A photograph of a cherry tree branch with several leaves showing signs of disease. The leaves are green but have large, irregular yellowish-brown patches, characteristic of American brown rot. Numerous small, dark brown spots are scattered across the leaves, indicating cherry leaf spot. Small, round, light-colored cherries are visible on the branch.

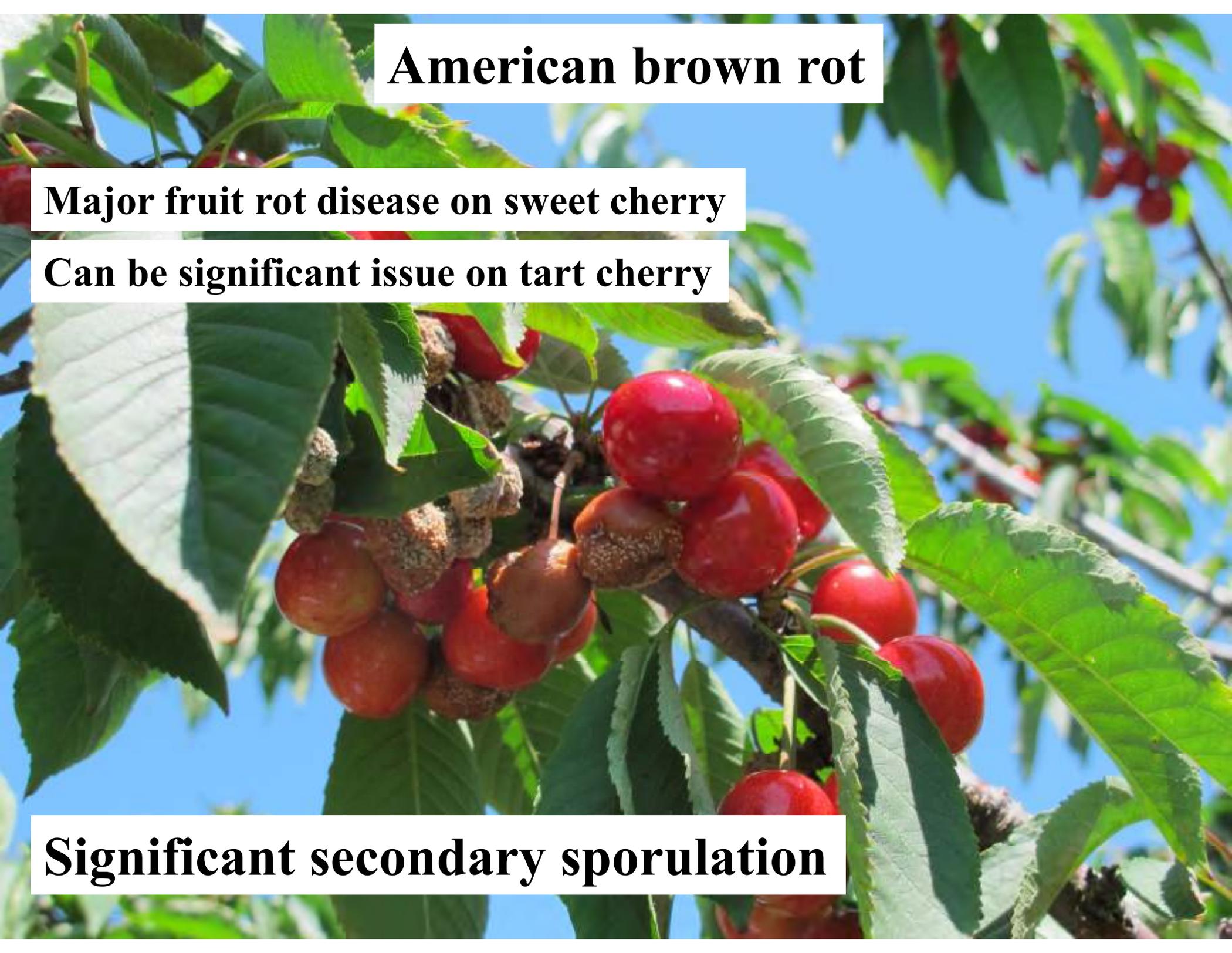
**Disease update: Controlling American  
brown rot and what's new in cherry  
leaf spot?**

**Northwest Orchard  
& Vineyard Show;  
January 14, 2014**

**George W. Sundin**

**MICHIGAN STATE  
UNIVERSITY**



A close-up photograph of a sweet cherry branch against a clear blue sky. The branch is covered with green, serrated leaves and clusters of bright red cherries. Several cherries in the central cluster show signs of American brown rot, appearing as brown, fuzzy, and textured lesions on their surfaces. The text is overlaid on the image in white boxes with black text.

# **American brown rot**

**Major fruit rot disease on sweet cherry**

**Can be significant issue on tart cherry**

**Significant secondary sporulation**

# **Environmental conditions favoring American brown rot**

- **Prefers ripening cherries**
  - **Needs wounds to infect green cherries**
- **Warm, wet humid weather**
- **18 hr wetness at 50 F; 5 hr wetness at 77 F to initiate infection**
- **Infection is slower above 80 and below 55 F**
- **Mature fruit can decay in 2 days under optimum conditions**

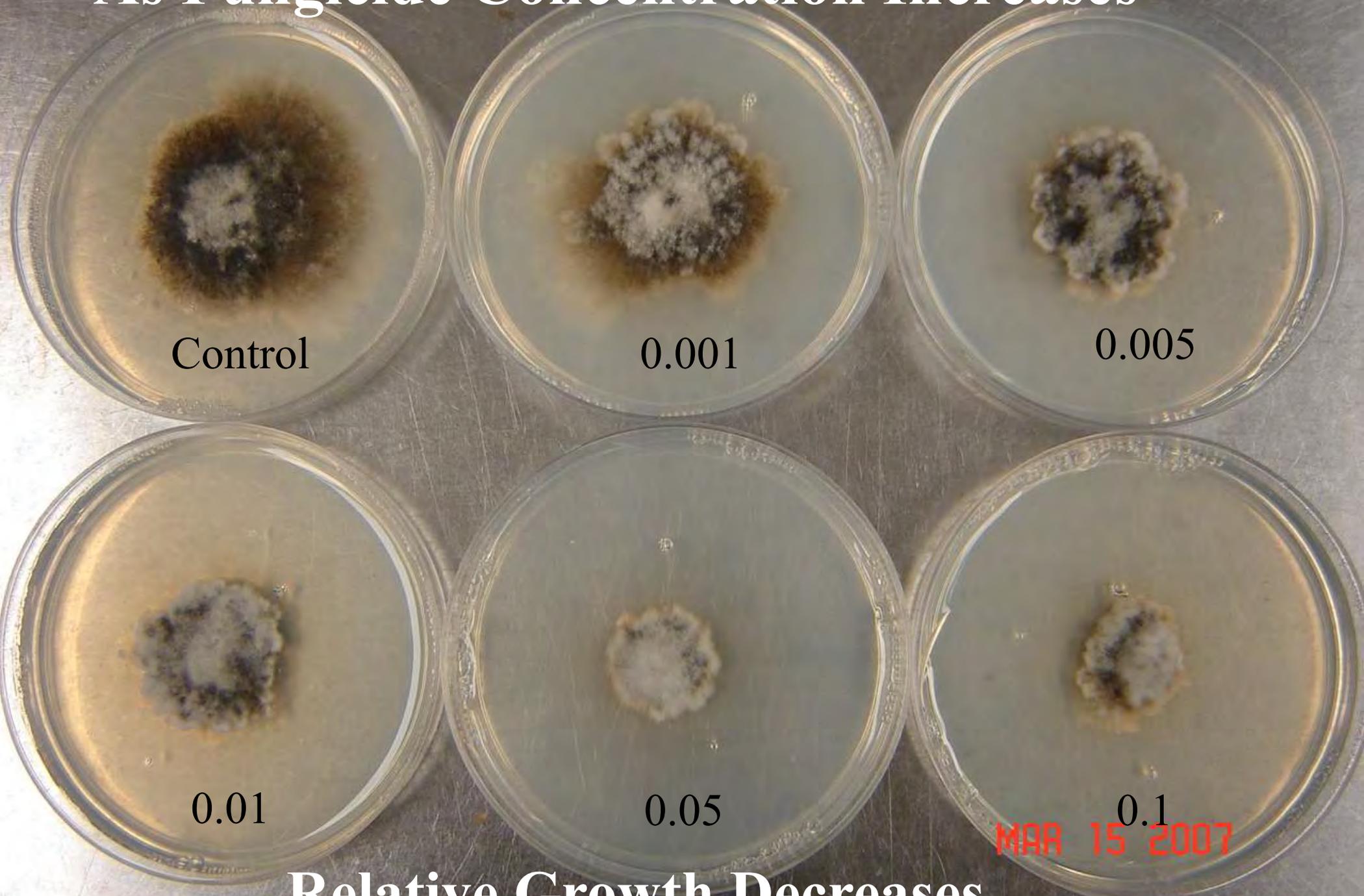




# **American brown rot disease control**

- **Indar 2F – we've relied on this sterol inhibitor (SI) fungicide for ABR control for decades**
- **Sterol inhibitor fungicides – effects on fungus are quantitative**
  - **Examine by testing fungal relative growth (RG)**

# As Fungicide Concentration Increases



Control

0.001

0.005

0.01

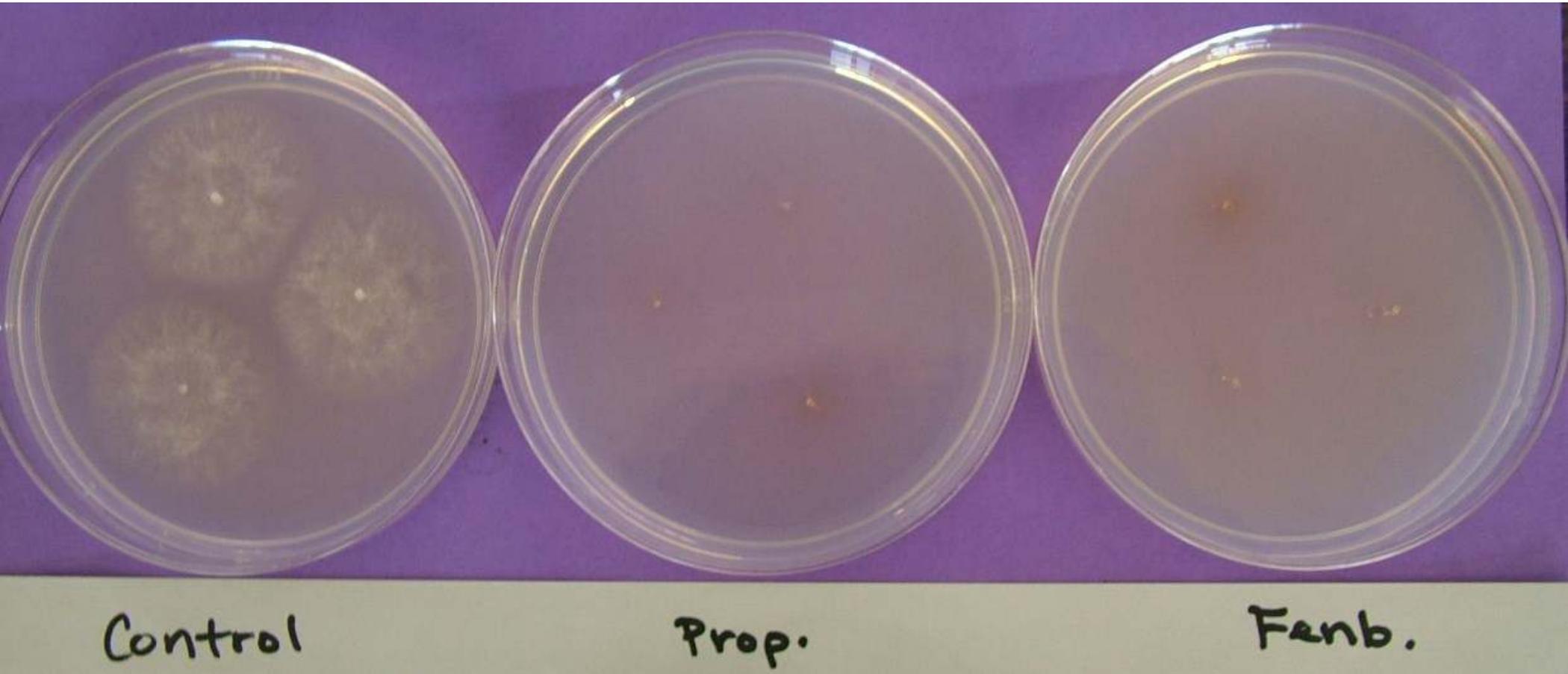
0.05

0.1

MAR 15 2007

## Relative Growth Decreases

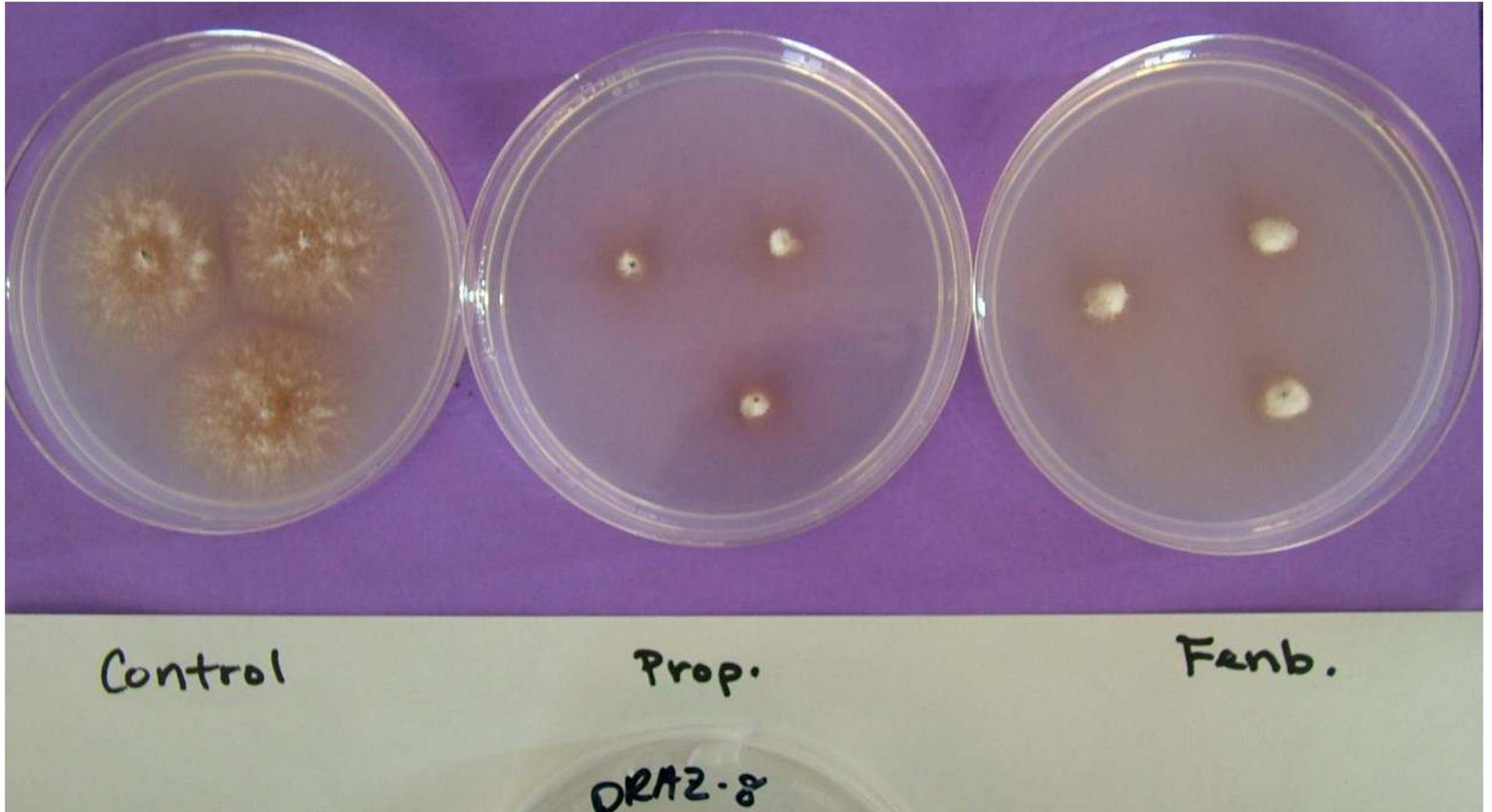
Relative Growth:  $RG = 0$



**Propiconazole  
(Orbit)**

**Fenbuconazole  
(Indar)**

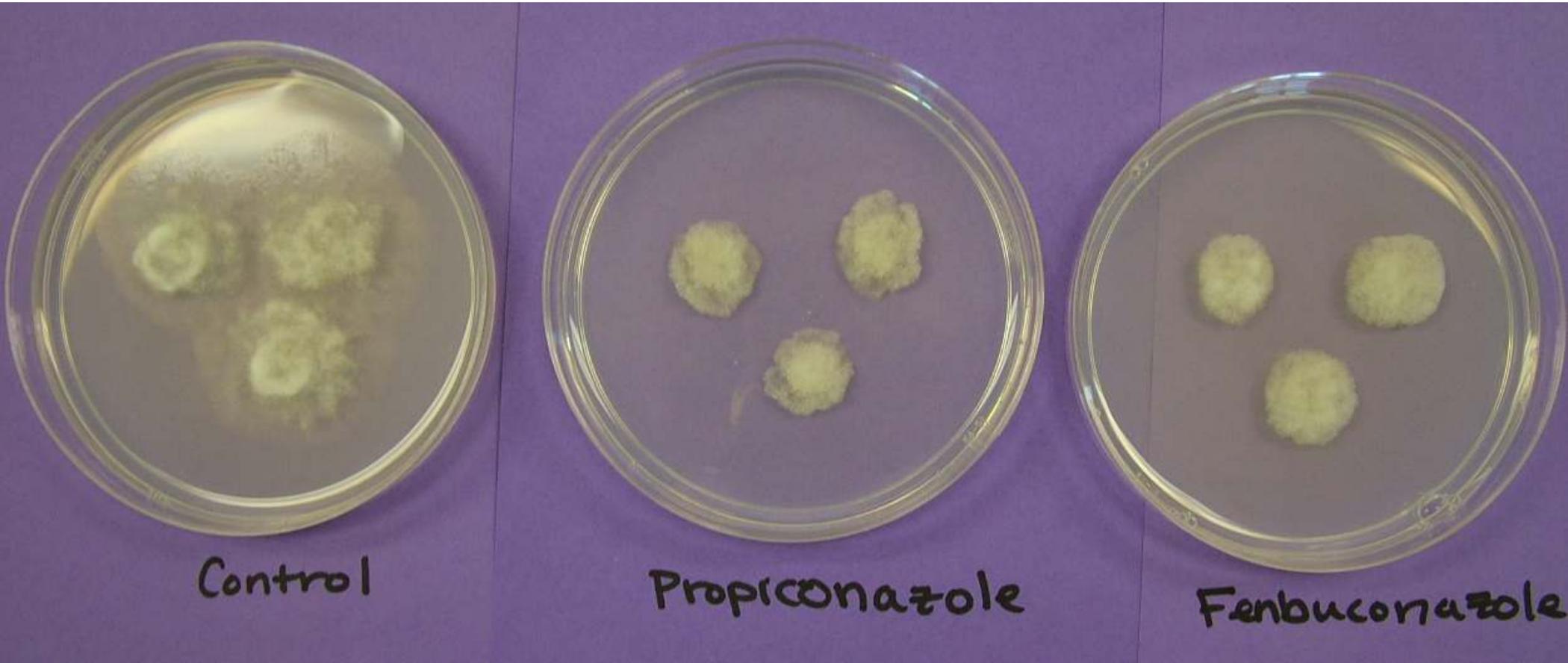
RG = 10%



**Propiconazole  
(Orbit)**

**Fenbuconazole  
(Indar)**

RG = 45%



# **American brown rot orchard surveys – RG on SIs**

- **Sundin lab has surveyed ~ 1,500 isolates of ABR fungus (2009-2013)**
- **Distribution of RG's:**
  - **0-30% --- 24.6%**
  - **31-70% --- 70.6%**
  - **> 70% --- 4.8%**
- **Orchard means ~ 40-47%**

# American brown rot Indar evaluation on peach



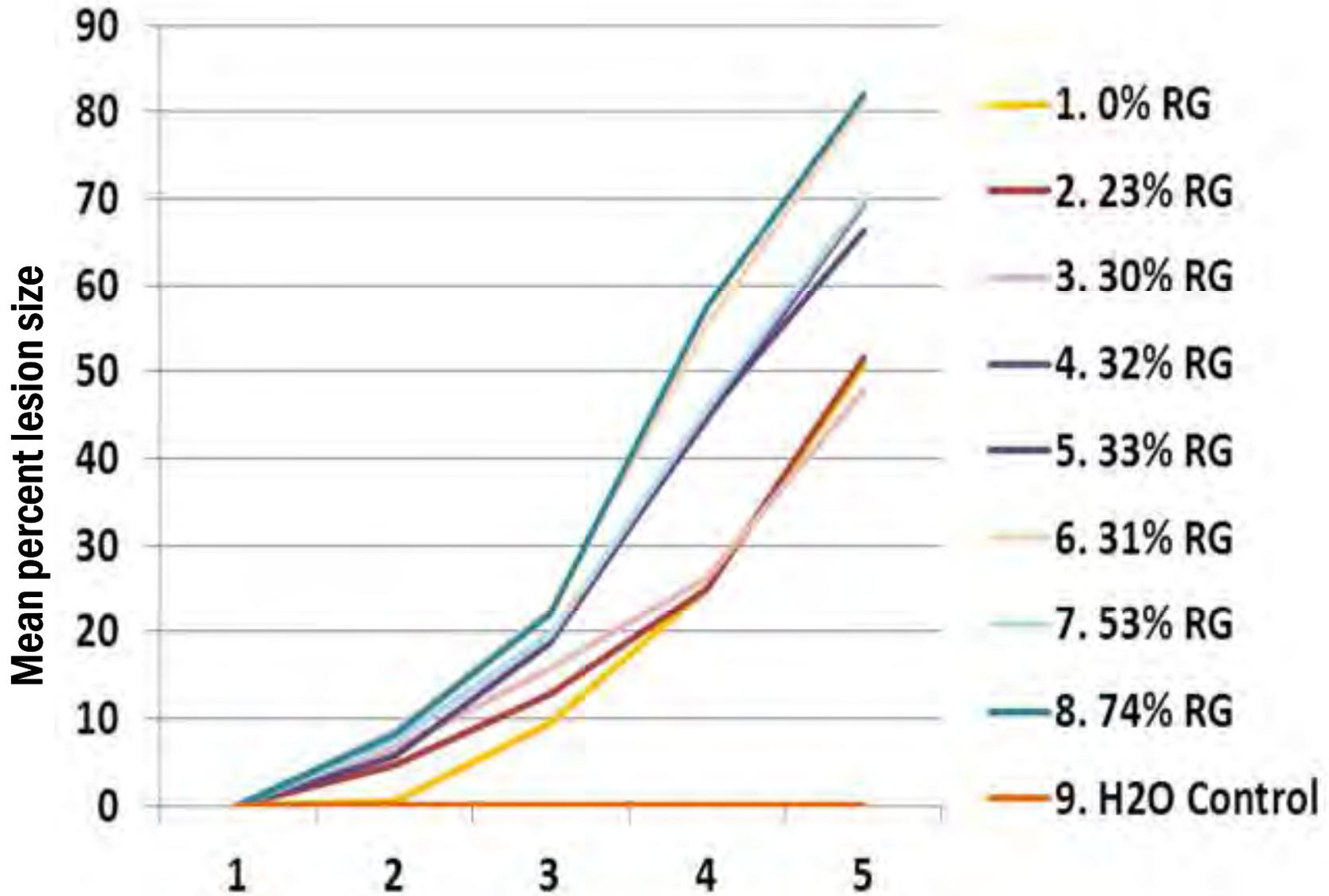
## American brown rot Indar evaluation on peach

- **ABR fungicide assays on peach fruit**
- **Protective or curative fungicide treatment**
- **Protective:**
  - **spray fruit with fungicide solution**
    - **Indar 2F @ 6 fl oz / A**
  - **1 day later wound and inoculate with ABR**
    - **Isolates with varying RG (0% to 74%)**
  - **monitor lesion size daily**

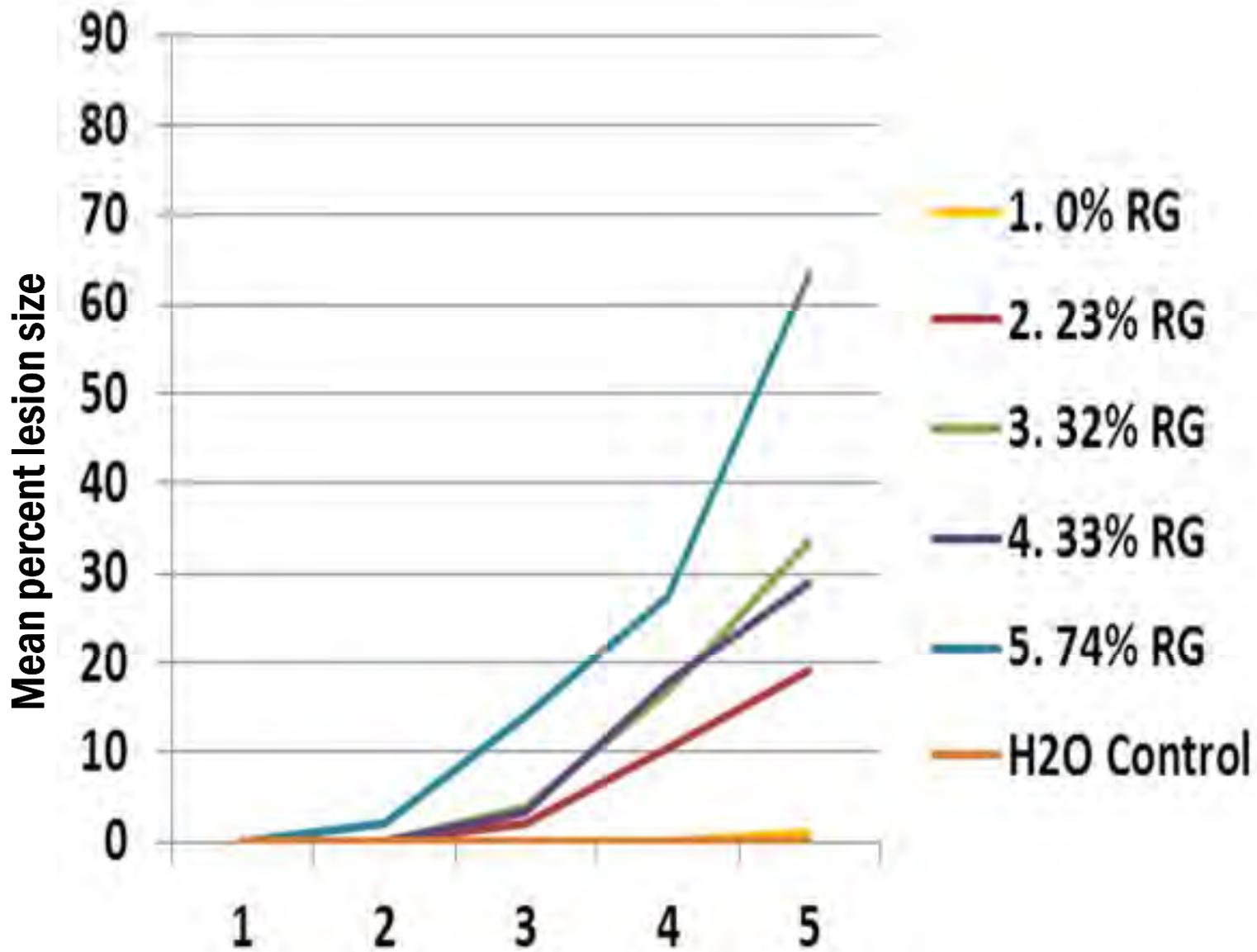
## American brown rot Indar evaluation on peach

- **ABR fungicide assays on peach fruit**
- **Protective or curative fungicide treatment**
- **Curative:**
  - **wound and inoculate fruit with ABR**
  - **1 day later spray with fungicide solution**
  - **monitor lesion size daily**

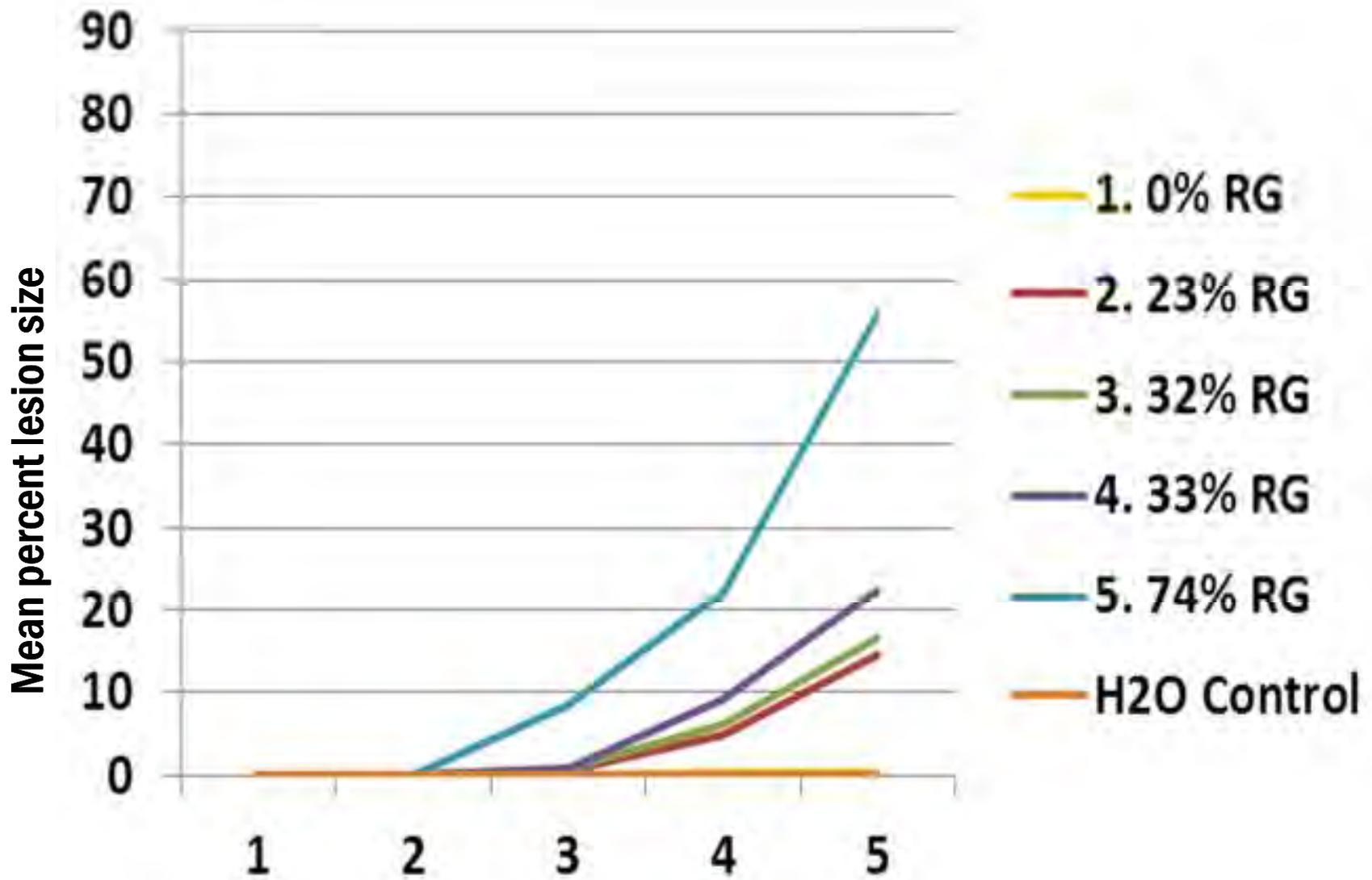
# No fungicide treatment



# Indar 2F (6 fl oz/A treatment)



# Indar 2F (12 fl oz/A treatment)



# Curative SI studies

- **Everything looked bad, even more sensitive isolates**
- **With the shifting to reduced sensitivity of the ABR isolates, treating them after infection with Indar is impossible**

# American brown rot SI studies

- **RG distribution:**
- **0-30% --- 24.6%**
- **31-70% --- 70.6%**
- **> 70% --- 4.8%**
  
- **>70% RG – definitely resistant, even 12 fl oz / A rate not effective**
- **Most of ABR population is shifted**
  - **Orchard means ~ 40-47%**

# American brown rot control strategies, 2014 and beyond

- **When using Indar, high rates are important, *spray window must be shortened***
  - **4-5 days depending on weather conditions**
  - **Protective applications are essential**
  - **Great coverage is essential**
- **Add Captan for resistance management**
  - **2.5 lbs/A Captan 80 WDG**

# American brown rot control strategies, 2014 and beyond

- **Mix in the new SDHIs Luna Sensation or Merivon**
- **Bracket or alternate SDHIs with Indar**
  - **SDHI, Indar, Indar, SDHI or**
  - **Indar, SDHI, Indar, SDHI**
- **Add Captan for resistance management**
  - **2.5 lbs/A Captan 80 WDG**

# **American brown rot control take-home message**

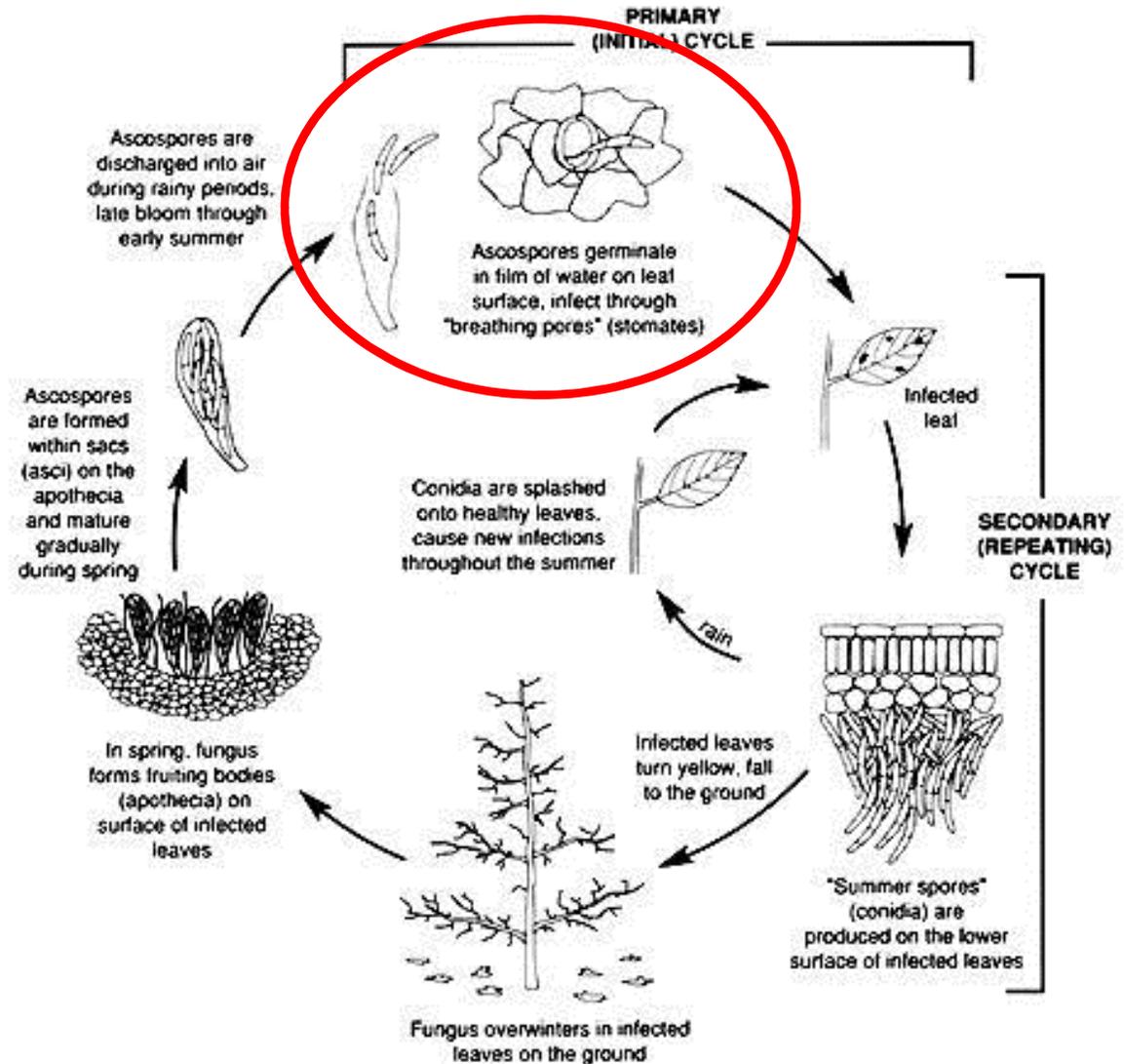
- **We can't continue to rely on Indar**
- **Targeting a window ~ 2 weeks before harvest**
- **Spray every 4-5 days if weather indicates**
- **Indar (12 fl oz/A) + Captan**
- **Luna Sensation or Merivon + Captan**
- **Need great coverage!**



# Review of Cherry Leaf Spot Biology

## Ascospore discharge:

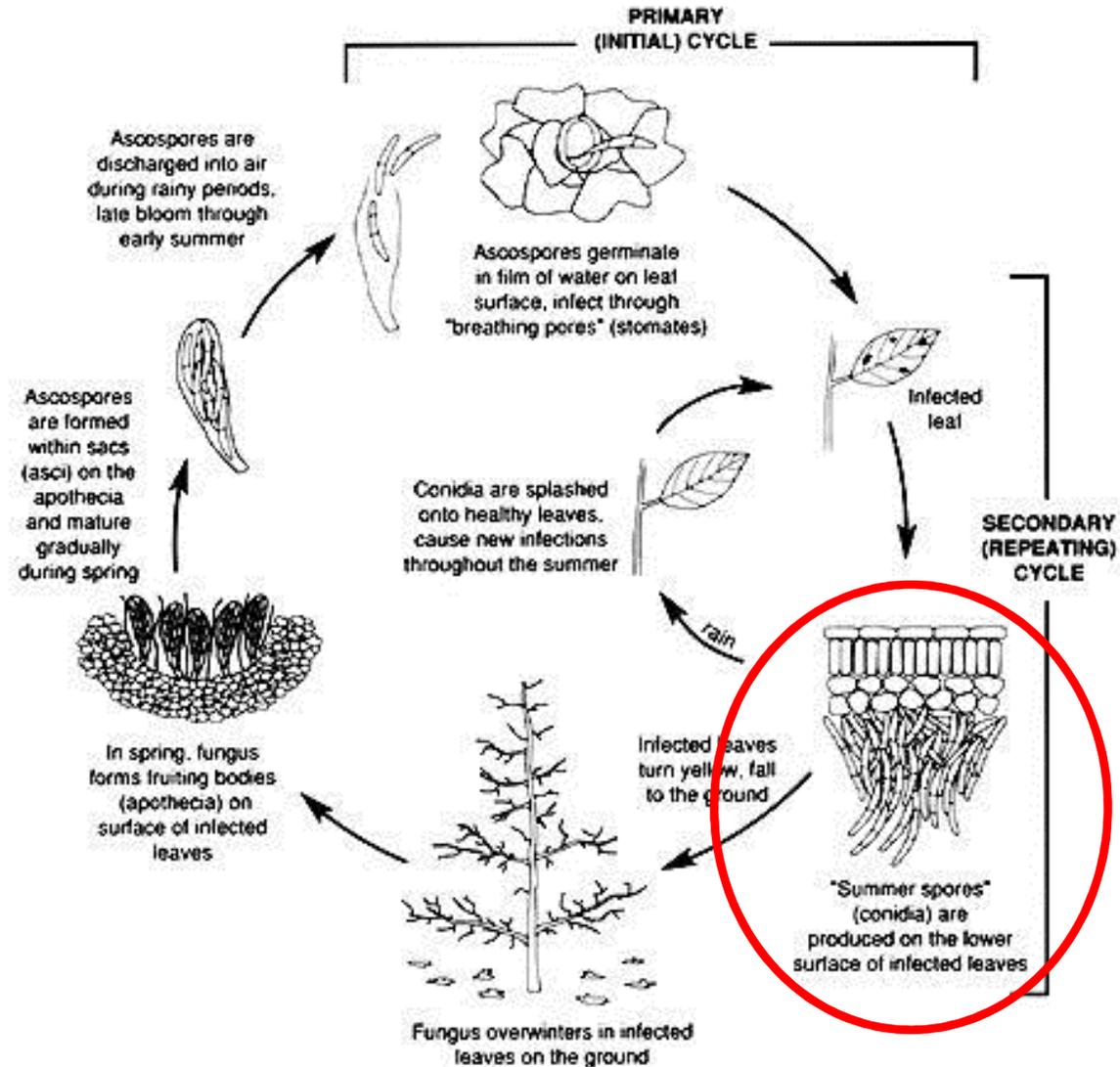
- \* Ascospores released by wetting (petal fall + 4-6 weeks)
- \* > 61 F, maximum discharge
- \* 50's F, reduced discharge
- \* 39-46 F, minimal discharge



Cherry leaf spot disease cycle.

# Cherry Leaf Spot -- Life Cycle

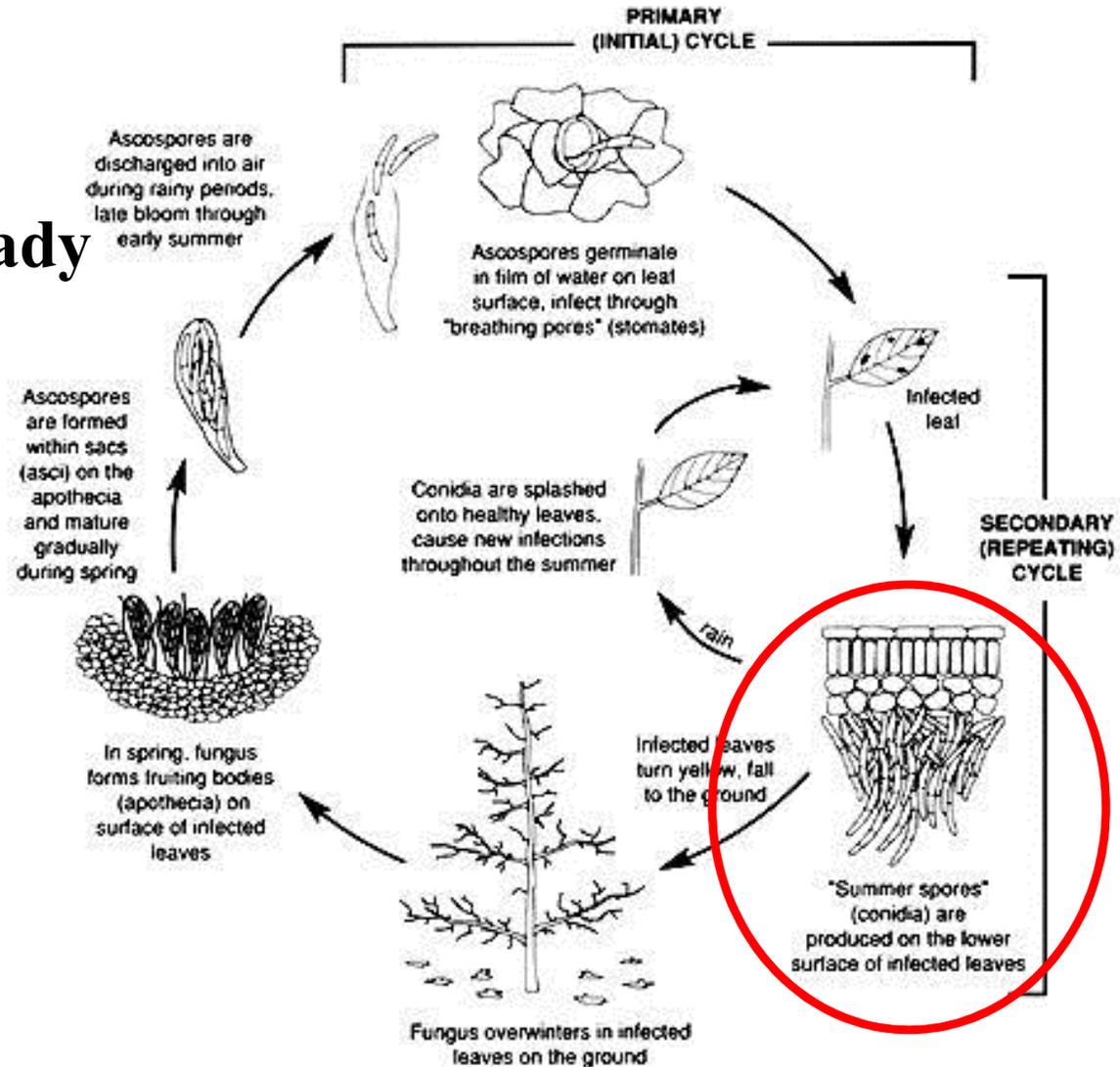
1. Secondary spores >>>>>  
Primary spores



Cherry leaf spot disease cycle.

# Cherry Leaf Spot -- Life Cycle

1. Secondary spores >>>>>  
Primary spores
2. Secondary spores are already  
in the tree



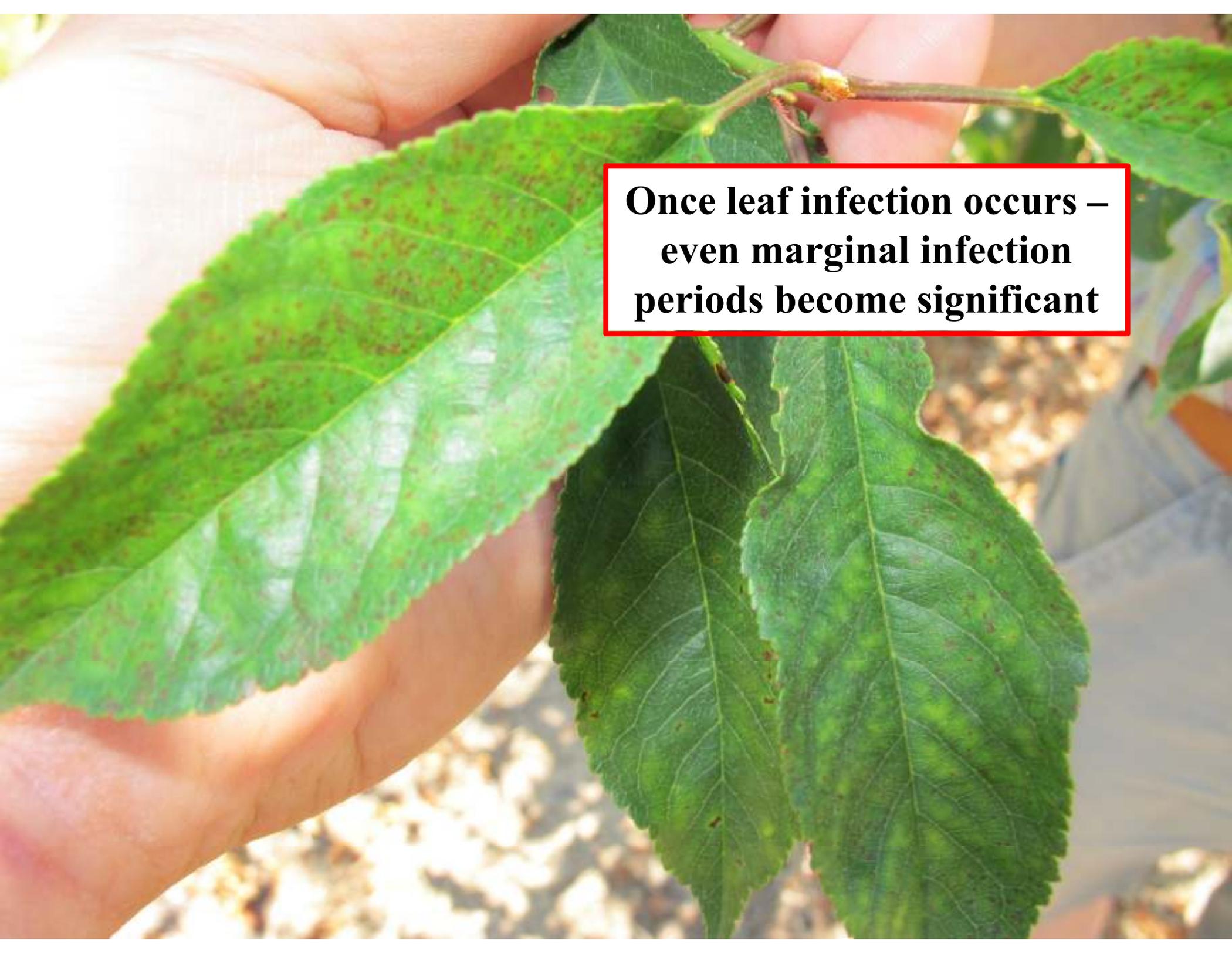
Cherry leaf spot disease cycle.

# 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**







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



# Cherry leaf spot fungicides

- **New SDHIs**
  - **Luna Sensation (SDHI + Gem)**
  - **Merivon (SDHI + pyraclostrobin)**
- **Syllit + Captan**
- **Coppers**
  - **1.2 lbs metallic Cu per acre**
- **Extended window for Bravo**
- **Captan**
- **Gem**

# **News and Notes; Cherry Leaf Spot Control**

- **New SDHIs – Merivon and Luna Sensation**
  - **Captan should be added for resistance management**
- **Use high rates of these materials**
  - **essential for long-term protection from resistance**
  - **Merivon – at least 5.5 fl oz/A**
  - **Luna Sensation – (5 to 5.8 fl oz/A)**
- **Best powdery mildew fungicides**
- **VG to E for American brown rot**

# **News and Notes; Cherry Leaf Spot Control**

- **Extended window for Bravo**
  - **Excellent leaf spot fungicide**
- **Remember: Bravo is a protectant**
  - **Surface associated, not systemic**
  - **Needs a reduced spray interval compared to new SDHIs or Syllit**
  - **1<sup>st</sup> cover timing critical for mildew control, use Luna Sensation or Merivon**



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**Gail Ehret -- MSU**

**Kim Lesniak – MSU**

**Cory Outwater -- MSU**

**Nikki Rothwell -- NWMHRS**

**Erin Lizotte – NWMHRS**

**Karen Powers -- NWMHRS**

**Bill Klein – NWMHRS**

**Myron Anderson – NWMHRS**

**Michigan Cherry Committee**

**Michigan State Horticultural  
Society**