

National Agricultural Research, Extension, Education and Economics Advisory Board

Karen Hunter, Executive Director
Room 3870 South Building
REE Advisory Board Office
U.S. Department of Agriculture
Washington, DC

Mailing Address:
STOP 0321
1400 INDEPENDENCE AVE SW
WASHINGTON, DC 20250-0321
Telephone: 202-720-3684
Fax: 202-720-6199

Report on Agriculture Research Needs of Invasive Species

July 1, 2009

EXECUTIVE SUMMARY

An estimated annual economic impact of \$120 billion per year makes invasive species a prominent issue. Pests such as weeds, pathogens, insects and animals are the greatest direct threats to agriculture. Emerging infectious diseases such as highly pathogenic avian influenza and swine influenza have the capacity to mutate and threaten animals and humans. Prevention and control of invasive species can promulgate social and political problems among other issues. Certain invasive species can be used by enemies for bio-terrorism. The magnitude of the challenge to address invasive species is huge.

The Invasive Species Work Group of the NAREEE Advisory Board was formed in 2008 and charged with studying the scope and effectiveness of research, extension, education and economics programs associated with invasive species within the United States Department of Agriculture (USDA) Research, Education and Economics (REE) mission area. The Work Group consulted with experts in the field, REE agency administrators and program leaders. Information was also gathered from discussions at the November 2008 NAREEE Advisory Board meeting.

The results of the Work Group's findings indicate a strong REE presence in the area of invasive species research and public outreach, as well as playing a valuable and integral role in interagency collaborations. The NAREEE Advisory Board makes the following observations:

- The development of risk-management strategies is critical to proactively protecting the U.S. borders from newly-arrived species.
- Successful inter- and intra-agency collaborations are necessary to best utilize the research base and applications currently available.
- Addressing public perception and social acceptability issues will continue to be challenges, but are not insurmountable, particularly given the unique education and extension outreach potential within the REE mission area.

The NAREEE Advisory Board commends the REE mission area for its progress in invasive species control and management. In the four years since the Board last addressed invasive species, REE agencies have achieved success in various research, extension, education, and economic pursuits. Funding for the topic of invasive species should be maintained, and focused on the specific areas detailed in this report.

National Agricultural Research, Extension, Education and Economics Advisory Board

Karen Hunter, Executive Director
Room 3870 South Building
REE Advisory Board Office
U.S. Department of Agriculture
Washington, DC

Mailing Address:
STOP 0321
1400 INDEPENDENCE AVE SW
WASHINGTON, DC 20250-0321
Telephone: 202-720-3684
Fax: 202-720-6199

Report on Agriculture Research Needs of Invasive Species

July 1, 2009

The Invasive Species Work Group of the NAREEE Advisory Board was formed in 2008 and charged with studying the scope and effectiveness of research, extension, education and economics programs associated with invasive species within the United States Department of Agriculture (USDA) Research, Education and Economics (REE) mission area. The NAREEE Advisory Board addressed the topic of invasive species in October of 2004 and felt it necessary to review and evaluate progress and assess future plans. Work Group findings were presented and discussed at the full NAREEE Advisory Board meeting held in November of 2008 in Washington, DC. The Work Group findings, discussions with subject matter experts and input from Board members were used to develop this report.

Invasive species include native and non-native microbes, insects, plants or animals which cause significant detrimental economical, environmental or ecological damage. Species with the greatest economic impact include crop weeds, insects, plant and animal pathogens, zoonoses, and mammals such as rats and feral cats. Certain food safety issues are closely associated with invasive species. For example, pesticide use to curtail pests may have a residual effect on the crop, thus causing potential contamination in the food supply. Also, certain microbes (pathogens) produce deadly toxins. In addition, newly emerging disease problems in people often originate as invasive pathogens for animals that become or are naturally zoonotic. Social acceptability is also a critical component of invasive species management and control program.

Based on research and input from participating experts, several areas were identified as priorities in the area of invasive species. Because the area of invasive species is so broad, it is necessary to develop a mechanism to prioritize continued research needs. Communication and inter-mission area cooperation between the USDA Animal and Plant Health Inspection Service (APHIS), Agricultural Research Service (ARS) and the Cooperative State Research, Extension, Education and Economics Service (CSREES) should be increased to coordinate invasive species research and avoid overlap in services. Emphasis should also be placed on forward-thinking diagnostics and surveys. Detecting pests before or upon entry into the U.S. is critical to preventing invasive species proliferation. While APHIS and the Economic Research Service (ERS) have developed some economic and epidemiological models to predict impact of diseases and pathogens, most research is focused on carrying out and remediating pest situations. It would be prudent to continue to invest funds in creating additional models for species with the most impact. Operational support for Biosafety Level III Agriculture (BSLIII-Ag) research facilities that exist

at University campuses, research centers, and National Laboratories is critical to conduct investigations on invasive pathogens in farm animal and plant host species.

There are opportunities for existing bodies of knowledge to be tapped and adapted for use with invasive species management and mitigation. Risk-management strategies are essential for successful invasive species control, perhaps even more so than current problem-solving approaches. Shifting from a problem-solving mentality to a risk-management focus could allow Homeland Security and Customs and Border Patrol to determine risk before allowing travelers, shipments of agricultural products, or other items access to the U.S. Risk assessment protocols are decision-making tools that identify risk factors such as safe thresholds, species, country of origin, and general trends. The use of trend information to target specific shipments from certain countries is based on informed risk and allows the U.S. to take a proactive stance in protecting the nation from invasive species crossing the borders. Research, Education and Economics (REE) mission area agencies such as ARS and CSREES currently provide certain necessary research data for other USDA agencies (such as APHIS) to develop the actual risk assessment tools. This example of interagency collaboration and cooperation is commendable.

Another example of interagency cooperation is the Federal Interagency Committee on Invasive and Terrestrial Animals and Pathogens (ITAP). One goal of ITAP is to improve access to complementary scientific and technical expertise among the Federal Departments and Agencies. Active participation by ARS in the group contributes to the exchange of technical information and communication. Research within ARS encompasses sensors, diagnostics, and remote sensing; biological controls; genetic resistance; and vaccines. The research findings are utilized by others in the ITAP Committee as well. Current research in invasive species at ARS is well-aligned with the overarching priority needs.

The National Invasive Species Council (NISC) is a group of 30 federal departments and 30 non-federal stakeholders. The August 2008 National Invasive Species Management Plan establishes goals and programs in five areas: 1) prevention; 2) early detection and rapid response; 3) control and management; 4) restoration; and 5) organizational collaboration. As the co-chair of NISC, the Secretary of Agriculture ensures that USDA plays a central role in implementing the management plan. Tasks are assigned to a variety of USDA agencies, including the REE mission area. While the plan seeks to protect the food system, markets, and the ecosystem, it does not call for much research on the economics of invasive species.

CSREES recently demonstrated successful prediction of the flow of the soybean rust pathogen by using a variety of informational sources. The National Plant Diagnostic Network (NPDN) is a network of existing diagnostic laboratories which serves to rapidly and accurately detect and report significant plant disease pathogens, including those which have the potential to be introduced through bio-terrorism. The NPDN relies on prompt and effective communication of diagnostic results and possible outbreaks. Information is shared with individuals at participating facilities. A website (found at <http://www.npdn.org>) communicates information to the public and facilitates NPDN committee activities and organization. The Board recognizes the magnitude of the impact of the NPDN and strongly urges CSREES to continue funding this collaboration.

One of the greatest challenges with invasive species management is finding a way to communicate research-based facts to the general public while overcoming the prevalent distrust

of science and scientific methods. It is doubtful that this challenge can be met solely within the invasive species realm, but that it will require a concerted, focused effort on the part of the agricultural and other scientific communities. The REE mission area agencies should consider addressing the science and education issues surrounding public knowledge of invasive species in a more visible way. Clearly communicated risk-benefit statements can be shared with the public addressing invasive species. The National Agricultural Library (NAL) has developed the National Invasive Species Information Center, a website providing invasive species information on international, national, state, and local levels. The site (found at <http://www.invasivespeciesinfo.gov/>) is an excellent example of a comprehensive consumer outreach resource. The NAL should strive to promote this valuable resource; REE mission area agencies should also become familiar with the site and widely disseminate the web address to their respective constituents.

The U.S. Department of Agriculture in general and the REE mission area in particular are uniquely able to contribute to a wide variety of topics associated with invasive species management and control. The depth and breadth of technical and programmatic expertise are striking. In relation to the 2004 NAREEE Advisory Board focus session on invasive species, the REE mission area agencies are forging ahead to solve problems with science-based results. The NAREEE Advisory Board recommends that funding be continued and enhanced for the agencies' research, education, extension and economic programs to support efficient and effective invasive species prevention, management and control.

NAREEE Advisory Board Invasive Species Work Group

Thomas Rosol (Chair)
Steven Quarles
Ricardo Chavez Rel
Terry Wolf