**Annual Progress Report / Final Report**

**Title:** Maintenance of late blight of potato forecasts

**Personnel:**

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**Reporting Period:** Year Initiated: 2022; Terminating Year: 2022.

**Summary of accomplishments & progress toward long-term goals:**

Late blight of potato, caused by *Phytophthora infestans*, has caused epidemics in the Columbia basin of Washington at least since 1947 (Anonymous, 1947). After this first recorded epidemic, it was not until 1990 that yearly epidemics consistently compromised potato crops (Johnson, 1996). To manage late blight effectively in potato crops, efficacious fungicides are applied. To reduce fungicide cost, yield losses, and the risks that strains of *P. infestans* will develop fungicide resistance, accurate forecasts are required. The goal of this project is to assist potato growers in the Columbia Basin of Washington make informed late blight management decisions. Its aim is to minimize late blight outbreaks in Washington and maintain the necessary infrastructure to support management decisions and diagnostics. To achieve this, as in previous years, late blight forecasts were generated weekly for three regions, Tri-Cities, Othello and Prosser during potato growing season. More specifically, starting the first of May until the third week of September 2022, weather forecast data was obtained from the Fox Weather Station. Thus, obtained weather data were used in a model developed by Johnson et al. 1998 to calculate the probability of late blight occurrence for the given week. Late blight risk was calculated by taking product of five risk factors, such as crop phenology, previous report of late blight, date, number of rainy days forecasted and probability of late blight occurrence. The obtained risk factor was then used to determine weekly recommendations for growers. The weekly forecasts and recommendations were shared by Dr. Wohleb via WSU’s Potato Alerts. Despite the extremely favorable environmental conditions, with extremely wet May and June, no late blight disease was reported nor observed by the PIs during 2022 growing season from Columbia Basin region. In summary, weekly late blight forecasts and recommendations were issued in a timely manner for the 2022 field season. Although not required, arrangements were made to do race and genotyping of *P. infestans,* in case of an outbreak of the late blight.

**Activities or experiments conducted:**

Late blight forecasts were produced weekly starting from May until September using the same methods as Johnson and colleagues. The model uses rain forecasts for Prosser, Othello, and Tri-Cities were used as inputs. The weather forecast data was obtained from Fox Weather LLC every week. These models use the product of 5 risk factors to determine the appropriate recommendations for the risk of late blight in the region.

The first risk factor is crop phenology. It is a vital information since late blight has only ever occurred in the Columbia Basin after row closure. The second risk factor is the presence or absence of late blight in adjacent fields. Phenology and late blight reports were obtained from Dr. Wohleb and Dr. Waters. The third risk factor is the probability that late blight will occur in Prosser, Othello, and Tri-Cities. These probabilities were calculated from the models developed by Johnson et al. (1998). The probability of the annual occurrence of late blight is modeled as a function of the presence of late blight the previous year as well as the number of rainy days during the spring and summer (Johnson et al. 1996). Probabilities for each location were issued weekly with forecasts and recommendations in the WSU Potato Pest Alerts by PI Dr. Carrie Wohleb. The fourth risk factor is the date. The date is important because the potato canopy is more conducive to late blight in June than in May, July or August (Johnson and Cummings, 2016). Finally, the fifth risk factor is number of rainy days expected in the next 7 days. These fine scale weather forecast data was obtained from Fox Weather LLC. Together the product of these risk factors was used to determine weekly recommendations for growers using the scale developed by Johnson et al.

**Results and Discussion:**

To achieve this, as in previous years, late blight forecasts were generated weekly for three regions, Tri-Cities, Othello and Prosser during potato growing season. More specifically, starting the first of May until the third week of September 2022, weather forecast data was obtained from the Fox Weather Station. Thus, obtained weather data were used in a model developed by Johnson et al. 1998 to calculate the probability of late blight occurrence for the given week. Further, late blight risk was calculated by taking product of five risk factors, such as crop phenology, previous report of late blight, date, number of rainy days forecasted and probability of late blight occurrence. The obtained risk factor was then used to determine weekly recommendations for growers. The weekly forecasts and recommendations were posted on our [project site](https://d-linnard.github.io/LateBlight/) and shared by Dr. Wohleb via WSU’s Potato Alerts. A glimpse of the Potato Pest Alert report is below. The project was completed on late September 2022.

Despite the extremely favorable environmental conditions, with extremely wet May and June, no late blight disease was reported nor observed by the PIs during 2022 growing season from Columbia Basin region. Therefore, PIs didn’t carry out objectives 2 and 3. However, provisions were made to do race and genotyping in case the disease exploded. The PIs contacted other researchers in OR and NC who could help with the genotyping.

Graphical user interface, text, application, email

Description automatically generated

**Publications: NA**

**Presentations & Reports: NA**

**Literature cited:**

1. Anonymous. 1947. Discover blight menace to late potato crops. Prosser Record-Bulletin. Prosser, WA. September 25.
2. Johnson DA, Alldredge JR, and Vakoch DL. 1996. Potato late blight forecasting models for the semiarid environment of south-central Washington. Phytopathology. 86: 480-484.
3. Johnson DA, Alldredge JR, and Hamm PB. 1998. Expansion of potato late blight fore- casting models for the Columbia Basin of Washington and Oregon. Plant Dis. 82:642-645.
4. Johnson DA and Cummings TF. 2016. In-canopy environment of sprinkler irrigated potato fields as a factor for late blight management in the semiarid environment of the Columbia Basin. Am J. Potato Res: 93:239-252.