Potato Leafhopper Management

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Potato leafhopper (PLH)

*Empoasca fabae*

Nymphs

Hopperburn

Adult + nymph
Potato Leafhopper Life History

- Economically damaging pest of alfalfa, potato, soybean, raspberry, maple
- Feeds on >200 broad leaf plants
- Prefers to feed on new growth
- Piercing-sucking mouthparts → phloem feeders
- Documented as a pest on hops in 1800s (Magie 1942)
- 2-3 generations/season
- Has killed first year hop plants in Northeast
- Yearly population variation

Yearly Population Variation

Alburgh, VT
- 2012: Late June peak
- 2013: June-July steady
- 2014: Low pop, late arrival
- 2015: Late June peak
- 2016: High pop, late June peak
1st Instar Nymphs

Second Generation 6/23/17

Severe Hopperburn

No Hopperburn
Hopperburn

Visual damage doesn’t show up until ~ 5 days after feeding occurs.

Control Option

- Spray pyrethroid insecticide
  - Significantly reduce PLH population
  - Risk two-spotted spider mite outbreak

- As of 2017, there is no PLH Economic Threshold.
- Current recommendation to shake plants. If PLH adults fly out, you need to spray.
Yes, you can try releasing biocontrols...

Lady bugs can fly away.

-Squirt them with water
-Keep in fridge
-Release in the evening

Research into Alternatives

1. Trap Cropping

2. Plant Defense
   (physical and chemical)
Management in Other Crops

1. Intercropped soybean with w. wheat. PLH is not attracted to these fields.

2. Plant defense. Resistant alfalfa varieties have very hairy leaves.

Miklasiewicz and Hammond 2001

In years with high PLH population and well established clover stand PLH preferred red clover over hops.

Calderwood et al. 2017
Mono vs. Polyculture Alfalfa

Alfalfa Monoculture

Preferred by PLH

Alfalfa Polyculture


Trap Crop Management

• How big does a legume stand need to be?
• How far into the hop yard does the alfalfa pull PLH away?
• Do the leafhoppers need to be removed from the trap crop at a certain density?
2016-2017 SARE Farmer Grant

- Alfalfa trap crop plots are 4000 ft²
- Sticky card placed in trap crop trts and throughout hop yard
- 4 replicates

20 + acre potato field!

July 1 (Average Peak PLH population)
Yard B, 2016 Mean PLH/trap. **Excluding July 1.**

<table>
<thead>
<tr>
<th>Spray</th>
<th>Control</th>
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<tr>
<td>STERLING XXX</td>
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<tr>
<td>ALPHARCIMA/BAKAU</td>
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<td>NUGGET</td>
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<td>MAGNUM</td>
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Yard B, mean whole season PLH/trap **including July 1.**

**June 20** → mean 4 PLH/trap  
**July 1** → mean 75 PLH/trap
Surrounding Habitat Influences PLH

Farm B: Surrounded by hay fields + meadow

Farm C: On top of a hill, very windy surrounded by diverse meadow
2. Plant Defense

Have you noticed that PLH prefer some cultivars over others?

2012 and 2013
Mean # PLH/leaf in Alburgh, VT
Hop Plant Defenses and Potato Leafhopper

Liberty

Centennial

More leafhoppers
Less lupulin glands on leaves

Less leafhoppers
More lupulin glands on leaves

Sid Bosworth
Currently in search of the “Hairiest Hop”

Hop Looper Caterpillar
Thank you!