

**Outbreak of European brown rot on Montmorency tart cherry**



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# European Brown Rot

- Caused by *Monilinia laxa*
- Mainly a problem on Balaton cultivar (we thought .....
- Prior to 2013, only a very minor issue on Montmorency





- ***M. laxa* damages flowers and spurs**
- **Infection can occur at white bud and during bloom**
- **A wetting period is required for flower infection**
- **Able to grow at  $-2^{\circ}\text{C}$**
- **Newly infected flowers turn brown and the fungus sporulates on infected tissue**
- **Low temperatures enhance conidial production**
- **Systemic infection of the spurs follows**

# **European brown rot blossom blight in 2013 on Montmorency**

- **Widespread infection on Montmorency observed under the following conditions:**
- **Tree located in sites with slow-drying conditions**
  - **Adjacent trees in sites with good air movement not infected**
- **Trees located in sites affected by fog**
- **Trees located in low pockets in orchard**
  - **Adjacent trees not infected**

**Balaton trees completely hammered in 2013 by EBR**

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**However, results from ~ 400 isolations (10 orchards) followed by PCR ID indicated *M. laxa***



**EBR infection**





**Shoot collapse appeared to occur more slowly on Montmorency than is typical on Balaton**





Shoot collapse also occurred unevenly



1

2



**~ 100% infection was unprecedented for *M. laxa* on Monts**



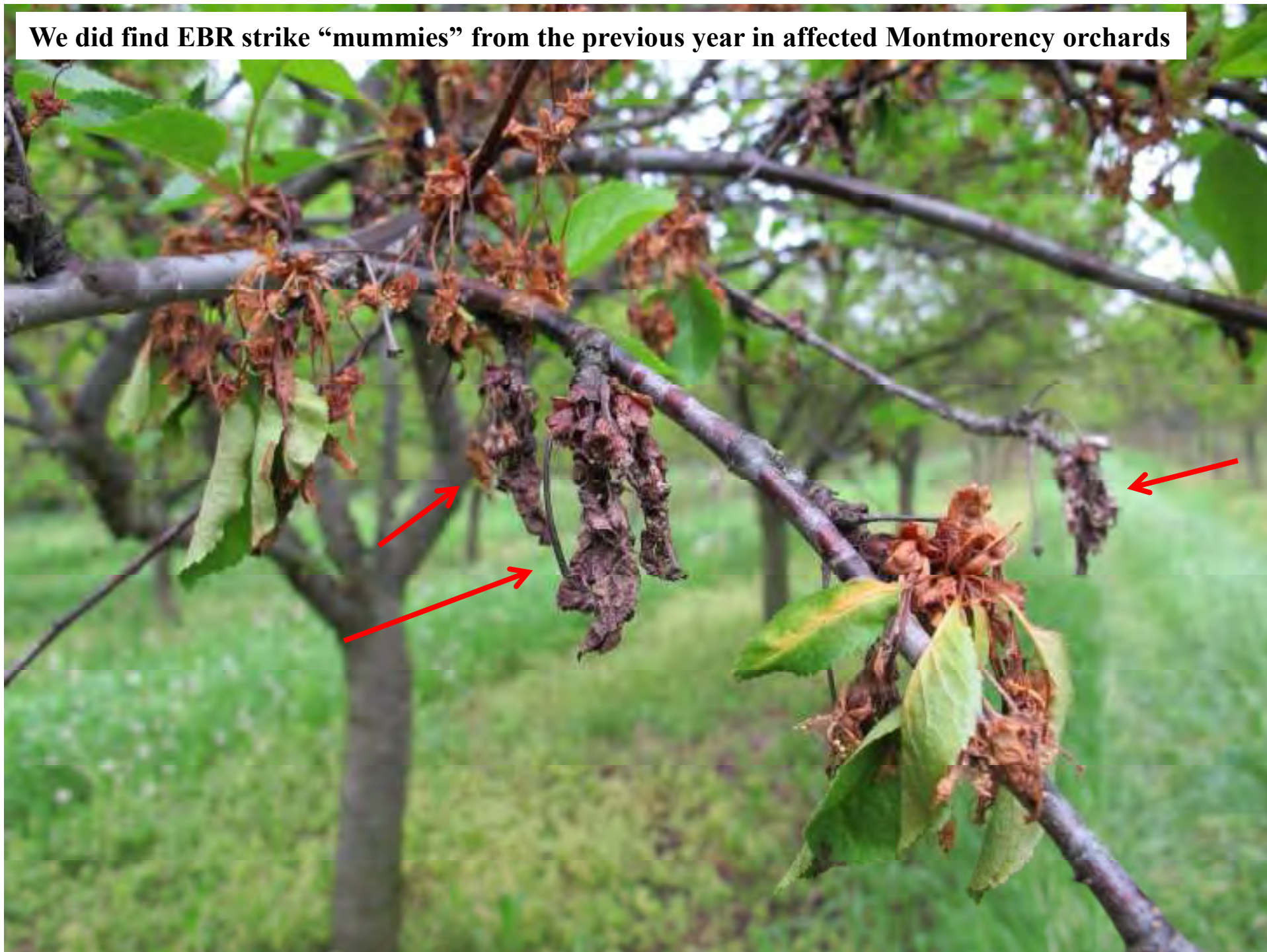


**In this EBR year, Balatons were completely hammered!**





**We did find EBR strike “mummies” from the previous year in affected Montmorency orchards**





**Sporulation was noted on pedicels of infected flowers for a few weeks after symptoms observed**



# **Weather conditions leading to EBR infection, 2013**

- **Very warm temps leading up to bloom, then very cold from white bud through bloom**
- **At NWMHRC:**
  - **8 May – early white bud**
  - **10 May – first bloom**
  - **15 May – 60% bloom**
  - **20 May – early petal fall**



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<b>Date</b>	<b>Low</b>	<b>High</b>	<b>Rainfall</b>
<b>8 May</b>	<b>54</b>	<b>81</b>	<b>0</b>
<b>9 May</b>	<b>43</b>	<b>74</b>	<b>0.05”</b>
<b>10 May</b>	<b>38</b>	<b>43</b>	<b>0.61”</b>
<b>11 May</b>	<b>32</b>	<b>46</b>	<b>0.11”</b>
<b>12 May</b>	<b>32</b>	<b>38</b>	<b>0.03”</b>
<b>13 May</b>	<b>32</b>	<b>50</b>	<b>0</b>

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12 May	32	38	0.03"
13 May	32	50	0

17-hr wetting period,  
RH > 86% for 48 hr





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# European Brown Rot

- Important fruit brown rot pathogen in Europe
- However, we did not observe sporulation from infected shoots (Balaton or Montmorency) while fruit was ripening
- All brown rot-infected fruit examined in 2013 (and in previous years) was infected by *M. fructicola*





**No sporulation**





**We recovered *M. laxa* from 11 of 15 sampled strikes; no visible sporulation**

**We did induce sporulation from 3 strikes in the lab, but only a very low amount of spores**



# **EBR – why was infection so extensive on Montmorency in 2013?**

- **Montmorency typically does not show high percentages of EBR strikes**
- **Ideal conditions for infection**
- **Very high inoculum load**







# EBR Infection Summary

- EBR pathogen is *very highly sensitive* to environmental conditions
- If these conditions are met, infection can occur; if not, infection does not occur
- Conditions:
  - Wetting event; RH > 80% for > 16 hr
- Ex. “enclosed” orchard which results in extreme slow-drying conditions
- Ex. infection only observed in low spots in orchard



# EBR research moving forward

- EBR pathogen is *very highly sensitive* to environmental conditions
- We will work to identify the environmental conditions facilitating EBR infection
  - infection timing
  - length of wetting period required for infection
  - length of relative humidity required for infection
  - spore numbers required for infection
  - estimate spores present in strike “mummies”
- Ultimate goal is to develop a predictive EBR infection model that can be used to determine when fungicide sprays are needed

# **EBR Control Options**

- **Only efficacy data available from a 1993 test on 'Meteor' conducted by Al Jones**
- **Indar (equivalent to Indar 2F, 6 fl oz per acre) and a Benlate + Captan treatment were the only effective treatments**
- **Benlate alone not tested that year**
- **Captan alone not tested that year**
- **Iprodione (Rovral) was not effective**



# EBR Control Options

- **Added pressure of using Indar on *M. fructicola* not a good thing because of the emerging SI issues**
- **However, in 2014, Indar will be the fungicide of choice in affected orchards**
- **Indar 2F @ 6 fl oz / A; two applications (white bud and 7 days later)**
- **We will test Topsin M, Topsin M + Captan, Captan alone, and Vangard for EBR control next year in Balaton**
- **We are also testing *M. laxa* isolates for fungicide sensitivity this fall**

# **EBR Control Options**

- **Major focus will be on Montmorency blocks with high levels of infection in 2013**
- **Also Mont blocks adjacent to heavily-infected Balaton blocks**
- **In blocks with lighter infections levels in 2013, will also be worthwhile to prune, remove, and burn EBR strike mummies**



# EBR Summary

- **Extent of infection observed in some orchards was surprising on Montmorency**
- **Likely that conditions at those sites were super-optimal for infection**
- **Lack of fungal sporulation activity closer to harvest is a huge bonus for growers**
- **Ultimately, fungus appears to be active ~ 1-2 months of the year:**
  - **picks up activity prior to bloom, infects flowers and shoots, sporulates, goes quiescent for rest of year**

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- **Lack of fungal sporulation activity closer to harvest is a huge bonus for growers**
- **Ultimately, fungus appears to be active ~ 1-2 months of the year**
- **It will likely take 1-2 years minimum of dedicated management efforts to reduce inoculum levels in orchards and keep the infection phase under control**

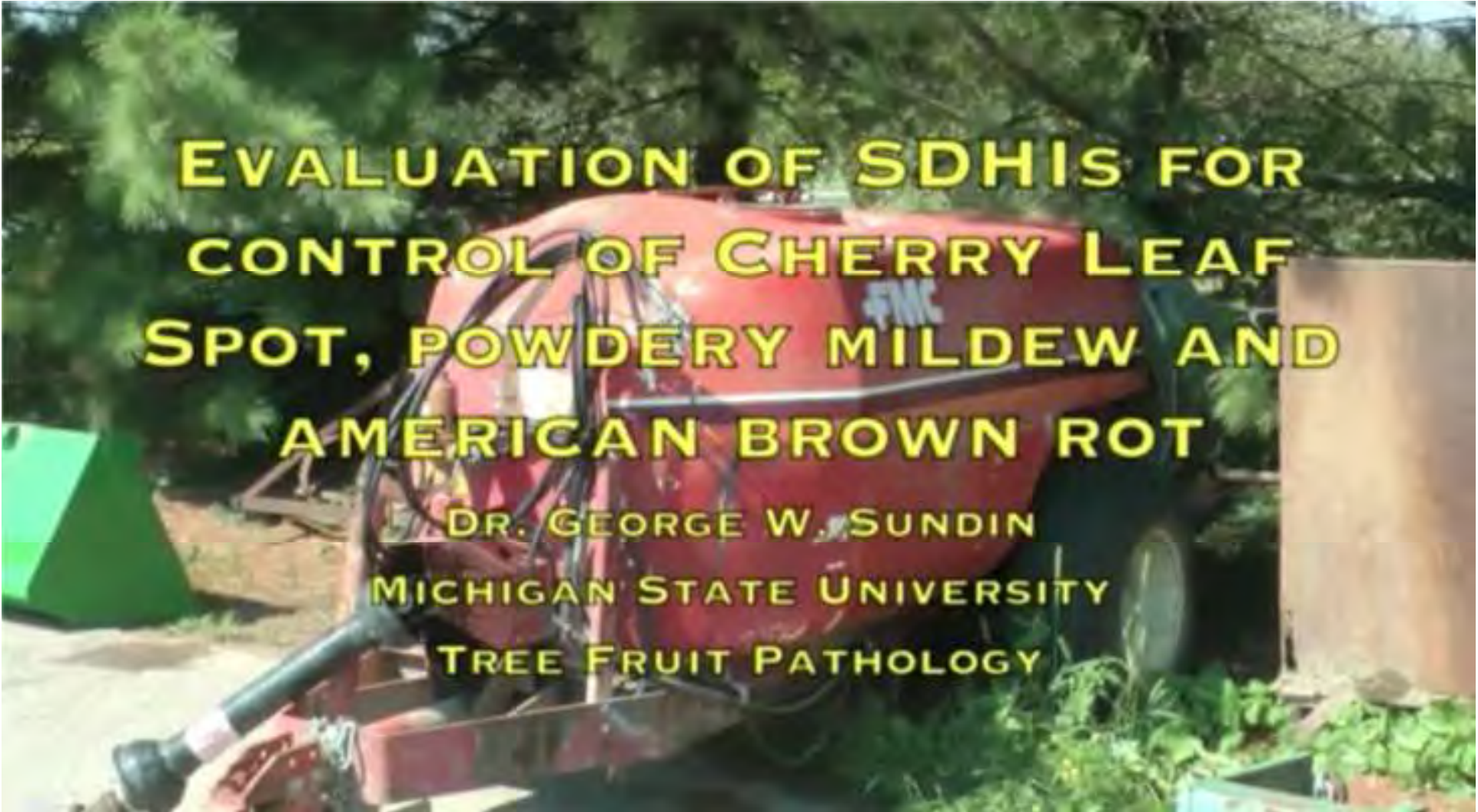


**Youtube videos**



**<http://www.youtube.com>**

**Search: treefruit pathology**



**EVALUATION OF SDHIS FOR  
CONTROL OF CHERRY LEAF  
SPOT, POWDERY MILDEW AND  
AMERICAN BROWN ROT**

**DR. GEORGE W. SUNDIN  
MICHIGAN STATE UNIVERSITY  
TREE FRUIT PATHOLOGY**

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Search "tree fruit pathology"





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