

# **The Spotted Lanternfly, *Lycorma delicatula*: Penn State Research Update: July 16, 2018**

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Photo : Pennsylvania  
Dept. of Agriculture

# Overview

## Current Funding:

### **Farm Bill Funds**

-- **Urban Lab**

-- **Baker Lab**

### **PA Agriculture Resource Center Funds**

-- **Biddinger, Urban, Mason, Centinari,  
Krawczyk, Leskey, Timer (several projects)**

### **PDA Funding (Gov. Wolf designated funds)**

-- **Hughes**

-- **Biddinger, Urban, Mason, Lopez-Uribe**

### **Wine Association: Effects of SLF on Wine Palatability**

-- **Kelly, Centinari, Ali, Urban**

# **Research Objectives in Urban Lab**

- 1. Use genetics to find the origin of SLF in Pennsylvania**
  - Determine origin of SLF detected in other areas**
- 2. Characterize internal microbial associates of SLF**
- 3. Characterize changes in microbial communities on plants/trees associated with SLF feeding and honeydew deposition**

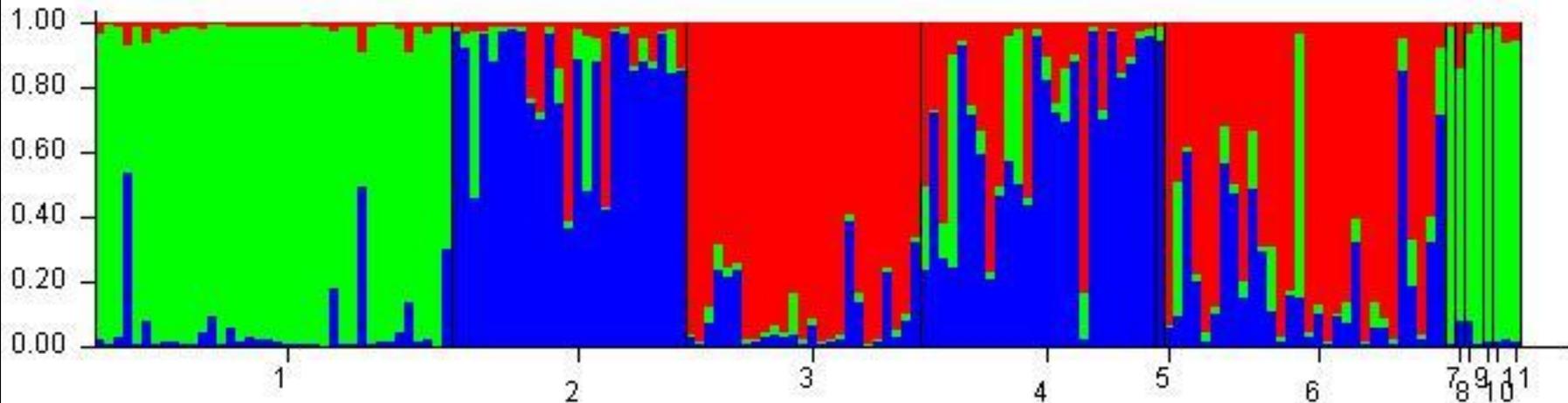
# Research Objectives in Urban Lab

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**-- Determine origin of SLF detected in other areas**

**microsatellite sequencing**

**~320 genotyped w/ Parks et al. markers**



# Research Objectives in Urban Lab

## 1. Use genetics to find the origin of SLF in Pennsylvania

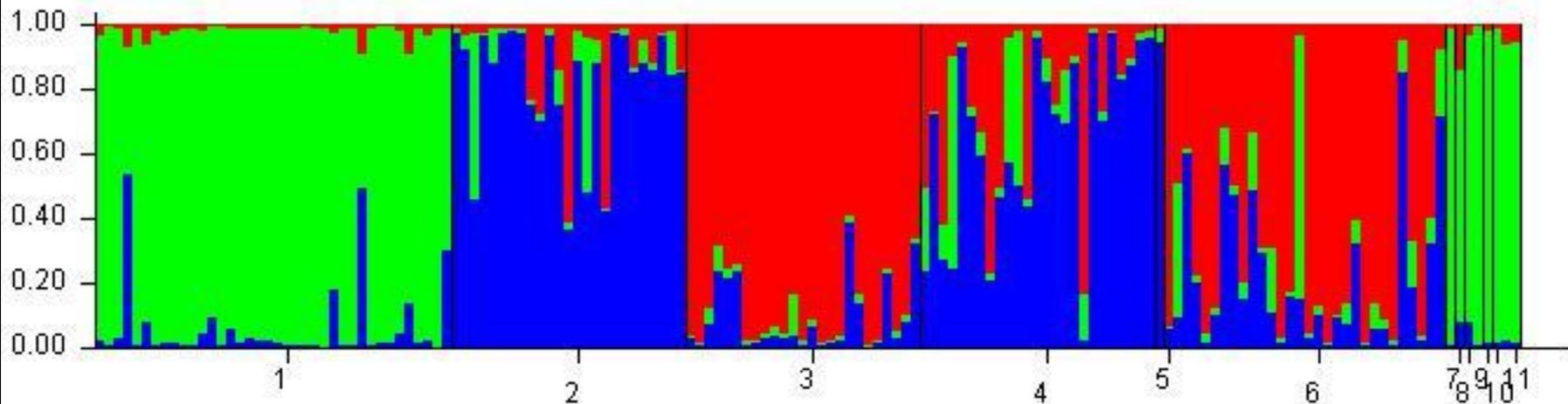
-- Determine origin of SLF detected in other areas

microsatellite sequencing

~320 genotyped w/ Parks et al. markers

NOT from Korea

New markers in development: DNA extracted from ~250 additional SLF



# Research Objectives in Urban Lab

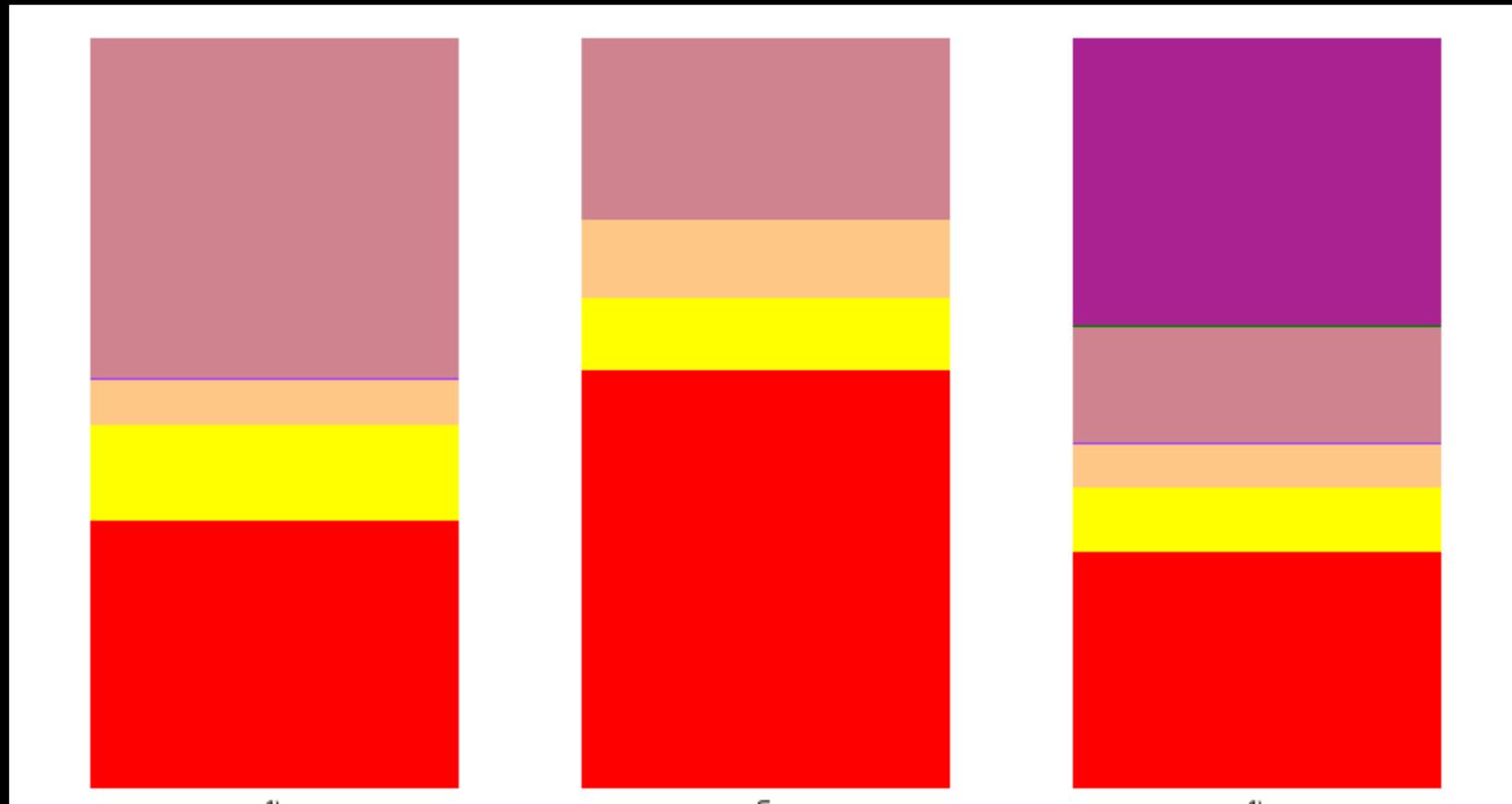
## 2. Characterize internal microbial associates of SLF

Compare *L. delicatula* microbiome of individuals sampled from native versus invaded ranges

**PA  
(invasive)**

**Korea  
(invasive)**

**China  
(native)**



### **3. Characterize changes in microbial communities**

**Taleb, Urban: sooty mold development (DNA-based)**

**-- sampled same surfaces weekly over 9 wks**

**-- DNA extracted from ~170 swabs (leaves, trunks)**

**-- amplification, sequencing July, 2018**



# Research Objectives in Baker Lab

## Behavior of Adult SLF:

**Sex Pheromone Attractant Research**

**Non-Pheromonal Communication**

**Seasonal Changes in Adult SLF**

**dispersal behavior of flying adult SLF**

**changes in wing morphology (w/ Urban)**



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-- Kelly, Centinari, Ali, Urban

# Feeding Damage

**Spring 2018 studies: Experiment + field observations**

**Centinari, Timer, Smyers, Urban grape in vineyard**



# Feeding Damage

**~80 3 yr. old vines planted, Manatawny Vineyard  
vary levels of insect feeding – nymphs, adults**



# Feeding Damage



# Insecticide Efficacy

**Spring 2018: Experiments on fruit trees & grapes**  
**Biddinger, Krawczyk, Leach, Urban; Leskey (colony)**



# **Insecticide Efficacy: Krawczyk**

## **Efficacy against Egg Cases – Beekman Orchard**



# **Insecticide Efficacy: Biddinger, Leach, Urban**

## **Fruit tree & grape study – PSU Berks Campus**

**-- 500 peach trees: test 20 insecticides (contact & residual effects on nymphs, adults)**

**-- 250 1 yr. grapevines (Wine Association Funding)**



# **Insecticide Efficacy**

**Efficacy against Egg Cases – Beekman Orchard**

**Fruit tree & grape study – PSU Berks Campus**

**-- 500 peach trees: test 20 insecticides (contact & residual effects on nymphs, adults)**

**-- 250 1 yr. grapevines (Wine Association Funding)**

**Also w/ Wine Association Funding:**

**Grape grower needs based assessment – Leach & Centinari**

**-- (Leach will discuss in her presentation)**

# **Insecticide Efficacy**

**Leskey update: Fort Detrick Quarantine Lab**

**-- needed window sealed**

**-- permit anticipated: near future (this summer)**

**Will test 20 insecticides under controlled lab conditions**

**-- has Ailanthus, black walnut, hops plants grown in chambers (clean)**

**-- purchased fruit trees to begin feeding trials**

# Feeding Behavior, Impacts, Preferences

Summer 2018: Experiments on ornamentals in Penn State Quarantine Greenhouse

Mason, Hoover, Sattar, Smyers, Urban



# Feeding Impacts

**Ornamentals – PSU Lehigh Valley Campus**  
**Mason, Kackley, Borowski**



# **Insecticide Efficacy**

## **Summer 2018: Experiments on ornamentals**

**Walsh, Mason**

**-- Walsh: applicator's license;  
doing testing on clients'  
properties w/ Arborjet**

**-- Mason: data collection &  
analysis with Kackley,  
Borowski at Lehigh Valley**

**-- Krawczyk: testing products  
available to home owners**

**Working with Biddinger,  
Leach, Calvin, Roush to  
develop recommendations for  
homeowners**



Photo: Brian Walsh, 2017

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# **PDA Funding: Building Capacity**

## **David Hughes**

- Plant Village App development**
- automated band counting**

## **Biddinger, Urban, Mason, Lopez-Uribe**

- tools for multiple research studies:**

**SLF female reproductive development and endosymbiont transmission**

**imaging of parasitized SLF eggs**

**feeding preference studies: Ailanthus  
(w/Hoover)**

**feeding preference studies: phloem flow**

**rubidium tracking of nymphs**

# **PA Wine Association**

**Kelly, Centinari, Ali, Urban:**

**-- effects of SLF on Wine Palatability:**

**Sooty mold influence on wine**

**SLF-harbored toxins in wine**

# Overview

## Grants in Queue:

**HRI: Dependence on Ailanthus**  
-- Hoover, Urban, Mason

**National Association of Departments of Agriculture  
funding for SLF Summit (winter 2019): Dennis Calvin**

## **2018 SCRI Rated High Priority, Not Funded:**

**For short, med., long-term management of SLF in  
tree fruit & grapes (3yr., ~\$2,995,000)**

-- Urban, Baker, Bartlett, Biddinger, Centinari,  
Hoelmer, Krawczyk, Leskey, Rosa, Urban

## **On Horizon AND to Begin Discussing HERE:**

**2019 SCRI**

**2019-2020 Farm Bill Suggestions, Other Grants ???**

# Acknowledgements

**United States Department of Agriculture, APHIS-PPQ**

**Pennsylvania Department of Agriculture**

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-- Heather Leach

-- Dana Roberts

-- Erica Smyers

-- Mariam Taleb

**Collaborators:** Greg Parra, Sven Spichiger, Lawrence Barringer, Dana Rhodes, Ruth Welliver, Leo Donovall, Heather Farrington, David Biddinger, Tom Baker, Ed Rajotte, Tracy Leskey, Kim Hoelmer, Kelli Hoover, Charles Bartlett, Greg Krawczyk, Michela Centinari, Mike Saunders, Jody Timer, Bryan Hed, Greg Setliff, Brian Walsh, Robyn Underwood, Karen Kackley, Pam Borowski, Dave Sanford, Christina Rosa, Sampurna Sattar, Jared Ali, Molly Kelly, Doug Miller, & more & growing