

Psyllids

See also: <http://www.potatoes.com/research.cfm>



Psyllids are close relatives of aphids and whiteflies, and are also known as “jumping plant lice.” These pictures are all of the **potato psyllid**. This is the only psyllid found in potatoes in the U.S.

Adult potato psyllid - white stripes on the head and thorax, and bold white bands on the abdomen are distinctive for potato psyllid. They are able to jump long distances very quickly when disturbed.



Psyllid egg on leaf edge.
Each egg is on a short stalk.



Young psyllid nymph.



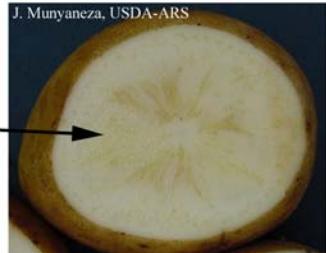
Older psyllid nymphs, showing their
strange tubes of excrement.



Psyllid nymph side view - psyllid nymphs
have functional legs and are capable of
walking, unlike whitefly nymphs (see reverse).



Psyllid nymphs and
adults on a penny for
size reference.



J. Munyaneza, USDA-ARS

1. Potato psyllids do not overwinter in Washington, but arrive here from southern locales by mid-summer. Many fields will have some psyllids present by mid-August.
2. Potato psyllid transmits the bacteria that causes “zebra chip.” Zebra chip symptoms have not been seen in the Northwest, probably because psyllids arrive too late for damage to develop.
3. Psyllids are currently not a serious problem in WA, but that may change in the future, much as in the case of tuberworm.

Washington State Potato Commission (Phone: 509-765-8845)

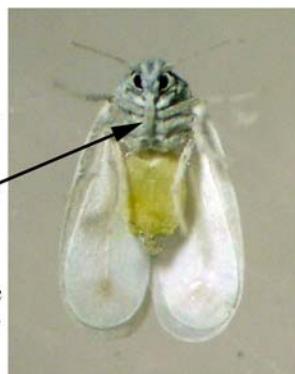
Whiteflies

See also: <http://www.potatoes.com/research.cfm>



Adult whiteflies are less than 1/8" long and resemble tiny moths.

Whiteflies are close relatives of aphids & psyllids, feeding on plant sap through piercing-sucking mouthparts.



Immature whiteflies resemble immature psyllids (see reverse) and are sedentary throughout development.



These two pictures are of the same whitefly nymph, and show the size of a full-grown nymph compared to a potato leaf.



The adult whitefly's eyes can be seen before it emerges from the nymphal skin.

Whitefly biology and damage

1. Whiteflies are present in many potato fields, but rarely if ever require control in the Pacific Northwest.
2. The whitefly most common in Washington potatoes is the greenhouse whitefly, not the silverleaf whitefly that is so feared in the southern U.S.
3. Whiteflies are most diverse and abundant in warm-temperate and tropical environments.

Idaho recommendations for potato psyllid and zebra chip management for 2012

At the end of the 2011 growing season and throughout the storage season, tuber samples with an unusual type of symptom from the Magic and Treasure Valleys were diagnosed with zebra chip, a disease that is new to Idaho and the Pacific Northwest. This disease is caused by a bacterium (*Candidatus Liberibacter solanacearum*) that is transmitted by potato psyllids. The bacterium causes necrotic flecking in the flesh of the tuber similar to net necrosis, but the symptom extends throughout the length of the tuber. When affected tubers are fried, the disease causes severe darkening of the chip or fry. The tuber defect is severe enough that the disease is a concern for both fresh and process potatoes. The number one means to control zebra chip is to control infected potato psyllids. Non-infected psyllids will not cause zebra chip. The University of Idaho and Miller Research have developed a scouting and information transfer program for the 2012 growing and storage season. Below is a summary of the program and recommendations for the 2012 season.

1. University of Idaho will implement a potato psyllid monitoring plan funded by the Idaho Potato Commission. At least 11 fields throughout Idaho will be extensively monitored for potato psyllid populations. Monitoring efforts will focus on fields located in areas where zebra chip was detected in 2011. Some fields in eastern Idaho will also be monitored even though there have been no positive zebra chip samples reported from this area to date. The Idaho industry will be immediately notified regarding any initial and subsequent detection of potato psyllids observed through our monitoring program and/or submitted samples. Notification will occur via multiple formats and will include the following: email alert system using PNWPestalert (www.pnwpestalert.net), postings in 'Potato Progress' and various websites (www.MillerResearch.com, www.kimberly.uidaho.edu/potatoes.htm), and the Idaho pest hotline (1-800-791-7195).
2. Various scouting techniques will be used to survey Idaho fields. If you are considering your own potato psyllid scouting program, here are some recommendations. Begin scouting fields around May 15th and no later than June 1st. These dates may need to be adjusted based upon timing of crop emergence. No one scouting method is superior to the others, but some methods will be better for certain life stages. In all cases, scouting for potato psyllids also will provide information on populations of other potato insects such as green peach aphids and potato aphids. You can either evaluate your samples for the presence of potato psyllids yourself or, initially, you may bring them into your local University of Idaho R & E Center to confirm identifications. After submission, subsequent training will occur to allow you to diagnose potato psyllids. Potato psyllid samples submitted to the University of Idaho will be analyzed for the presence of the zebra chip pathogen. Photographs and key diagnostic characters of the different life stages of potato psyllids can be found at various websites listed above or ordered at www.potatoes.com/research.cfm.
 - a. Use of yellow sticky cards – for adults. This method will detect only adult potato psyllids. These cards must be placed within the field but towards the field edge to concentrate

on the detection of potato psyllids and reduce the number of other harmless psyllid species on cards. Sticky cards need to be checked and replaced at least weekly, if not more frequently, since many insects are attracted to the cards which makes finding psyllids on the cards difficult. Before transporting, individual cards should be handled in one of the following ways: placed in a thin, clear plastic bag; separated with a wooden rack; covered with wax paper; or covered with the paper covering that comes with the card. If using a plastic bag, the sticky face of the card should be carefully adhered to the inside face of the bag to allow observation of insects through the plastic. A photograph is shown below illustrating how to manage sticky cards. There are several sources or vendors for yellow sticky traps. Choose a vendor by price and service.

- b. Use of leaf sampling – for eggs, nymphs, and adults. We recommend that you collect 10 leaves from 10 locations within 30 feet of the edge of the field. The best approach would be to sample the expanded leaves towards the middle of the plant. This technique will allow sampling for all life stages including adults, nymphs, and eggs. However, adult potato psyllids are active and often jump abruptly when disturbed and may not be observed. A hand lens or magnifying glass is necessary since the insects are quite small.
 - c. Use of sweep nets – for adults. The recommendation is to take 100 sweeps in the field from various areas and focusing on field edges. Collect all insects from the sweep net into a plastic bag, jar, or vial, and freeze overnight. Freezing the sample immediately decreases the potential for sample degradation and loss from predators eating the potato psyllids.
3. Information/mapping of potato psyllid and zebra chip throughout Pacific Northwest. We will update and post information on potato psyllid detection throughout Washington, Oregon, and Idaho to allow for tracking of the presence and movement of potato psyllids. Information will be reported by county only and all information will be kept confidential. Both the presence of potato psyllids and whether they are infected with the bacterium that causes zebra chip will be reported.
 4. Recommendations for areas in Idaho that had zebra chip present in the 2011 crop (for example, Magic and Treasure Valleys):
 - a. We recommend an at-planting application of a neonicotinoid insecticide (seed treatment, in-furrow, or at-hilling).
 - b. Follow up with a foliar insecticide application to target adult and nymph potato psyllids once the at-planting material nears the end of its efficacy period. Refer to the “Biology and Management of Potato Psyllid in Pacific Northwest Potatoes” report published in the Potato Progress (and posted at <http://www.potatoes.com/pdfs/PotatoPsyllid.pdf>) for foliar insecticide recommendations. Note that some insecticides target adults, nymphs, eggs, or all life stages. Select an insecticide that is most effective for the psyllid

- life stage requiring control measures as well as other insects that may be present at the time (e.g. Colorado potato beetles, aphids, mites, etc.).
- c. Avoid foliar neonicotinoid insecticide applications if this class of insecticide was used at planting or at hilling. This is important to avoid insecticide resistance. At-plant neonicotinoids have a long period of control, exposing susceptible insects for several weeks. This period and intensity of exposure may be adequate to foster insecticide resistance in any one (or more) of the pests in potatoes. Adding more foliar applications with the same class of insecticide will only increase this selection for resistance. It is important to remember that Colorado potato beetles, aphids, and other insect pests are also being affected by sprays targeting psyllids. Relying too heavily on any one mode of action will select for resistance not only in potato psyllids, but in all of these pests. Avoiding insecticide resistance in these pests is a critical part of psyllid management decisions.
 - d. Avoid pyrethroid insecticides for potato psyllid control. Pyrethroids may flare potato psyllid populations by enhancing egg laying by females and/or killing beneficial insects that attack potato psyllids. Pyrethroids also may flare aphid and mite populations by releasing them from control by natural enemies.
5. Recommendations for areas in Idaho that did not report any zebra chip in 2011 (for example, eastern Idaho):
- a. Follow traditional insecticide program previously used, but consider an at-planting or at-hilling neonicotinoid insecticide if it is not a part of your current insecticide program.
 - b. Keep current on survey results in areas with positive detection of infected and non-infected potato psyllids.
 - c. If at risk, follow a foliar program as described above and as outlined in the "Biology and Management of Potato Psyllid in Pacific Northwest Potatoes" report published in the Potato Progress.
6. University of Idaho will hold periodic training sessions throughout the state on psyllid identification and to answer questions regarding the current situation. Additional information will be disseminated as necessary via various outlets as described above.
7. A brief update on the 2011 season and storage situation regarding zebra chip. The first infected tuber samples were collected in the Magic Valley in September 2011. Since the initial findings, numerous fields in both the Magic and Treasure Valleys have been reported to have zebra chip infected tubers. No positive samples have been detected in eastern Idaho to date. The incidence of zebra chip in most of the infected fields has been 0.5 to 1% although some have reported a much higher incidence causing significant loss to quality. Thus far, disease progression in storage has been limited. However, there are many unknowns regarding this disease, and the possible effects of storage conditions over time on symptom development are still not clear.

Recommendations were a collaborative effort of Nora Olsen, Erik Wenninger, Phil Nolte and Mike Thornton of the University of Idaho; Jeff Miller of Miller Research; Andy Jensen of the Idaho, Washington and Oregon Potato Commissions.

