



February 25, 2014

Dr. Rosalind James
USDA, ARS, Office of National Programs
National Program Leader, Weed Science
5601 Sunnyside Ave.
Beltsville, MD, 20705-5139

Dear Dr. James:

The weed science community, including the Weed Science Society of America (WSSA), appreciates being invited to participate in the NP304 Crop Production and Protection Program stakeholder webinar on January 29, 2014, and to provide subsequent comments on the next five-year research priorities for the program. As the external review of the previous five years of the NP304 revealed, the USDA-ARS weed scientists involved in this program are highly productive and are conducting important and cutting edge research. However, it was also noted in the review and again during the webinar that there is an imbalance in the investment of resources between entomology and weed science programs within the NP304 program. Weeds and invasive plants are the most impactful and economically damaging pest group for managed and natural ecosystems. Seventy percent of the pesticides applied in the United States are herbicides, representing an annual cost of \$7 billion for US farmers and land managers. Without effective weed management, estimates of crop yield losses range from 20 to 40%, and many horticultural crops would be a total loss. While herbicide treatments return more than \$3.50 for every dollar spent, it is widely recognized that weed management systems in both agricultural and natural systems need be more diversified to be sustainable, as well as to preserve the utility of our current herbicides. Therefore, WSSA, the Aquatic Plant Management Society (APMS), and all four regional Weed Science Societies strongly urge USDA-ARS to direct more personnel and financial resources within NP304 to address critical weed science needs facing the country.

WSSA periodically tasks its Research and Competitive Grants Committee with assessing the research and funding priorities for our discipline. The following three priority areas for weed science research outline some of our recommendations to USDA-ARS for weed research priorities in the next five-year NP304 Project Plan.

1. Weed systematics, genetics, biology, physiology and ecology – factors related to weed species ability to reproduce, optimize genetic variability, and interact with other organisms. This includes the evolutionary mechanisms of multiple herbicide resistance in weeds.

2. Weed environment and climate change – factors related to the weed environment, including mechanisms of dispersal, dynamics in differing ecosystems, and responses to a changing climate.

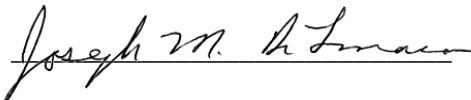
3. Integrated weed and invasive plant management systems – factors related to weed control through the integrated use of chemical, physical, cultural, and biological practices.

As was clearly articulated in the webinar, understanding the taxonomy, biology and ecology of insects is essential to developing effective and sustainable management systems. These same principles also apply to both agricultural weeds and invasive plants. A fundamental understanding of weed biology and ecology is essential for developing environmentally and economically sustainable systems. Because herbicides have been both economical and effective, they are the principal means of weed control in most systems. However, widespread evolution of herbicide-resistant weeds threatens the utility of these tools. In particular, herbicide resistant Palmer amaranth (*Amaranthus palmeri*), waterhemp (*Amaranthus rudis* and *A. tuberculatus*), kochia (*Kochia scoparia*), Italian ryegrass (*Lolium perenne* ssp. *multiflorum*) and horseweed (*Conyza canadensis*) seriously impact the economic sustainability of many crops throughout the country (resistant populations occur in at least 20 states for each of these species). Many of these species are already resistant to multiple herbicide sites of action, often overlapped in the same biotypes, and many alternative tools for their control have yet to be identified. Therefore, solutions to the expanding herbicide resistance problems will require new weed management technologies combined with holistic and sustainable integrated weed management systems. This will only be attained through an understanding of weed biology in diverse production systems and environments across the US. In addition to herbicide resistance issues, there are several other weed management concerns that will have dramatic effects on the sustainability of agricultural systems. Many of these issues severely impact water quality. As an example, the impact of tillage on soil loss and water quality due to erosion has become one of the major areas of concern in many waterways throughout the US. These problems will also require researchers to develop sustainable integrated management solutions.

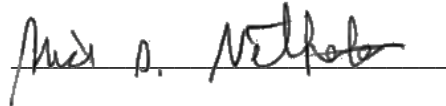
Integrated weed management strategies are critical in all terrestrial (agricultural and natural areas) and aquatic systems and investment in the development of these strategies should be increased. In terrestrial systems, invasive plants can reduce forage quality and quantity for both livestock and wildlife, affect animal and human health, dramatically increase the risk of catastrophic fires, and reduce both animal and plant diversity, including endangered species. In particular, the impacts of aquatic weeds can affect almost all segments of our society and culture and can threaten not only our food security, but also pose the greatest threat to our critical riparian and aquatic habitats. Among the primary problem species are hydrilla (*Hydrilla verticillata*), Eurasian watermilfoil (*Myriophyllum spicatum*), Brazilian egeria (*Egeria densa*), and water hyacinth (*Eichhornia crassipes*). The emerging threats are purple loosestrife (*Lythrum salicaria*), Japanese knotweed (*Polygonum cuspidatum*), and many woody species. These weeds impede water movement in canals and irrigation ditches and thus, reduce water availability to crops. They also cause fish kills by reducing dissolved oxygen in aquatic systems, impact recreational activities (e.g., fishing, swimming, boating, etc.), reduce water quality, increase flooding risks, decrease plant and animal diversity, limit the access of both livestock and wildlife to important sources of water, increase the incidence of animal and human disease by harboring mosquitoes and other disease vectors, impede the movement of recreational and commercial navigation vessels, and reduce land values. The investment in research and personnel for these important weeds should be substantially increased to address the extensive negative impacts they pose to our country's many wetland, riparian, and aquatic systems.

The priority areas outlined are equally applicable to all the agricultural and natural areas that are impacted by weeds and invasive plants. Attention to these three priority areas to effectively address the weed and invasive plant management challenges facing the nation will require a more concerted and collaborative effort among USDA-ARS, other government agencies, universities, industries, land managers, and growers. Collaborations between USDA-ARS and other groups can increase the capacity to leverage resources, as was emphasized in both the retrospective review and the stakeholder webinar. We are at a crossroads, whereby our current technological capabilities are not keeping up with the evolving weed issues and therefore the support of research for new solutions in weed management is critical in maximizing both crop yields and preserving natural areas for future generations. It is incumbent upon all of us to seek both applied and fundamental solutions through strategically funded research. Thus, we strongly recommend that USDA-ARS increase their investment in these areas during the next five years as we work together to solve some of the most pressing economic and environmental issues facing agriculture and natural areas in the US.

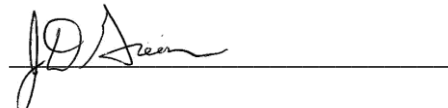
Sincerely,



Dr. Joseph DiTomaso
President
Weed Science Society of America



Dr. Michael Netherland
President
Aquatic Plant Management Society



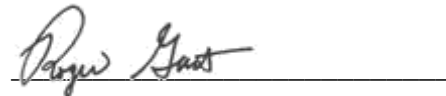
Dr. J.D. Green
President
North Central Weed Science Society



Dr. Gregory Armel
President
Northeastern Weed Science Society



Dr. Scott Senseman
President
Southern Weed Science Society



Dr. Roger Gast
President
Western Society of Weed Science

cc: Dr. Chavonda Jacobs-Young, USDA-ARS Administrator
Dr. Caird Rexroad, USDA-ARS Associate Administrator
Dr. Kay Walker Simmons, USDA-ARS Acting Associate Administrator
Dr. Sally Schneider, USDA-ARS National Program Leader, Horticulture
Dr. Sheryl Kunickis, USDA Office of Pest Management Policy, Director