PPQ 2023 Annual Report

Risk Analysis and Methods Development

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Introduction

The U.S. Department of Agriculture's Plant Protection and Quarantine (PPQ) program uses the best available science and technologies to develop more effective tools for detecting, identifying, managing, and eradicating invasive pests. These advances keep PPQ and its partners on the cutting edge in the fight against harmful plant pests and diseases.

As global trade continues to expand, the pressure of invasive pest and disease introductions will also increase. To keep ahead of the threat, PPQ continually applies the latest science and technology to develop the most effective survey and diagnostic methods, diagnostic support, treatment technologies, risk evaluations, and strategic program alternatives. We also analyze pest interception data to identify the imports with the highest risk. Then we can address the problem at its source.

Risk Analysis

PPQ develops pest risk analyses and epidemiological approaches to support and improve pest exclusion programs and decision making. In FY 2023, PPQ completed approximately 200 risk analyses associated with imports, exports, invasive pest threats, and other programmatic requirements. This total includes 28 analyses to open, expand, or maintain export markets for U.S. producers and 26 risk assessments for import requests from foreign countries.

PPQ's work also included evaluations of 27 newly detected pests by the New Pest Advisory Group, 9 pathway analyses and spread models, 2 economic analyses supporting operational and policy decisions, and 10 New Pest Response Guidelines to proactively prepare for emergency responses. These products identify potentially harmful plant pests and diseases and help PPQ decide what mitigating actions to take to prevent their entry into or limit their spread or economic impact within the United States.

PPQ's Plant Pathogen Confirmatory Diagnostics Laboratory (PPCDL) develops, adapts, validates, and uses diagnostic methods for the detection of regulated plant pathogens. In FY 2023, PPCDL expanded the use of molecular diagnostic tools to three additional plant inspection stations at ports of entry for a *Ralstonia*, a pathogen that cannot be detected visually.

Methods Development

The Plant Protection Methods Development (PPMD) program develops scientifically viable and practical tools for exotic plant pest exclusion, detection, and management. These tools preserve economic opportunities for farmers and industries that engage in interstate commerce and international trade, and safeguard U.S. agricultural and natural resources from invasive plant pests. The program is

essential to PPQ's mission by developing tools for detecting exotic pests in survey programs; developing molecular diagnostic tests and identification tools for pest identification; developing integrated pest management methods, including biological control, to help eliminate or manage invasive pests; and developing phytosanitary treatments to support interstate and international trade.

A major focus of this program is to develop and implement biological control technologies. They allow for the use of natural enemies alone, or in combination with other control tactics, to effectively mitigate the impacts of introduced invasive insect pests, weeds, and plant pathogens, while minimizing impacts to the environment.

The PPMD program maintains its own quarantine and rearing facilities for biological control agents in Arizona, California, Massachusetts, Michigan, Texas, and Guatemala. APHIS partners with USDA's Agricultural Research Service (ARS), the U.S. Fish and Wildlife Service, State departments of agriculture, universities in 30 States and Territories, and 2 Native American Tribes to evaluate and establish biological control agents for invasive plants, pests, and diseases. The biological control program has been responsive in developing biological control agents to address invasive pests and weeds such as Asian longhorned beetle, emerald ash borer (EAB), roseau cane scale, air potato, and spotted lanternfly. The fiscal year (FY 2023) biological control portfolio included 31 cooperative agreements with States and Tribal Nations that collectively attack 16 exotic weeds and 3 arthropod pests.

In FY 2023, the program continued developing and improving technologies, tools, and treatments for APHIS plant pest and disease programs, such as Mexican fruit fly, grasshopper, and spotted lanternfly (SLF). Specifically, the program continued operationalizing the use of golden pest spray oil (a product

that is 93 percent food-grade soybean oil registered with the Environment Protection Agency and certified for organic use) as a control method on SLF egg masses to prevent spreading. In FY 2023, the program analyzed monitoring data of almost 3,000 SLF egg masses with partners in four States—Delaware, New Jersey, Pennsylvania, and Virginia—using the golden pest spray oil treatment on a trial basis.

APHIS will expand field monitoring of egg mass treatments to additional States in FY 2024. In addition, the program developed and delivered protocols to monitor treatment efficacy of insecticide applications and evaluate efficacy of portable vacuum as a treatment for SLF adult and nymphs. The program also developed and deployed a data collection tool for field use, improving accuracy and replacing paper data sheets. to collect data from the treatment monitoring sites.

In FY 2023 the PPMD program also supported research on the invasive northern giant hornet (*Vespa mandarinia*). The northern giant hornet is a predator that feeds on other pollinators, including honey bees. It was first detected in Washington state in late 2019. Since then, APHIS has worked closely with the Washington State Department of Agriculture to support eradication of this invasive pest. In FY 2023, the program funded research with the Washington State Department of Agriculture and university researchers to investigate the population genetics of the genus, phenology modeling, and the northern giant hornet's foraging behavior in its native range.

The PPMD program also supports research related to invasive honey bee pests. Managed honey bee colonies add at least $15 billion to the value of U.S. agriculture each year through increased yields and superior quality harvests (O'Brien, D. 2019 ARS Microscopy Research Helps Unravel the Workings of a Major Honey Bee Pest). In FY 2023, the program continued to fund priority projects with other

Federal agencies as well as university and non-profit researchers that support managing, suppressing, and eradicating Varroa mites and other pests and diseases contributing to a decline in honey bee health. These projects included investigating a multidisciplinary approach for tackling emerging disease outbreaks, management techniques to improve overwintering success, and detection and management of the parasitic *Tropilaelaps* mites that feed on worker bee pupae. In FY 2024, the program will continue to fund similar priority projects to important issues related to honey bee health.