PROTOCOL

For the monitoring of Canker Stain of Plane (Ceratocystis platani)





IPSN International Plant Sentinel Network





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Canker Stain of Plane

Canker Stain of Plane is a disease also known as plane tree wilt. The disease is caused by the ascomycete fungus *Ceratocystis platani*.

Distribution

The fungus species is known to be native to the eastern United States, from where it expanded to the western United States.

During World War II, it was accidentally introduced to Europe through infected wood used to package military supplies, arriving at the ports in southern Italy and France.

Since then, the fungus has gradually spread to other European countries and is now present in Italy and France, as well as, Switzerland, Turkey, Greece, Armenia, and Albania. The disease has not been reported in the UK (Fig. 1).





Figure 1. Distribution of the fungus Ceratocystis platani 2024. For updated distribution maps: <u>https://gd.eppo.int/taxon/CERAFP/distribution</u>.

<u>Hosts</u>

Canker Stain of Plane can affect several species of plane trees (*Platanus* genus).

The disease was first reported in the hybrid *Platanus* x *hispanica* or *Platanus* x *acerifolia*, known as the London plane, that is widely grown in British cities and towns (Fig. 2a), but is also a popular urban landscape tree around the world.

Figure 2. a) Platanus x hispanica in London's parks,b) Platanus orientalis, and c) Platanus occidentalis.

The fungus can also affect both parent species of the hybrid: the oriental plane (*P. orientalis*) (Fig. 2b) native to southern Europe, and the North American native eastern plane (*P. occidentalis*) (Fig. 2c).

Threats

Canker Stain of Plane is a devastating disease, causing high levels of mortality of plane trees in the United States and Europe, both in natural woody ecosystems and well as on ornamental trees (Fig. 3). The disease particularly affects the widely used hybrid London plane, leading to major losses in parks, gardens, and along streets and roads.

Plane trees are valued for their shade, aesthetics, and tolerance to pollution and water shortages. However, removing and replacing infected trees is costly, and replanting trees with new planes trees presents significant challenges. The disease poses a significant risk to UK plane trees, with potential losses severely impacting urban environments economically and ecologically.



Figure 3. Canker stain of plane has ruined miles of historic plane trees along Canal du Midi, France.

Spread and infection process

Infections occur when the *C. platani* spores come in contact with fresh wounds. The fungus enters the tree via cuts and damage to the bark of branches, the stem or roots, caused by wind, floods, pruning tools, machinery or insects.

After the spores germinate, the developing mycelium of the fungus colonises the exposed tissue and then advances into the xylem, where it spreads longitudinally and tangentially. This blocks the vessels in the vascular system from transporting water and nutrients, causing the sudden wilting of the tree. On the surface of the wounded-infected tissues, spores of the pathogen form within 2 to 8 days following infection.

The primary transmission pathway is through infested wood fragments, such as sawdust and wood chips, on pruning and cutting tools, as spores can remain viable on metal surfaces for weeks. *C. platani* can also spread through contaminated workers' gloves, ropes, clothes, machinery, and equipment, as well as being moved by wood packaging material. The disease can be transferred by root grafts between neighboring trees. The fungus can survive for long periods in the soil, making contaminated soil another pathway for spread. Additionally, *C. platani* can be transported long distances by windblown sawdust containing spores, in infected wood fragments or as spores in water.

Symptoms

- The first visible symptom is the wilting of the foliage, with infected trees showing sparse, chlorotic (yellowish) leaves (see Fig. 4a & b, trees on the right), leading to extensive dieback of the crown (see Fig. 4a & b, trees on the left).
- The disease also causes bark cankers. In thin-



Figure 4. a & b) Plane trees affected by canker stain of plane: trees on the right with sparse yellowing leaves and trees of the left with extensive dieback.

barked trees, cankers appear as sunken lesions with orange or purple streaks around the margins (see Fig. 5a), while in thicker-barked trees, vertical cracks can be observed (see Fig. 5b).

- When the bark is removed, leopard-like spots in shades of brown to dark violet are evident on the outer wood (see Fig. 6).
- Trees with a diameter of 30–40 cm can be killed in 2–3 years, while larger and more vigorous trees may take 4–7 years to succumb to the disease.
- In cross-sections of infested branches or stem, bluish-black staining in the wood extends radially (see Fig. 7).

Figure 5. a) Orange and purple streaking around the margins of a lesion and b) vertical cracks on the bark caused by *C. platani*.







Figure 6. a & b) Dark spotting under the bark of a plane tree caused by *C*. *platani*.



Setting traps for monitoring Canker Stain of Plane

Canker Stain of Plane (Ceratocystis platani) is a serious disease of plane trees (Platanus spp.) and a quarantine pest in many regions. Early detection is key to preventing its spread.

This guide introduces a simple, passive monitoring method using prism spore traps—low-tech devices with filter paper suspended from host trees (see Fig. 8).

This monitoring guide is intended for general use and can be applied by anyone interested in supporting plant health surveillance.

UK-Based Monitoring Project

In the UK, this work is part of the Defra-funded Future Proofing Plant Health programme, led by Forest Research and BGCI's International Plant Sentinel Network (IPSN), with the aim of building a national network for monitoring Canker Stain of Plane.

This UK-specific project involves the distribution of monitoring kits and supporting materials to individuals and organisations willing to deploy traps and help detect the disease.

If you are based in the UK and would like to participate in this network, please contact us (<u>lara.salido@bgci.org</u>; <u>itxaso.quintana@bgci.org</u>) to receive materials and further guidance.



Figure 8. Traps to be set in botanic gardens/arboreta for capturing spores on the canker stain of plane.

Materials needed:

- 1 x Plastic tent trap, with a petri dish stuck to its floor
- Rope
- Filter papers
- TE buffer in 2ml microfuge tubes
- Safety Data Sheets (SDS) for TE buffer
- Envelopes and stamps





How to set the traps:



Place a filter paper in the petri dish. Ensure that the elastic band prevents it from blowing out.





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Pour the TE buffer. Use one of the tubes to wet the filter paper with the TE buffer.



Construct your plastic tent.

Do not seal with the double-sided tape, use the wire to hold the tent together and attach the rope to hoist it into position





Install the trap.

This should be set up on the first Monday of the month. Choose an appropriate location for the trap to be situated.



This could be close to a building or in a tree. The trap will ideally be suspended 2m off the ground.

Check the trap regularly. If the filter paper is dry, pour on more TE buffer.



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After 7 days, take down the trap and remove the filter paper.

Place the filter paper in a small envelope, and add the label:

- Location site
- Date range the trap was up for

Mail it to your local diagnostic lab.

Insert the envelope with the filter paper into one of the stamped and addressed envelopes.

Repeat the process every month.



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For more information:

- Forest Research: <u>https://www.forestresearch.gov.uk/tools-and-resources/fthr/pest-and-disease-</u> resources/canker-stain-of-plane-ceratocystis-platani/
- Forestry Commission: <u>https://cdn.forestresearch.gov.uk/2015/08/fcph-pw_dk3t5vc.pdf</u>
- Observatree: <u>https://www.observatree.org.uk/pests-and-diseases/priority-pests-and-diseases/plane-wilt/</u>
- APS Publications: https://doi.org/10.1094/PDIS-09-16-1235-FE
- EPPO Global Database: https://gd.eppo.int/taxon/CERAFP

If you are interested in participating in the project, or have any questions, please contact:

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