

Presentation Summary: Thrips in Potatoes

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WHAT ARE THRIPS?

Photo: Szent István University



- Adult female: 1-1.5 mm long, antennae, 8 segments, reddish-yellow to mid-dark brown, winged

- Adult male, Juvenile: translucent, yellowish body, reddish eyes

- Have piercing/sucking mouthparts, used to penetrate plant cells

- Short life cycle (egg to adult in as little as two weeks) under hot dry conditions

Image above: Thrips at various points of the life cycle –light coloured juveniles to the left and winged adult to the right (note that the male adult is also light coloured).

WHY ARE THRIPS A CONCERN?

Photos: K. Jack, ES Cropconsult Ltd.

Thrips cause damage through:

- Feeding
- Egg laying
- Virus transfer

How to identify thrips damage:

- Shiny
- Speckled
- White or silvery scarring
- Hairspray-like
- Frass → dark specks
- Easier to see if moved in sunlight
- Rough lines
- Running along the veins
- Juvenile and adult thrips
- Predators of thrips



Image above: Varying levels of thrips feeding damage on potato leaves – underside (left), topside (right).

How thrips feeding damage differs from other feeding damage:

Thrips Damage	Other Insect Damage
<ul style="list-style-type: none"> • Likely to find feeding damage along the veins, and on the back of the leaf • May find damage on both sides of leaves but does not show through from one side to the other • Feeding damage silvery in colour and shiny 	<ul style="list-style-type: none"> • Lygus nymph damage → likely to find damage that breaks through the leaves, puckering of leaves • Spider mites damage → visible through both sides of the leaf, likely to be webbing even if mites aren't present • Aphid damage → look for presence of aphids or their corpses, also leaf yellowing/purpling

Virus transmission by thrips:

- Tomato spotted wilt virus (TSWV) of greatest concern
 - exists on weeds in the Fraser Valley
 - some thrips species found in local potato fields can transmit TSWV
 - has caused issues in Australia → reduced potato yield and compromised seed potatoes
 - difficult to ID in field, similarities to early and late blight and nutrient deficiencies on leaves (Image right: TSWV on potato leaves)
- Only thrips larvae acquire viruses, but both larvae and adults transmit the viruses to plants



Photo: M. McGrath, Cornell University

Climate concerns:

- The Fraser Valley is expected to experience hotter, drier summers and milder winters
 - Thrips thrive under hot dry summer weather and are more likely to survive milder winters
- Data summarized from historical E.S. Cropconsult monitoring reports also demonstrates increasing thrips populations in potato fields
 - In the late 1990's and early 2000's, thrips management recommendations were rarely made for more than one field per year
 - Since 2003, thrips management recommendations have been made in 5% to 20% of fields

THRIPS PROJECT OUTLINE AND UPDATE

PROJECT: *Evaluation of thrips damage to potatoes in a changing climate*

Objective A → Evaluate yield loss due to thrips damage to potato crops in relation to growing season conditions.

- Four fields with trial plots, plots treated weekly with: Insecticide, Water, and Untreated
- Counted thrips on leaves and sticky cards and assessed thrips feeding damage weekly
- Treatments were effective on thrips damage – less thrips damage in Insecticide plots compared to Water and Untreated plots

Objective A continued

- Impact of thrips damage on yield loss was only significant in one field
- Analysis also revealed that early feeding damage may have more effect on yield loss
- Will repeat field trials in 2016 growing season

Objective B → Assess occurrence of thrips vectoring tomato spotted wilt virus (TSWV) to potatoes within the Fraser Valley.

- Thrips and thrips-damaged leaves were collected for analysis from 16 fields
- Leaves were tested for TSWV with enzyme linked immunosorbent assay (ELISA)
- All samples tested negative for TSWV
- Different locations and varieties will be included in sampling in 2016

Objective C → Evaluate potato varietal difference in thrips attraction.

- Data was mined from E.S. Cropconsult's 2015 potato monitoring
- Potato variety differences were complicated by:
 - Surrounding crop → grass, grains, strawberries and peas harbouring more thrips
 - Geographic orientation → more thrips at south, east and west edges due to wind from the south east and south west

Objective D → Increase grower knowledge of the effect of thrips on potato yield and quality, and which varieties can be used to adapt to thrips issues as the climate changes.

- Survey completed in fall 2015 with 30 growers (high response rate of 79%)
 - Most growers have heard of thrips
 - Clear concern was raised about climate change and subsequent thrips issues
 - Knowledge gaps identified:
 - Thrips and thrips damage identification
 - Varietal susceptibility
 - Climate which thrips thrive under
 - Management practices
- Updates on findings will be distributed to growers directly involved in virus and yield testing

KEY TAKE-HOME MESSAGES

- Thrips can cause damage through feeding, egg laying and virus transmission
- As climate changes we will likely have more thrips issues
- It appears that early season feeding damage can have an effect on yield
- No TSWV was found so far
- Variety, surrounding crop, and geographic orientation all appear to play a role in risk of thrips issues
- Finally, most growers are aware of thrips, many are concerned about climate and thrips, and there are knowledge gaps related to thrips identification and management

This project was made possible through the following funding sources and partners:



Potato Industry Development Fund

