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Stephen L. Young

USDA ARS, Stephen.Young@usda.gov

James J. Kells

Michigan State University

Vijay K. Nandula

USDA National Institute of Food and Agriculture

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Symposium

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Author for correspondence:

Steve Young, Office of National Programs, USDA Agricultural Research Service, Beltsville, MD 20705. (Email: stephen.young@usda.gov)

Federal agency perspectives and funding opportunities for weed and invasive plant research

Stephen L. Young¹ , James J. Kells²  and Vijay K. Nandula³ 

¹National Program Leader, Office of National Programs, USDA Agricultural Research Service, Beltsville, MD, USA;

²Professor Emeritus, Department of Plant, Soil and Microbial Sciences, Michigan State University, East Lansing, MI, USA and ³National Program Leader, USDA National Institute of Food and Agriculture, Kansas City, MO, USA

Weeds and invasive plants know no borders and have collectively impacted many ecosystems worldwide, including croplands, forests, grasslands, rangelands, wetlands, and riparian areas. Losses continue to mount, affecting yield and productivity, species diversity, and ecosystem services, with both short- and long-term repercussions on the sustainability of plant and animal communities and the livelihoods of many. New and emerging invasive plants, along with many of the most intractable weeds, have undermined even the best control efforts, serving as a reminder of the constant need for improvements in science, application, and technology. One of the main reasons for the success of weeds and invasive plants is their ability to adapt to abiotic and biotic conditions, and research suggests that this will continue with minimal change.

Despite the challenges posed by weeds and invasive plants, integrated management techniques, several effective chemistries, and the development of new technology are a signal that ongoing and renewed efforts are worthwhile. National coordination is needed across the sectors of weed and invasive plant sciences to achieve common goals. Federal agencies have the largest land holdings—which are infested with weeds and invasive plants—and work with a diverse group of stakeholders comprising managers, researchers, and regulators. Thus, there is an urgent and pressing need to facilitate dialogue between federal agencies specific to weed and invasive plant science to (1) serve as a starting point for summarizing current knowledge and identifying information gaps and (2) re-engage national program leaders and representatives to better coordinate programs in addressing common challenges.

Federal departments and agencies with expertise in weed and invasive plant science were brought together at a symposium held during the Weed Science Society of America's 63rd Annual Meeting in Washington, DC. Individuals from the Animal and Plant Health Inspection Service (APHIS), Agricultural Research Service (ARS), National Institute of Food and Agriculture (NIFA), Office of Pest Management Policy (OPMP), Natural Resources Conservation Service (NRCS), U.S. Forest Service (USFS), Bureau of Land Management (BLM), U.S. Geological Survey (USGS), National Park Service (NPS), Department of Defense (DOD), Army Corps of Engineers (ACOE), National Aeronautics and Space Administration (NASA), and National Science Foundation (NSF) shared current research and management efforts and participated in a discussion focused on the identification of funding opportunities and other issues pertaining to research gaps and management needs among this society's membership.

Each federal department and agency that gathered at the symposium supports weed and invasive plant science research and/or management through grant funding, technical assistance, and scientific studies. Together they represent a diversity of stakeholders who may be separated geographically yet have a common focus on weeds and invasive plants in crop, terrestrial, and aquatic ecosystems.

The panelists shared their perspectives in response to audience questions, and several ideas were generated on how best to use the information gained from a recent Weed Science Society of America survey of members on the needs and direction of research in the field of weed and invasive plant science (published as Brainard et al. 2023). The symposium provided an environment for a productive dialogue that focused on research gaps, program support, and national initiatives in weed and invasive plant science. Many existing relationships were strengthened, and new ones developed as a result of the symposium.

The terrestrial and aquatic areas covered by federal agencies and the work of employees and associated stakeholders to address weeds and invasive plants are a primary reason to focus on improved coordination and communication. As such, the symposium, which brought together national program leaders and representatives from 12 federal agencies and departments, represented an initial effort in this direction by discussing weed and invasive plant science and what is known and needed in order to help build and reestablish connections. Funding and

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Table 1. Funding opportunities from select federal agencies that focus on weeds and invasive plants.

Agency	Program	Notes
ARS	Areawide Pest Management Program	This is an internally funded program at ARS
APHIS	Plant Protection Act Section 7721	Search website
DOD	Strategic Environmental Research and Development Program	Link to funding
	Environmental Security Technology Certification Program	Link to funding
EPA	EPA Grants	Search for weeds and/or invasive plants
NASA	Applied Sciences Program–Agriculture, Ecological Conservation	Browse practitioner resources, including opportunities that links to NSPIRES (NASA Solicitation and Proposal Integrated Review and Evaluation System)
NIFA	Agriculture and Food Research Initiative (AFRI)	Several programs, including interdisciplinary, in plant health and production categories
	Crop Protection and Pest Management	Link to RFA
	Methyl Bromide Transition	Link to RFA
	IR-4	Link to RFA
	Organic Agriculture Research and Extension Initiative	Search program information
	Organic Transitions	Search program information
	Specialty Crop Research Initiative	Link to RFA
DOI	Funding Guide for Invasive Species Management	Search program information
NRCS	Conservation Innovation Grants	This program has funded projects on weeds and invasive plants
NSF	Plant Biotic Interactions	A joint program with NIFA that focuses on agricultural species
USFS	Invasive Forest Plants	Requests for applications through the Working with Us link

engagement opportunities with program representatives for each agency and department have been provided for greater awareness among weed and invasive plant scientists (Table 1). In addition, an effort is underway to identify gaps and overlaps in invasive plant activities that could create opportunities for greater collaboration at the national level. Ultimately, the symposium served as an important starting point for more frequent and diverse interactions, improving information and knowledge transfer pathways, and building collaborations.

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Brainard DC, Haramoto ER, Leon RG, Kells JJ, Van Wychen LR, Devkota P, Jugulam M, Barney JN (2023) A survey of weed research priorities: key findings and future directions. *Weed Sci.* doi: [10.1017/wsc.2023.24](https://doi.org/10.1017/wsc.2023.24)