

ML 2018 Project Abstract

For the Period Ending December 31, 2022

PROJECT TITLE: Improve invasive plant treatment efficacy using climate based phenology models

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FUNDING SOURCE: Environment and Natural Resources Trust Fund

LEGAL CITATION: ML 2018, Ch. 214, Art 4, Sec. 2, Subd. 6a

APPROPRIATION AMOUNT: \$346,211

AMOUNT SPENT: \$346,211

AMOUNT REMAINING: \$0

Sound bite of Project Outcomes and Results

We developed climate-based models of key phenological events (e.g. flowering, fruiting) for scheduling treatments to control invasive Japanese knotweed and wild parsnip. We created the Pesky Plant Trackers program to house the models and to train volunteers to collect phenology data, which increased their appreciation of plant life cycles.

Overall Project Outcomes and Results

Understanding plant phenology is important for predicting the annual timing of key plant growth stages like flowering or seed development, which are controlled by environmental factors like temperature and sunlight availability. Currently, management activities tend to use calendar days for predicting phenology and timing of management. However, phenology is strongly regulated by temperature. Thus, scheduling management using temperature-based predictions of phenology could be more effective.

This research team developed better information on the timing of life cycle events, and how they relate to temperature, for two priority invasive species: wild parsnip (*Pastinaca sativa*) and Japanese knotweed (*Polygonum cuspidatum*). Montgomery and her team developed climate-based phenology models of key phenological events such as flowering and fruiting. To collect data for the models, they created and nurtured a robust citizen science network called Pesky Plant Trackers. In addition, there were 5 University field plots across Minnesota from which they collected data. Overall, they trained 96 volunteers; 80 contributed data on 255 plants (180 planted) or patches of plants located at 64 sites.

Phenological data on Japanese knotweed and wild parsnip is available on USPests.org along with a guide on how to use the data (see project results). Land managers can use the data to estimate phenology of these species given current and projected seasonal temperatures.

Project Results Use and Dissemination

This project had a number of [products](#) resulting from the research. The growing degree data models are available at [Online Phenology and Degree Day Models](#) for use by managers to plan timing of treatment.

The project can also be found at [USA NATIONAL PHENOLOGY NETWORK](#). This research was featured in the USA-National Phenology Network's [annual report](#) as a project that informs decisions in natural resource management.