# Sooty Bark Disease (Cryptostroma corticale)

Evidence summary and sampling guide











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### Sooty Bark Disease: evidence summary

Sooty bark disease (SBD) is caused by the fungus *Cryptostroma corticale*. The disease leads to the dieback and ultimately the death of trees, prediminately maples (*Acer* spp.).

#### a. Distribution

The fungus was first described in North America from where it was introduced to Europe, likely through the transport of infected wood. It was first documented in England in 1945 (Gregory & Waller, 1951). Following its initial detection in Europe, the fungus was subsequently reported in France and Germany. By the early twenty-first century, the disease had spread to several other European countries, including Austria, the Czech Republic, the Netherlands, Italy, Switzerland, Bulgaria, Belgium, Slovenia, and Russia (EPPO, 2025) (Fig 1).



Figure 1. Distribution of the fungus *Cryptostroma corticale* in 2025. For updated distribution maps: <u>https://gd.eppo.int/taxon/CRPSCO/distribution.</u>



#### b. <u>Host</u>

*Cryptostroma corticale* mainly appears to become pathogenic and cause Sooty Bark Disease on *Acer* species (maple trees), affecting especially *Acer* pseduoplatanus (Sycamore) in Europe (Muller et al. 2023) (Fig. 2). It has been also recorded in *A. macrophyllum, A. saccharinum, A. platanoides, A. campestre, A. palmatum* (Bencheva 2014, Brooks et al. 2022; Garbelotto et al. 2024; Worral 2020).

Figure 2. Sycamore (*Acer pseudoplatanus*) a) mature tree, b) details of the leave and flowers.

Sooty Bark Disease has also now been found outside the Acer genus, on Tilia species (lime), Betula species (birch), Aesculus hippocastanum (European horse chestnut), Fraxinus excelsior (European ash) and Cornus nuttallii (Kuppen 2021; Brenken et al. 2024; Langer et al. 2024; Worral 2020).

#### c. <u>Spread and infection process</u>

*Cryptostroma corticale* can remain as an endophyte in trees for many years without causing the disease. It is considered an opportunistic latent pathogen, switching from its endophytic stage to pathogenic and saprophytic life stages when its host is stressed (Ogris et al. 2021). Severe drought and high temperatures (25°C) are among the key stressors that can trigger the appearance of Sooty Bark Disease, which can ultimately lead to tree mortality (Ogris et al. 2021; Muller et al. 2023).

Sooty Bark Disease is dispersed by the spores that the fungus produces. The wind carries a large number of spores allowing them to travel long distances (as far as 310 km) (Muller et al. 2023) and infect new trees through fresh wounds, cracks or natural openings in the bark. Once inside the tree, the mycelium grows longitudinally through the wood, while hot and dry weather accelerates radial growth (Worral 2020). As the fungus advances, it kills the cambium, invades the bark, and forms the stroma, which produces vast numbers of spores (Braun at al. 2021) (Fig. 3).



Figure 3. Trunk of infested maple tree (Acer) showing spore layer of *Cryptostroma corticale*.

#### d. Symptoms

Symptoms of Sooty Bark Disease include (Burgdorf & Straser, 2021; Brooks et al. 2022):

- Wilting and branch dieback frequently seen in upper limbs (Fig. 4).
- Bark cracking and falling off, revealing brown-black sooty masses erupting through the shedding bark (Fig. 5).
- Once the spores have been released, the stroma has a silvery appearance (Fig. 6).
- Wood staining when seen in cross sections (Fig. 7).
- The disease can progress rapidly in mature trees, ultimately resulting in mortality.



Figure 4. Acer pseudoplatanus showing aerial dieback.



Figure 5. Dark brown spore masses of Crytostroma corticale.



Figure 6. Silvery appearance of Crytostroma corticale stroma after release of spores.



Figure 7. a,b) Cross-section of Acer pseudoplatanus stem showing stain.

#### e. Threats

The prevalence and severity of the disease are linked to high temperatures and water stress (Dickenson & Wheeler 1981). As climate change drives more frequent droughts and hotter summers, trees will become increasingly susceptible to infection (Ogris et al. 2021, Muller 2023). Additionally, the most impacted host species, sycamore (Acer pseudoplatanus), is commonly found as a mature tree in woodland and non-woodland settings. As a result, the number of infected and hazardous trees may rise rapidly, leading to increased management costs. To improve the long-term prospects of sycamore in the UK, it is advisable to plant it in mixtures with other species.

#### f. Public Health concerns

Another concern regarding Sooty Bark Disease relates to human health. The extremely high numbers of spores (one hundred million spores per cm2) that the fungus produces are hyperallergenic and can cause hypersensitivity pneumonitis (Kespohl et al. 2022), which can have a serious impact on lung function if left untreated.

Though 'occasional and limited exposure' to Sooty Bark Disease spores is not considered high risk (Brooks et al. 2023); those that work closely and repeatedly with infected trees and wood such as foresters, arboriculturists, tree surgeons, sawyers and mill workers are the most likely to be affected (Braun et al. 2021).

#### g. Public Health mitigation measures

The only experimental health study on Sooty Bark Disease recommends the following mitigations measures (Kespohl et al., 2022):

- Cease work or increase protective measures in cases where hypersensitivity pneumonitis has occurred.
- Prioritise mechanized tree felling and processing whenever feasible.
- Conduct work in humid or damp conditions to reduce airborne spores.
- Rotate workers between tasks to minimize prolonged exposure.
- Avoid bringing spores into enclosed spaces such as vehicle cabins or break room.
- Store infected wood and debris in sealed containers.
- Use FFP2/FFP3 masks with an exhalation valve for motor and manual work.
- Wash clothing with water and shake out outdoors, away from others, while wearing Personal Protective Equipment (PPE).

Due to the economic impact of the disease, there may be a temptation to offset losses by repurposing the wood as firewood. However, the fungus can persist in arisings such as stacked wood and sawn planks, and even wood that appears symptom-free may still contain the fungus and thus produce spores – debarking logs may eliminate fungal infestation (Kespohl et al. 2022).

### Sampling for Sooty Bark Disease

#### **Precaution measures!!!**

Due to the health risks associated with this disease, precautions need to be taken when collecting samples. This protocol has been produced to advise on how best to take samples whilst reducing the risk.



**Choose suitable weather conditions:** Ideally work should be conducted during damp or wet weather conditions to reduce spore dispersal.



Wear appropriate Personal Protective Equipment (PPE): Use gloves and FFP3 face covering or respirator to reduce spore exposure and inhalation.



#### Before samping: Tree Alert Report \*\*

There has been very little recent research on Sooty Bark Disease in the UK. Further research will improve our understanding of Sooty Bark Disease's prevalence and impacts in the UK as well as provide evidence to inform mitigation and recovery. Reporting of Sooty Bark Disease through TreeAlert is also low, and as such, formal records do not currently reflect the true distribution or prevalence of the disease.

You can help improve our understanding of Sooty Bark Disease by reporting suspected cases via TreeAlert before collecting samples. Submitting a report ensures that diagnosticians are aware of the suspected infection and can **provide guidance and the necessary material on the appropriate sample type needed for accurate diagnosis.** 

#### To access TreeAlert portal:



Scan the QR code or <u>Click here to access</u> <u>TreeAlert</u>

To submit a report of a suspected Sooty Bark Disease on a tree, select the **"General Report"** option. When asked about client details, select **"Targeted survey or campaign"** in the client project box. For submission, the following information will be necessary:

- Date of observation, tree location, location type and landowner.
- The tree's approximate age and size.
- Species name, or if not possible the genus is required.
- Signs and symptoms displayed on the crown, steam and base of the tree.
- Three photos that show: 1) the tree in context, 2) the signs of ill-health in context, and 3) the signs and symptoms in more detail (these are mandatory).

To help our diagnosticians identify the disease accurately, please provide as much detail as possible when submitting a report. The more information you share, the better we can understand and track the disease.

Once your enquiry is reviewed, you will receive updates on the findings. If you are a registered user, you can also track your past submissions through your **"Dashboard".** 





## Sampling guide:



Traditionally, when a tree was suspected of being infected, the diagnostic laboratory would receive bark panels for testing. These are small sections of bark carefully removed from the tree, often from areas showing signs of infection.

However, we are now trialling a different, less invasive sampling method using a swab to collect spores from the tree's surface. This method is easy to use and just as effective in diagnosing the disease. After submitting a TreeAlert report, we will send you a swab kit, making it simple for you to contribute.





Work during damp/wet weather conditions



**Use gloves and FFP3** face covering







#### 2

#### **Collect the spores:**

Gently place the cotton bud onto the spore mass and roll around to make sure the bud has been covered with spores.



### 3

4

5

#### Return the swab to the tube:

After collecting the spores return the swab to the plastic tube and seal the tube tightly.

#### Label the sample:

Add the TreeAlert / enquire number, location information/ grid reference and date of collection.

#### Place the tube into plastic bags: The tubes should be sealed correctly and double bagged prior to sending.



#### Place the sample in a sealable plastic bag:

Carefully place the piece(s) of bark into the sealable bag and seal the bag.

#### Label the sample:

Add the TreeAlert / enquire number, location information/ grid reference and date of collection.



3

#### Use a second plastic bag:

Place the sealable bag in another bag to prevent any spores being released accidentally.

Once the samples have been collected:

- Packages need to be labelled as 'Suspected SBD' on the outside.
- Then address and send them to:

THDAS, Forest Research, Alice Holt Lodge, Farnham, Surrey, GU10 4LH







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#### For more information:

- Forest Research: https://www.forestresearch.gov.uk/tools-and-resources/fthr/pest-and-disease-resources/sooty-bark-disease-cryptostroma-corticale/
- IPSN: https://www.bgci.org/wp/wp-content/uploads/2024/03/IPSN-POSTERS-2024\_Sooty-Bark-Disease.pdf
- EPPO: https://gd.eppo.int/taxon/CRPSCO



**IPSN** International Plant Sentinel Network







For any questions, please contact:

Forest Research: <u>alex.lewis@forestresearch.gov.uk</u> <u>caroline.gorton@forestresearch.gov.uk</u> <u>jen.clements@forestresearch.gov.uk</u>

If you are interested in sampling outside the UK, please contact:

International Plant Sentinel Network (IPSN): lara.salido@bgci.org itxaso.quintana@bgci.org