no exceptions to the rule of one board per paper. Posters should be no larger than this size.**
4. Content of Paper. Text, graphs, and tables must be easily read from a distance of 6 feet. Titles and headings should be larger and readable from a greater distance.
5. Because of cost and logistics, it will not be possible to provide electrical connections, video equipment, or other special equipment for posters.
6. Groups of authors may present more than one poster, but at least one author must be present at each poster during the time designated exclusively for viewing the poster.

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THINK NEWSLETTER
Deadline for October issue
September 1, 2016

WSSA HOME PAGE ACCESSED AT:
www.wssa.net

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WASHINGTON REPORT

by Lee Van Wychen, Director of Science Policy

NATIONAL AND REGIONAL WEED SCIENCE SOCIETIES COMMENT ON EPA'S PROPOSED HERBICIDE RESISTANCE MANAGEMENT PLAN

The Weed Science Society of America (WSSA), Aquatic Plant Management Society (APMS), Northeastern Weed Science Society (NEWSS), North Central Weed Science Society (NCWSS), Southern Weed Science Society (SWSS), and Western Society of Weed Science (WSWS) submitted comments on EPA's proposed herbicide resistance management plan, which was first proposed as part of the dicamba-tolerant cotton and soybean registrations. EPA's proposal presents a significant change in how resistance is monitored, mitigated and communicated to weed management stakeholders. One of our concerns was that this proposal was included as part of the proposed dicamba registration and not as a separate Pesticide Registration (PR) Notice by itself. However, just as the dicamba registration comment period was closing, EPA did issue a separate PR Notice for the Resistance Management Plan (see next story below).

While the National and Regional Weed Science Societies complimented EPA on these proactive resistance management measures, we provided many suggestions and recommendations on how to improve the plan. It will be important for EPA to communicate to the weed management community what their expectations are for the plan, how much it will cost to implement, and how will success (and failure) be measured. In addition, we consider the plan a first iteration that will need adaptation and evolution with our experience with it. The comments are at: http://wssa.net/wp-content/uploads/Weed-Science-Societies-Comments-on-EPA-11-element-Resistance-Mgmt-Plan.pdf

EPA ISSUES DRAFT GUIDANCE ON MANAGING PESTICIDE RESISTANCE

On June 2, EPA made available for a 60-day comment period two draft Pesticide Registration Notices (PR Notices) that are aimed at combating pesticide resistance. The first PR Notice (PR Notice 2016-X) is titled "Draft Guidance for Pesticide Registrants on Pesticide Resistance Management Labeling" and the second PR Notice (PR Notice 2016-XX) is titled "Draft Guidance for Herbicide Resistance Management Labeling, Education, Training, and Stewardship."

To address the growing issue of resistance and preserve the useful life of pesticides, EPA is beginning to embark on a more widespread effort that is aimed at combating and slowing the development of pesticide resistance. The release of these two PR Notices will allow EPA to communicate and seek comment on potential strategies to combat pesticide resistance.

Draft PR Notice 2016-X, which revises and updates PR Notice 2001-5, applies to all conventional agricultural pesticides (i.e., herbicides, fungicides, bactericides, insecticides and acaricides). The updates in PR Notice 2016-X focus on pesticides labels and are aimed at improving information about how pesticide users can minimize and manage pest resistance. Updates fall into the following three categories: (1) additional guidance to registrants and a recommended format for resistance-management statements or information to place on labels; (2) references to external technical resources for guidance on resistance management; and (3) instructions on how to submit changes to existing labels in order to enhance resistance-management language.

Draft PR Notice 2016-XX, which only applies to herbicides, communicates EPA's current thinking and approach to address herbicide-resistant weeds by providing guidance on labeling, education, training, and stewardship for herbicides undergoing registration review or registration (i.e., new herbicide actives, new uses proposed for use on herbicide-resistant crops, or other case-specific registration actions). It is part of a more holistic, proactive approach to slow the development and spread of herbicide-resistant weeds and prolong the useful lifespan of herbicides and related technology.

To view and provide comments on these draft Pesticide Registration Notices and any supporting material, please visit EPA-HQ-OPP-2016-0242 for PRN 2016-X and EPA-HQ-OPP-2016-0226 for PRN 2016-XX. The comment period for each closes on August 2, 2016. In the future, EPA plans to evaluate other types of pesticides (e.g., fungicides, bactericides, insecticides, and acaricides) to determine whether and what guidance may be appropriate for these types of pesticides.

WEED SCIENCE SOCIETIES OPPOSED TO EPA'S PROPOSED TANK MIX PROHIBITIONS

The National and Regional Weed Science Societies also commented on the tank mix prohibitions proposed by EPA for two new herbicide registrations: 1) dicamba-tolerant cotton and soybean; and 2) halauxifen-methyl.

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The comment period for both those registrations closed at the end of May. EPA is considering whether they will continue to propose tank mix prohibitions on all new registrations and re-registrations going forward due to uncertainty about potential tank mix synergism effects on non-target organisms.

The National and Regional Weed Science Societies are opposed to the proposed tank mix prohibitions because the benefits of tank mixing outweigh any "uncertainty" about potential tank mix synergism effects on non-target organisms. EPA recognizes the benefits from tank mixes and states: "The practice of tank mixing can result in **significant economic benefits to the grower** by allowing control of a wider variety of pests in a single application without incurring the expense of sequential applications. Additionally, by reducing the number of visits to the agricultural field, the grower is also **reducing fossil fuel use** and emissions from large agricultural equipment, **as well as the potential exposure to pesticides** that can result from multiple visits to the same area being treated. It is also widely accepted that the practice of **mixing products with different modes of action is essential to the management of weed resistance**. Because weed resistance is known to have a very costly impact to overall crop yields, which in turn negatively impacts growers' harvests and the price of commodities to the consumer, tools that aid in the prevention of resistance are considered to be a very important benefit to agriculture."

Yet, despite these recognized benefits, EPA has proposed a tank mix prohibitions for both dicamba and halauxifen-methyl. In addition, EPA's "uncertainty" about the effects of herbicide synergism on non-target organisms is a divergence from the 2013 National Academy of Sciences (NAS) report: "Assessing Risks to Endangered and Threatened Species from Pesticides." The NAS report is the gold standard for how EPA and the Fish and Wildlife Service are supposed to make endangered species assessments. The NAS report recognizes that "The toxicity of a chemical mixture probably will not be known, and it is not feasible to measure the toxicity of all pesticide formulations, tank mixtures, and environmental mixtures. Therefore, combined effects must be predicted on the basis of models that reflect known principles of the combined toxic action of chemicals." The 2013 NRC report emphasizes that the complexity of assessing the risk posed by chemical mixture (i.e. tank mixing herbicides) "**should not paralyze the process**."

The National and Regional Weed Science Societies comments are at: http://wssa.net/wp-content/uploads/Weed-Science-Societies-comments-on-dicamba.pdf and http://wssa.net/wp-content/uploads/Weed-Science-Societies-comments-on-Halauxifen-methyl.pdf

SUPREME COURT SAYS LANDOWNERS CAN CHALLENGE FEDS IN CWA PERMIT DETERMINATIONS

On May 30, the Supreme Court ruled unanimously against the government in a case deciding when landowners can challenge certain decisions about water permits in court. The case, *Army Corps of Engineers v. Hawkes Co. Inc.*, centers on a North Dakota peat mining company that wants to challenge a government determination that its mining plans would require costly Clean Water Act permits.

The broader issue in the case was whether the Army Corps of Engineers' "jurisdictional determinations" about whether permits are required represents "final agency actions" that can be challenged in court. Property rights advocates and industry contend that landowners should be able to contest those decisions in court; the government disagrees.

Chief Justice John Roberts wrote the court's opinion, finding that a jurisdictional determination approved by the corps is indeed a "final agency action" that is subject to judicial review. The justices seemed skeptical of the government's position when they heard oral arguments in the case in March.

It's the latest wetlands case the Obama administration has lost in recent years. In 2012, the high court ruled 9–0 against the government in another important case where property owners sought to challenge EPA enforcement actions in court. Click here to read the Supreme Court opinion.

"NPDES FIX" BILL PASSES HOUSE, BUT STRIPPED OUT OF ZIKA RESPONSE CONFERENCE AGREEMENT

On May 24, the House passed H.R. 897, the Zika Vector Control Act (formerly the Reducing Regulatory Burdens Act – a.k.a. the "NPDES Fix" bill) by a vote of 258–156. This is the 3rd time in five years the House has passed this bill. This version of H.R. 897 contains the same language as the original legislation, but included a 2 year sunset provision that we oppose. The Zika Vector Control Act (H.R. 897) was rolled into H.R. 2577, which also includes the Military Construction and Veterans Affairs Appropriations Bill as well as the Zika Response Funding bills.

The National and Regional Weed Societies joined over 100 other organizations to urge House and Senate Conferees to support the inclusion of H.R. 897 in the final conference agreement for H.R. 2577 and to remove the sunset

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provision. The good news is that part of the NPDES fix language made it into the House – Senate Conference Agreement that includes a $1.1 billion Zika virus response package and the fiscal 2017 Military Construction-VA appropriations bill. The bad news is that there is only a waiver from NPDES permits for mosquito control, not aquatic weeds. Plus the waiver is only for 180 days, and then sunsets. The House did pass the conference agreement (H.R. 2577), but then it blew up in the Senate, plus Obama promised to veto it. In other words, it's back to the drawing board.

FY 2017 AG APPROPRIATIONS

The House and Senate Agriculture Appropriations Subcommittees released their proposed budgets for FY 2017. In both budgets, many of the USDA agencies that receive funding for weed research and management were proposed to receive modest increases compared to FY 2016. Agencies with proposed increases include: APHIS, ARS, NIFA, and NRCS. Within NIFA, the AFRI Competitive Grants program, both the House and Senate recommended an increase of $25 million over the FY 2016 appropriation of $350 million. However, most of the other NIFA line items relevant to weed science were held constant to the FY 2016 levels. This included Hatch Act, McIntire-Stennis, Smith Lever b & c, IR-4, SARE, and Crop Protection and Pest Management.

There are also various instructions and recommendations included in both the House and Senate Ag Appropriations bill related to weed science and pest management in general.

Here are five items that are mentioned in the House Ag Approps bill:

1) **Office of Pest Management Policy.**—The Committee commends the Office of Pest Management Policy for its work providing the Department, federal agencies, producers, and other interested stakeholders scientifically sound analysis of pest management issues important to agriculture, especially methyl bromide transition, pesticide resistance management, and the development of antimicrobials to combat citrus greening. The Committee encourages the Under Secretary to better utilize this office and directs ARS to continue to support its vital work.
2) **Invasive Species.**—The Committee recognizes the threats posed by invasive plant species and the need to protect, restore, and enhance native plants, including those that are endangered or threatened. The Committee encourages ARS, the Natural Resources Conservation Service (NRCS), and NIFA to support the research, education, and conservation of native plants.
3) **Cheat Grass Eradication.**—The Committee encourages NRCS to continue to assist farmers and ranchers to eradicate, control, and reduce the fuel loads associated with cheat grass and to collaborate with ARS, as appropriate, on research related to cheat grass.
4) **Herbicide Resistance.**—The Committee reminds NRCS of the challenges many producers are facing due to the spread of herbicide-resistant weeds and encourages it to ensure agency staff, partners, and producers are aware of conservation practice standards, conservation activity plans to address herbicide-resistant weeds, and financial assistance available through conservation programs to assist producers in their efforts to control these weeds.
5) **Milkweed.**—The Committee is concerned about the rapid decline in milkweed for monarch butterfly habitat. The Committee encourages NRCS consider the increased bene-

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	FY 2014	FY 2015	FY 2016	FY 2017 House	FY 2017 Senate
USDA AGENCY	$ millions				
ARS	1,122.4	1,132.6	1,143.8	1,151.8	1,177.9
ERS	78.0	85.3	85.3	86.0	86.7
NASS	161.2	172.4	168.4	168.4	169.6
NIFA	1,277.1	1,289.5	1,326.4	1,341.1	1,363.7
APHIS	821.7	871.3	894.4	930.9	939.2
NRCS	812.9	846.4	850.8	855.2	864.4
NIFA Programs					
Research and Education Activities	772.5	786.8	819.6	832.8	851.4
-Hatch Act (Experiment Stations)	243.7	243.7	243.7	243.7	243.7
-Cooperative Forestry Research	33.9	33.9	33.9	33.9	33.9
-AFRI Grants Program	316.4	325.0	350.0	375.0	375.0
-Sustainable Ag Res. & Education	22.6	22.6	24.6	24.6	27.0
-IR-4 Program	11.9	11.9	11.9	11.9	11.9
Extension Activities	469.1	471.6	475.8	477.3	476.2
-Smith-Lever Act, Section (b) & (c)	300.0	300.0	300.0	300.0	300.0
Integrated Activities	35.3	30.9	30.9	30.9	36.0
-Crop Protection & Pest Mang't	17.1	17.2	17.2	17.2	20.0

fits of restoring milkweed for monarch habitat in fiscal year 2017.

Here are four items that are mentioned in the Senate Ag Approps bill:

1) **Office of Pest Management Policy.**—The Committee recognizes the critical role that the Office of Pest Management Policy plays in fulfilling USDA's statutory role in the interagency consultative process under the Federal Insecticide, Fungicide, and Rodenticide Act. The importance of OPMP's mission has increased commensurately with the increased actions undertaken by EPA, and the Committee provides $3,000,000 for OPMP to fulfill its obligations on behalf of USDA.
2) **Research Assistance.**—The Committee encourages the Agricultural Research Service to provide direct, place-based assistance to 1862 Institutions in States that do not have Agricultural Research Service facilities to address the research priorities of such States, such as invasive plant species and insects that cause significant impacts to agriculture, aquaculture, and communities in such States and to assist in the development of specialty and horticultural crops to increase food security and expand marketing opportunities for small farmers.
3) **Sage Steppe Restoration Science.**— The Committee includes an increase of $1,000,000 for ARS to advance sagebrush habitat restoration science in the Northern Great Basin including cooperative research, testing and deploying precision restoration methods to restore habitat Impacted by significant disturbance such as wildfire and invasive species.
4) **Pollinator Health and Monarch Recovery.**— The Committee reiterates its concern for the need to address threats posed to pollinator health, and urges the Department to continue to support the Fish and Wildlife Service's Monarch Conservation Strategy. The Committee directs NRCS to leverage resources, relationships and partnerships, including with non-governmental organizations that are perceived positively by the private land and agriculture communities and that possess experience working directly with agricultural producers and other conservation partners. The Committee recommends the Department continue to support monarch conversation on private lands in fiscal year 2017 and expects to see a multi-year recovery effort undertaken, focusing on the deployment of conservation practices.

FY 2017 AQUATIC PLANT CONTROL FUNDING

The Senate Energy and Water Appropriations Subcommittee recommendation for aquatic plant control funding in FY 2017 initially included $9 million in their first markup in March, despite the Army Corp of Engineers not requesting any funding once again. Within the $9 million in funding from the Senate, $4 million was for the Aquatic Plant Control Research Program (APCRP), another $4 million was for the watercraft inspection stations, and $1 million was for monitoring and contingency planning associated with watercraft inspection stations.

The House and Senate both passed the Energy and Water Development and Related Agencies Appropriations Act, 2017 (H.R.2028) in May, albeit with several changes to aquatic plant control funding. In the House version of H.R. 2028, there is only $4 million for the watercraft inspection stations. In the Senate version, there is only $4 million for APCRP. Needless to say, the National and Regional Weed Science Societies will support the Senate version over the House version if we had to choose, but we'd rather see both programs receive $4 million like they did in the FY 2016 appropriations.

During the floor debate in the Senate on H.R. 2028, an amendment by Sen. John Hoeven (ND) that would have blocked the EPA and Army Corps of Engineers WOTUS rule was defeated by a 56–42 vote. They needed 60 votes to invoke cloture and pass the amendment. The amendment also would have blocked EPA's Interpretive Rule, which narrowed an agricultural exemption for farmers and ranchers under the Clean Water Act.

$286 MILLION – COST TO BRING A NEW CROP PROTECTION PRODUCT TO MARKET

CropLife America (CLA) recently helped the market research firm, Phillips McDougall, develop a study that shows the overall cost to discover and advance a new crop protection product averages $286 million – up 21% over the previous 5 years. (Link to CLA statement with imbedded report available here: http://www.croplifeamerica.org/cost-of-crop-protection-innovation-increases-to-286-million-per-product/ The biggest driver in that cost increase appears to be regulatory compliance. That statistic demonstrates why it is so important to be sure that US regulatory requirements are assessments of real science and safety advancements, not simply reactions to non-scientific political ideologies.

NAS GENE DRIVE REPORT URGES CAUTION

On June 9, the National Academies of Sciences, Engineering and Medicine issued a report titled: Gene Drives on the Horizon: Advancing Science, Navigating Uncertainty, and Aligning Research with Public Values (2016). The report notes that the technology offers

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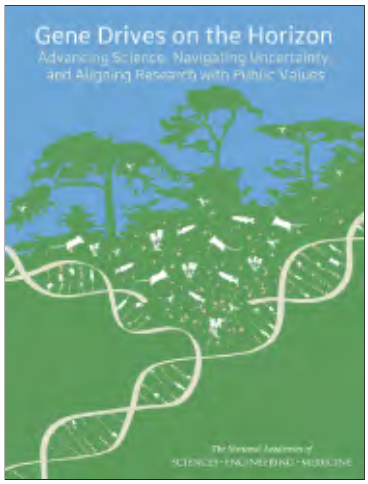
great promise for agriculture, conservation, and public health, but it stresses that the current regulatory system, which includes institutional review boards and environmental impact assessments, is not adequate to address the potentially great risks. It calls for a greater involvement of the public in the early stages of the technology's development and approval for use.

To examine the questions surrounding gene drive research, the report explored seven plausible gene drive case studies that offer practical scenarios on which to base the report's analysis and recommendations. Two of those case studies involved weeds, *Centaurea maculosa* and *Amaranthus palmeri*, both of which I include below.

CASE STUDY 5: *Centaurea maculosa* - Plausibility of a Gene Drive Solution

Spotted knapweed is obligately outcrossing (Harrod and Taylor, 1995), meaning that there is little or no self-fertilization and that gene drives would be able to spread throughout knapweed populations. Another factor that makes it potentially suitable for a gene drive is that the basis for its ability to outcompete native plants is thought to come from the production of a compound called catechin (Thelen et al., 2005), which it exudes from its the roots. Catechin inhibits the germination and growth of native plant species, thereby conferring a competitive advantage to spotted knapweed (Bais et al., 2003).

There are two possible gene-drive approaches to help limit the spread of spotted knapweed, which could potentially be employed together. The first option is to engineer a suppression gene drive by targeting sex-specific genes, thereby biasing gender ratios and facilitating a population crash. The second is to modify the



population by targeting the catechin biosynthetic pathway, which in theory would negatively affect the knapweed's ability to compete against endemic plants, although this effect is still debated (Perry et al., 2005). In either case, the rate of spread of either of these gene drives is expected to be slow, because spotted knapweed is a perennial plant that lives for approximately nine years (Zouhar, 2001). In addition, the success of a suppression drive is likely to depend critically on the fertility advantages of sex-modified plants compared to hermaphrodites and also on features such as pollen availability and spatial structure (Hodgins et al., 2008).

CASE STUDY 6: *Amaranthus palmeri* - Plausibility of a Gene Drive Solution

Palmer amaranth is a likely candidate for gene-drive technology, for five reasons. First, it is an annual plant, so it has yearly sexual reproduction and a rapid generation time. Second, Palmer amaranth and some other members of the genus are dioecious (male and female flowers occur on separate plants (Steckel, 2007), which ensures the outcrossing necessary to spread gene drives. Third, it does not have an extensive seed bank; studies suggest that most seeds do not persist in the soil, so that there is unlikely to be a seed repository that is immune to the gene drive. Fourth, an Amaranthus species has been transformed genetically (Pal et al., 2013), suggesting that it will be technologically feasible to insert gene drives into Palmer amaranth. Finally, Palmer amaranth is wind-pollinated, implying that the eradication of species will, at the very least, not harm insect pollinators.

In theory, Palmer amaranth could be subjected to two types of gene drive. In the first, a modification drive would target the genes that confer resistance to glyphosate and reestablish the population's susceptibility to glyphosate herbicides. The potential targets of this gene drive are known, because the glyphosate herbicide acts by interrupting the function of 5-enolpyruvylshikimate-3-phosphate synthase. In Palmer amaranth, this synthase gene has been duplicated extensively, leading to enzyme overexpression and glyphosate resistance (Gaines et al., 2010). Thus, a candidate gene drive would need to target multiple 5-enolpyruvylshikimate-3-phosphate synthase copies that are scattered throughout the genome. If the gene drive succeeded and susceptibility became fixed, glyphosate could then be used again as a tool to limit Palmer amaranth populations. A second approach would be to build a suppression drive. Although the target and content of such a drive is not yet clear, the fact that there are separate male and female plants implies that there are sex-specific genes that are suitable targets for biasing the sex ratio. Under this approach, the goal would be skew sex ratios until the entire population (or species) collapses.

LACK OF MILKWEED IS UNLIKELY TO BE DRIVING MONARCH DECLINE

The *Oikos Journal* published a Cor-

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nell study online on April 27 titled "Linking the continental migratory cycle of the monarch butterfly to understand its population decline." **Abstract:** Threats to several of the world's great animal migrations necessitate a research agenda focused on identifying drivers of their population dynamics. The monarch butterfly is an iconic species whose continental migratory population in eastern North America has been declining precipitously. Recent analyses have linked the monarch decline to reduced abundance of milkweed host plants in the USA caused by increased use of genetically modified herbicide-resistant crops. To identify the most sensitive stages in the monarch's annual multi-generational migration, and to test the milkweed limitation hypothesis, we analyzed 22 years of citizen science records from four monitoring programs across North America. We analyzed the relationships between butterfly population indices at successive stages of the annual migratory cycle to assess demographic connections and to address the roles of migrant population size versus temporal trends that reflect changes in habitat or resource quality. We find a sharp annual population decline in the first breeding generation in the southern USA, driven by the progressively smaller numbers of spring migrants from the overwintering grounds in Mexico. Monarch populations then build regionally during the summer generations. Contrary to the milkweed limitation hypothesis, we did not find statistically significant temporal trends in stage-to-stage population relationships in the midwestern or northeastern USA. In contrast, there are statistically significant negative temporal trends at the overwintering grounds in Mexico, suggesting that monarch success during the fall migration and re-establishment strongly contributes to the butterfly decline. Lack of milkweed, the only host plant for monarch butterfly caterpillars, is unlikely to be driving the monarch's population decline. Conservation efforts therefore require additional focus on the later phases in the monarch's annual migratory cycle. We hypothesize that lack of nectar sources, habitat fragmentation, continued degradation at the overwintering sites, or other threats to successful fall migration are critical limiting factors for declining monarchs.

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THINK NEWSLETTER

Deadline for October issue
September 1, 2016

NECROLOGY

CHARLES R. SWANSON
1924 – 2015

Charles Swanson died July 3, 2015, in Moorhead, MN. He was born in St. Paul, MN on September 11, 1924. His family soon moved to Fargo, ND where he spent his childhood and youth. He attended North Dakota Agricultural College in Fargo until World Was II broke out and he immediately joined the service, where he was trained as a meteorologist. After the war, he returned to NDAC where he earned his B.S. and M.S. degrees. He then moved to Iowa State University where he earned the PhD in Plant Physiology in 1952. He served as a faculty member at North Dakota State University, then joined the U.S. Department of Agriculture Agricultural Research Service.

Charles had a long and productive career in weed research and in research administration. His personal research on mechanism of action and metabolism of herbicides in plants was outstanding and his success in research and a recognition of his administrative talents led to his appointment to administrative positions, first as Leader, Pesticide Investigations-Metabolism in Plants at the USDA Metabolism and Radiation Laboratory at Fargo, ND, then later as Director of the Southern Weed Science Laboratory at Stoneville, MS, and finally to Assistant to the Regional Administrator, ARS in New Orleans, LA.

He has served WSSA in many ways: as a member of the Board of Directors, as Vice President, President-Elect, and President, and as Associate Editor and Editor of *Weed Science*.

Charles Swanson was truly a well-respected scientist and will be missed.

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CALENDAR OF UPCOMING EVENTS

DATE	EVENT	LOCATION	CONTACT
November 22–24, 2016	Canadian Weed Science Society Annual Meeting	Delta Beauséjour Moncton, New Brunswick	www.wssa.net
December 12–15, 2016	North Central Weed Science Society Annual Meeting	Des Moines Marriott Downtown Des Moines, Iowa	www.wssa.net
January 23–25, 2017	Southern Weed Science Society Annual Meeting	Hyatt Regency-Wynfrey Hotel Birmingham, Alabama	www.wssa.net
February 6–9, 2017	Weed Science Society of America Annual Meeting	Hilton El Conquistador Golf and Tennis Resort Tucson, Arizona	www.wssa.net
March 13–16, 2017	Western Society of Weed Science Annual Meeting	The Coeur d'Alene Hotel Coeur d'Alene, Idaho	www.wssa.net
July 16–19, 2017	Aquatic Plant Management Society 57th Annual Meeting	Hilton Daytona Beach Resort Ocean Walk Village Daytona Beach, Florida	www.wssa.net

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