

# SOOTY BARK DISEASE SHOULD WE WORRY?

Forest Health Monitoring  
Workshop 3/12/2024

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# CAES

The Connecticut Agricultural Experiment Station  
*Putting Science to Work for Society since 1875*

# Current research in my lab

## ■ Association of site factors with street tree health

- How urban heat island and soil conditions affect tree health?
- Dr. Faisal Qaseem (postdoctoral scientist in CAES)



## ■ Carbohydrates and tree stress

- Stressed  $\leftrightarrow$  Desserts
- Can carbohydrate levels be used to detect stressed urban trees?
- Dr. Faisal Qaseem (postdoctoral scientist in CAES)



## ■ Mycorrhizae and tree health

- How mycorrhizal inoculation affects tree health?
- Is maple health associated with mycorrhizal colonization?



**Field sites  
wanted!**

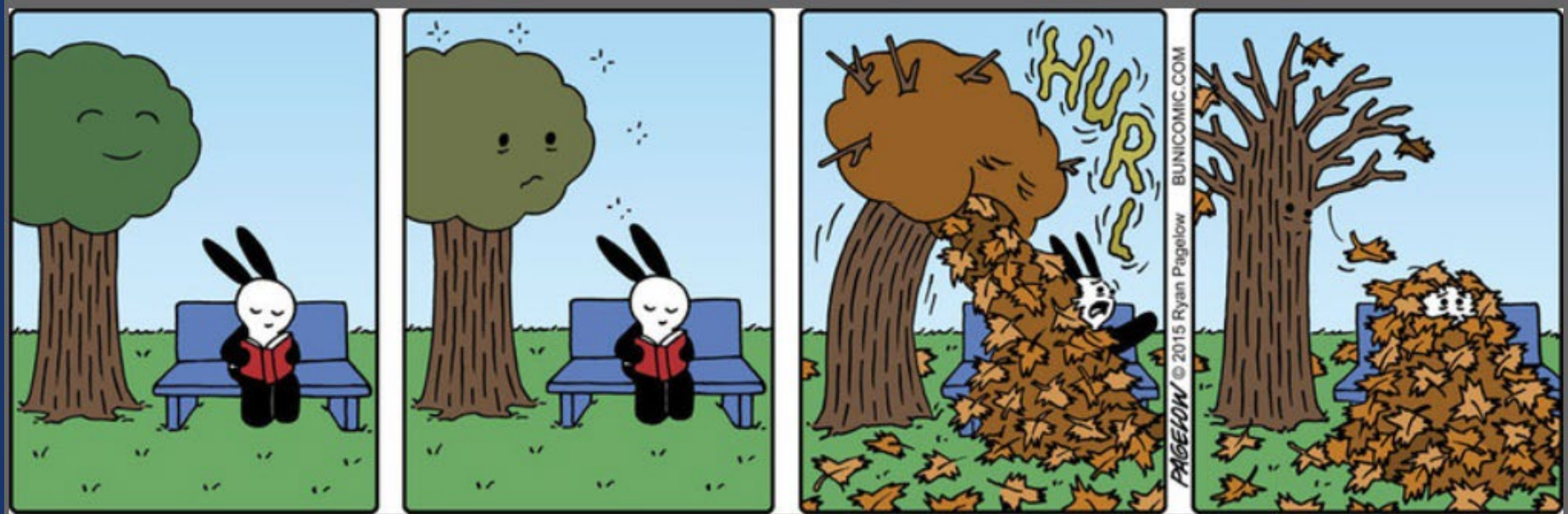
# Sooty Bark Disease – Should we worry?

# To Be Covered Today

- Latent pathogens
- What is sooty bark disease (SBD)
- Should we worry about SBD?
- What is NOT SBD?

# Latent Tree Pathogens

Stress triggers symptoms



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# What is a latent pathogen?

- Infects trees without detectable symptoms
  - Endophytic/Latent life style
- Stress can trigger pathogenic behavior
  - Weakened defenses → fast growth → symptoms
  - Drought and heat as inciting factors



# What is sooty bark disease?

## Newly discovered fungus spores spurred by heat and drought are killing Seattle street trees

July 11, 2021 at 6:00 am | Updated July 14, 2021 at 9:41 pm

The Seattle Times, July 2021

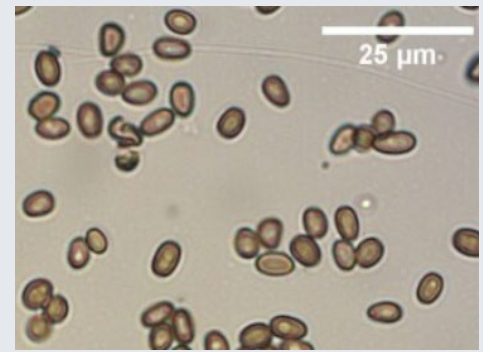


1 of 8 | A dead sycamore maple shows clear indications of sooty bark disease, located at Jefferson Park in Seattle's Beacon Hill neighborhood. Sooty bark is a fungal infection that produces visible black spores and causes the tree to shed bark. (Bettina Hansen / The Seattle Times)

# Sooty Bark Disease (SBD)

- Fungus *Cryptostroma corticale*
- Spreads by conidiospores through wounds into xylem: vascular wilt
- Sapwood colonization causes staining, wilting, and kills cambium
- Finally bark cracks, revealing matts of black conidia

Brooks et al. 2023



WSU, Marianne Elliott



Thomas Cech, FFRC, Vienna






# Sooty Bark Disease (SBD)

- First described in 1945 in UK on sycamore maple
  - Reports from EU since 2000
  - Epidemic in WA in 2021
- Native in Great Lakes region
- Drought and heat incites *C. corticale* growth: reduces host defenses → cambium killed → SPORULATION

SBD in WA in 2021.  
Seattle Times 2021.



# Sooty bark disease of maples: the risk for hypersensitivity pneumonitis by fungal spores not only for woodman

Markus Braun<sup>\*</sup> , Doris Klingelhöfer and David A. Groneberg

- When inhaled, the spores can cause mild to severe respiratory symptoms
- Can causes maple bark disease in humans
- Risks greatest for tree workers



**Fig. 2** Planar soot-like coloured spore layer of *Cryptostroma corticale* on a maple trunk under the peeled bark. Photo courtesy of Dr. Wolfgang Prüfert (German Mycological Society, DGfM e.V.)



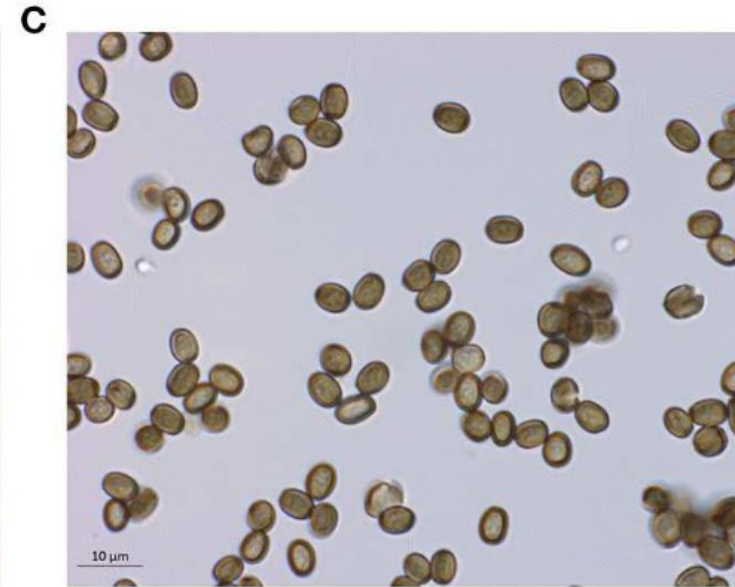
# SBD: symptoms on affected trees



Diseased maple with visible brown patches releasing spores of *Cryptostroma corticale*.



Makroscopic view on the cross section of maple with a thick layer packed with a mass of brown conidiospores between the phloem and the outer bark.



Brown, oval conidiospores of *Cryptostroma corticale*, 4-5 x 3,5-4 µm.

Kespohl et al. 2022

PUBLISHED 18 October 2022

DOI 10.3389/fpubh.2022.973686

# SBD: appearance on affected trees

- The disease is characterized by peeling of the outer layer of the bark and brownish-black spores under the peeled off bark.

Braun et al. 2021



**Fig. 2** Planar soot-like coloured spore layer of *Cryptostroma corticale* on a maple trunk under the peeled bark. Photo courtesy of Dr. Wolfgang Prüfert (German Mycological Society, DGfM e.V.)



# SBD: appearance on affected trees

- Appearance on bark varies depending on species and how healthy the tree is



WSU



Brooks et al. 2023



# Widespread latent infection of *Cryptostroma corticale* in asymptomatic *Acer pseudoplatanus* as a risk for urban plantations

*Forest Pathology*. 2017;47:e12344.

DOI: 10.1111/efp.12344

**2017**



I. Kelnarová<sup>1</sup> | K. Černý<sup>2</sup>  | D. Zahradník<sup>2</sup> | O. Koukol<sup>1</sup> 

- Scientists have developed a species-specific PCR-based molecular test to detect SBD
  - DNA sequence unique only to *C. corticale*
- 25% of wood cores from 112 trees at DBH were infected
  - Higher detection could be possible from top canopy where the infections usually start

# Fungi associated with woody tissues of *Acer pseudoplatanus* in forest stands with different health status concerning sooty bark disease (*Cryptostroma corticale*)

*Mycological Progress* (2023) 22:13

DOI: 10.1007/s11557-022-01861-6

Rebekka Schlößer<sup>1</sup>  • Steffen Bien<sup>1</sup>  • Gitta Jutta Langer<sup>1</sup>  • Ewald Johannes Langer<sup>1</sup> **2023**

- In Germany, symptoms of *C. corticale* are commonly reported (black dots on map)
- In 2021, the pathogen was found in 26% of trees in sites that had no visible symptoms
  - More widespread than thought

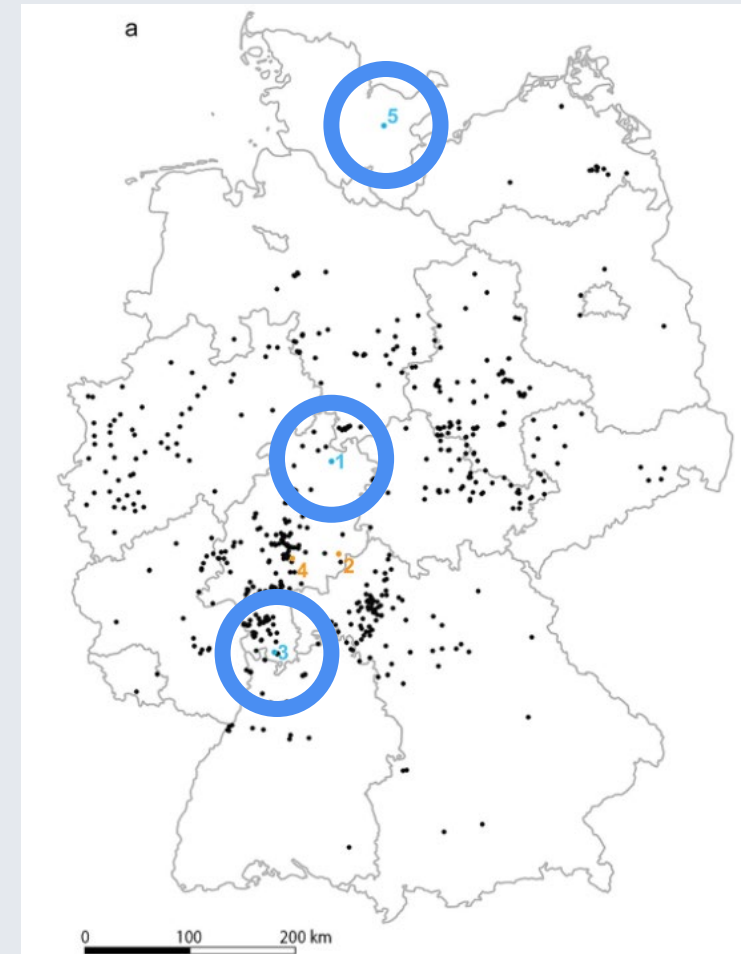







Fig. 1 a: Distribution of SBD cases in Germany, reported by 31.05.2021, 2

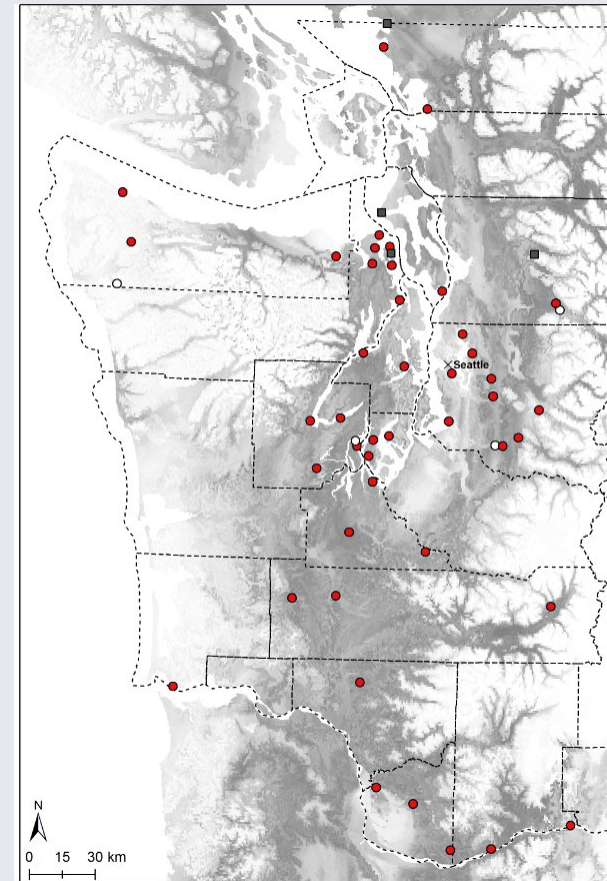
# *Cryptostroma corticale*, the causal agent of sooty bark disease of maple, appears widespread in western Washington State, USA

Rachel K. Brooks<sup>1</sup>  | Daniel Omdal<sup>1</sup> | Samuel Brown<sup>2</sup>  | Collin J. Marshall<sup>3</sup> |  
Joseph M. Hulbert<sup>3</sup>  | Marianne Elliott<sup>3</sup>  | Gary Chastagner<sup>3</sup> 

**2023**

*Forest Pathology*. 2023;53:e12835. DOI: 10.1111/efp.12835

- *C. corticale* detected on 80% of symptomatic and 68% of asymptomatic big leaf maples (red dots on map)
  - Bigger trees sampled
  - Vigorous trees
- Tree care important to minimize stress and incitement of fruiting





# Does CT need to worry about SBD?



# *Cryptostroma corticale* in New Haven

- Pin oak tree in New Haven was cut down in fall 2022, air was thick with spores/dust
  - New host
- Tree Warden Annie Mixsell sent two wood samples to WSU for PCR testing
  - WSU: Marianne Elliott, Joey Hulbert, Gary Chastagner
- One was PCR positive, but fungus did not grow






# Confirmed hosts in Washington State

Since 2020, *Cryptostroma corticale* has been confirmed on these tree species in Washington:

- Sycamore maple (*Acer pseudoplatanus*)
- Bigleaf maple (*Acer macrophyllum*)
- Norway maple (*Acer platanoides*)
- Japanese maple (*Acer palmatum*)
- Field maple (*Acer campestre*)
- Vine maple (*Acer circinatum*)
- Full moon maple (*Acer japonicum*)
- Red maple (*Acer rubrum*)
- Horse chestnut (*Aesculus hippocastanum*)
- Pacific Dogwood (*Cornus nuttallii*)
- Cherry plum (*Prunus cerasifera*)

It is likely that  
host range is  
wider.

# Sooty bark disease of maples: the risk for hypersensitivity pneumonitis by fungal spores not only for woodman

Markus Braun<sup>\*</sup> , Doris Klingelhöfer and David A. Groneberg

- When inhaled, the spores can cause severe respiratory symptoms
- Can cause maple bark disease in humans
- Risks greatest for tree workers



**Fig. 2** Planar soot-like coloured spore layer of *Cryptostroma corticale* on a maple trunk under the peeled bark. Photo courtesy of Dr. Wolfgang Prüfert (German Mycological Society, DGfM e.V.)

# Maple Bark Disease

## Washington Department of Health

### What is Maple Bark Disease?

Maple Bark Disease is a form of “hypersensitivity pneumonitis,” an inflammation of the airways or lungs, caused by a fungus called *Cryptostroma corticale*. Susceptible people can get Maple Bark Disease by breathing in *Cryptostroma corticale* spores. The fungus grows on maple and other broadleaf trees. The fungus does not cause an infectious disease in people - Maple Bark Disease is the reaction some people experience after exposure to the fungus.

Occasional and limited exposure to *Cryptostroma corticale* spores is not a serious disease risk for most people. The benefits of outdoor recreation

- Hypersensitivity pneumonitis, or maple bark disease
- Exposure risk high when infected wood is cut, chipped, or handled
- Symptoms can include: wheezing, cough, fever, nausea, vomiting, diarrhea

# Precautions: What can you do?

- From Washington Department of Health:
- For cutting symptomatic trees: Wear gloves, coveralls, N95 mask. Work in damp weather.
- Bury or remove material to contain spores.
- **The benefits of outdoor recreation and activities far outweigh the risks** of acquiring [hypersensitive pneumonitis]. It is a **very rare disease**, with the greatest risk for those with occupational exposures.

# What is NOT sooty bark disease?

Please note, there are many fungi that cause black staining or molds on dead plant tissues.

Laboratory diagnostics are needed  
to confirm if a tree is infected  
with *Cryptostroma corticale*.



# NOT SBD

- *Biscogniauxia* sp:  
fruiting bodies are  
“crusty”, tough
- Opportunistic  
pathogen/saprotroph
- Role in maple decline  
unclear
  - Several species





# NOT SBD

- *Biscogniauxia* sp.  
On a street tree  
sugar maple in  
New Haven
- Appeared after  
roots were  
damaged during  
sidewalk repair





# NOT SBD

- Sooty mold?
- Advanced *Steganosporium ovatum* infection?
  - Not much information available
- Impacts on tree health low or unclear



# Conclusions

- Sooty bark disease is (likely) in Connecticut
- Most infections are asymptomatic → no spores
- Reducing tree stress reduces sporulation
  - Information needed on host range and incidence
- Precaution: Wear a respirator/N95 mask and goggles when cutting or chipping trees that have visible brown/black patches



# Questions?

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# If you find a suspicious looking tree

- Take a photo
- Note species and condition
- Record coordinates
- Send an email: [susanna.kerio@ct.gov](mailto:susanna.kerio@ct.gov)