

Central Oregon Potato Extension Program

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Abstract

Insect pests were monitored in potato fields to assess potential risk of disease transmission. Aphid, tuberworm moths, and potato psyllids were collected and counted weekly using water pans for aphids, delta traps for potato tuberworm and yellow sticky traps for psyllids. This information was distributed to growers, fieldman and industry representatives through the Potato Patches newsletter. During 2014 aphid numbers were moderately high at the beginning of the season, averaging fifteen to seventy-seven aphids per trap before decreasing to below twenty in mid-July, followed by a slight rebounded in mid-September. Potato tuberworm moths were found in very low numbers through the season. During 2014 the first recorded incidence of potato psyllid was detected in Jefferson County. Specimens were tested for the pathogen causing zebra chip, (*Candidatus Liberibacter solanacearum*), and all tested negative. Early blight prediction modeling and crop water use data provided helpful information for seed potato management. Weekly monitoring and reporting through the Potato Patches newsletter continues to be a significant source of information for integrated pest management in Central Oregon potato fields.

Introduction

The central Oregon potato industry is focused primarily on seed production. Pest monitoring and alerting services are vital for successful potato production. Aphids can affect the yield by transmitting diseases or extracting nutrients from the plants and stunting their growth. Potato Virus (PVY) is the most common reason seed lots are downgraded or rejected from certification. Growers can lose a dollar per hundredweight for each classification downgrade. Aphids are the primary vector of the PVY virus and control is a major production expense.

The potato tuberworm (*Phthorimaea operculella*) is one of the most important pests that infest potato worldwide. Potato tuberworm moth appeared in the area in 2013 and has the potential to impact production due to larvae mining in tubers.

The Pacific Northwest potato industry was alerted of the finding of the zebra chip (ZC) disease in 2011. The pathogen causing ZC is *Candidatus Liberibacter solanacearum*, a type of bacterium vectored by the potato psyllid (*Bactericera cockerelli* Sulc). Population dynamics of the potato psyllid need to be assessed. Monitored as a statewide collaboration is important when newly developing pests and pathogens appear to help growers and fieldmen effectively plan their control programs.

Central Oregon routinely experiences early blight infections and late blight has appeared in some years. Fungicide applications for late blight can cost up to \$250/acre annually. Models are being perfected in the local area to help predict the potential occurrence of late and early blight. As prediction models are refined, fungicide applications can be centered on anticipated incidences instead of calendar spray schedules. Savings can be achieved by improving the timing and efficiency of the fungicide applications.

The objects of this project are:

1. Monitor flights of aphids, adult male potato tuberworm moth, beet leafhopper, and potato psyllid in Central Oregon
2. Generate early blight prediction model and weekly water use data
3. Educate, communicate, and disseminate information about these pests to industry.

Methods and Materials

1. IPM Trapping Project:

Aphids: Pan traps are used to determine when aphid populations are increasing and field monitoring becomes necessary. Sixteen yellow water traps were used to collect winged aphids in commercial potato fields throughout Central Oregon from June 16 to September 23. Trapped aphids were collected from water using a soft paint brush and transferred into vials filled with alcohol. Vials were transported to the OSU-COARC laboratory and identified as green peach aphid or other aphids.

Potato Tuberworms: Sixteen pheromone delta traps were placed at the edge of commercial potato fields from June 16 to September 23. Delta traps consist of a triangle shaped trap, removable sticky liner bottom, and a lure impregnated with the pheromone of the female potato tuberworm moth. Sticky liners were removed weekly and inspected for presence of male moths. Confirmation of an initial tuberworm moth find in 2013 was verified by the OSU-HAREC Irrigated Entomology Program Laboratory, Hermiston, OR.

Potato Psyllid: Sixteen yellow sticky traps were placed five feet within the field from June 16 to September 23, 2014. Double-sided yellow sticky traps measuring 4 x 6 inches were placed at canopy height and monitored weekly for potato psyllid activity. Specimens were sent to OSU-HAREC for confirmation and were tested for *Candidatus Liberibacter solanacearum*, the pathogen that causes zebra chip (ZC).

2. Early Blight Prediction Model and Weekly Water Use Data:

Weekly early blight prediction models were run using June 1 and June 10 emergence dates. The model predicts the first seasonal rise in the number of spores of the early blight fungus based on the accumulation of 300 physiological days (P-days) from green row. Once 300 P-days have accumulated, the first fungicide for early blight control should be applied. This usually occurs when rows have closed. Potato is a moisture sensitive crop with a shallow active root zone compared to cereals and forages. Availability of moisture in the root zone is crucial for high yields and is influenced by soil properties such as texture and percent organic matter. Moisture demand increases as the crop begins to develop after emergence and peaks 7-9 weeks later during the tuber bulking growth stage. Weekly water use data was calculated for two major soil types in central Oregon.

3. Weekly Newsletter Updates:

A weekly newsletter was sent to potato industry participants from June 23 to September 23 that included the early blight prediction model, weekly water use, weekly aphid identification and population numbers, and notification of potato tuberworm moth and potato psyllid presence. Location of trap sites used for pest monitoring were identified for grower use. Weekly reports were posted onto the COARC website and can be found at <http://oregonstate.edu/dept/coarc/aphid-trap-reports>, providing.

Results and Discussion

1. IPM Trapping Project:

Aphids: Aphid populations in central Oregon ranged between 4 and 24 aphids per trap in 2014 (Fig. 1). Overall, aphid populations were low all season long with a small peak on July 23 and another slight increase at the end of the season on September 3. Green peach aphid numbers were very low ranging from 0 to 3.6 aphids per trap. Identification and reporting remains a helpful tool in controlling this vector of PVY.

Potato Tuberworm: In 2013, first identification of potato tuberworm moth occurred on August 27 and was confirmed by the OSU-HAREC Entomology Lab. During 2014, tuberworm was found each week (at least one but no greater than 3) until trap removal on September 17 prior to harvest. The increasing presence of potato tuberworm is of concern to central Oregon growers. Control methods include prompt harvest after vine kill and keeping soil moist as vines die to prevent cracking of the soil and exposure of tubers.

Potato Psyllid: During 2014 the first recorded incidence of potato psyllid was detected in Jefferson County. One psyllid was initially found on September 16, with 7 the following week. This new pest was limited to two fields. Specimens were sent to OSU-HAREC for confirmation and were tested for Lso (*Candidatus Liberibacter solanacearum*); all tested negative. The presence of potato psyllid is a growing concern for potato production in central Oregon.

2. Early Blight Prediction Model and Weekly Water Use Data:

Early blight prediction modeling and crop water use data provide helpful information for seed potato management. Use of the early blight prediction model assisted growers and fieldmen as they time fungicide sprays to efficiently prevent disease outbreak. The prediction of crop water use is important to proper crop management throughout the growing season and during maturation to assist with harvest and prevent storage rot.

3. Weekly Newsletter Updates:

Weekly reports were sent growers, fieldmen and industry participants and made available at on the Central Oregon Agricultural Research Center Website. Weekly monitoring continues to be a significant source of information for integrated pest management in Central Oregon potato fields.

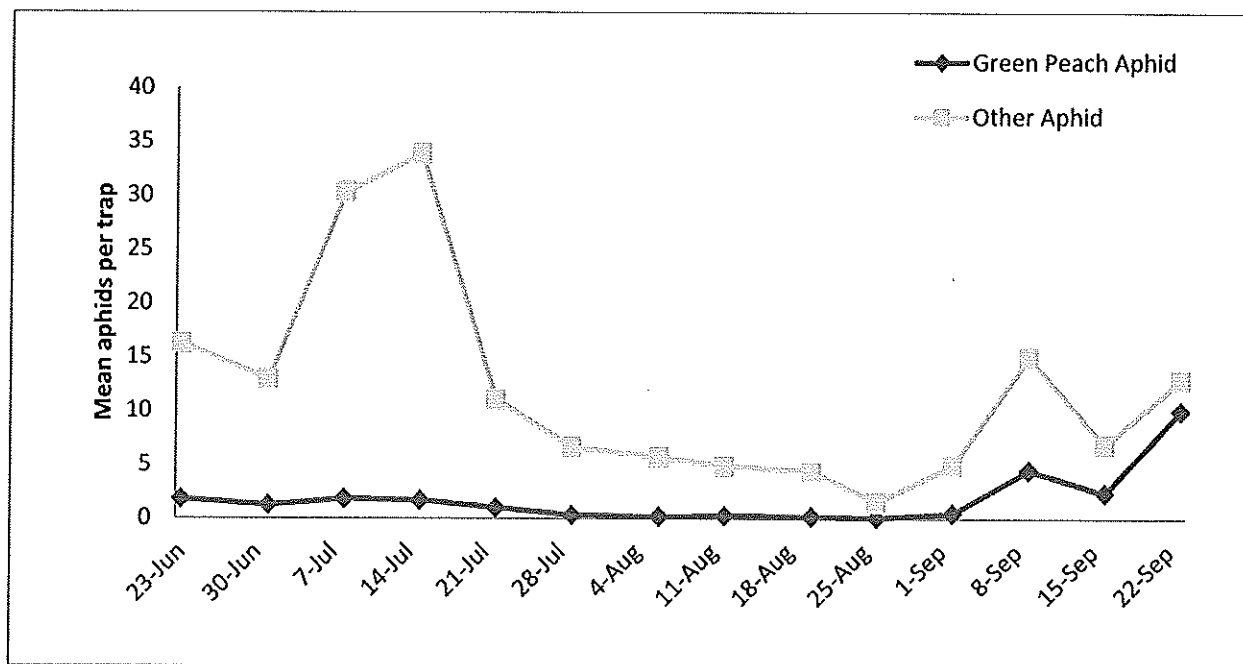


Fig. 1. Average population of aphids per trap in commercial fields in Jefferson County, Oregon 2014.