The potato psyllid and its associated pathogens

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Overview

This presentation will discuss the potato psyllid, *Bactericera cockerelli*

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

What is a psyllid?

Nymphs

Adult

Nymphs, adults, and cast skins

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

Photos: top and middle - Joe Munyaneza, USDA/ARS; bottom - Whitney Cranshaw, Colorado State University, Bugwood.org, #5369938

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What is a potato psyllid?

Adult potato psyllid

Photos: Whitney Cranshaw, Colorado State University, www.bugwood.org, #1476083

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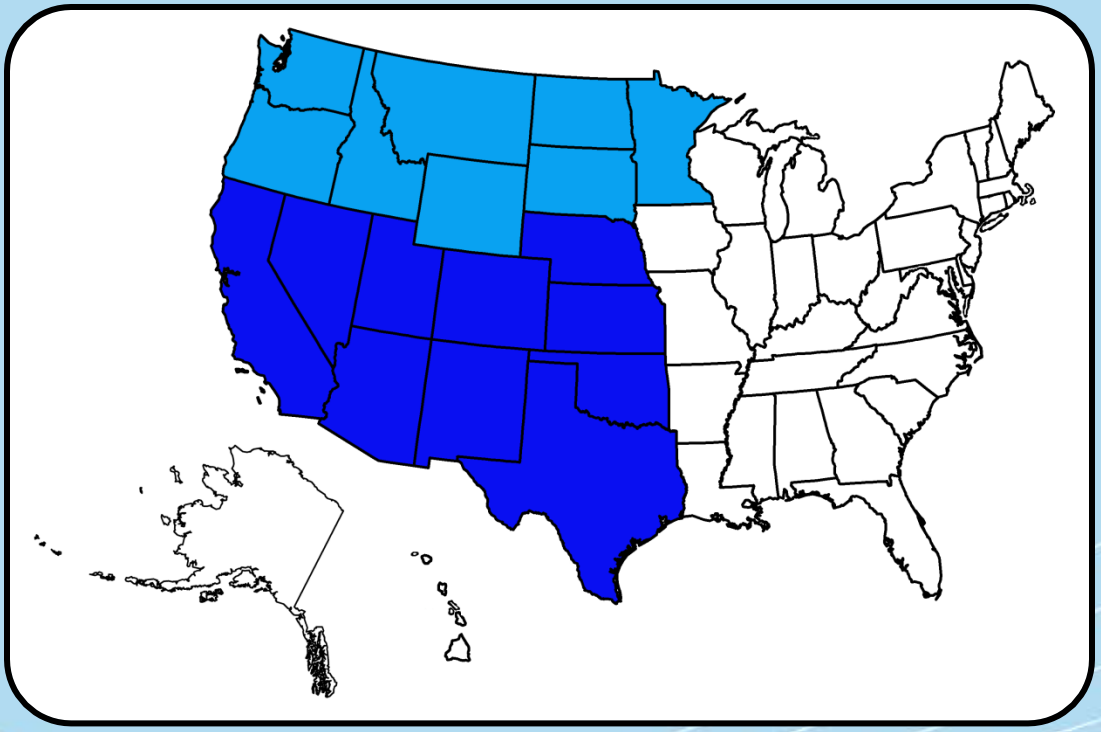
Distribution map of the potato psyllid in the Americas

- Lighter blue areas are colonized intermittently.

- Note that half of North America has no potato psyllids.



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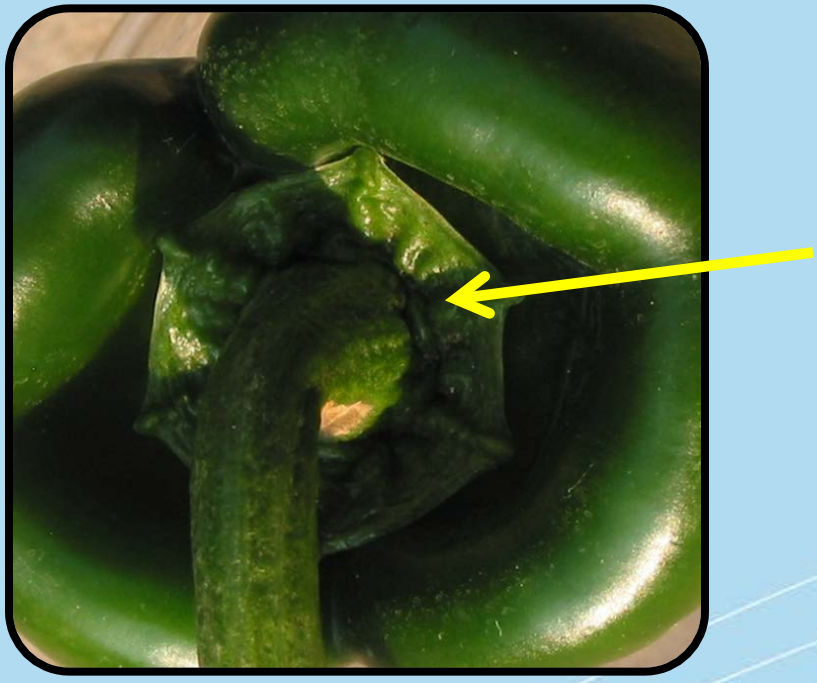
Hosts of the potato psyllid

- Over 20 families and 40 plant species are hosts, but they prefer Solanaceous plants.
- Usually found on leaves.
- Can be on pepper fruit.
- Causes a regulatory hazard



Psyllid nymphs hide under the calyx of the peppers.

Photo: Susan Halbert FDACS/DPI

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Life cycle of the potato psyllid

- Eggs

Photo: Joe Munyaneza, USDA/ARS

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Life cycle of the potato psyllid

- Nymphs

Late stage nymph

Early stage nymph

Photos: Joe Munyaneza, USDA/ARS

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Life cycle of the potato psyllid

- Adults

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

Photo: left - Joe Munyaneza, USDA/ARS; right - Susan Halbert, FDACS/DPI

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How to identify potato psyllids

- Slide mounted specimens required for identification by a trained taxonomist
- Your local county extension agent can advise you on sample submission for identification
- There are many similar species of psyllids that may look like potato psyllid, but they are found on other plants.

Are there other psyllids found 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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Direct damage from potato psyllids

Damage to the stems of potato plants caused by the potato psyllid

Psyllid yellows in 'Atlantic' potatoes.

Photo: Joseph Munyaneza, USDA/ARS

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

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Tuber damage from psyllid yellows

- Growth to slow or stop, tubers are commonly misshaped and can begin sprouting before harvest.

Tubers prematurely sprouting prior to harvest due to psyllid yellows.

Photo:

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Pathogen transmission by potato psyllids

- Potato psyllids transmit bacteria that cause zebra chip disease in potatoes.
- Symptoms occur in foliage and tubers.

Foliar symptoms of zebra chip disease

Photo: Joseph Munyaneza, USDA/ARS

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Pathogen transmission by potato psyllids

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

Photos: Joseph Munyaneza, USDA/ARS

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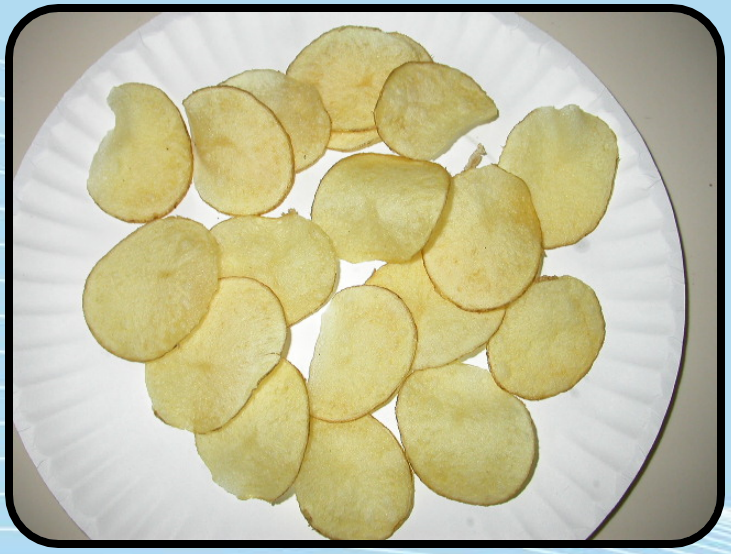

Photos: Joseph Munyaneza, USDA/ARS

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

- Solanaceous crops are subject to many disorders and diseases.
- Zebra chip disease can only be diagnosed by a laboratory.
- If you suspect that you have potato psyllids and your crop may have zebra chip disease, contact your local extension agent.

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How do potato psyllids move?

Potato psyllid nymphs

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Photos: Nina Zagvazdina and Susan Halbert, FDACS/DPI; truck -

Management of potato psyllids

- No cure for zebra chip disease.
- Management of psyllid populations is key.
- The first step in management is monitoring.
  - Use sweep nets and vacuum devices or sticky traps for adults.
  - Use visual inspection for eggs and nymphs.

Photo: USDA/NIFA

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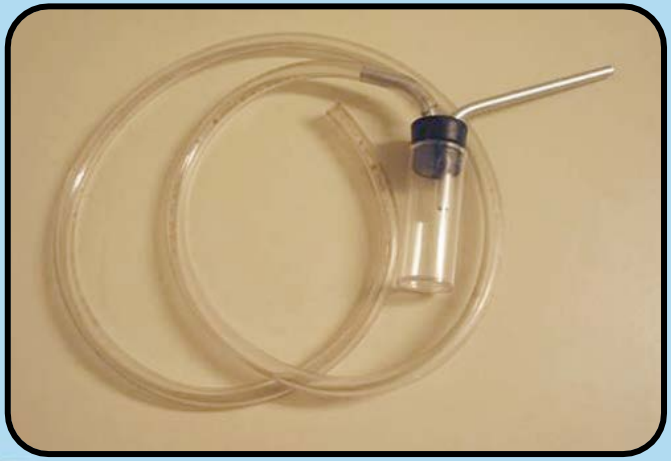
Monitoring for potato psyllids



Aspirator

Sweep net

- Sweep nets and vacuum devices:
  - Use a very fine mesh net.
  - Do not beat the foliage – aim for 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.

Photo: Susan Halbert, FDACS/DPI; net - Norman E. Rees, USDA Agricultural Research Service - Retired , www.bugwood.org, 30025086

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Monitoring for potato psyllids

- Sticky traps:
  - Yellow sticky traps can also be used to monitor for adults.
  - A psyllid pheromone is being developed at ARS-Wapato.

Photos: Joseph Munyaneza, USDA/ARS

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Monitoring for potato psyllids

- Visual inspection:
  - Look on the leaves and other above ground parts of the plant for eggs and nymphs.
    - 100 leaves (10 from 10 locations along field perimeter).
    - Labor-intensive

Photos: Joseph Munyaneza, USDA/ARS

Cultural control for potato psyllids

- Planting date may affect the occurrence of zebra chip disease

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

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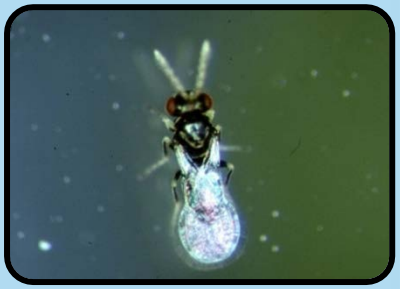
Biological control for potato psyllids

- 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.

Lady Beetle

Damsel bug

Minute pirate bug



Parasitoid wasp

Lacewing

Photo: minute pirate bug - Bradley Higbee, Paramount Farming, www.bugwood.org, #9005024, Damsel bug- Joseph Berger, Bugwood.org, #5435575; Lady beetle- Russ Ottens, University of Georgia, Bugwood.org, #5367975; Green lacewing- Whitney Cranshaw, Colorado State University, Bugwood.org, #1475072; Parasitoid wasp- Whitney Cranshaw, Colorado State University, Bugwood.org, #1243148.

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Chemical control for potato psyllids

- Currently, most management to control for zebra chip disease depend on chemical control.
- Application timing depends on monitoring efforts.
- Consult your local extension agent for specific recommendations for your area.

Photos: Joseph Munyaneza, USDA/ARS

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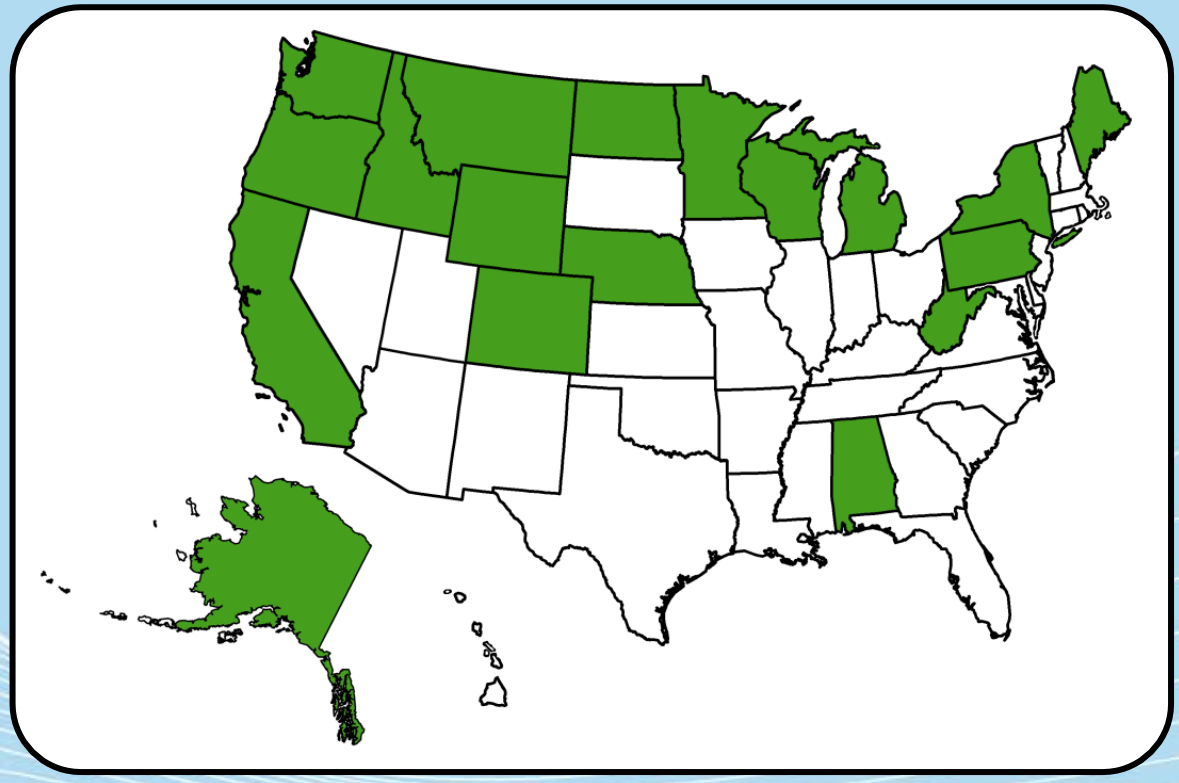
Regulatory measures

- State and federal regulations prohibit movement of psyllids and pathogens into areas where they are not known to occur.
- Seed testing and certification is required in most potato producing states.



Map of states with seed certifying agencies.

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Questions?

- For more information, check out www.protectingusnow.org
- You can also contact:
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Extension Disaster Education Network (EDEN)

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Cooperative Agriculture Pest Survey Program (CAPS)

National Plant Board (NPB) and State Departments of Agriculture

National Plant Diagnostic Network (NPDN)

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