



WASHINGTON STATE
UNIVERSITY
EXTENSION

DEVELOPING DECISION SUPPORT TOOLS FOR PACIFIC NORTHWEST POTATO CROPS

BY THE NUMBERS

- Produced more than 100 maps predicting densities of 4 target pests in the 2014 and 2015 growing seasons.
- More than 600 growers and crop consultants subscribed to email alerts containing information on insect populations.
- Developed phenology models for 3 major pests based on data from more than 200 farms surveyed from 2007 to 2014.
- Delivered more than 15 presentations on the sampling network and pest maps during the 2013, 2014, and 2015 growing seasons.
- Supported two entomology graduate students.



2016

ISSUE

Potato growers in the Pacific Northwest must manage a suite of pests that vector pathogens and/or directly damage plants. To aid the potato industry in sustainably managing these pests, our team has conducted weekly monitoring of select potato fields across the Columbia Basin since 2007. These surveys update the potato industry about the size and location of important insect pest populations, which aids growers and crop consultants in monitoring and making pest control decisions. Outputs from the sampling network include a weekly email update, "Potato Pest Alerts." Data also are published at <http://potatoes.wsu.edu> in the form of digital maps. In 2016 we are adding a feature that integrates maps into Google Mapping engines so growers can zoom in and out, and locate their individual fields.

However, while these data are informative, they only provide a general sense of pest densities throughout the region, without offering growers or crop advisors the ability to generate targeted predictions for particular fields. Furthermore, certain regions are sampled more intensely than others, such that the utility of the network varies across the region. Management of potato pests would be improved if growers and crop consultants had access to detailed spatial data on pest populations across the Columbia Basin growing region.

RESPONSE

Our project addressed these issues by incorporating data from the potato-sampling network into geographic information systems (GIS) models to generate weekly predictions of pest densities throughout the Columbia Basin. Maps were created weekly during the 2014 and 2015 growing seasons and showed predicted densities of potato tuberworm, beet leafhopper, and aphids. These pests directly damage potatoes or transmit pathogens. Models were validated in production fields in 2013 and with our extensive sampling dataset. This validation allowed us to refine predictions and provide a "proof of concept" to build confidence in the approach for growers and crop advisors. The maps were easily accessible to growers through the <http://potatoes.wsu.edu> website and weekly email alerts. Our maps offered growers access to detailed information on pest densities, allowing them to make targeted and timely management decisions. In fall 2014 we secured funding to integrate our sampling maps into Google Earth so growers can get targeted predictions for specific fields.



QUOTES

"It consolidates a lot of regional information for convenient viewing."

"I rely on the pest alerts to aid me when scouting fields to be more aware of potential problems. They are a valuable resource."

FUNDING

We are grateful to WSU Extension for providing funding for the project and supporting the development of the <http://potatoes.wsu.edu> website.

IMPACTS

We have collected one of the largest datasets on insect pests for any cropping system in the Pacific Northwest. Using these data we developed phenology models for beet leafhopper, aphids, and potato tuberworm. Developing phenology models provides information as to whether pests are in growth or decline phases, allowing for more targeted management. For example, growers can reduce pesticide use as the cumulative emergence of each pest approaches 100%.

In 2014 we began to publish maps based on our interpolation approach at <http://potatoes.wsu.edu/potatoinsectsurvey/> and incorporated them into the potato pest email alerts. Every week throughout the summer/fall of 2014 and 2015 we produced maps for potato tuberworm, beet leafhopper, and aphids. The maps showed regional predictions of insect pest densities. Our interpolation approach has allowed for growers throughout the Columbia Basin to get targeted and up-to-date information on pest populations over the course of the growing season.

In 2014 we demonstrated that our interpolation method worked for pests in Oregon as well as it did in Washington. This means that our approach can be extended to Oregon growers. We have also made progress in developing similar tools for wheat cropping systems, which we expect to put online in the next two years. We expect adoption of our GIS-based approach to predict regional pest populations to be widespread in the next 5 years.

In 2015 we received a \$2.7 million USDA Specialty Crops grants that will fund continued monitoring of potato pests, particularly potato psyllid. We will use this funding to develop more targeted predictions for insect-vectored diseases in potato crops. This information will be integrated into our dynamic website and increase the impact of our project.

Our project contributed to growth in the number of subscribers to the regional insect sampling network in potatoes, with more than 600 growers and crop consultants subscribed. Subscriptions rose 100% in the past 3 years, including the majority of potato producers in the Columbia Basin.

