**PHASE I**

**Applicant Organization and Contact Information:**

**Contact 1:** David Linnard Wheeler

**Contact 2:** Kenneth Frost, James Woodhall, Chakradhar Mattupali, and David Crowder and or Joe Zagrodnik

**DUNS #:** 04-148-5301

**Federal Tax ID #**

**Title:** Development of late blight forecasting models for the Pacific Northwest

**Multi-State Project:** Yes. Oregon and Idaho. Potato production in the Pacific Northwest does not respect politic boundaries. Potato seed come from across the US. Similarly, diseases spread regionally across the Pacific Northwest. Finally, existing agricultural infrastructure is designed to operate across state lines. As such scientists and support from Idaho and Oregon are required to address disease forecasting needs in Washington. The role of the project in Idaho and Oregon will be to support spore trap and weather data infrastructure required to develop and maintain the forecasting system.

**Project period: Start date:** October 1st 2021; **End date:** September 1st 2024.

**Does your project support R&D?** Yes.

**Funding Category:**

* Innovative technologies or Pest Management

**Funding Priority:**

* Control pests and diseases

**Project Summary:**

Include a project summary of 250 words or less suitable for dissemination to the public. A Project Summary includes:

* The name of the applicant organization that if awarded a grant will establish an agreement or contractual relationship with the State Department of Agriculture to lead and execute the project,
* A concise outline of the project’s outcome(s) and objectives, and
* A description of the general tasks to be completed during the project period to fulfill this goal.
* Late blight of potato, caused by *Phytophthora infestans,* causes annual yield losses in the Pacific Northwest. The objective of this project is to minimize losses and fungicide applications by developing disease forecasts for producers in the PNW. Scientists at Washington State University, the University of Idaho, and Oregon State University propose to develop forecasts with disease intensity, pathogen abundance, phenology, and weather data. To accomplish this objective, late blight intensity data will be collected from cooperating producers and ground-truthed by the PIs. Pathogen abundance and weather data will be collected from strategically distributed spore traps and weather stations, respectively. Phenology data will be collected by producers. Disease intensity data will be modeled as a function of pathogen abundance, phenological, and weather data with classical and machine learning models. The model(s) that perform best will be used for forecasts. Site-specific forecasts will be delivered electronically to producers weekly during the growing season. Expected outcomes of this research include (i) site-specific late blight forecasts and weekly management recommendations, (ii) improved fungicide stewardship, (iii) identification of factors that influence late blight epidemics, and (iv) extension and peer-reviewed publications. The effectiveness of the first two expected outcomes will be measured with surveys. In the short term, accurate and site-specific forecasts should help reduce both yield losses due to late blight and fungicide applications. In the long- term, late blight forecasts and fungicide stewardship should enhance the sustainability of potato production in the PNW.

**Project Purpose**

* Provide the specific issue, problem or need that the project will address.
  + Washington state produces almost a quarter of potatoes grown in the US (NASS, 2020). Unfortunately, the potato industry is often threatened by diseases like late blight. For example, in 1998 the cost of potato losses, fungicide applications, and other management activities in Washington was $22.3 million (Johnson et al. 2000). These losses translate to $35.3 million in 2020. To maintain competitive potato yields without excessive fungicide applications, site-specific forecasts are needed to inform disease management decisions for producers.
* Describe the approach to addressing the issue.
  + To address this issue, the PIs propose to develop site-specific late blight forecasts for potato producing regions of the PNW.
* Describe the relevance and importance to the specialty crop industry.
  + Potatoes are a specialty crop in Washington state. The sustainability of potato and other specialty crops in the PNW depends on prudent fungicide stewardship.

**Objectives**

* Provide at least one but no more than three objectives that this project hopes to achieve.
  + Develop site-specific late blight forecasts for potato producing regions of Washington, Oregon, and Idaho.
  + Deploy late blight forecasts electronically.

**Project Beneficiaries**

* Provide an estimate of how many specialty crop industry members will be benefiting from this project and provide a justification for your number?
  + For Washington state alone, approximately 300 producers and 36,000 employees (Capital Press, 2016) will benefit from the application of fewer fungicides.
* Who are the specialty crop beneficiaries of the project and how will they be directly benefiting from the outcomes of this project?
  + Crop producers are the beneficiaries this project. Potato producers will benefit from achieving competitive yields while reducing the resources needed to apply fungicides. Likewise, employees will benefit from reduced exposure to fungicides and prolonged efficacy since the risks of fungicide resistance should decrease with less usage. Similarly, nearby producers of other crops will also enjoy the prolonged efficacy of fungicides.

**Socially Disadvantaged and Beginning Farmers (not scored)**

* If you answer yes to your project benefitting either a socially disadvantaged or beginning farmer, explain how your project benefits either and or/both.
  + No.

**Is your project continuing the efforts of a previously funded SCBGP project?**

* + No