



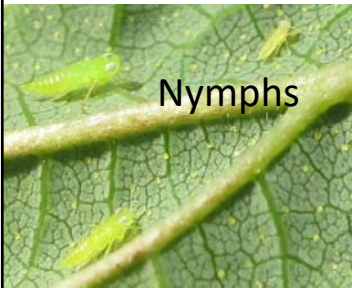
# Potato Leafhopper Management



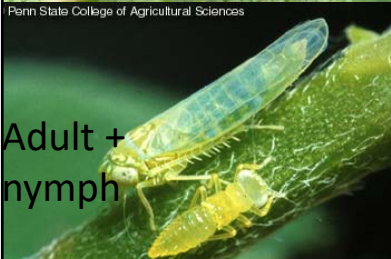
Lily Calderwood, Ph.D.  
Cornell Cooperative Extension  
Capital Area Agriculture & Horticulture Program  
lbc75@cornell.edu

## Potato leafhopper (PLH)


*Empoasca fabae*



Nymphs



Adult + nymph



Hopperburn

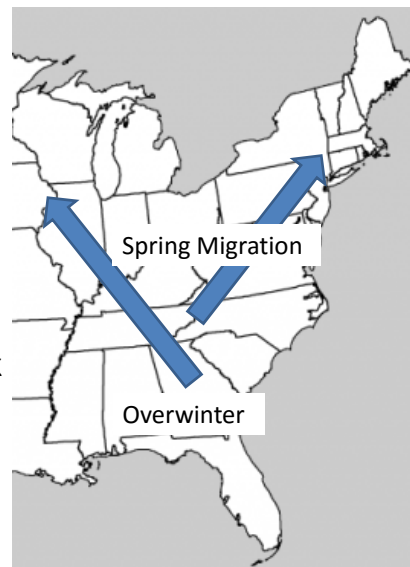
## Potato Leafhopper Life History

- 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

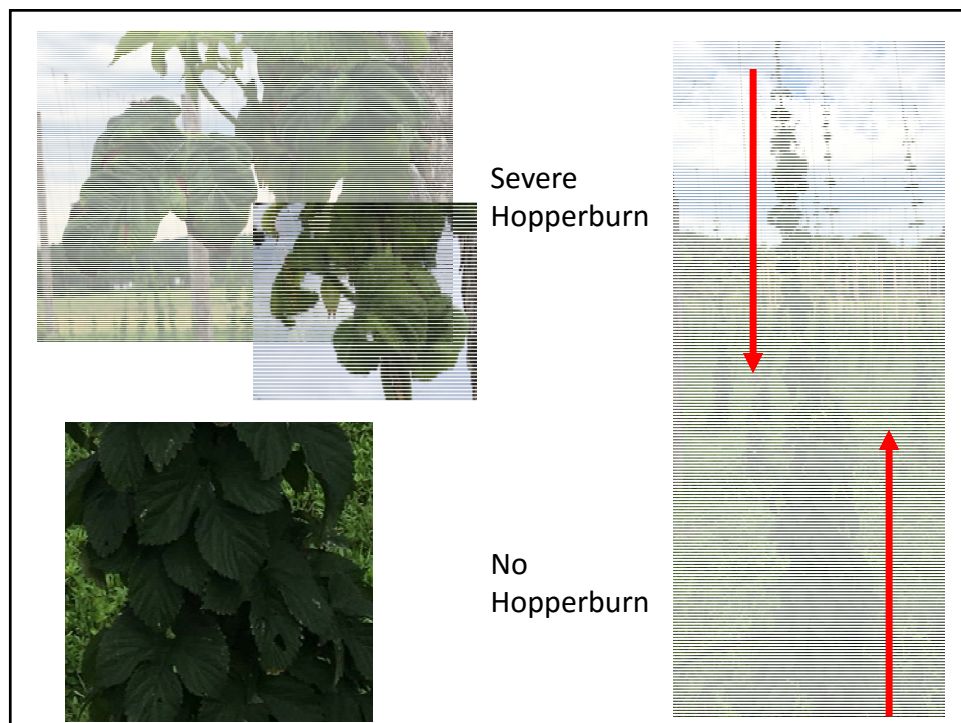
## Yearly Population Variation

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



Calderwood et al. 2015



## Hopperburn



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

## Control Option

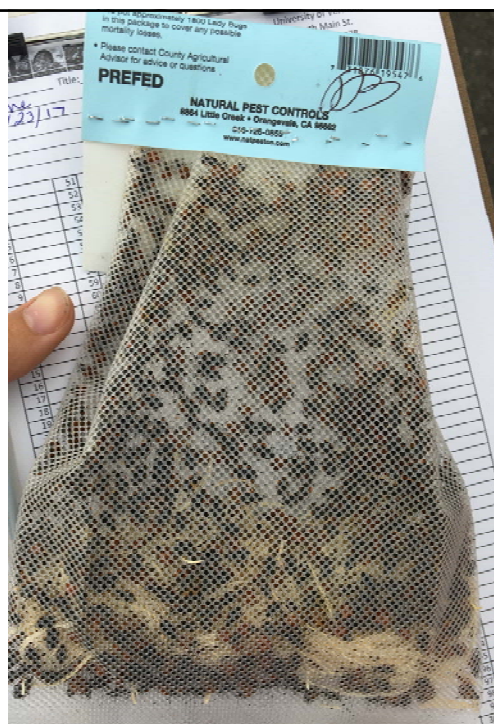
- Spray pyrethroid insecticide
  - Significantly reduce PLH population
  - Risk two-spotted spider mite outbreak
- As of 2017, there is no PLH Economic Threshold.
- Current recommendation to shake plants. If PLH adults fly out, you need to spray.



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)

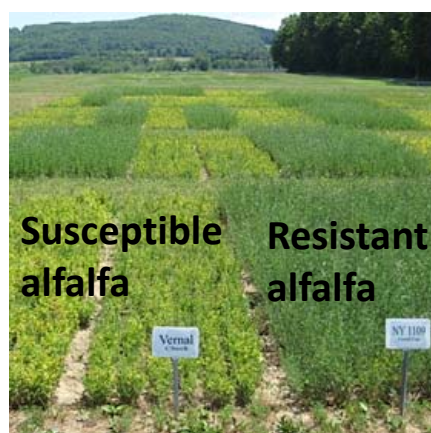
## Management in Other Crops

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



Miklasiewicz and Hammond 2001

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



Elden and McCaslin 1997

## 1. Trap Cropping Flowering Ground Cover Study

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



Clover stand  
(10 x 30 ft)

>



Hop plants

>



Diverse mix  
(Polyculture)

Calderwood et al. 2017

## Mono vs. Polyculture Alfalfa

Alfalfa Monoculture

Preferred by PLH

Alfalfa Polyculture

Lamp et al. 1984, Oloumi-Sadeghi et al. 1987, Lamp 1991, and Straub et al. 2013



## 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?





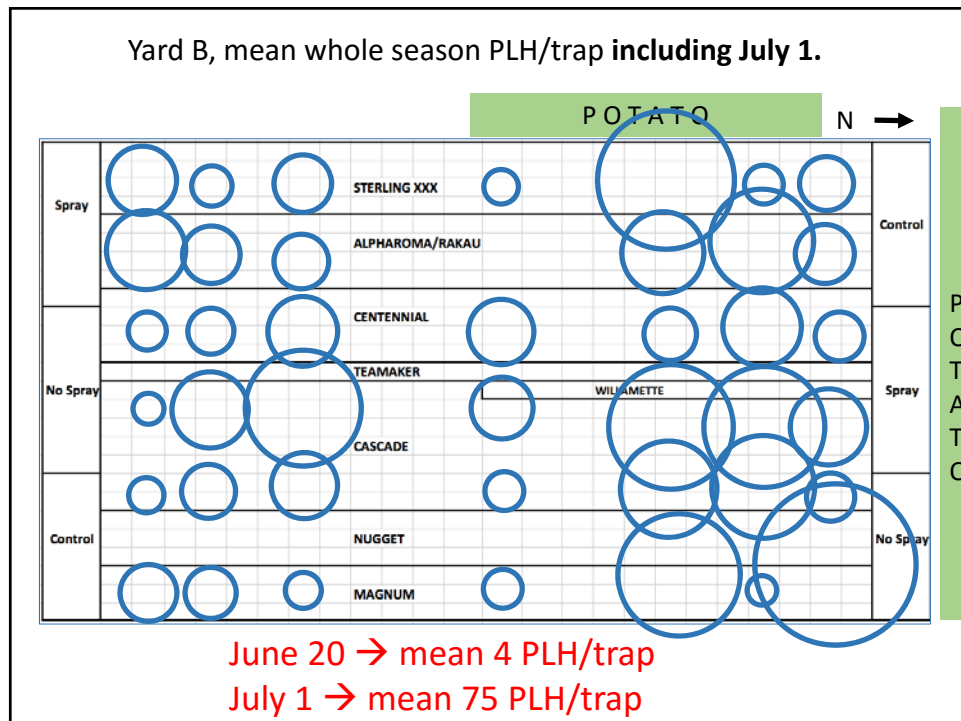
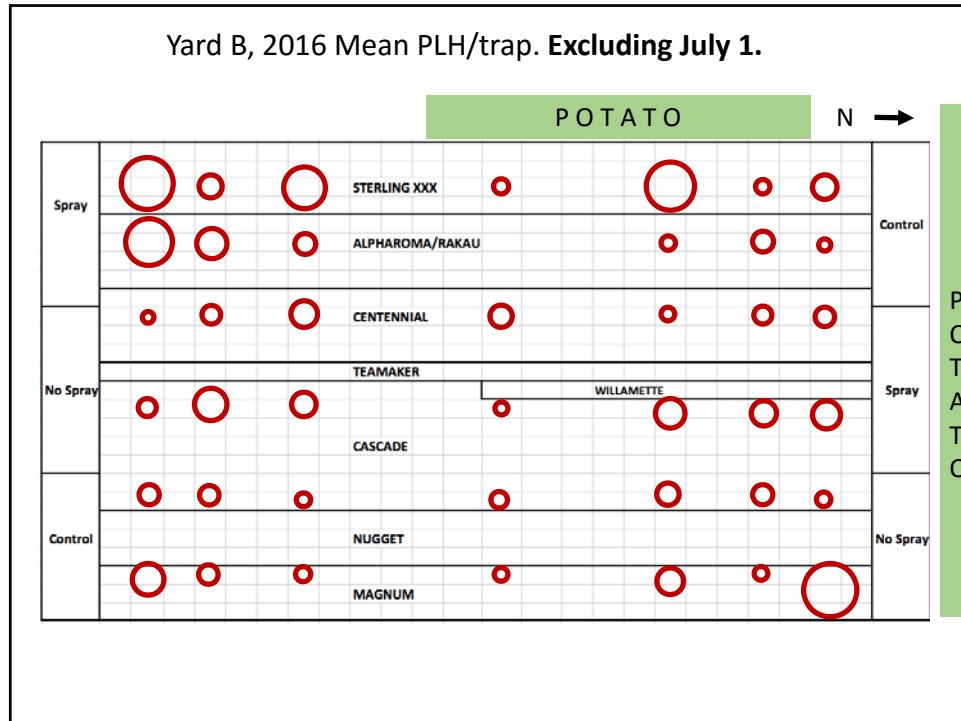
## 2016-2017 SARE Farmer Grant



## July 1 (Average Peak PLH population)







## Surrounding Habitat Influences PLH

Farm B: Surrounded by hay fields + meadow

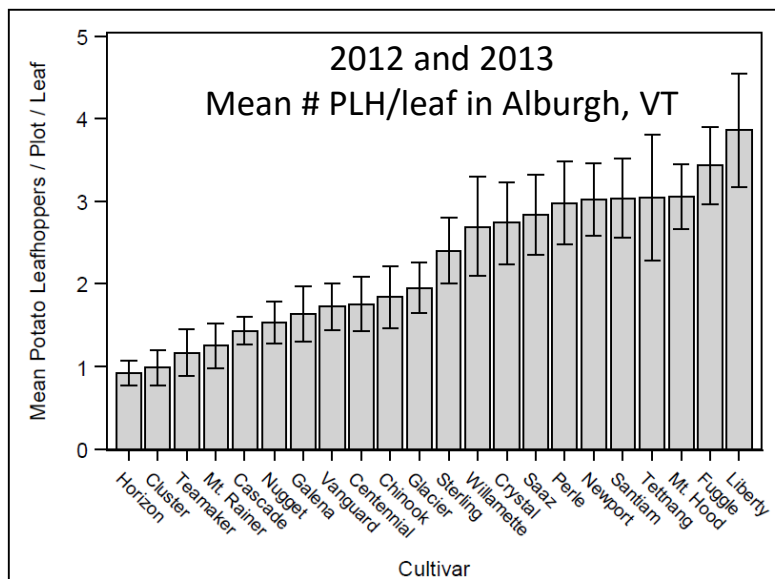


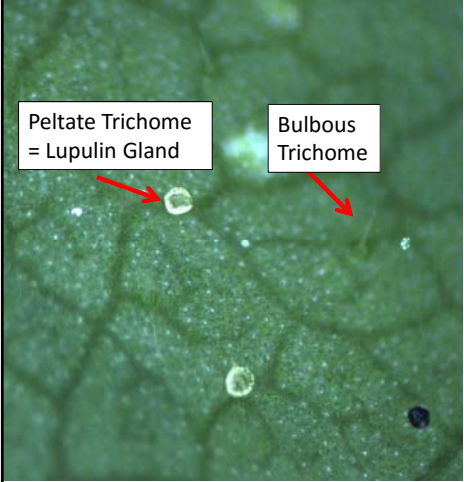
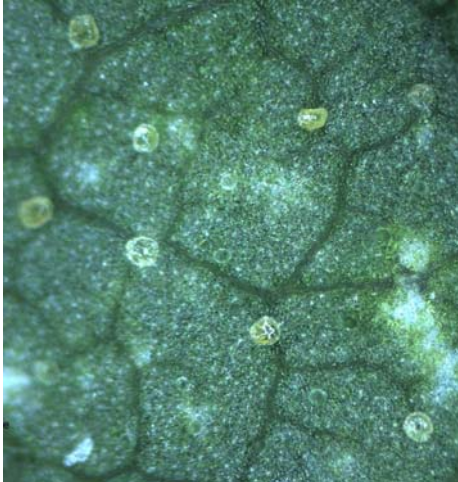
Farm C: On top of a hill, very windy  
surrounded by diverse meadow


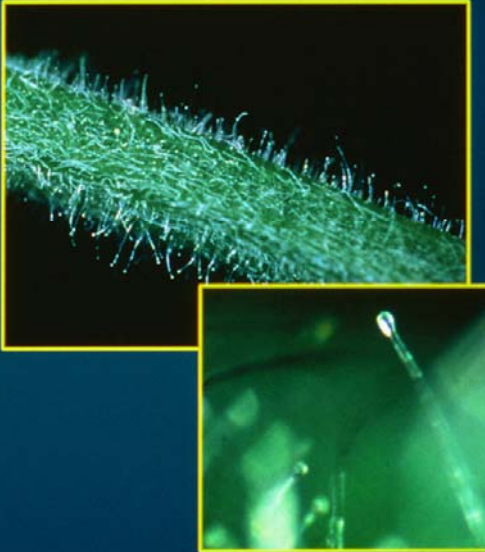


## 2. Plant Defense

Have you noticed that PLH prefer some cultivars over others?



Hop Plant Defenses and Potato Leafhopper	
Liberty	Centennial
	
<p>More leafhoppers Less lupulin glands on leaves</p>	<p>Less leafhoppers More lupulin glands on leaves</p>

Standard Cultivar	PLH Resistant
	

Sid Bosworth





Thank you!

