



PPQ 2022 Annual Report

Optimizing Pest Management: Field Crop and Rangeland Ecosystem Pests

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Introduction

The Field Crop and Rangeland Ecosystem Pests (FCREP) program protects U.S. agricultural crops and rangelands from the establishment or spread of invasive or economically significant pests, facilitates safe international trade and domestic commerce, preserves economic opportunities for U.S. farmers, and fosters healthy ecosystems in rangelands and natural lands. To accomplish these goals, the U.S. Department of Agriculture’s Plant Protection and Quarantine (PPQ) program provides national coordination, threat assessment, and strategies to prevent pests and diseases such as grasshoppers and Mormon crickets (GMC), imported fire ants (IFA), Karnal bunt, and witchweed from spreading and impacting export markets for U.S. farmers. These programs help protect resources that small, rural communities depend on for income.

Grasshoppers and Mormon Crickets

Through the FCREP program, PPQ cooperates with Federal, State, Tribal, and local agencies, organizations, and institutions to conduct survey and suppression activities in western States to reduce damage that GMC outbreaks cause, protecting rangeland resources that serve as forage for livestock, provide habitat for wildlife and ecosystem services, as well as recreation opportunities. A 2013 University of Wyoming [study](#) found that healthy rangeland provides forage value worth \$6.7 billion and overall benefits ranging from \$10.7 billion to \$21.2 billion. Uncontrolled GMC infestations could cause significant economic losses for U.S. livestock producers by reducing animal food supply in rangeland, and therefore forcing producers to buy supplemental feed or sell their livestock at reduced prices.

Besides feeding on grass, GMC can also devastate cultivated crops such as alfalfa, barley, corn, and wheat. Infestations often cover vast acreage, and landowners or land managers may need Federal support to control them. The program helps landowners and land managers by providing population information, helping to predict where grasshopper populations could develop into outbreaks, and providing technical assistance about options for dealing with problem-level populations. By providing ongoing information, and advice to land managers and conducting suppression treatments where necessary and possible, this program helps protect 661 million acres of rangeland across the western United States.

In FY 2022, PPQ conducted surveys in 13 States for GMC, collecting data at approximately 30,685 survey points. Grasshopper populations can build cyclically, and high population levels that began in FY 2020 continued into FY 2022. Based on the results of the surveys and needs of land managers, the program conducted treatments in eight States in FY 2022, using FCREP funding and reimbursements

from participating landowners. The Plant Protection Act specifies that the Federal government covers 100 percent of treatment costs on Federal lands; 50 percent on States lands; and 33.3 percent on private lands.

PPQ conducted treatments on 91,642 acres in Arizona, Idaho, Nevada, Oregon, and Utah. These treatments protected rangeland forage and wildlife habitat on more than 224,000 acres. Before conducting any grasshopper treatments, PPQ confirms the species of the grasshopper, as some do not cause damage to rangeland and others can even provide ecological benefits by eating weeds (leaving grasses for grazing livestock).

Imported Fire Ants

Imported fire ants (IFA) is a major public nuisance and serious agricultural pest causing approximately \$6.7 billion in damage to homeowners, agriculture, and natural ecosystems within the IFA Federal quarantine area, according to the Ant Pests Community led by the National Institute of Food and Agriculture's Extension Service (<https://ant-pests.extension.org>). The economic impact if IFA reached all suitable habitats in the United States where IFA could become established is greater than \$10.6 billion per year (Economic Evaluation of the Regulatory Program for Imported Fire Ants, APHIS, March 2018). IFA infests more than 374 million acres in Puerto Rico and 14 States: Alabama, Arkansas, California, Florida, Georgia, Louisiana, Mississippi, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, which are under a partial or full State quarantine. The IFA program provides regulatory guidelines to stakeholders for the treatment of regulated articles, oversight, and enforcement to help prevent the human-assisted spread of the pest.

In FY 2022, the IFA program continued work with university researchers and USDA's Agricultural Research Service (ARS) to develop new pesticide treatments to prevent IFA movement on nursery stock and sod and to stay informed on any new opportunities for biological control. The program also worked with ARS on a second generation of the molecular-based field identification assay kit which identifies red, black, and hybrid IFAs in the same assay. In FY 2022, the program incorporated the new IFA field test kits in detection surveys. The kits appear to be working well according to initial feedback and requests for additional test kits.

The program continued support to California to maintain the scope of their annual IFA surveys and assisted New Mexico with information on IFA surveys. The IFA program is in the process of expanding the Federal quarantine area for new counties in Arkansas and Tennessee.

Karnal Bunt

The FCREP program also addresses Karnal bunt, a fungal disease of wheat that was first detected in the United States in 1996. Many U.S. trading partners will not accept U.S. wheat unless it is certified to originate from areas where Karnal bunt is known not to exist. The program prevents the disease from entering the grain market system, spreading beyond the areas of Arizona where it is currently found, and directly affecting most other States. In FY 2022, the program removed 24,715 acres from Karnal bunt regulated areas on tribal and non-tribal lands in Arizona based on the program's protocols. These activities prevent Karnal bunt from affecting other States.

USDA's Economic Research Service estimated in 2010 that, without the program's efforts, there would be a cumulative reduction of national net farm income of \$8 billion over the next eight years. In FY

2022, 23 wheat-producing States participated in the Karnal bunt national survey. The program tested 559 samples with no positive detections. Based on this national survey, the program certifies wheat exports free of Karnal bunt, assuring trading partners about the safety of U.S. wheat exports, retaining export markets, and facilitating wheat movement into domestic and international markets.

In 2021, farmers across the country planted approximately 47 million acres of wheat and harvested 1.6 billion bushels of wheat with a value of \$11.9 billion (National Agricultural Statistics Service, Crop Values 2021 Summary and Crop Production). The United States exported 24 million metric tons of wheat, valued at \$7.2 billion; wheat products valued at \$153 million; wheat flour valued at \$180 million to 83 countries (Foreign Agricultural Service, Global Agricultural Trade System). Without the successful Karnal bunt quarantine and survey program, wheat trade would be disrupted.

Witchweed

Another concern for the FCREP program is witchweed, a parasitic plant that can significantly damage corn, rice, sorghum, and sugarcane. If witchweed were to spread throughout the Corn Belt, it could decrease crop yields for corn and sorghum by up to 10 percent and could negatively impact trade in commodities from these areas. Since program activities began in 1957, PPQ and cooperators have successfully eradicated witchweed from 99 percent of the infested areas in North Carolina and South Carolina. These activities consist of frequent field inspections, treatment of infested acres (tillage, ethylene injections to stimulate witchweed seeds to sprout, and hand-pulling and herbicide application), conducting post-eradication surveys, and addressing any new infestations.

The program surveyed 21,786 acres in FY 2022 (surveys continue through the fall and are still ongoing). At the beginning of the 2022 season, 1,725 acres were infested, and 62 acres were newly infested or re-infested during the season. In 2022, PPQ treated 861 acres. Because witchweed seeds can remain viable in the soil for up to 14 years, and a host plant must be present for witchweed germination, year-to-year fluctuations in the number of acres infested are common. By preventing the spread of this damaging weed, the program indirectly protects U.S. corn production, which covered more than 93 million acres in 2021 valued at nearly \$82.6 billion (National Agricultural Statistics Service, Crop Values 2021 Summary).

Roseau Cane Scale

Roseau cane is an important grass species in wetland areas of the lower Mississippi Delta, Louisiana. The plant's root system provides wildlife habitat, protects the interior from storm surges, and protects riverbanks from erosion, which impacts the Mississippi River navigation channel. Since 2017, researchers from Louisiana State University (LSU) and ARS have investigated multiple potential stressors causing dieback of roseau cane in the Mississippi River Delta. These stressors include high water levels, salinity intrusion, scale insects, plant pathogens, and soil chemistry.

To further investigate the possible causes of the die-off, LSU formed a multi-disciplinary and multi-institutional team with support from PPQ, starting in FY 2018. Research objectives include the biology and control of the scale insect that affects roseau cane; other stressors that may affect the health of roseau cane, including soil composition, pH levels, and nitrates; marsh grass restoration techniques; host plant resistance to scale insects; impacts of both beneficial and pathogenic microbes on roseau cane; and restoration ecology.

In FY 2022, funding from PPQ supported continued work on environmental stressors and roseau cane die-off and restoration; above and below ground interactions impacting roseau cane; field monitoring and remote sensing of roseau cane dieback sites and restoration plots; and categorization of genetics of roseau cane found in the Mississippi River Delta. Additionally, with funding available under Plant Protection Act 7721, PPQ identified a potential biological control agent (*Aprostocetus* sp.) and is conducting initial work to develop it, including rearing it in containment to start a colony and begin testing to ensure it will not attack non-target plants. The work to date by the roseau cane die-back team has improved our understanding of plant stressors on roseau cane and the biology, distribution, feeding ecology, and impact of the scale insect attacking the cane at the Mississippi River Delta.