ML 2018, Ch 214, Art 4 Sec 2, Subd 6a Project Abstract
For the Period Ending June 30, 2024

PROJECT TITLE: Early detection of invasive tree pathogens using molecular tools for prevention and to mitigate
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FUNDING SOURCE: Environment and Natural Resources Trust Fund
LEGAL CITATION: ML 2018, Ch 214, Art 4 Sec 2, Subd 6a
               M.L. 2023 - Sec. 2. Carryforward; Extensions

APPROPRIATION AMOUNT: $383,865
AMOUNT SPENT: $383,865
AMOUNT REMAINING: $0

Sound bite of Project Outcomes and Results

This project effectively utilized molecular tools for early detection of invasive tree pathogens in Minnesota. Fourteen previously unreported species of *Phytophthora* were identified. Extensive spore trapping for *Heterobasidion irregulare* indicated its presence in Minnesota. This research enhanced statewide efforts to monitor, prevent, and mitigate damage to Minnesota's natural resources.

Overall Project Outcome and Results

Minnesota's forests have experienced massive ramifications from the introduction of several exotic pathogens—Dutch elm disease and oak wilt, for example. A recent, newer threat is Heterobasidion Root Disease (HRD, also called annosum root rot) that has the potential to devastate Minnesota's pines and other conifers. Many pathogens like HRD spread through windborne spores. Oftentimes windborne pathogens are only detected after being established in an area for some time. New molecular biosurveillance tools can use DNA technology to help detect forest diseases before they establish. Blanchette's team is developing such molecular biosurveillance tools for a number of priority invasive pathogens to facilitate early detection of tree diseases across Minnesota. Researchers effectively used molecular tools to detect invasive tree pathogens in Minnesota. After collecting and analyzing over 1,500 samples from nurseries, forested areas, waterways, and Christmas tree plantations, they identified 24 different species of Phytophthora. 14 of these species were previously unreported in Minnesota.

Using several types of spore traps in Minnesota and Wisconsin, they confirmed the presence of HRD, which led to eradication efforts. HRD was found in Wisconsin counties adjacent to Minnesota and several locations in eastern Minnesota. Spore trap types included Burkard, Roto Rod, and windsocks. Wind socks were found to be an effective and inexpensive way to monitor for spores of many species of pathogens. At the conclusion of this project, researchers recommend continued spore trapping to monitor pathogens as an efficient way to detect pathogens before they become major outbreaks, and to locate the source of pathogens. They also recommend investigating the distribution and completing virulence testing of the Phytophthora species new to the state. This 4-year research project enhanced statewide efforts to monitor, prevent, and mitigate damage to Minnesota's natural resources. It also serves as a model of biosurveillance to other states and federal agencies.

Project Results Use and Dissemination

Two peer reviewed publications have derived from this research project. All peer reviewed publications are permanently archived. Multiple public presentations were made at academic conferences and conservation organizations. A full listing may be found on the MITPPC webpage dedicated to this research project.