



Western Society of Weed Science Newsletter

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WINTER 2021

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President's Report - by Corey Ransom

Happy New Year to my fellow members of WSWS. While some things have not changed from 2020, I think there is plenty to be optimistic about as the year unfolds. Particularly, I am looking forward to meeting with you in our Annual Conference of WSWS combined with APMS to be held virtually March 1 to 4, 2021. Please register if you have not done so already. There will be lots of opportunities to share science, interact with colleagues and students, and to participate in discussions and conversations.

I want to especially thank Sandra McDonald and the Program Committee for their work in putting together an excellent and interactive program and for all the extra work in creating a virtual meeting for all of us. Our Student Liaison, Mirella Ortiz, has been exceptionally diligent in representing the interests of the students in the planning of the meeting. Added thanks to Eric Gustafson from IMI for continued support of our Society in numerous ways and to Lee Van Wychen our Director of Science Policy Liaison for his action on policies critical to our membership in Washington.

I am excited for the opportunity to honor several of our members during our Awards luncheon and to announce our elected officers for 2021 during the General Session.

Our Board Meeting will take place the week prior to the conference on February 26 to allow opportunities to include reports or other content into the online meeting. I appreciate the work done by the various committees and I would ask that each committee chair prepare their committee reports and submit them prior to the board meeting. I would further ask that each chair prepare and record a brief report for the General Business Meeting on Thursday, March 4. In addition, there is "booth space available" if a particular committee wants to put up a poster or have a place to interact with membership at a virtual booth.

An exciting part of the meeting will be the student paper and poster contests with winners announced as usual at the Business Meeting.

We will have an important item of new business as the Society will have the opportunity to vote to accept the Diversity and Inclusion Statement that has been prepared by Elizabeth Mosqueda and the members of the Diversity and Inclusion Ad hoc Committee. A copy will be provided to attendees for review prior to the business meeting. I am extremely appreciative of their efforts to help the society continue to be open and welcoming to all members as we continue forward and to ensure all voices can be heard. I wish you the best as you begin the New Year and look forward to interacting with each of you at our Annual Conference in March.

Sincerely,
Corey Ransom

Sidebar highlights:

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WSWS Annual Meeting March 1-4, 2021

Program Update

Sandra McDonald, WSWs/WAPMS 2021 Program Chair and President-Elect

The WSWs/WAPMS joint annual meeting will be held virtually from March 1-4, 2021.

The Program Committee has been meeting regularly to bring you the best possible virtual meeting. Our event provider/host is Community Brands. Our goal is keeping the “Westerns the Westerns” even if we cannot be together in person. We want to keep many of our traditional elements such as sharing scientific information, networking between our members and attendees, our Project Discussion Sections, Student Night Out, What’s New in Industry, and recognizing outstanding members and students with awards. However, all posters will be available for viewing ahead of the meeting, starting February 22, 2021.

We also want to embrace the virtual format and bring new options for interaction between our members and attendees. We are adding a series of Roundtable Discussions. The intent is for our members to have the ability to network and share ideas and learn from each other in a virtual “mimic” of hallway interactions. Although these are designated as a discussion, it will not replace the official Project Discussion Sections, thus no report will be included in the Proceedings. These will all be built around a topic with a facilitator(s). Some of the topics include:

- Better Land Management Through Better Understanding: Government Contracting and the Commercial Applicator -- Facilitated by John Coyle and Todd Neel
- The Future of Contract Research -- Facilitated by George Newberry and Mike Hubbard
- Integrating Biological Control and Herbicides. Facilitated by Carol Randall and Todd Neel
- Opportunities to Use Chemigation for Supplemental Weed Control in Irrigated Orchards -- Facilitated by Brad Hanson and Marcelo Moretti
- Virtual Weed Tours - A Future Takeaway from 2020? -- Facilitated by Scott Nissen and Harry Quicke

If you have a topic you would like to see or even better help facilitate, please contact me (sandra@mountainwestpest.com).

We are excited to have the following three symposia at the meetings:

1. Annual Invasive Grass Management
2. Are Herbicide-Resistant Crops the Solution to Herbicide-resistant Weeds?
3. Updates from Weed Biocontrol- An Unsung Component of Integrated Weed Management on Land and in Water

The virtual platform will also provide a Networking Lounge where all meeting attendees will be able to ‘meet and greet’ and get connected. This will include the ability to connect via video chat, chat rooms and/or zoom sessions to catch up.

This format is new for WSWs, but we are only one among many other societies and associations going virtual. In fact, WSWs is using the same virtual platform as WSSA, so it will be very familiar for those of you attending both meetings.

Please feel free to contact me (sandra@mountainwestpest.com), Mithila Jugulam (mithila@ksu.edu), Research Section Chair, or Todd Neel (todd.a.neel@usda.gov), Education & Regulatory Section Chair, or any of our Board members, if you need any clarification or have ideas to share.

Regards,

Sandra McDonald - WSWs President-Elect/Program Chair

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Student Liaison Report - Mirella Ortiz

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Greetings Students,

First of all, Happy New Year! I hope that everyone enjoyed safely the holidays over winter break and is ready to prepare some great research for our 2021 virtual joint meeting.

As you know one of the most exciting nights for the students is the student night-out, where students and professionals have a chance to discuss about the future and career opportunities. This year will be no different, and I want to strongly encourage students and professionals to participate. If you are a professional and would like to help young professionals understanding more about what you do, please fill out this form: [Student Night Out Form](#)

I also want to remind everyone about the student silent auction. If anyone has any items that they would like to donate it would be very appreciated. Each year we count on donated items to raise enough money for the Elena Sanchez scholarship. Please, e-mail me if you have any items you would like to donate or you can do a monetary donation through GoFundMe: [Elena Sanchez Scholarship Donations](#).

I will again take this opportunity to promote student involvement in the society and would like to ask for nominations for the student liaison position, self-nominations are also encouraged. Serving as the student liaison has been an amazing opportunity and has helped me to learn even more about the society and make more connections. I will be sending out a call for nominations for the student liaison position before the annual meeting.

There are other ways to be involved in the society, so also consider serving as the student representative on one of the several committees.

Looking forward to a great meeting and I hope to see everyone there.

Mirella Ortiz, Student Chair
mirella@colostate.edu

Jodie Crose, Student Chair (elect)
jcrose@uwyo.edu

WASHINGTON REPORT

January 17, 2021
Lee Van Wychen

Weed Science Policy Fellows: Camp Hand and Vasiliy Lakoba

The Weed Science Policy Fellowship program is a unique opportunity for graduate students to assist me in my role as Executive Director of Science Policy for WSSA while gaining experience dealing with a broad array of weed science policy issues. The 2020 Science Policy Fellows are **Lavesta “Camp” Hand** at the University of Georgia and **Vasiliy Lakoba** at Virginia Tech.



Camp is currently a PhD candidate at the University of Georgia under the direction of Dr. Stanley Culpepper. Camp received a B.S. and M.S. in Horticulture from Auburn University, and is passionate about weed management in vegetable systems, which led him to Dr. Culpepper’s program. Through his studies, Camp became extremely passionate about doing work that was unbiased and based on grower needs. Currently his research focuses on determining the possibility of using 2,4-D or dicamba as preplant burndown herbicides over plastic mulch prior to

vegetable transplanting, quantifying the reduction in selection pressure associated with the utilization of cover crops, residual herbicides, and layby applications in cotton, and cereal rye response to commonly used wheat herbicides for improved weed control in rye produced for grain. Camp is interested in policy because he has seen the positive impact that Dr. Culpepper’s involvement in policy has made on Georgia agriculture. Camp wants to help producers in a similar way, and having exposure to policy through this fellowship will allow him to do that, wherever he ends up.



Vasiliy is a fourth year PhD candidate at Virginia Tech working on invasive plant ecology with Dr. Jacob Barney. His primary research is on local adaptation to climate and stress across the agricultural and non-agricultural ecotypes of johnsongrass. At Virginia Tech, he is an Interfaces of Global Change Fellow, pursuing additional research into noxious weed policy, as well as freshwater salinization. Prior to this, he worked on forest understory restoration while completing an M.S. at Penn State. Vasiliy is interested in how invasive species policy can be

informed by bolstering communication channels between researchers, land managers, industry, advocates, government agencies, and other stakeholders.

Major Changes in the House Ag Committee

There will be a significant transition in leadership for the House Ag Committee as Chair Collin Peterson (D-MN) lost his re-election bid after a 30 year tenure in the House. He has served as either chair or ranking member of the House Ag Committee since 2005. In addition, House Ag Committee Ranking Member, Rep. Mike Conway (R-TX) is retiring this year after 16 years in Congress. He also served as Chair of the committee from 2015-2019.

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Publications

WSWS ONLINE EDUCATION

<http://passel.unl.edu/pages/index2col.php?category=weedscience#>

WSSA Journals Website Online

www.wssa.net/publications/

CALENDAR OF EVENTS

**Weed Science Society of
America Annual Meeting**
Feb. 15 - 18, 2021
Virtual
www.wssa.net

**Western Society of Weed
Science Annual Meeting**
Mar. 1 - 4, 2021
Virtual
www.wsweedsociety.org

**North Central Weed Science
Society Annual Meeting**
Dec. 13 – Dec. 16, 2021
Grand Rapids, Michigan
www.ncwss.org

**Northeastern Weed Science
Society Annual Meeting**
Jan. 3 – 6, 2022
Gettysburg, Pennsylvania
www.newss.org

**Southern Weed Science
Society Annual Meeting**
Jan. 23 - 27, 2022
Austin, Texas
www.swss.ws

**Weed Science Society of
America
and
Canadian Weed Science
Society
Joint Annual Meeting**
Feb. 21-24, 2022
Vancouver, British Columbia
www.wssa.net
www.weedscience.ca



On December 3, **Rep. David Scott (D-GA)** was approved by the House Democratic Caucus to serve as the next House Agriculture Committee Chair for the 117th Congress. Their primary task will be preparation of the next Farm Bill, due in 2023. Scott was elected to Congress in 2003 and has served on the House Agriculture Committee during the entire time. "I am honored to have been chosen by my colleagues in the Democratic Caucus to serve as Chairman of the House Agriculture Committee," said Scott. "I was born on my grandparents' farm in rural Aynor, South Carolina, during the days of segregation, and the hardships, of those, on whose shoulders I now stand. I owe this historic selection as the first African American Chairman of the House Agriculture Committee to a diverse coalition of members from across our nation. And I will use this critical opportunity to represent the values of our entire caucus and advance our priorities for trade, disaster aid, climate change, sustainable agriculture, SNAP, crop insurance, small family farms, specialty crops, and rural broadband. The fault lines dividing our rural and urban communities are running deep, and climate change is now threatening our nation's food supply. As Chairman, I will lead the fight to rise up and meet these challenges."



House Republicans approved **Rep. Glenn "GT" Thompson (R-PA)** as the House Agriculture Committee's Ranking Member. "The challenges ahead of us are considerable, but we will continue to put farm families first and ensure our country has the most safe and affordable food supply chain on the planet," said Thompson. He was first elected to Congress in 2008 and comes from a family of dairy farmers, and has lived in rural Pennsylvania his whole life. The 117th Session of Congress begins on Jan. 3, 2021. The full list of House Democratic Committee Chairs [are here](#). The full list of House Republican Committee Ranking Members [are here](#).

Senate Ag Committee Chair Roberts Retires



On the Senate side, Senate Agriculture Committee Chairman **Sen. Pat Roberts (R-KS)** is retiring after 40 years in Congress. He spent 16 years in the House and 24 years in the Senate. He is the only member in the history of Congress to chair both the House and Senate Agriculture Committees. Sen. Roberts presided over a Senate Agriculture Committee hearing on agricultural research and food security on Dec. 2. During the hearing, many committee members -- as well as the witnesses -- praised Roberts' tenure on the House and Senate agriculture committees. In his opening remarks, Sen. Roberts noted that, in fiscal year 1981, "When I began my service in the House, \$1.4 billion in public funding was provided for U.S. agriculture research. By 2015, that annual investment more than tripled to more than \$4.5 billion. Even more impressive, private sector investment in food and agriculture research rose over 660% over that same period -- from \$1.6 billion to more than \$12 billion per year." Roberts added, "There is still a great deal to do. We must take

a fresh look at what agricultural security means in terms of the defense of the agriculture sector and our food supply."

Senate Ag Committee Ranking Member Debbie Stabenow (D-MI) is the only one of the four Ag Committee leaders in the House and Senate who will be returning for the 117th Congress. She is in her 4th Senate term and served as Chair of the Senate Ag Committee from 2011-2015. She will likely remain the top Democrat on the Senate Ag Committee and become chair again, while Arkansas Sen. John Boozman will serve as the ranking member on the GOP side.

Vilsack Nominated as USDA Secretary



On December 8, the Biden administration announced they were nominating Tom Vilsack to lead USDA as the 32nd U.S. Secretary of Agriculture. Vilsack is currently the CEO of the U.S. Dairy Export Council and served through both terms of the Obama Administration as the 30th Secretary of Agriculture from 2009 to 2017. Prior to that, he served as governor of Iowa from 1999 to 2007. Vilsack would be the first USDA Secretary to serve in two different administrations nonconsecutively. His fellow Iowan James "Tama Jim" Wilson served as Secretary of Agriculture for 16 years from 1897 to 1913 during three consecutive presidencies and holds the record as the longest-serving U.S. Cabinet member.

Vilsack was born in an orphanage in Pittsburgh, PA and went on to earn his bachelor's degree at Hamilton College in Clinton, NY and his J.D. from Albany Law School. Vilsack and his wife Christie moved to Mount Pleasant, IA in 1975, where he joined his father-in-law's law practice. He became mayor of Mount Pleasant in 1987 and then was elected to the Iowa Senate in 1992 before becoming governor of Iowa in 1999.

Haaland Nominated as Secretary of Interior



Rep. Deb Haaland (D-NM) was nominated by the Biden administration to lead the Department of the Interior. If confirmed, she would become the first Native American to run the Department of the Interior in its 171 year history, and the first Native American Cabinet secretary in U.S. history.

Haaland was first elected to the U.S. House of Representatives in 2018 for New Mexico's 1st District. She was subsequently re-elected for a second term in the House in 2020 before being nominated for Interior Secretary.

Haaland was born in Winslow, Arizona and is an enrolled member of the Laguna Pueblo. As a child in a military family, Haaland moved frequently and attended 13 public schools across the U.S. before her family settled in Albuquerque, NM. At 28, she enrolled at the University of New Mexico, where she earned a Bachelor of Arts in English in 1994. She earned her Juris Doctor in Indian law from the University of New Mexico School of Law in 2006, but is not a member of the New Mexico State Bar. Haaland served as the tribal administrator for the San Felipe Pueblo from 2013 to 2015 and was elected to a two-year term as chair of the Democratic Party of New Mexico before running for Congress in 2018.

Strong Demand for College Grads with Agriculture Degrees

A new report, released by USDA-NIFA and Purdue University, shows a strong job demand for new college graduates with degrees in agricultural programs. U.S. college graduates can expect approximately 59,400 job opportunities annually between 2020 and 2025. This reflects a 2.6 percent growth from the previous five years. **Employer demand will exceed the supply of available graduates with a bachelor's degree or higher in agriculture-related fields.** [Read the full report.](#)

New CAST Issue Paper: "Ground and Aerial Robots for Agricultural Production: Opportunities and Challenges"

The Council for Agricultural Science and Technology (CAST) issue paper is now [available for free download](#). The paper discusses ground and aerial robots; robotic manipulators; robots used for row crops, orchards, and specialty crops; automated systems in animal agriculture; and enabling factors for the deployment and adoption of robots.

FY 2021 Appropriations Signed Into Law

Here is a look at the final FY 2021 appropriations levels for various weed and aquatic plant management research programs compared to FY 2019 and FY 2020:

	FY19 Final	FY20 Final		FY21 President	FY21 House	FY21 Senate	FY21 Final
	-----Millions -----						
USDA-ARS	\$1,303	\$1,414		\$1,368	\$1,452	\$1,510	\$1,492
USDA-NIFA	\$1,471	\$1,527		\$1,591	\$1,574	\$1,539	\$1,570
-AFRI Competitive Grants	\$415	\$425		\$600	\$435	\$435	\$435
-Hatch Act (Exp. stations)	\$259	\$259		\$243	\$259	\$259	\$259
-Smith Lever (Extension)	\$315	\$315		\$299	\$315	\$315	\$315
-IR-4 Program	\$12	\$12		\$17	\$15	\$12	\$12
-Crop Protection and Pest Management (CPPM)	\$20	\$20		\$20	\$20	\$20	\$20
Army Corp- Aquatic Plant Control research	\$6	\$6		\$0	\$2	\$7	\$7
Army Corp- Watercraft Inspection Stations	\$6	\$18		\$0	\$18	\$13	\$18
EPA - Great Lakes Restoration Initiative	\$300	\$320		\$320	\$335	\$320	\$330
NOAA – Sea Grant Program	\$68	\$74		\$0	\$71	\$76	\$75

Note- The final FY 2021 appropriations language also provides **\$3 million** to USDA-APHIS to partner with state departments of agriculture and forestry commissions in states considered to be the epicenter of **cogongrass** infestations to assist with its control and treatment.

National Academy of Sciences (NAS) Webinar on the Future of Sustainable Agrochemistry

This intriguing webinar was hosted by the Chemical Sciences Roundtable of NAS on November 12th and examined the current landscape of agrochemistry and discussed methods and technologies to sustain crop production into the future using chemistry. Speakers included: Dr. Peter Eckes, BASF Bioscience Research; Dr. George Frisvold, The University of Arizona; and Dr. Tejas K. Shah, Corteva Agriscience.

[The webinar recording is available here.](#)

Castille Appointed as New USDA-NIFA Director



On Dec. 22, 2020, the Trump administration named Dr. Carrie Castille as the new director to USDA's National Institute of Food and Agriculture (NIFA). The NIFA director position is a 6 year appointment and she will be the first female to serve in this role in a non-acting capacity.

Dr. Castille served as Assistant Professor and Agriculture and Natural Resource Leader at Louisiana State University prior to serving as Associate Commissioner and Senior Advisor to the Commissioner for the Louisiana Department of Agriculture and Forestry. She was currently serving as coordinator for USDA's Farm Production and Conservation mission area in the mid-south.

Dr. Castille was appointed by USDA Secretary Vilsack to the National Agriculture Research, Extension, Education, and Economics (NAREEE) advisory board from 2010 – 2017. During this period, she served as Chair of the NAREEE board, and also contributed to many organizations, including the American Public and Land Grant University (APLU) Council on Agriculture Research, Extension, and Teaching.

She holds a Ph.D. in Renewable Natural Resources and M.S. in Environmental Studies from Louisiana State University, and a B.S. degree in Industrial Engineering from the University of Louisiana at Lafayette.

EPA Finalizes Application Exclusion Zone Requirements

In January, the National and Regional Weed Science Societies **submitted comments** on EPA's proposed Application Exclusion Zone (AEZ) regulation revisions. We are pleased that EPA adopted most of those revisions when they released their final AEZ requirements in October 29, 2020. The AEZ is the area surrounding pesticide application equipment that exists during outdoor pesticide applications. Below are some of the improvements made:

- AEZ requirements only apply within the boundaries of the agricultural establishment, removing off-farm responsibilities that were difficult for state regulators to enforce.
- Immediate family members of farm owners are now exempted from all aspects of the AEZ requirements. Farm owners and their family are now able to shelter in place inside closed buildings, giving them flexibility to decide whether to stay on-site.
- New clarifying language has been added so that applications that are suspended due to individuals entering an AEZ may be resumed after those individuals have left the AEZ.
- Simplified criteria to determine whether applications are subject to the 25- or 100-foot AEZ.

EPA Proposes Interim Registration Decision for Paraquat

EPA issued a **proposed interim decision (PID) for paraquat** on October 22, 2020 for review and comment. WSSA has previously submitted comments on EPA's draft human health and ecological risk assessments for paraquat in 2016 and 2019. Given the value of paraquat as a unique weed management tool and the updated human health mitigation measures, **WSSA submitted comments opposed** to the following application restrictions proposed by EPA: 1) prohibition of all aerial applications of paraquat except for cotton desiccation; and 2) prohibition of all paraquat applications using mechanically pressurized handguns and backpack sprayers. Those application restrictions would eliminate many unique weed management options and put undue pressure on other broad-spectrum burndown treatments.

Triazines and Glyphosate Begin Endangered Species Act Review

On Nov. 5, 2020, EPA released its draft biological evaluations (BEs) for atrazine, simazine and propazine for review and comment. Biological evaluations (BEs) are the beginning of EPA's Endangered Species

Act consultation review process for pesticides where they determine if an endangered or threatened species or critical habitat could be affected by the use of that pesticide. The triazines are the **first herbicides** to go through EPA's **Revised Method for Species Biological Evaluations of Conventional Pesticides**. The BEs make effects determinations for 1,795 endangered or threatened species and 792 designated critical habitats. EPA's draft BEs for the triazines predict that:

- atrazine is likely to adversely affect 54 percent of all species and 40 percent of critical habitats;
- propazine is likely to adversely affect 4 percent of all species and 2 percent of critical habitats; and
- simazine is likely to adversely affect approximately 53 percent of species and 40 percent of critical habitats.
- **Comments on the draft BEs for the triazines are due Feb. 19, 2021.**

Not far behind the triazines, EPA issued its draft biological evaluations for glyphosate on November 27, 2020. EPA's draft BEs for glyphosate predict that:

- glyphosate is likely to adversely affect 93% of all species and 96 percent of critical habitats.
- **Comments on the draft BEs for glyphosate are due Mar. 13, 2021.**

If the EPA determines a pesticide may affect a listed species or its critical habitat, it will consult with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (the Services) as appropriate. The Services will then issue a biological opinion to determine if the population of a species would be adversely impacted and, if so, propose ways to reduce risks.

Monarch Butterfly Listing Warranted but Precluded

On Dec. 15, 2020, the U.S. Fish and Wildlife Service (FWS) found that adding the monarch butterfly to the list of threatened and endangered species is **warranted but precluded by work on higher-priority listing actions**. With this decision, the monarch becomes a candidate for listing under the Endangered Species Act, and its status will be reviewed each year until it is no longer a candidate.

Interior's Invasive Species Strategic Plan Finalized

The National and Regional Weed Science Societies **submitted comments** on the Department of the Interior's (DOI) draft Invasive Species Strategic Plan on Oct. 9, 2020. Invasive weeds in terrestrial and aquatic ecosystems are estimated to cost nearly \$30 billion per year and our main concern was that DOI invasive species efforts are extremely underfunded. In FY 2020, DOI estimated it spent \$143 million to manage invasive species on over 400 million acres of DOI's public lands. That's roughly 35 cents per acre for invasive species prevention, early detection and rapid response (EDRR), monitoring, restoration, research and public awareness, while the USDA is spending over \$9 per acre annually.

We also supported increased focus on invasion pathways and vectors. Effective management of invasive species at a national scale will need a systemic and science-based prioritization. As the draft plan reiterated the importance of cost-efficiency in this venture, it should be noted that much more return on investment may be had by minimizing an introduction pathway than by eradicating a single invader whose place may be subsequently taken by another invader.

On Jan. 14, 2021, DOI released its **new Invasive Species Strategic Plan**, based on stakeholder input and comments received. This Plan will guide DOI's work on invasive species for 2021 – 2025.

America's Conservation Enhancement Act Signed Into Law

America's Conservation Enhancement (ACE) Act was signed into law (P.L. 116-188) on October 30, 2020. The new law contained eight bills that were introduced in either the House or the Senate or both

that reauthorized a number of key conservation programs important for invasive species management as well as created new authorization for a chronic wasting disease (CWD) task force and for national fish habitat partnerships. The legislation, led by Senate Environment and Public Works Committee chair Sen. John Barrasso (R-WY) and ranking member Sen. Tom Carper (D-DE), had strong support across the conservation community and marks one more success for conservation legislation enacted during the 116th Congress. Among its provisions, the ACE Act:

- Reauthorizes the North American Wetlands Conservation Act at up to \$60 million per year through 2025
- Reauthorizes the National Fish and Wildlife Foundation (NFWF) through 2025 at \$15 million per year for Interior, \$5 million per year for USDA and \$5 million per year for Commerce
- Authorizes funds to combat the threat of invasive species through the Fish and Wildlife Coordination Act with up to \$2.5 million per year through 2025 for both Interior and the Army Corp of Engineers
- Reauthorizes the Chesapeake Bay Program through 2025

2020 Water Resources Development Act (WRDA) Becomes Law

The 2020 Water Resources Development Act (WRDA) was included as “Division AA” of the massive 5000+ page Consolidated Appropriations Act of 2021 that was signed into law (P.L. 116-260) on Dec. 27. WRDA bills are authorization bills enacted by Congress to deal with various aspects of water resources such as environmental, navigational, and flood protection issues that are mostly administered by the U.S. Army Corp of Engineers (ACOE). This is the 14th WRDA bill enacted since 1974 and the fourth since 2014.

We supported passage of the Senate version of 2020 WRDA which had many invasive species provisions that were not in the House passed version. Some of the invasive species provisions included in the final 2020 WRDA bill:

- Authorizes \$25 million for a Harmful Algal Bloom (HAB) demonstration program to “*determine the causes of, and implement measures to effectively detect, prevent, treat, and eliminate, harmful algal blooms associated with water resources development projects*”. The HAB demonstration program will be carried out by ACOE with focus areas in the Great Lakes, the tidal and inland waters of New Jersey, the coastal and tidal waters of Louisiana, the waterways of the counties that comprise the Sacramento-San Joaquin Delta, California, the Allegheny Reservoir Watershed in New York, and Lake Okeechobee, Florida.
- Requires ACOE to add “prevention” to its aquatic invasives species research, in addition to its research on the management and eradication of aquatic invasive species.
- Directs ACOE to conduct a terrestrial noxious weed control pilot program in consultation with the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW) “*to identify and develop new and improved strategies for terrestrial noxious weed control on federal land under the jurisdiction of the Secretary (of the Army)*”.
- Authorizes \$50 million per year for FY 2021 - 2024 for ACOE to “*enter into partnerships with applicable States and other Federal agencies to carry out actions to prevent the introduction of, control, or eradicate invasive species that adversely affect water quantity or water quality*” in the Platte River Basin, the Upper Colorado River Basin, the Upper Snake River Basin, and the Upper Missouri River Basin. ACOE shall give priority to projects that are intended to control or eradicate Russian olive (*Elaeagnus angustifolia*) or saltcedar (of the genus *Tamarix*).
- Authorizes \$10 million for the Secretary of the Interior, acting through the Director of the U.S. FWS, to establish a pilot program “*to remove invasive plant species in riparian areas that contribute to drought conditions*” in the Lower Colorado River Basin; the Rio Grande River

Basin; the Texas Gulf Coast Basin; and the Arkansas-White-Red Basin; and where appropriate, to replace the invasive plant species with ecologically suitable native species and to maintain and monitor those riparian areas.

- Authorizes \$25 million for the Secretary of the Interior, acting through the Director of the U.S. FWS, to establish a pilot program “to develop and carry out effective measures necessary to prevent, control, or eradicate aquatic invasive species in alpine lakes that are not located within a unit of the National Park System”.

2021 National Invasive Species Awareness Week (NISAW)

Participate in the largest invasive species awareness effort in North America! NISAW Part I - Information and Advocacy – is **February 22-26, 2021**. A policy focused webinar series is being scheduled. For more details and to register: www.nisaw.org/nisaw-2021/

NISAW Part II - Outreach and Education – is **May 15-22, 2021** and will focus on local invasive species prevention, removal, and educational events. Do you have a local invasive species prevention, removal, and educational events? Add it [HERE](#). The North American Invasive Species Forum is also being held virtually during NISAW Part II. The Forum is an international event encompassing the interests of professionals and organizations involved in invasive species management, research, and regulation across North America. Click [Here](#) to learn more and register for the North American Invasive Species Forum.

2020 Weed Survey Results Now Available

The 2020 survey results for weeds in grass crops, pastures & turf are posted at <http://wssa.net/wssa/weed/surveys/>. Weeds barely mentioned in 2017 that increased in 2020 include medusahead, ventenata, dogfennel, Scotch thistle, vaseygrass, Lehmann lovegrass, milkweed spp., and *Lepidium spp.* A poster of the most common and troublesome weeds in grass crops, pastures, and turf that is specific to the WSWS states and provinces will be presented at the WSWS annual meeting in March.

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Publications Available from the WSWS

The following books or DVDs can be purchased from the WSWS:

Aquatic and Riparian Weeds of the West
Weeds of California and Other Western States
Interactive Encyclopedia of North American Weeds DVD
Weed Bingo

All publications can be ordered online at [WSWS Bookstore](#). Contact the Business Manager (Eric Gustafson) at (303) 327-8016 for bulk order prices.

Classical Biological Control of Invasive Annual Grasses in the West

Brian G. Rector, USDA-ARS, Reno, NV

When I relocated to the USDA-ARS Great Basin Rangelands Research Unit in Reno, NV in 2009 from the USDA-ARS European Biological Control Laboratory in Montpellier, France, I was eager to learn about the most important weeds plaguing Great Basin stakeholders so that I could get involved in biocontrol research to manage them. I asked around and learned two things: 1) invasive annual grasses like cheatgrass and medusahead were at or near the top of nearly everyone's lists; and 2) biological control "wouldn't work" for them, either because they grew too fast or were too closely related to cereal crops or because nobody had ever seen a bug on them. Challenge accepted.

Invasive annual grasses blanket tens of millions of acres in the western USA and are a main driver of the recent increase in frequency, size, and intensity of wildfires. Whereas fire return periods in sagebrush steppe was formally on the order of 60-100 years, it is now closer to 10 years and falling, threatening native flora and fauna, as well as rural communities and rangelands. From 2014-18, USDI-BLM has allocated an average of \$237M per year in fire suppression efforts alone, with 12 western states accounting for 96% of that outlay. Although cattlemen have learned to use cheatgrass as an early-season bridge to more nutritious forage, its deleterious role in accelerating fire cycles outweighs those benefits, while medusahead does not even offer that meagre utility. The positive-feedback loop of annual grasses sparking fires that decimate sagebrush ecosystems, which are then taken over by more annual grasses, must be broken.

In the 225-year history of weed biological control, no classical agent (i.e., intended to establish and spread on its own in the invaded range) has ever been released on an annual grass target. Indeed, few annual grass weeds have ever been targeted. The slate was essentially blank, which to me screamed "Opportunity!" rather than "Beware!" To my mind, there was no reason why forbs like purple loosestrife and Klamath weed should have hungry, co-evolved natural enemies in their native ranges but annual grasses should not.

Given few if any published records of cheatgrass or medusahead natural enemies, there was both nothing to go on and nothing but possibilities ahead. Reasoning that one of the biggest challenges of biocontrol of annual grasses — particularly winter annuals — would be producing sufficient damage to reduce seed set in their remarkably brief

growing season, I decided to focus on finding agents with rapid life cycles. Luckily, during my time at ARS-EBCL, I had worked with several eriophyid mite specialists and I had learned a lot about these tiny beasts with 1-2 week life cycles and famously narrow host ranges. I also knew that eriophyid mites had been successfully employed as weed biocontrol agents, for example on field bindweed and rush skeletonweed. Several species of eriophyid mites are well known pests of annual grass crops, so why could not other, not yet discovered, mite species be “pests” of cheatgrass or medusahead? I decided to begin the invasive annual grass biocontrol program by focusing on the discovery and development of eriophyid mites as biocontrol agents.

Unfortunately, the early 2010’s was not a great time for international travel by federal government scientists (if, like me, you remember the “sequester” or the specter of the \$12 muffin, you probably wish you did not), which made native range exploration for cheatgrass and medusahead natural enemies virtually impossible, so my research during that time focused on characterization of the weed populations in the Great Basin. Then in 2014, I was able to conduct a brief field survey in Apulia (the boot heel of Italy) with a local eriophyid specialist from the University of Bari and two others from the University of Belgrade, Serbia. In two and a half days of perusing the verdant hills of the Alta Murgia National Park, we were able to collect mature medusahead plants from a half dozen fallow fields interspersed among the poppy-speckled waves of durum wheat.

At the end of the last day we gathered back at Prof. Enrico De Lillo’s laboratory to dissect those plants under stereomicroscopes (eriophyid mites are invisible to the naked eye at 0.2 mm in length). “I found one!” Enrico shouted, to our elation, as he picked through a spike. As we continued dissecting, more mites were collected and they proved to belong to a new species never seen before by human eyes: *Aculodes altamurgiensis*. It was also the first arthropod to ever be recorded feeding on medusahead. Since 2014, *A. altamurgiensis* has also been collected from medusahead in Bulgaria, Iran, Serbia, and Turkey.

This mite is currently under study to determine if it is worthy of release in the USA. Host-range tests conducted by my partners at the Biotechnology and Biological Agency in Rome have included barley, oats, maize, two types of wheat, and some wild European grasses, as well as five different populations of medusahead from the USA and Italy, and *A. altamurgiensis* has thus far proven to be quite specific to medusahead. As it happens, medusahead is one of the closest relatives of wheat, so the negative results on wheat suggest a host range restricted to medusahead although tests of many more wheat varieties prominently grown in the USA will be required, in addition to a long list of economically and ecologically important grass species. Further studies at BBKA found that the mites congregate within the mature seeds of medusahead prior to dehiscence,

which suggests that they may feed on the seed tissue, perhaps causing reduced germination. These lines of research are underway.

In 2016, I had the good fortune of being awarded a sabbatical assignment at ARS-EBCL that allowed me to spend the growing seasons of 2016-18 based there. This was a great boon to our ability to explore the native ranges of cheatgrass and medusahead for their co-evolved natural enemies. Prior to this, I had focused first on medusahead surveys because, although it is relatively rare in its native range, it is distinctive to see in the field at the spike stage and my colleague René Sforza of EBCL shared the locations of some medusahead populations that he had previously marked across southern Europe. Based out of EBCL from March to September of 2016 through 2018, I was able to survey the spike stages of both cheatgrass and medusahead, which do not overlap for very long, and thus I was able to survey more cheatgrass than before.

Whereas medusahead is fairly distinctive in the field and I was blessed with a head start of several known populations, cheatgrass, in addition to also being fairly uncommon in its native range, has a close relative there called poverty brome that looks very similar and is much more abundant. Clearly, collecting cheatgrass (and its natural enemies) was going to be much trickier than I had anticipated, as a mistake in field identification can lead to incalculable losses of time and effort. With experience, I was able to construct a profile of the native range environments favored by cheatgrass, including soil types, elevation, sympatric flora, climate, and other factors and work was able to progress. In addition, collections of red brome, a close relative of cheatgrass that is invasive primarily in the southwestern USA, were made opportunistically when its range overlapped with cheatgrass or medusahead.

While success in finding natural enemies of cheatgrass was not as fortuitously immediate as for medusahead, our patience eventually paid off. In 2018, I made a survey trip through the Balkans, collecting mostly mature, red cheatgrass plants for seeds (that would later be germinated for DNA extraction) and mite inspection. Arriving at the University of Belgrade, Serbia, where my colleagues would lead the mite inspections, I pulled the ziploc bags of samples from my backpack and was surprised by the sight of several dozen midges that had emerged from cheatgrass seeds from a sample collected in northeastern Greece. After sharing some of those specimens (and expertly produced photographs of others by Dragica Smiljanic of Univ. Belgrade) with the world's foremost (and perhaps only remaining) midge specialist, Dr. Raymond Gagné (ARS, retired), this too was determined to be a new species, *Stenodiplosis anisanthicola*. We have not yet been able to establish a colony of this midge in the laboratory to test its host range but, as a new species, it has never been recorded previously from any other plant before, much less an economically important species.

For this reason, new species to science are particularly promising as biocontrol candidates.

The following year, 2019, after I returned to Reno from one of the coldest Aprils in recent Greek history, which caused the cheatgrass spike stage to be delayed until after my survey trip was done (illustrating the disadvantage of having to plan international government travel months in advance and guessing what field conditions might be), my BBKA colleagues Dr. Massimo Cristofaro and Franca Di Cristina made two discoveries although one was a “delayed” discovery. First, having returned to Greece to try to collect midges after I left, they discovered weevil larvae emerging from ripe cheatgrass seeds collected in central Greece. Unfortunately, they were not able to rear these larvae to the adult stage for identification but we have DNA fingerprints from these larvae and look forward to matching them to adult weevils in the future [N.B. these DNA sequences do not match any sequences from weevils in online databases].

The second discovery came from mite collections these same colleagues made in 2018 from cheatgrass plants in central Bulgaria. At first glance, our eriophyid mite taxonomist in Belgrade, Prof. Biljana Vidovic, believed that these mites collected from cheatgrass were *A. altamurgiensis*, the same species that we had discovered from medusahead. Indeed, the collection site in Bulgaria contained both cheatgrass and medusahead populations. This would not have been promising news as it would have indicated a fairly broad host range for this mite, since cheatgrass and medusahead are not close relatives. However, to be sure, Prof. Vidovic needed to perform an extensive morphometrical comparison between the new mite from cheatgrass and the previous mite collected from medusahead, as well as DNA fingerprint analyses. When the comparisons were finally completed in 2019, they revealed that the new mite from cheatgrass was not *A. altamurgiensis* and that it is indeed another new species, which will be called *Aculodes dicristinae*.

Thus, to date we have three active biocontrol candidates to study on cheatgrass and one on medusahead (see Figure 1). Also on medusahead, an EBCL colleague, Javid Kashefi, collected galled seeds from a single site in Greece near the Turkish border. Subsequent collections by myself, Dr. Sforza, and Dr. Francesca Marini of BBKA, have yielded several different wasp species emerging from galls but it is unknown if any of these is the galling insect or if they are all simply parasitoids of that insect. Further collections will be necessary, perhaps extending into Turkey in an attempt to find a larger population of this galling insect.

One final important note about *A. altamurgiensis*, the mite from medusahead. While I was in Europe in 2018, my technician from Reno, Kirk Tonkel, joined me to receive training in working with eriophyid mites from my colleague Prof. Anna Skoracka of Adam Mickiewicz University in Poznan, Poland. Upon returning to Reno, Kirk

immediately went to the field and made some medusahead collections from six populations in NE California and NW Nevada where we have had long-term study sites. Using his newfound skills, he extracted mites from medusahead plants and discovered nine *A. altamurgiensis* individuals (sent to Belgrade and identified by Prof. Vidovic) from a sample collected in Lassen County, Calif. This was quite a revelation — this mite is already here, likely tagging along within medusahead seeds during one of the plants introduction events. Obviously, this raises many questions: How long have they been here? Are they anywhere else? What effect, if any, are they having on medusahead populations? This discovery also emphasizes the importance of thoroughly surveying the invaded range of your target weeds for any natural enemies that might already be present, whether native or imported with the plant.

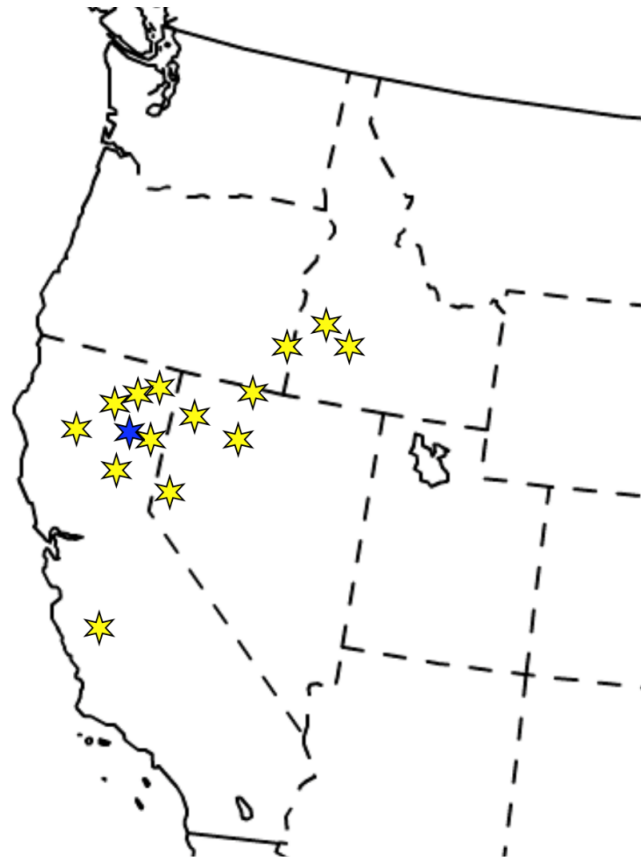
In response to this finding, in 2019 we surveyed 15 medusahead sites in CA, ID, NV, and OR for *A. altamurgiensis* or other mites (see Figure 2). However, 2019 was also a long, cold, wet spring in the Intermountain West, just as it had been in Greece, which is unfavorable for population growth of eriophyid mites that live on the surfaces of plants. We did not find any mites at any site in 2019, including the site of the original collection in Lassen County. We returned to the field in 2020 to 11 sites and are still processing those samples.

Much more work lies ahead. The windows for collecting these agents (and discovering new ones) from the field are brief and change from year to year based on weather events. Establishment of laboratory colonies for testing host ranges and damage assessment can require many iterations based on the biological quirks of any given insect or mite species. Ultimately, years of research on a given candidate agent may be scuttled altogether due to feeding on the wrong non-target plant. Despite all of this, the work of our international team thus far has shown that classical, self-perpetuating, biological control of annual grasses that currently plague the American West is feasible. Finding these new species of natural enemies on cheatgrass and medusahead in the span of just a few years suggests both that one or more among these may be specific and damaging enough to be effective and that more candidate agents are likely to be discovered as we expand our surveys to all corners of these weeds' native ranges (see Figure 3). For example, preliminary field surveys that Dr. Cristofaro and I made to Kazakhstan in 2017 and 2018 were very promising.

Finally, I would like to thank Joey Milan of USDI-BLM, Boise, ID, for essential support of this research through an interagency agreement beginning in 2016. In addition to cheatgrass, medusahead, and red brome, Mr. Milan asked us in 2020 to expand our search for biocontrol agents of invasive annual grasses to include the target weed wiregrass. We look forward to addressing this challenge.



Figure 1. Locations of collections of cheatgrass and medusahead natural enemies, 2014-2019. Orange = medusahead mite; yellow = medusahead gall insect; violet = cheatgrass mite; cyan = cheatgrass midge; red = cheatgrass weevil.



***A. altamurgiensis* found, 2018 = ★**
***A. altamurgiensis* sought, 2018-19 = ★**

Figure 2. Sites in the western USA where *Aculodes altamurgiensis*, was collected on medusahead in 2018 (blue star) and where it was sought but not found in 2018 and 2019 (yellow stars).

Priority survey areas, 2021-2025

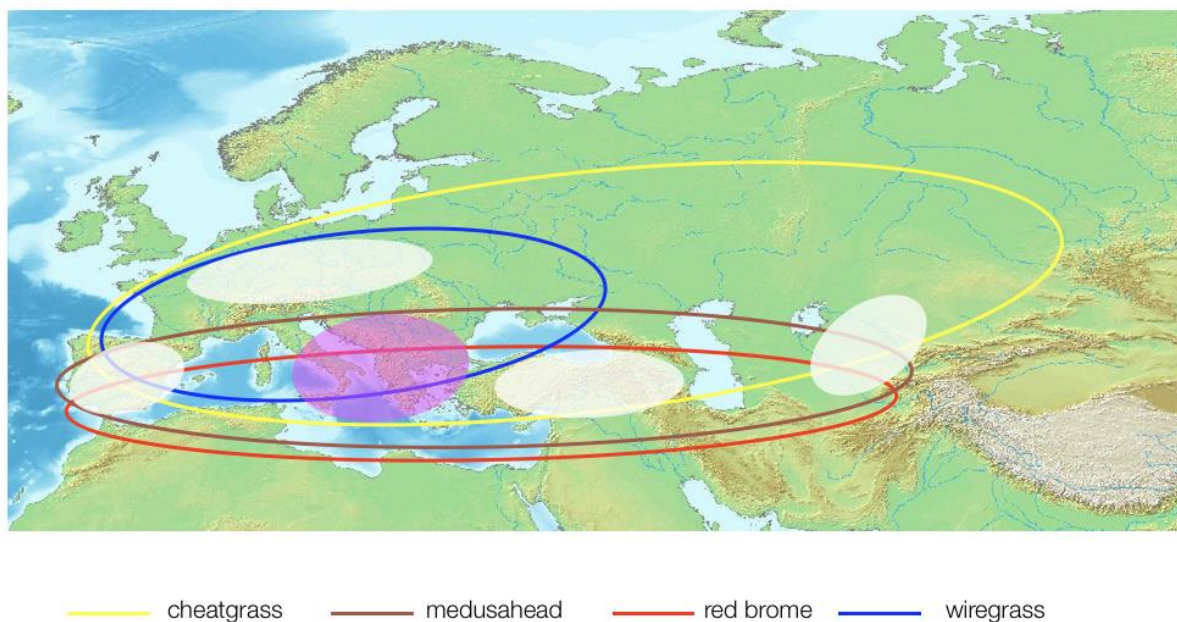


Figure 3. Priority native-range search areas for natural enemies of targeted annual grasses, 2021-2025. Approximate native ranges of targeted grass species shown. Magenta shading indicates primary survey areas 2014-2019; white shading indicates additional regions prioritized for surveys during the next 5-year period.

WSWS Objectives

- ❖ To foster and encourage education and research in weed science.
- ❖ To foster cooperation among state, federal and private agencies in matters of weed science.
- ❖ To aid and support commercial, private and public agencies in the solution of weed problems.
- ❖ To support legislation governing weed control programs and weed research and education programs.
- ❖ To support the Weed Science Society of America and foster state and regional organizations and agencies interested in weed control.



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