Potato Progress

Research & Extension for the Potato Industry of Idaho, Oregon, & Washington

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Late Blight Management in the Columbia Basin

From Dennis Johnson's late blight information line:

(Sponsors are Syngenta Crop Protection and WSU Extension)

Late blight has just been reported in five fields south of Basin City. Fungicide applications from Pasco to Basin City should be made on a 7-day schedule until harvest. Fields elsewhere in the Basin should be on a 10-day schedule until harvest. All potato fields should have a recent fungicide application (less than 7 days) before any significant rainfall. Check the 3 to 10 day weather forecasts for rain on a regular basis.

Late blight must be managed on a regional basis to be effectively controlled. Consequently, the general location of any late blight needs to be reported as soon as it is observed so fungicide applications for particular areas can be modified accordingly.

Please contact Dennis Johnson to report, confirm or to make late blight diagnosis: 509 335 3753.

Updates on Potato Psyllid and Zebra Chip (ZC)

Columbia Basin (excerpted from Carrie Wohleb's Potato Pest Alert)

As previously reported, zebra chip was confirmed from two potato plants in a field located east of Hermiston, OR on July 24. This week, potato psyllids infected with Liberibacter that causes ZC were collected near Cold Springs Reservoir and from HAREC. Potato psyllids collected in other parts of the Columbia Basin, including other areas in OR and southern WA, were tested this week, but were not carrying the bacterium. If you find potato psyllids or plants with symptoms, please let us know and we will help submit them for testing. ZC can cause significant yield and economic losses. Keep in mind that an insecticide program may not prevent the disease from entering your field via psyllids, but it should minimize colonization of psyllids in the field after they arrive, i.e. adult psyllids laying eggs and multiplying. The presence of eggs and nymphs indicates psyllids are colonizing the field. Growers who are waiting for first detection of potato psyllids in their fields before beginning a foliar insecticide program should be scouting their fields very carefully, and should understand that potato psyllids are tiny and very easy to overlook. A significant amount of damage may occur before the psyllids are detected. There are a number of insecticides registered for use on potatoes that have activity against psyllids in the adult and immature stages. For more information about chemical control options go to:

http://www.nwpotatoresearch.com/ and click on Pests/Diseases IPM.

Idaho (excerpted Erik Wenninger's post at PNWPestAlert.net)
(For more information from Idaho, see: www.kimberly.uidaho.edu/potatoes/)

Potato psyllids continue to be found across several sites being monitored by the University of Idaho. Numbers are up considerably at two sites. Sixteen potato psyllids were trapped on yellow sticky cards this week at the Kimberly R&E Center (and two psyllids were collected by vacuum sampling), and 54 potato psyllids were trapped on a grower's field in Twin Falls County. Eight psyllids were trapped on sticky cards in a field in Jerome County, and one was trapped in another field in Twin Falls County. We have yet to find immature potato psyllids on leaf samples taken from potato fields. See the U-Idaho site above to view a table that details where (by county) and when potato psyllids have been found so far during this season in Idaho.

Thus far, zebra chip in potato plants has been confirmed by PCR (molecular testing) at three locations in Twin Falls County (including the Kimberly R&E Center) and one location in Minidoka County. Plants with ZC symptoms have been collected or reported from other locations, but we are awaiting confirmation with PCR results.

Psyllids on Bindweed (from Andy Jensen, Editor and Regional Research Director)

In some parts of the Northwest, psyllids have been commonly found on field bindweed (*Convolvulus arvensis*) growing in and around potato fields. Potato psyllid (*Bactericera cockerelli*) is known to be able to survive and reproduce while feeding on this plant. There are, however, many species of psyllids living on the plants surrounding potato fields and there is at least one other species that feeds specifically on bindweeds: *Bactericera maculipennis*. This species is pictured below, including its egg in comparison to potato psyllid eggs. In some areas, *B. maculipennis* is very common and may be frequently caught on yellow sticky traps meant to catch potato psyllids. Note that separating adults of potato psyllid and *B. maculipennis* is easy based on the dark markings on the wings of *B. maculipennis*. There is no evidence that *B. maculipennis* reproduces on potato or transmits Liberibacter.

A bindweed-feeding psyllid, probably *Bactericera maculipennis*. Note the black markings on the wings and the very long stem on the egg (potato psyllid eggs above and to the left).

Incidence of the Beet Leafhopper and Beet Leafhopper-Transmitted Virescence Agent Phytoplasma (BLTVA) in the Southern Columbia Basin

Silvia I. Rondon, James M. Crosslin, and Philip B. Hamm

Phytoplasmas are single-celled prokaryotes associated with a number of serious plant diseases worldwide. These pathogens are transmitted to plants by insects with piercing-sucking mouthparts, such as leafhoppers, plant hoppers, and psyllids. In the Columbia Basin region of Washington and Oregon, the beet leafhopper, *Circulifer tenellus* (Figure 1), transmits a phytoplasma called the beet leafhopper-transmitted virescence agent (a.k.a. BLTVA). The beet leafhopper is a common insect in this region and the diseases caused by this phytoplasma can be economically important by reducing yield and/or quality. Beet leafhopper overwinters as an adult in the region. They move from weeds (preferred hosts) to potatoes (less desirable host) every year. Beet leafhopper feeding, without transmitting the phytoplasma, causes no potato damage.

In 2002, there was a major outbreak of BLTVA-induced potato purple top disease in the Columbia Basin with severe economic losses. Monitoring the occurrence and incidence of the vector and phytoplasma has been done since 2003. This provides useful information on the potential risk to potatoes by this pathogen. The timing of arrival of infective beet leaf hoppers can be important epidemiologically since potatoes are most susceptible and resulting infection causes the greatest damage if infected early in the season. Also, if infective leafhoppers are only present during a portion of the growing season, then control efforts can be focused on these periods rather than the whole growing season. The objective of the work described herein was to investigate the seasonal occurrence and abundance of the beet leafhopper (2007-2009) at multiple locations from within two counties in the southern Columbia Basin in Oregon and determine the incidence of phytoplasma in a portion of the insects collected in this region.

Materials and Methods

Yellow double-sided sticky traps (10 X 16 cm; Cascade AgServices, Mount Vernon, WA) were positioned in 36 areas in Morrow and Umatilla Counties, OR (Figure 3). All locations were near potato fields, in weedy areas, and away from dusty roads. There was one trap per location and the same location was used for each of the three years. Traps were kept low to the ground (the bottom edge of the trap was approximately 15 cm from the soil surface). Sticky traps were collected and replaced weekly from early April until late October or mid-November. Traps were taken to the entomology laboratory at the Oregon State University, Hermiston Agricultural and Research and Extension Center, where insects were identified, counted and the numbers of beet leafhoppers recorded. A subsample of the beet leafhoppers was carefully removed from the traps (locations 4, 10, 31, and 36) each week and placed into vials with 95% ethanol for PCR analysis to detect the presence of phytoplasma.

Results

Beet leafhoppers were detected from April or early May through October or November in each of the three years (Figure 4). In 2007, the average beet leafhopper counts steadily increased from late April through early June. The highest average number of beet leafhoppers trapped per day was on 5 June (9.2 beet leafhoppers per trap per day). The lowest counts were recorded in early April and then in August to early September. In 2008, the highest counts occurred on 19 June (3.5 beet leafhoppers per trap per day) and 23 October (2.8 beet leafhoppers per trap per day). In 2009, the highest beet leafhopper numbers were reached between 5 June and 7 July.

Of 250 insects tested in 2007, 20.8% were positive for BLTVA phytoplasma. In 2008, 269 insects were collected and tested from the five original sites plus locations 0, 14, and 19 and a total of 49

(18.2%) were positive for the phytoplasma. In 2009, 64 of 285 insects (22.4%) tested from the same trapping locations as those in 2008 were positive for the phytoplasma. Among all trapping sites and years, leafhopper infection rates varied from 0 to 65%. While the overall average incidence of BLTVA in beet leafhoppers was similar between years, the numbers of leafhoppers with BLTVA phytoplasma differed between trapping times. Throughout all three years, most of the phytoplasma-positive insects were collected in late June through July. In 2007, the highest phytoplasma infection rate occurred in insects collected the first week of July. Phytoplasma-positive insects were collected as early as 28 May in 2007 and as late as 13 November in each of 2007 and 2008. Nearly all leafhopper collections showed some level of BLTVA infection.

Conclusions

- An action threshold for phytoplasma-infected beet leafhoppers in the Columbia Basin region of Washington and Oregon has yet to be firmly established. Yet it is clear that the high infection rates consistently observed in the two Oregon counties reported here suggests that if this insect is present, then the phytoplasma is also present.
- Detecting the presence of the leafhopper with sticky traps provides an easy method for growers to monitor the influx and/or movement of leafhoppers in the early summer.
- Determining the percentage of phytoplasma-infected leafhoppers in a population can also aid growers in making decisions on insect control measures.
- Trapping information consistently indicates high levels of beet leafhoppers occurring sometime in May to June. Given the likelihood of these insects carry BLTVA and that potato plants are very susceptible early in the season and greater damage results from early infection, early control of beet leafhoppers is recommended.
- Assistance in identifying insects can be obtained from county extension offices (http://oregonstate.edu/dept/hermiston/); the Washington State Potato Commission (www.potatoes.com) also has resources to aid collection and identification of leafhoppers.

Full publication can be found at:

http://springer.r.delivery.net/r/r?2.1.Ee.2Tp.1gRqeL.C2LdWo..T.UCew.3o9E.bW89MQ%5f%5fDHNYFRZ0

Figure 1. Beet leafhopper adult. Photo credits. OSU-HAREC Ento, A. Murphy-Rondon's lab.

Figure 2. Symptoms of potato purple top disease include upright growth habit, rolling of leaflets, purple and/or yellow leaf discolorations, and elongation of the axial buds, often resulting in aerial tubers, and bushy appearance.

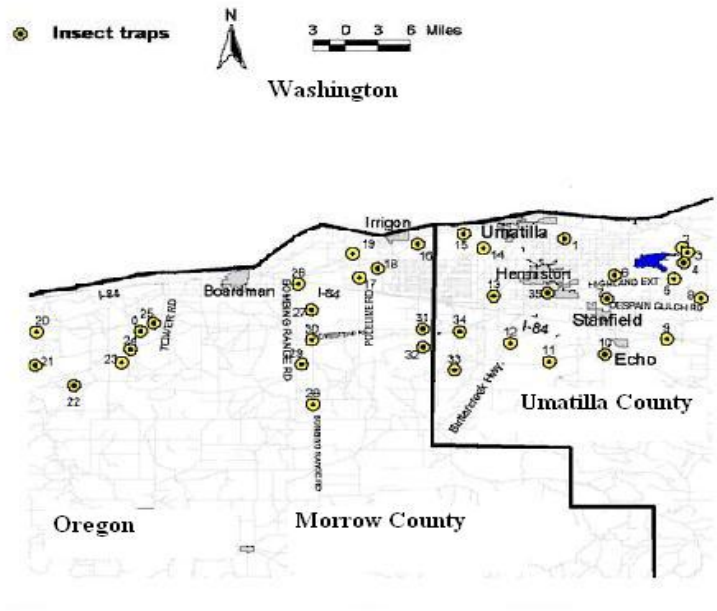

Figure 3. Distribution of traps in Umatilla and Morrow Counties. Map Credit. Simplot.

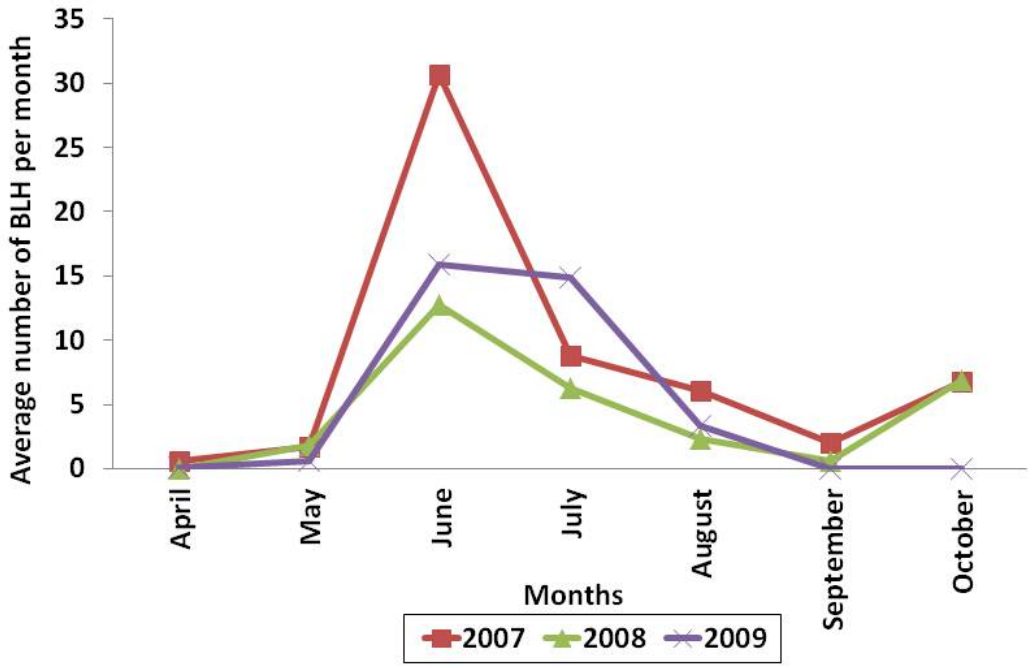

Figure 4. Population dynamics of beet leafhoppers in the lower Columbia Basin, 2007-2009.