The potato psyllid and its associated pathogens

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Overview

This presentation will discuss the potato psyllid, *Bactericera cockerelli* (Šulc).

- Host plants
- Life cycle
- Distribution
- Recognition
- Damage due to feeding and pathogen transmission
- Biosecurity issues
- Management

What is a psyllid?

Nymphs

Adult

- Psyllids are known as jumping plant lice.
- Adults are highly mobile and jump quickly when disturbed.
- Life stages include egg, nymph, and adult.

Photos: Joe Munyaneza, USDA/ARS

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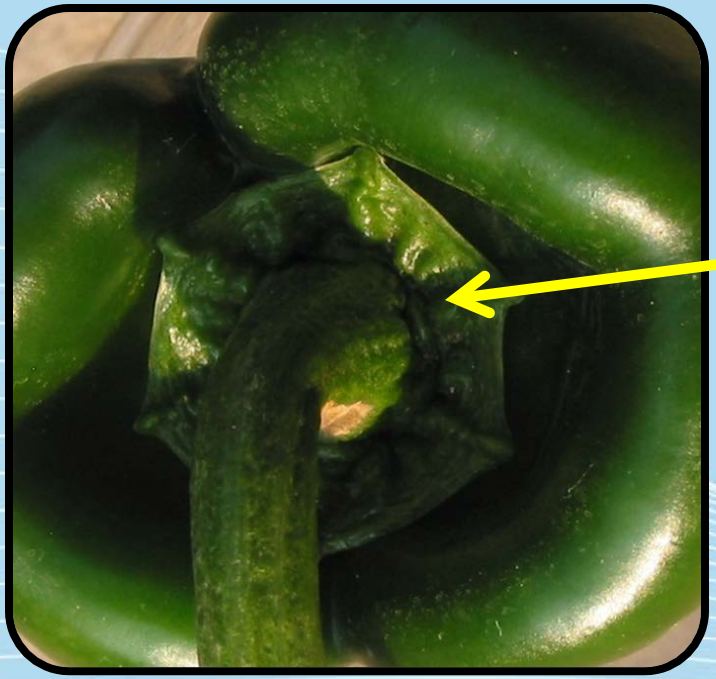
What is a potato psyllid?

- Occur in North and Central America.
- Feed by sucking juices from plants.
- Infest plants in the family Solanaceae, including important crops.

Hosts of the potato psyllid

- Psyllids are usually found on leaves.
- Can be on pepper fruit.



Psyllid nymphs hide under the calyx of the peppers.

Photo: Susan Halbert FDACS/DPI

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Distribution map of the potato psyllid in the Americas

- Lighter blue areas are colonized intermittently.
- Note that half of North America has no potato psyllids.

Map: Scott Burton, FDACS/ Div. Plant Industry

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Life cycle of the potato psyllid

The life cycle of the potato psyllid include:

- Eggs
- Nymphs
- Adults

Life cycle of the potato psyllid

- Eggs

Photo: Joe Munyaneza, USDA/ARS

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Life cycle of the potato psyllid

- Nymphs

Photos: Joe Munyaneza, USDA/ARS

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Life cycle of the potato psyllid

- Adults

Photo: Joe Munyaneza, USDA/ARS

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How to recognize potato psyllids

Potato psyllid nymphs and adults are found on above-ground parts of host plants.

Photos: Joe Munyaneza, USDA/ARS

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How to recognize potato psyllids

Potato psyllids have a distinctive pattern on the back of their head.

Photo: Susan Halbert, FDACS/DPI

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How to recognize potato psyllids

- Slide mounted specimens required for identification.
- Trained taxonomist required.
- Notify your local county extension agent.

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How to recognize potato psyllids: Are there other similar species?

- There are many similar species of psyllids on other plants.

- Psyllids found on other plants (not solanaceous crops) should be given to a trained taxonomist.

Other psyllids on solanaceous crops?

- In Eurasia, South America, and Australia, there are other species of psyllids on solanaceous crops.

- If you find psyllids on solanaceous crops, and they do not look like the potato psyllid, notify your local extension agent.

South American potato psyllid

Photo: Natasha Wright, FDACS/DPI/CAPS

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Plant damage due to potato psyllids

Damage comes from:

- Direct feeding

- Transmission of plant pathogens

Direct damage from potato psyllids

- Known as “psyllid yellows.”
- Observed for decades.
- Plants recover when psyllids are removed.

Psyllid yellows in ‘Atlantic’ potatoes.

Photo: Joseph Munyaneza, USDA/ARS

Pathogen transmission

- Psyllids transmit bacteria that cause zebra chip disorder in potatoes.
- Symptoms occur in foliage and tubers.

Foliar symptoms of zebra chip disorder.

Photo: Joseph Munyaneza, USDA/ARS

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What are bacteria?
Will zebra chip bacteria make me sick?

- Bacteria consist of single living cells.
- Some bacteria can cause diseases in plants, and others cause diseases in animals.
- Bacteria are too small to see without a lot of magnification.
- Zebra chip bacteria pose **no health threat** to humans or pets.

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More on zebra chip disorder

- Tubers harvested from infected plants present a striped pattern when fried.

Photos: Joseph Munyaneza, USDA/ARS

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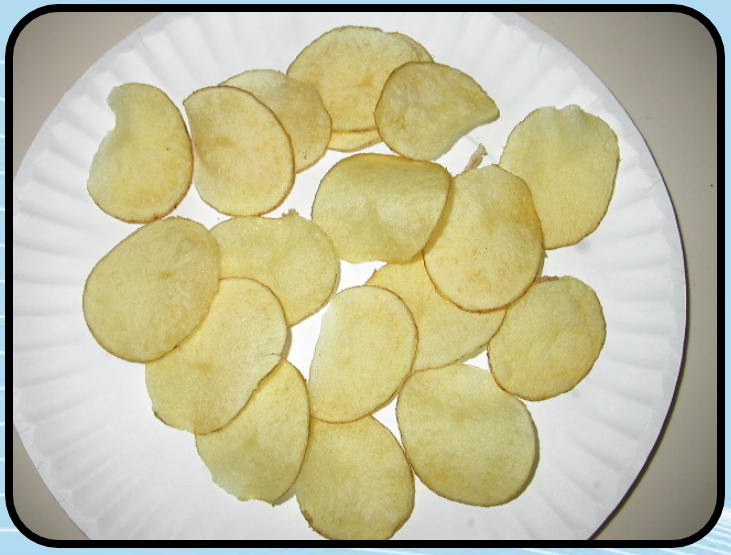

Photos: Joseph Munyaneza, USDA/ARS

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Zebra chip disease also affects fries

- Potatoes affected by zebra chip disorder are unacceptable for chips or fries.

Photo: Joseph Munyaneza, USDA/ARS

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If my potato plant is sick, does it have zebra chip disease?

- Solanaceous crops are subject to many disorders and diseases.
- Without laboratory diagnosis, it is not possible to confirm that the problem is due to zebra chip disorder.
- If you see potato psyllids, and your solanaceous crops are suffering, consult your local extension agent.

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Potato psyllids are on the move!

- New Zealand in 2008.
- Not found in eastern North America.
- Have been intercepted in Florida.

Map: Scott Burton, FDACS/ Div. Plant Industry

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How do potato psyllids move?

Potato psyllid nymphs

Photos: Nina Zagvazdina and Susan Halbert, FDACS/DPI

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Management of potato psyllids

- Cannot prevent disease transmission by psyllids.
-
- Contact local extension agent.
-
- Follow standard pest management strategies.

Monitoring

- It is important to monitor potato fields for psyllids.
- Use sweep nets and vacuum devices for adults.
- Use visual inspection for eggs and nymphs.

Photo: USDA/NIFA

Sweep-netting for psyllids

- Use a very fine mesh net.
- Do not beat the foliage – only touch the tips of the leaves.
- Psyllids will be startled, and their instinct is to jump – right into the net!
- Use an aspirator to collect the bugs.


Aspirator

Photo: Susan Halbert, FDACS/DPI

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Potato psyllid monitoring: sticky traps

Yellow sticky traps for adults.

- Limited sensitivity to low populations.

A psyllid pheromone is being developed at ARS-Wapato.

Photos: Joseph Munyaneza, USDA/ARS

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Monitoring: visual inspections

Visual inspection of leaves for eggs and nymphs.

- 100 leaves (10 from 10 locations along field perimeter).
- Labor-intensive.

Photos: Joseph Munyaneza, USDA/ARS

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Cultural control

- Some research indicates that planting date can make a difference in incidence of zebra chip disorder.

Photos: Joseph Munyaneza, USDA/ARS; Nightthree, Wikimedia Commons

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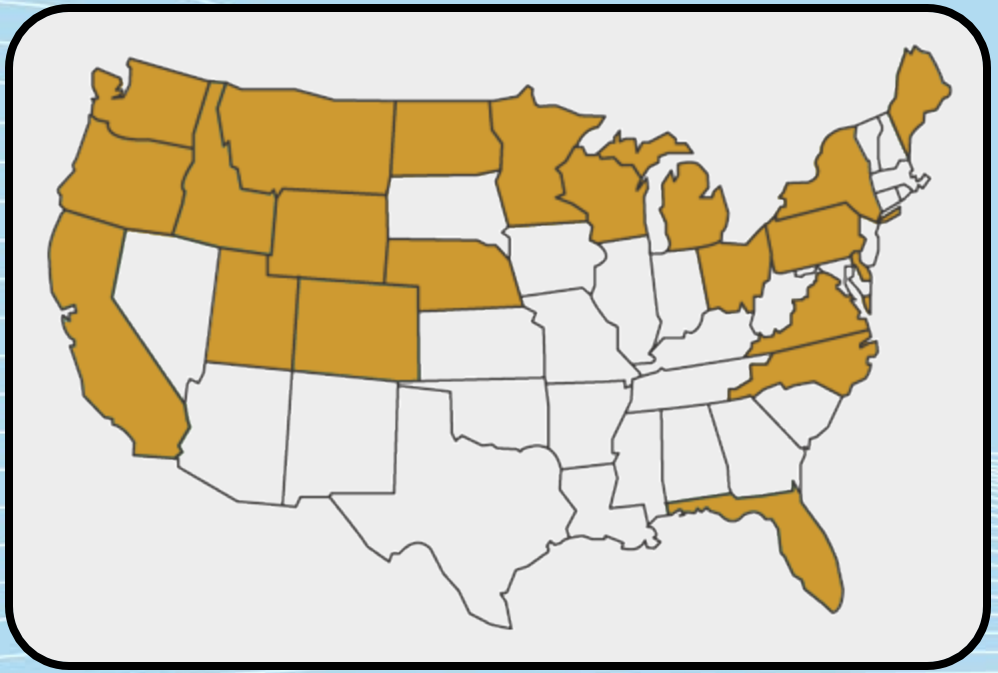
Regulatory measures

- Movement of psyllids and pathogens prohibited.
- Seed testing and certification required in potato producing states.
  - http://www.nationalpotatocouncil.org/NPC/resources_seedagen.cfm



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Host plant resistance

- Most cultivars are susceptible to zebra chip disorder.

- Yield loss can be greater than 50%.

Photo: Whitney Cranshaw, Colorado State University

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Biological control

- Generalist predators:
  - lady beetle
  - minute pirate bug
  - damsel bug
  - lacewing

- Parasitoid wasp: *Tamarixia triozae*.
- It has yet to be determined whether these natural enemies are effective at mitigating disease spread.

Photo: Michael Becker

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Chemical control

- Most management in commercial potato crops is dependent on chemical control.

  See:

  http://www.kimberly.uidaho.edu/potatoes/INFO.htm

  http://www.potatoes.com/IPM-home.cfm%5C

- Consult your local extension agent for specific recommendations for your area.

Photos: Joseph Munyaneza, USDA/ARS

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- Citation:

  Halbert, S.E. and J.E. Munyaneza. 2012. The potato psyllid and its associated pathogens. Accessed (add the date) – http://www.protectingusnow.org/.

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National Plant Board (NPB) and State Departments of Agriculture

National Plant Diagnostic Network (NPDN)

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