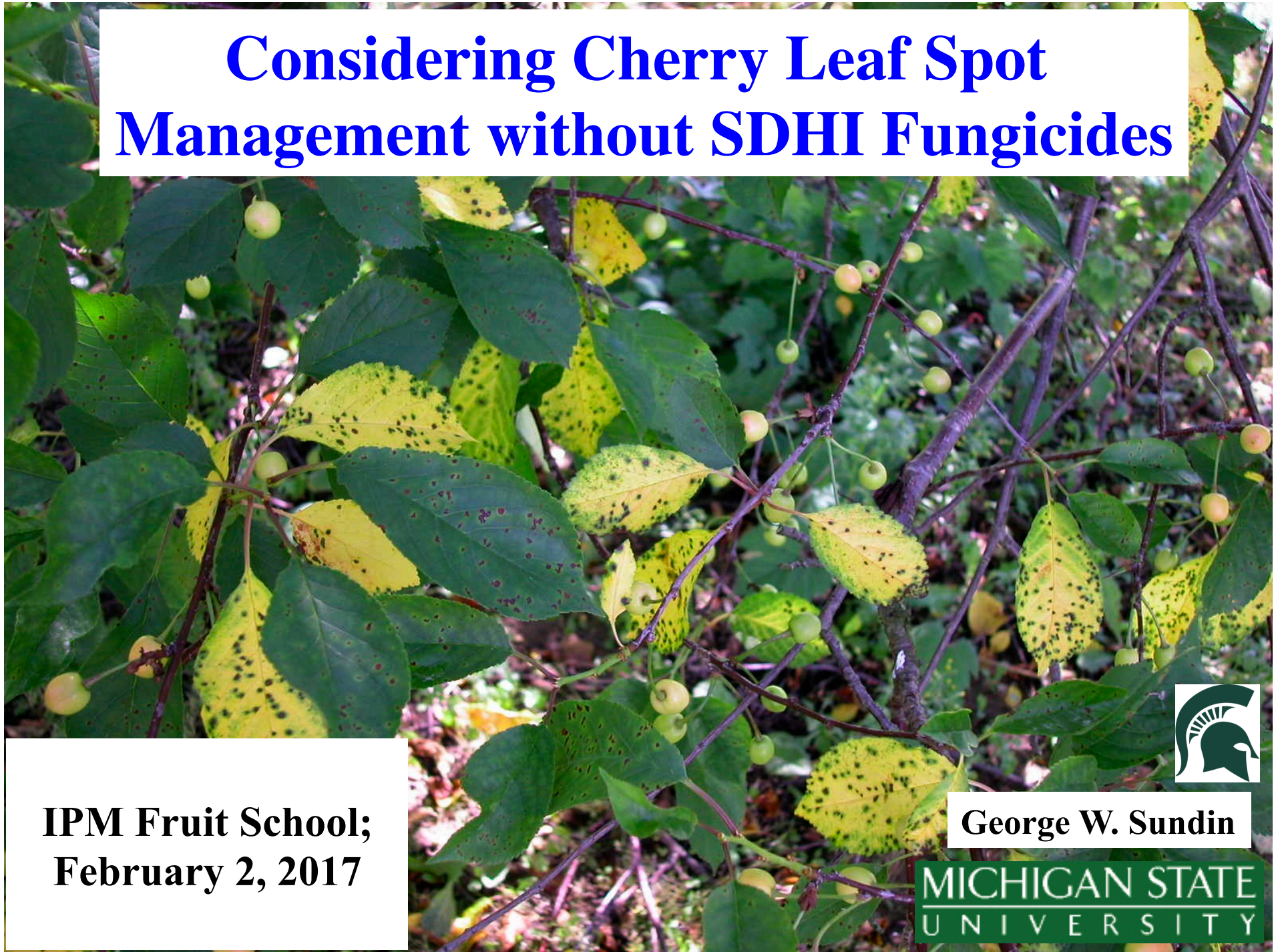


# Considering Cherry Leaf Spot Management without SDHI Fungicides



**IPM Fruit School;  
February 2, 2017**



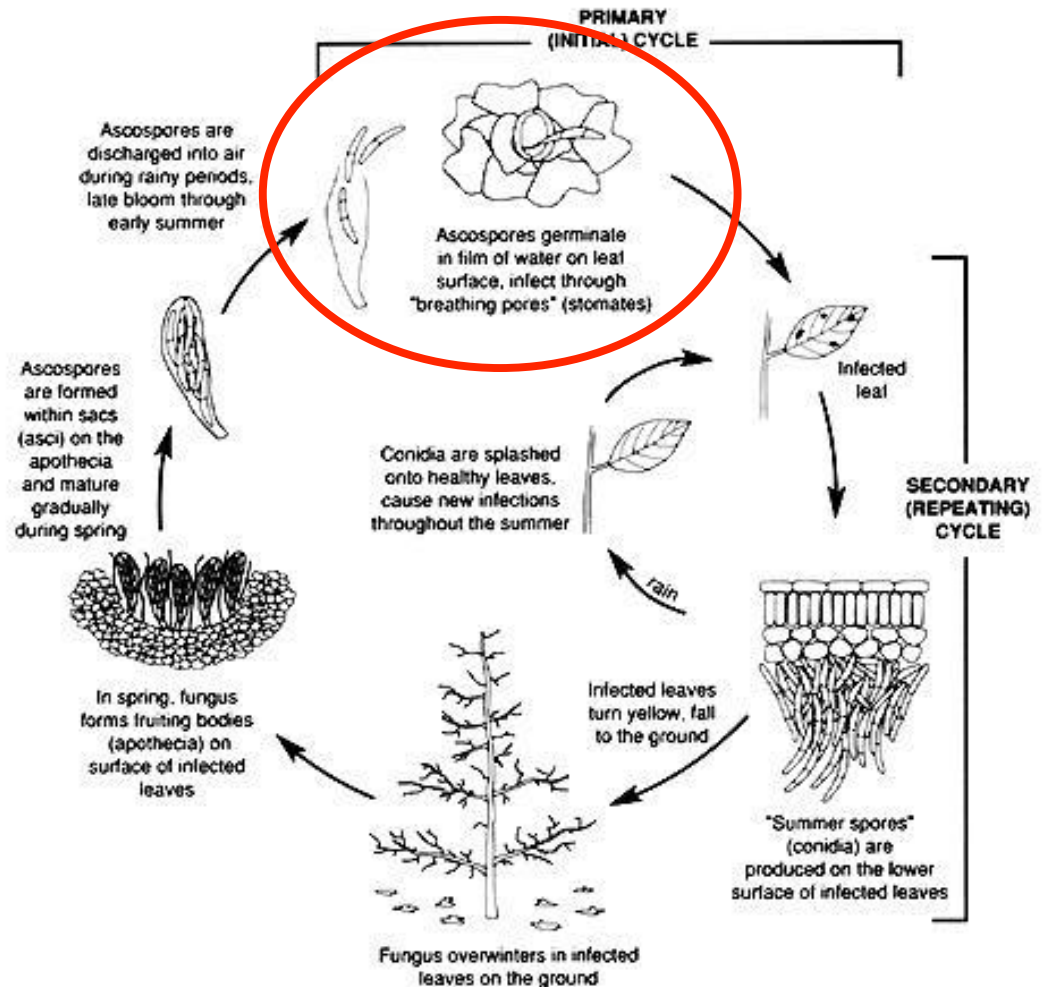
**George W. Sundin**

**MICHIGAN STATE  
UNIVERSITY**

# Review of Cherry Leaf Spot Biology

## Ascospore discharge:

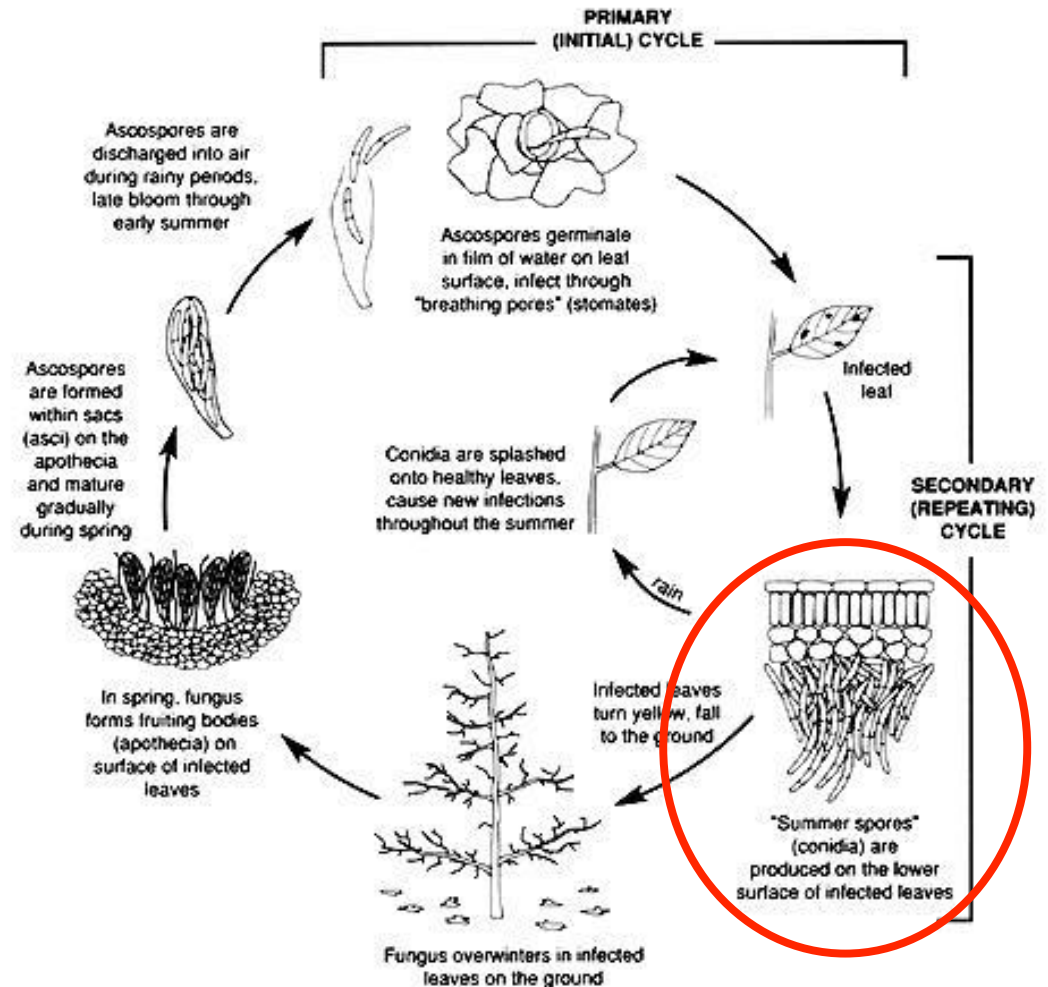
- \* Ascospores released by wetting (bloom + 4-6 weeks)
- \* > 61 F, maximum discharge
- \* 50's F, reduced discharge
- \* 39-46 F, minimal discharge



Cherry leaf spot disease cycle.

# Cherry Leaf Spot -- Life Cycle

- \* Inoculum coming up from ground is readily controllable
- \* However, if we miss an infection, consequences can be severe
- \* Secondary spores >>>>> Primary spores
- \* Much easier for CLS to spread within a tree



Cherry leaf spot disease cycle.

**Once leaf infection occurs –  
even marginal infection  
periods become significant**



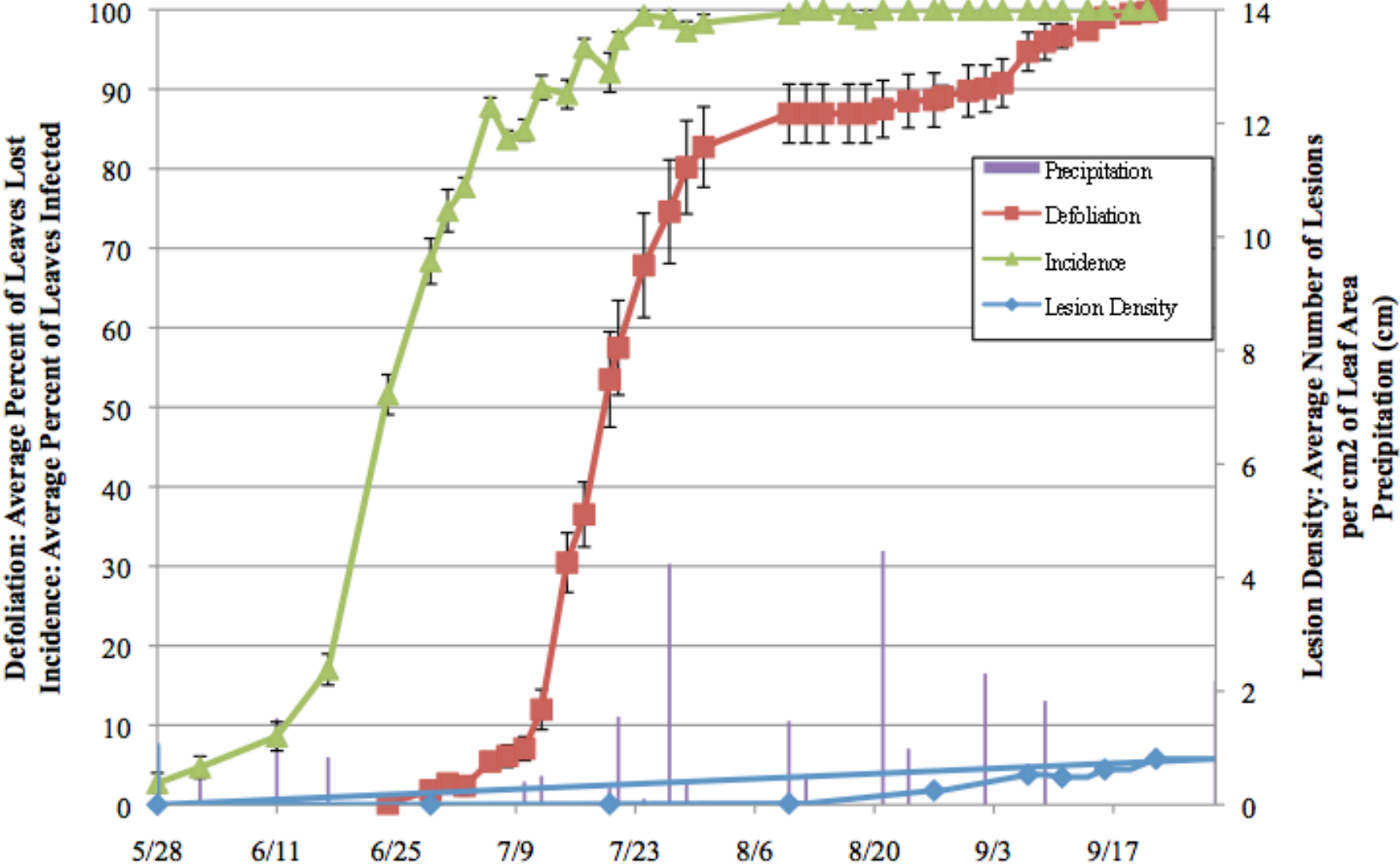
# **Cherry Leaf Spot Management Objectives**

- **1. Control primary infection before harvest**
- **2. Control primary infection before harvest**
- **3. Control primary infection before harvest**
- **4. Control primary infection before harvest**

# **Cherry Leaf Spot Management**

- **Cherry leaf spot is much easier to manage prior to harvest when leaves are “clean” and we are focused on preventing infection prior to harvest**
- **It becomes much more difficult to control CLS when we have sporulating lesions in trees (high pressure)**

# Montmorency (East Lansing)



# **SDHI Fungicide Chemistries for Cherry Leaf Spot Control**

- **Luna Sensation, Merivon**
- **Excellent fungicides for CLS**
  - **Also excellent for powdery mildew**
  - **VG to excellent for American brown rot**
- **Translaminar, persistent during long spray intervals**



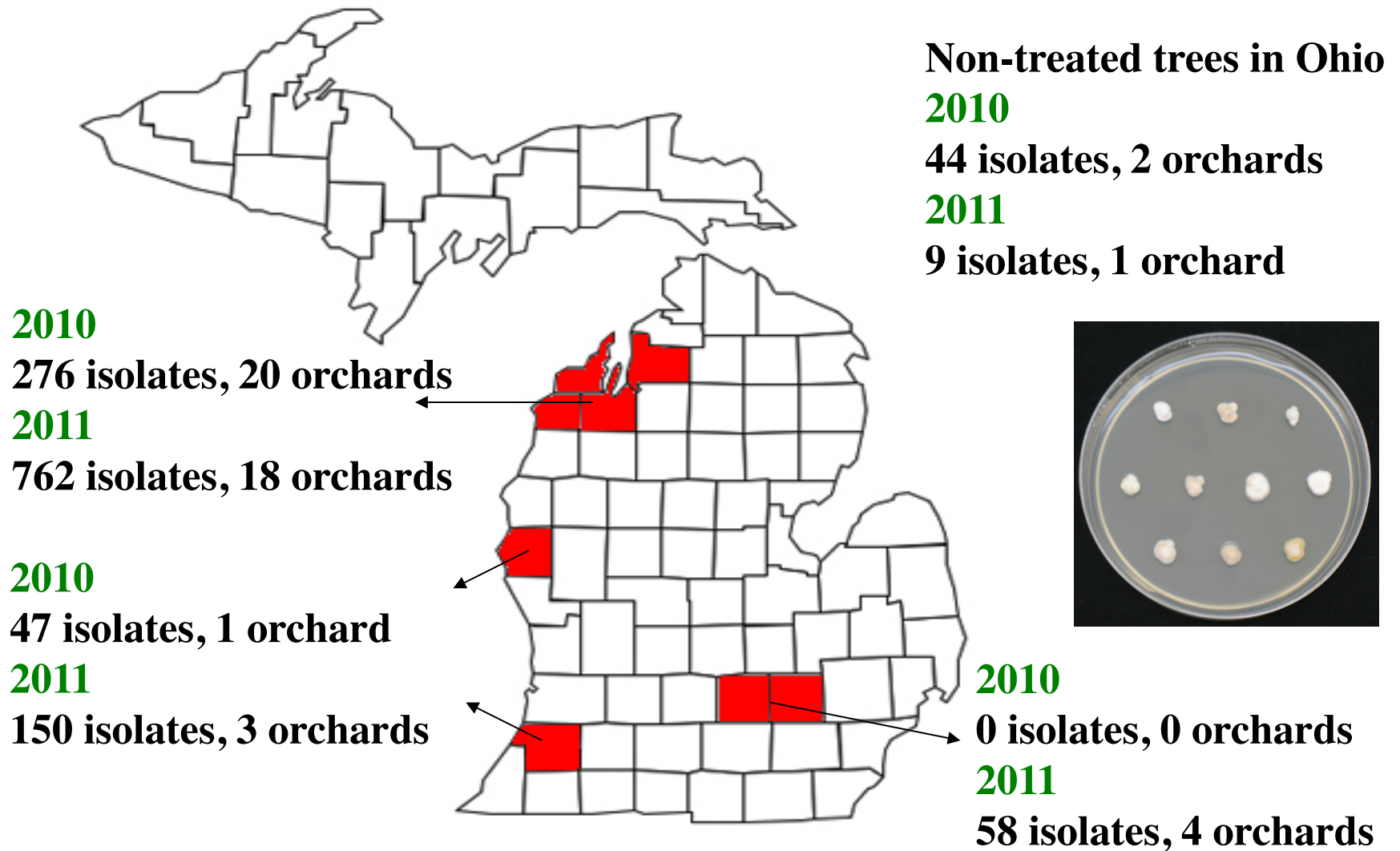
# **The Story of Pristine**

- **First registered in 2004**
- **Premix of boscalid (SDHI) and pyraclostrobin (strobilurin)**
- **Was a really excellent fungicide for CLS**
- **At the time, was a replacement for SI fungicides that we were losing to resistance**

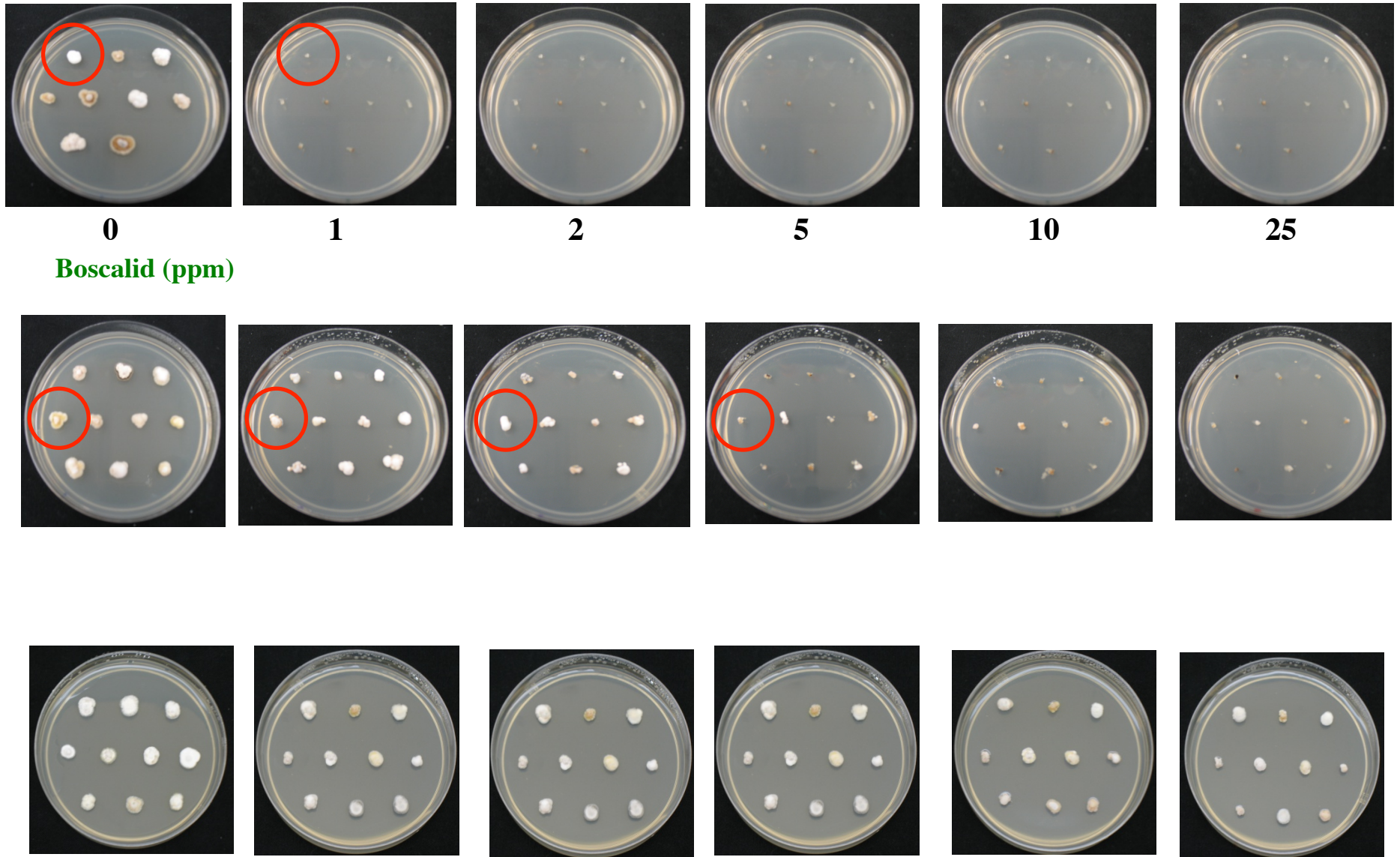
# **The Story of Pristine**

- **First registered in 2004**
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- **Was a really excellent fungicide for CLS**
- **At the time, was a replacement for SI fungicides that we were losing to resistance**
  
- **By 2010-2011, we were observing a reduction in control efficacy in field trials conducted at the NWMHRC**

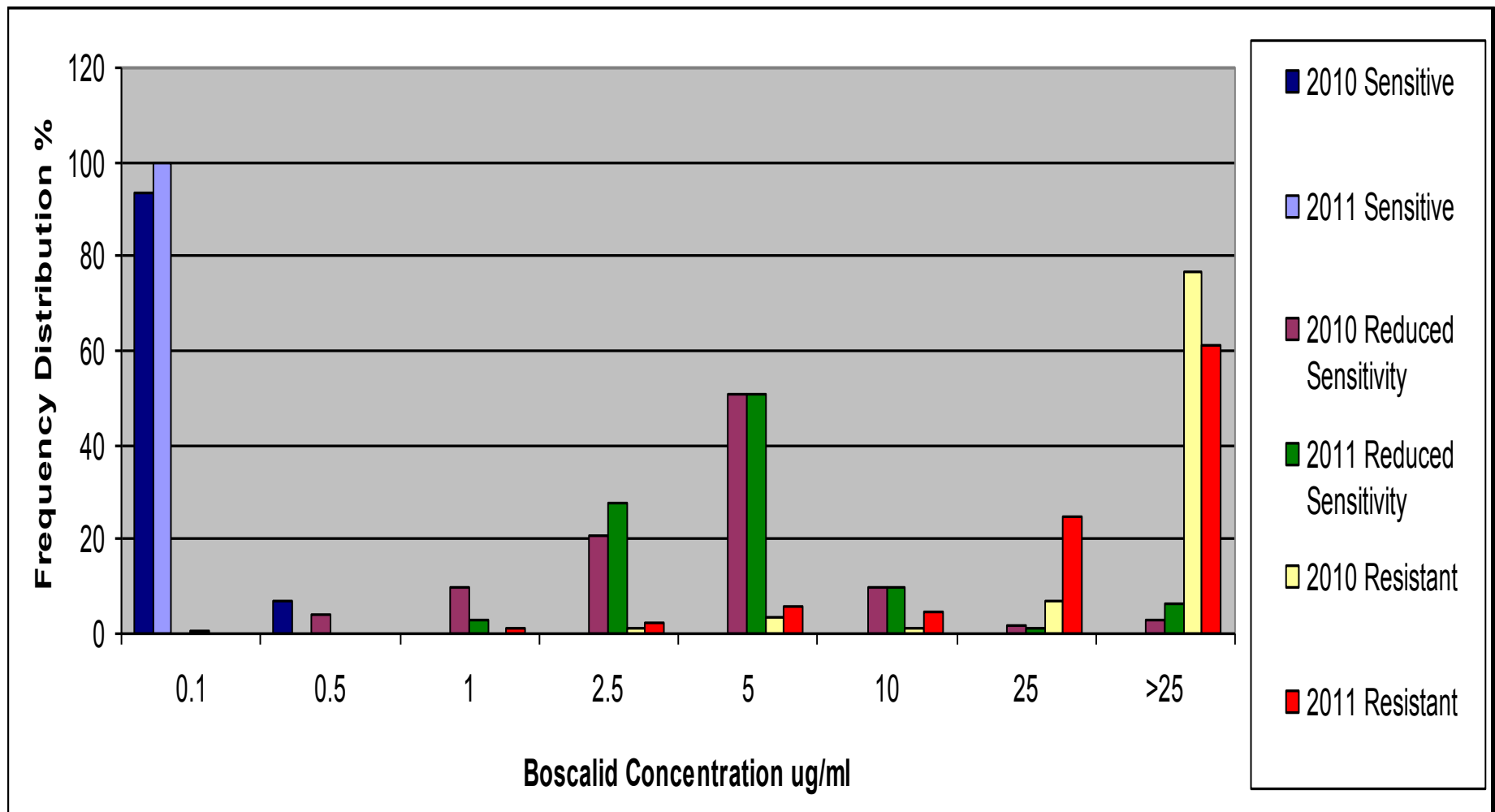
# 2010 and 2011 *B. jaapii* isolate survey



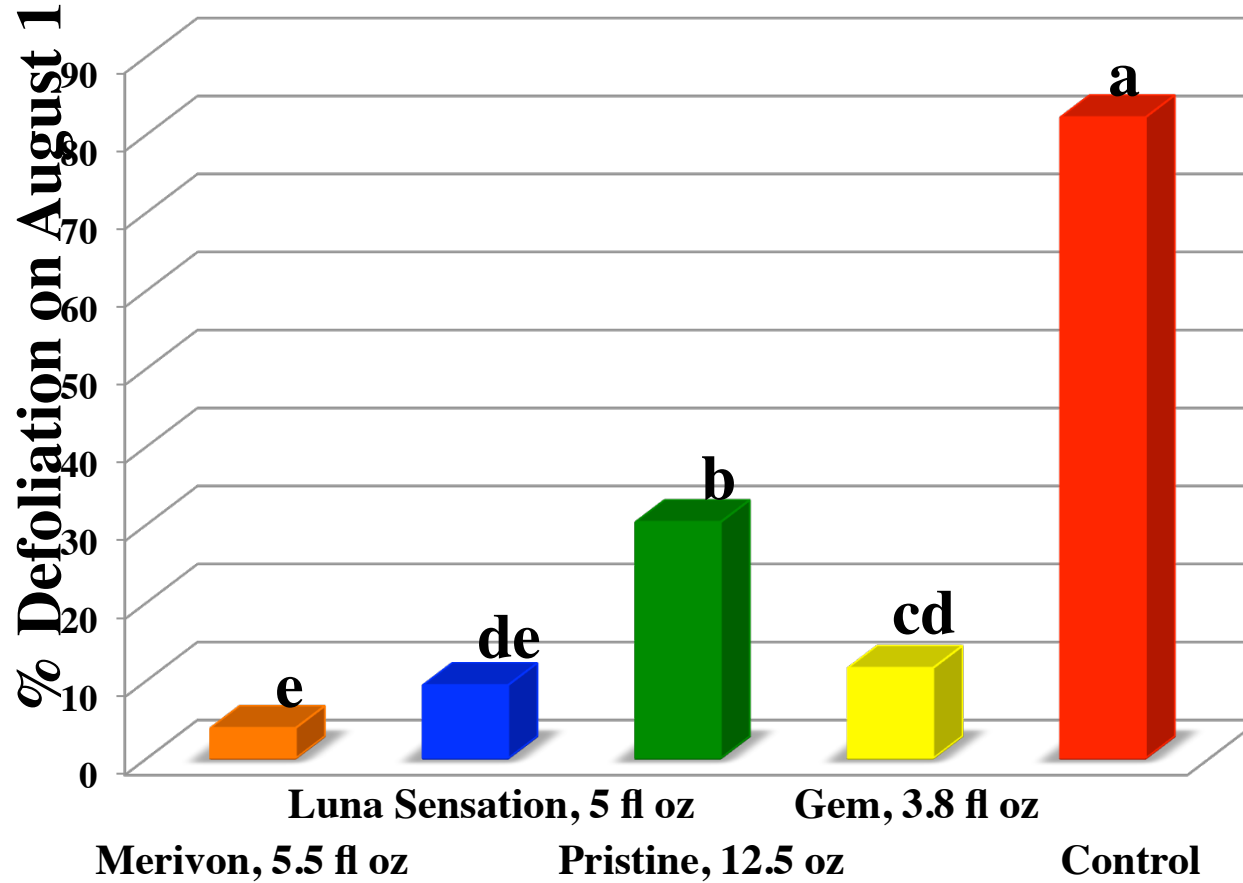
# Boscalid sensitivity analysis in *B. jaapii*



# Boscalid Sensitivity – Isolate distribution per orchard



# 2012 Field Trial at NWMHRC



First two applications are Bravo Weather Stik, 4 pts

# Identification of fungicide resistance mutation in *SDHB* target gene from *B. jaapii* isolates

## Sensitive Isolates

225

272

S1 SCPSYWWNSEEYLGPAVLMQSYRWLADSRDQKKEERKAALDNSMSVYRCHTIL  
S2 SCPSYWWNSEEYLGPAVLMQSYRWLADSRDQKKEERKAALDNSMSVYRCHTIL  
S3 SCPSYWWNSEEYLGPAVLMQSYRWLADSRDQKKEERKAALDNSMSVYRCHTIL

## Isolates with Reduced Sensitivity

RS1 SCPSYWWNSEEYLGPAVLMQSYRWLADSRDQKKEERKAALDNSMSVYRCHTIL  
RS2 SCPSYWWNSEEYLGPAVLMQSYRWLADSRDQKKEERKAALDNSMSVYRCHTIL

## Resistant Isolates

R1 SCPSYWWNSEEYLGPAVLMQSYRWLADSRDQKKEERKAALDNSMSVYRCRTL  
R2 SCPSYWWNSEEYLGPAVLMQSYRWLADSRDQKKEERKAALDNSMSVYRCRTL  
R3 SCPSYWWNSEEYLGPAVLMQSYRWLADSRDQKKEERKAALDNSMSVYRCRTL

# Cherry leaf spot (*B. jaapii*) orchard sampling, 2016

- **34 commercial orchards and the NWMHRC**
  - **NW MI down to Oceana county**
- **872 single spore isolates**
  - **1 leaf per tree, 25 leaves per orchard**
- **Screening sensitivity to SDHIs:**
  - **Boscalid (Pristine)**
  - **Fluopyram (Luna)**
  - **Fluxapyroxad (Merivon)**



## Cherry leaf spot (*B. jaapii*) orchard sampling, 2016

- **34 commercial orchards and the NWMHRC**
  - **872 isolates**
- **Some potentially concerning numbers on sensitivities to Luna and Merivon**
- **We don't have field data yet on impacts of various sensitivity numbers (i.e., 25 ppm MIC)**
- **Spring testing will be done on inoculated trees**

## **Potential issues with Luna Sensation and Merivon moving forward since 2013**

- **Consistent exposure of fungus population to SDHI fungicides since 2004**
- **Boscalid resistance mutation exists in population**
  - **A second mutation could make these strains resistant to Luna and Merivon**
- **Reduced sensitive strains may have a different mutation**
  - **A second mutation could make these strains resistant to Luna and Merivon**
- **Because of the current mutation status, resistance to Luna and Merivon may happen more easily**

# Fungicide Chemistries for Cherry Leaf Spot Control, 2009

- Chlorothalonil
- ~~Pristine~~
- ~~Adament~~, Gem
- Syllit + Captan
- Copper

# Fungicide Chemistries for Cherry Leaf Spot Control, 2017

- Chlorothalonil
- **Luna Sensation, Merivon**
- Gem
- Syllit + Captan
- Copper

# Cherry leaf spot fungicides

- **Chlorothalonil**
  - **Broad-spectrum protectant**
- **Captan – broad spectrum protectant**
- **SDHIs – Merivon and Luna Sensation**
- **Syllit**
- **Gem**
- **Copper -- broad spectrum protectant**

# Cherry leaf spot fungicides

- **Chlorothalonil**
  - **Broad-spectrum protectant**
- **Captan – broad spectrum protectant**
- **SDHIs – Merivon and Luna Sensation**
- **Syllit**
- **Gem**
- **Copper -- broad spectrum protectant**

\* **Should be tank-mixed with Captan 80WDG (2.5 lbs/A)**

# Cherry leaf spot fungicides

- **Captan 80 WDG, 2.5 lbs / A**
  - **Very robust CLS fungicide**
  - **Broad spectrum protectant (surface, not systemic)**
  - **No mildew activity, some ABR activity**
  - **Essential mixing partner for SDHIs, Syllit, Gem**

# Cherry leaf spot fungicides

- Chlorothalonil, Captan, **SDHIs**, Syllit, Gem, Copper
- **SDHIs are a key tool for CLS, we don't want to lose them .....**
- **SDHIs control multiple diseases**
- **Gem is at long-term risk of resistance because strobilurins are known to break down over long-term use**
- **Alternatives will be fine in lower and medium pressure years but will be problematic in significant CLS years**



## Considering cherry leaf spot management without SDHI fungicides

- Chlorothalonil, Captan, **SDHIs**, Syllit, Gem, Copper
- SDHIs are a key tool for CLS, **we don't want to lose them .....**
- SDHIs control multiple diseases

# Considering cherry leaf spot management without SDHI fungicides

- Chlorothalonil, Captan, **SDHIs**, Syllit, Gem, Copper
- SDHIs are a key tool for CLS, **we don't want to lose them .....**
- SDHIs control multiple diseases
- **For now, we need to practice excellent resistance management strategies**
- **Tank-mix Luna Sensation and Merivon with 2.5 lbs/A Captan 80WDG**
- **Two applications max per season**

**Thank you to:**

**Cory Outwater**

**Tyre Proffer**

**Jacque Gleason**

**Suzanne Slack**

**Nikki Rothwell**

**Emily Pochubay**

**Karen Powers**

**Bill Klein**

**MI Cherry committee**

