Potato Progress

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Potato Psyllids and Psyllid Yellows

Andrew Jensen, Washington State Potato Commission

Many potato fields in the Columbia Basin have been turning up with curled & yellowing or purpling leaves, shortened internodes, swollen nodes, and aerial tubers. Many samples from such fields have been tested for potato leafroll virus, which is spread by aphids, and phytoplasmas, which are spread by leafhoppers. All tests have come back negative for both pathogens. The other primary remaining option that could be causing this set of symptoms is a physiological disorder called **psyllid yellows**. The foliar symptoms of psyllid yellows and phytoplasma infection (sometimes known as "purple top" or aster yellows) are nearly identical. The main method of distinguishing the two is through testing for the phytoplasmas that cause "purple top." The fact that affected plants are testing negative for phytoplasmas implies that psyllid yellows is the answer. It is difficult to ever know for sure that psyllid yellows is the cause because no test can detect it – it is a physiological response to psyllid toxins, not a disease caused by a virus or other pathogen.

Psyllids are close relatives of aphids (see Figure 1). The adults resemble miniature cicadas, while the immature stages are scale-like and mostly sedentary (much more sedentary than aphids). According to the Pest Alert newsletter from Colorado State University (1), early stage immatures are pale brown, while older ones are green. Immature psyllids generally feed on the under sides of potato leaves, and rarely occur in large populations.

According to the *Compendium of Potato Diseases* (2), foliar symptoms include: "erectness and mild chlorosis, basal upward cupping, and a progression of red coloration of new leaves. As the disease intensifies, other symptoms may include an upward rolling of leaves on all parts of the plant; shortened and thickened terminal internodes, resulting in a rosette growth pattern; enlarged nodes; the formation of aerial tubers or axillary branches; pronounced chlorosis (i.e. yellowing); and a cessation of new growth." Various tuber symptoms have been associated with psyllid yellows, including reduction in size, increased tuber set, flabbiness, rough periderm, and disrupted dormancy resulting in multiple "hair" sprouts (2, 3). Some evidence has emerged from affected fields this year that tubers from affected plants may be frying darker than those from unaffected plants in the same field. One published study out of Arizona suggests that yield and quality factors due to psyllid yellows may vary with potato variety (4).

Although a number of pesticide recommendations have been published for the control of psyllids, and many products are labeled for their control, no specific guidelines can be offered.

Some severely affected fields in Washington this year were treated with good at-plant systemic materials that are labeled for psyllids. It is possible that timing of infestations and pesticide applications is critical.

1. Cranshaw, W. 1999. Watch for Potato/Tomato Psyllid. *Pest Alert* 16: 1-2.
2. Stevenson, W.R., Rosemary Loria, Gary D. Franc, and D. P. Weingartner, eds. 2001. *Compendium of Potato Diseases, Second Edition.* APS Press, St. Paul, MN. 106 pp.
3. Pavlista, A. 2002. Potato (Tomato) Psyllids. *Nebraska Potato Eyes* 14: 1-4.
4. Ahmet, A., P.M. Bessey, K. Matsuda, and N.F. Oebker. 1985. Physiological effects of psyllid (*Paratrioza cockerelli*) on potato. *American Potato Journal* 62: 9-22.

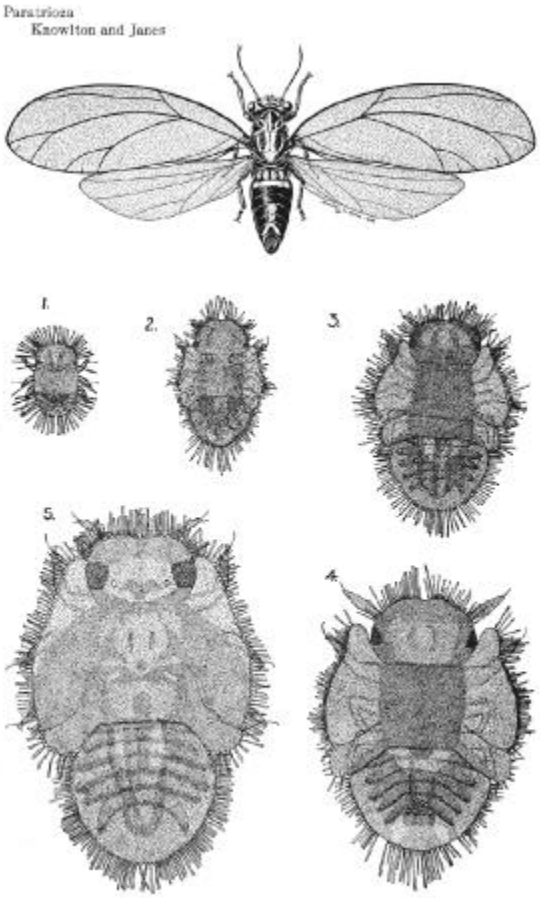

Figure 1. *Bactericera cockerelli* (=*Paratrioza cockerelli*), the potato psyllid. Numbers 1-5 are the immature stages in order and in accurate relative size. (Illustration from Knowlton, G.F. & M.J. Janes. 1931. Studies on the biology of *Paratrioza cockerelli* (Sulc). *Ann. Ent. Soc. Amer.* 24: 283-290.)

Potato Mop-Top

Debra Ann Inglis, WSU Mount Vernon

Potato mop-top is the name of a disease on potato caused by Potato Mop-top Virus, PMTV. The name, "mop-top," comes from the appearance of the infected potato plants which may have stunted stems and shortened internodes. Foliar symptoms consist of bright yellow blotches, rings or V-shaped markings, and can make the leaves "feathery." The most distinctive symptom is "spraing," dark-brown arc-shaped patterns in the tuber flesh; these can resemble the necrotic arcs and rings in tubers infected with corky ringspot. However, corky ringspot is caused by a different virus, tobacco rattle virus. Cool conditions favor the development of both tuber and foliar symptoms of mop-top. Losses are usually not in yield but in the decrease in quality of processing potatoes because of internal tuber symptoms.

PMTV is different from other potato viruses in that it cannot be spread by aphids or other vectors. Instead, it is vectored in a persistent manner by the powdery scab organism, *Spongospora subterranea*. Spread of mop-top into new areas occurs by planting PMTV-infected tubers with powdery scab lesions. Once established, PMTV has been reported to persist in fields for long periods of time, living within its *Spongospora* host (10, 12, 15 and 18 years), even if potatoes are not planted. Generally, potatoes are the primary host, although various species in the potato family, and lambsquarter and spinach can be infected mechanically by sap inoculations.

Powdery scab and PMTV are usually associated with cool and wet soils. Powdery scab is present in potato production areas, worldwide. However, occurrence of PMTV is more limited, with reports from northern and central Europe, the Andean region, Canada, China, Israel and Japan. Recently, mop-top was identified on a farm in Maine, and now the Canadian government has claimed that they have detected it in potatoes shipped to Canada from Washington, Oregon, and several other states. PMTV infection can be verified several ways including ELISA, soil bioassays, use of indicator plants, electron microscopy, and PCR. *(Editor's note: To date, there has been no verification of PMTV in Washington by any lab in the U.S. Much attention is being paid to the problem, and if PMTV is in the state, we expect to know much more about the situation soon.)*

Both the virus and vector need to be managed for successful control of PMTV. The virus depends on *Spongospora* for field spread, therefore, preventing spread of powdery scab is desirable. This typically is done by quarantine and certification of seed tubers. No fungicides or fumigants are specifically labeled for powdery scab at this time. Sanitary practices aimed at reducing movement of the spore balls of *Spongospora*, either on infected tubers, in soil adhering to seed or field equipment, or in irrigation water can also help to reduce spread. It has been reported that PMTV can be naturally self-eliminating in seed lots if grown in soil free of *Spongospora.* This is because plants grown from infected tubers may produce some shoots and daughter tubers free of virus infection. Furthermore, rouging of infected plants under cool conditions when foliar symptoms are most distinct can also be utilized to eliminate infected plants. Presently, there are no good sources of resistance in potato to PMTV.

Internal Tuber Damage - Virus Testing

Numerous tuber samples are being submitted to Phil Hamm at the OSU Hermiston Agricultural Research and Extension Center. These have symptoms similar to corky ringspot, but with the current headline news about Potato Mop-top Virus, and the ongoing concerns about PVY strains, Phil is planning extensive virus testing of tuber samples submitted to him from Oregon and Washington. If you find corky ringspot-like tuber necrosis symptoms in fields without a history of corky ringspot, Phil would be interested in testing your tubers for accurate identification of the problem. Phil can be reached at 541-567-8321; the OSU HAREC address is: P.O. Box 105, Hermiston, OR 97838.

Tuber Rot Samples Wanted

Dr. Debra Inglis at WSU-Mount Vernon is collecting samples of potato tubers with symptoms of pink rot, late blight, and *Pythium*. Isolates obtained from the samples will be tested for sensitivity to mefenoxam, the active ingredient in Ridomil Gold. Dr. Inglis requests your assistance in collecting samples, and has prepared mailing kits so that samples can be FedExed to her laboratory at Mount Vernon. The kits can be obtained directly from Mount Vernon (360-848-6135 or 6134), the WSPC office, or the extension offices in Pasco and Ephrata.

Field Day Date

The following field day is still upcoming this season. Please contact the commission office for further information, driving directions, etc.

Paterson - Specialty Potato Field Day, USDA-ARS Research Site, **Sept. 12**, 9:00 AM.