Department
for Environment
Food & Rural Affairs

Supplementary data on *Ceratocystis platani*

Date: October 2020

What is the name of the pest?

Taxon: Fungus (Ascomycota, Sordariomycetes, Microascaceae)
Pest: *Ceratocystis platani*
Common name: canker stain of plane, plane wilt
Synonym: *Ceratocystis fimbriata* f. sp. *platani*

What initiated this document?

The UK has had a Protected Zone (PZ) for this pest since 2014. With the re-classification of *Ceratocystis platani* as a Union quarantine pest, protected zone designations have been revoked for this pest and the implications of this needed to be assessed.

This paper provides an update to aspects of the UK PRA on *Ceratocystis platani*, (Woodhall, 2013).

Background

Ceratocystis platani is indigenous to eastern USA. The organism was introduced from the USA to several Southern European ports at the end of the Second World War and spread rapidly in Italy and more slowly in France. In 2019 the pest was reported for the first time in areas of northern France.

Ceratocystis platani infects trees through existing wounds or other injuries made in the branches, trunk or in the roots. The natural spread between trees is thought to be slow, with spread of propagules and infected sawdust potentially being weather driven by wind and wind-driven rain. It is possible that it can also spread via root contact between trees

(root anastomosis) or via insects, birds and other animals moving from one wound to another, although no vector is directly associated with the pathogen (EFSA PLH Panel, 2016). Water courses are also implicated in the spread, as they can carry spores or infected wood or wood remains such as sawdust or insect frass, and if tree roots are injured, the infection can enter the tree. Infection also occurs by contaminated pruning tools or machinery (EFSA PLH Panel, 2016). It is thought that *Platanus* trees in urban environments are particularly vulnerable to infection by *C. platani*, following disturbance to the roots by machinery. These trees are already subjected to other environmental stresses such as pollution and drought.

What is the pest's current geographical distribution?

Native to the USA, *C. platani* is found on both the east and west coasts. Within Europe, after its initial introduction to France and Italy, it is now also found in Albania, Armenia, Greece, Switzerland and Turkey (EPPO GD, 2020).

Ceratocystis platani was recorded in Spain in 2010, but was declared eradicated in 2014 (EPPO Global Database, 2020), and subsequent surveys have not detected it. The fungus is absent from all other EU member states.

Some details of the recent findings in Northern France during 2019 are summarised below (Europhyt, 2019):

Both records were following "a report", after which official inspections were done and samples were taken (Europhyt, 2019). This suggests that symptoms may have been visible, causing the report to be made in the first place. The Nantes record was on 2 trees of *Platanus* x *acerifolia* (London plane), part of a row of 18 trees in a marketplace. All of these trees have been felled and uprooted and *Platanus* trees in the buffer zone (which encompasses all of the municipality of Nantes) have been inventoried and are being monitored by annual surveillance (Europhyt, 2019). In the Île de France, the municipality of Antony had eight infected trees. All the infected trees and all *Platanus* within 35 m of an infected tree (over 100 in total) have been felled and uprooted, and the buffer zone for further annual monitoring is the whole of the municipality of Antony (Europhyt,2019). (However, the maps provided do show that all the infected trees are in the northern part of Antony and neighbouring municipalities are much closer to the infected trees than southern and central parts of Antony).

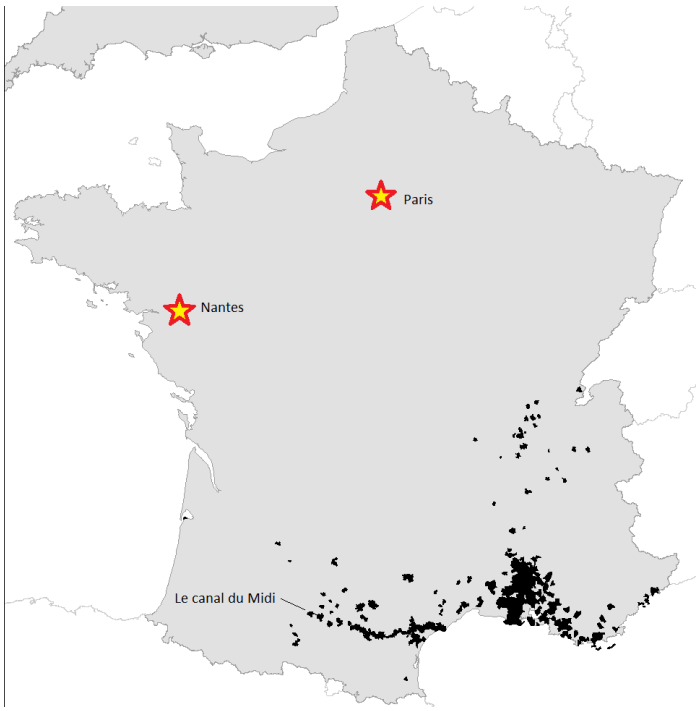

Fig. 1 Infected communes (small administrative area) of *Ceratocystis platani* in France (in black) (data source: Miniggio and Felis,2016). The locations of the recent findings in the northern part of the country are shown by the coloured stars. The course of the canal du Midi (along which the pathogen has been spreading) is clearly visible in the south-west.

The detection of *Ceratocyctis platani* in Northern France in 2019 indicates that the fungus is spreading by artificial means (Fig. 1). As the fungus causes rapid decline even in mature, vigorous trees, the outbreaks in Northern France indicate that the pest has spread to a new area within the last seven years, unrelated to the previous findings.

What pathways provide opportunities for the pest to enter the UK and transfer to a suitable host?

The 2013 UK PRA focused on the pathways: host plants for planting, soil, contaminated wood, sawdust and wood packaging. It also considered contaminated footwear, machinery and other equipment, though these were judged to be of lower likelihood for the UK. Evidence since this PRA was conducted suggests that the machinery and equipment pathway is more important than was rated in 2013, and the EFSA opinion (2016) quoted Greek authors who suggested that the pathogen is assumed to have spread from Southern to Northern Greece on road construction machinery and vehicles previously used in affected areas. It has also been suggested that it arrived in Switzerland via contaminated tree surgery equipment used on infected trees in Italy and then used in Switzerland without disinfecting it (London Tree Officers Association, 2018). Anecdotally – speaking to contractors and tree officers in the UK – it is definitely believed that there are some operatives who travel from the UK to mainland Europe with their equipment in their vehicles, and then return to the UK.

However this is not the only potential pathway for which there is previous evidence. “It has been speculated that the pathogen spread from Italy or France to Greece on infected *Platanus* plants (Ocasio-Morales *et al.*, 2007). This was further supported by genotyping

studies, which showed that the genotype present in Greece was identical to the genotype reported earlier from Italy, France and Switzerland (Ocasio-Morales *et al*., 2007) and different from the genotype present in the USA" (EFSA PLH Panel, 2016).

The 2016 EFSA opinion identified high risk pathways as:

Host plants for planting,

Wood and machinery (construction/terracing/logging),

Pruning and cutting tools.

Machinery and plants for planting are now considered the most important mechanisms of long-distance spread, and requirements for machinery were introduced in the last update (September 2019) of Directive 2000/29/EC, and Albania and Turkey were added as infested third countries (in addition to Armenia, Switzerland and United States). These third countries need to make a declaration concerning plane wilt on phytosanitary certificates and all EU member states need to meet passporting requirements.

In Directive 2000/29/EC *C. platani* was listed both as a quarantine organism for the whole EU and a Protected Zone pest for the UK and Ireland, with more stringent requirements being in place for the movement of plants for planting into the protected zones. The new EU plant health regulations which came into force late 2019 (Commission Implementing Regulation (EU) 2019/2072) do not allow for a pest to be listed as both a Union quarantine pest and a Protected Zone quarantine pest. Therefore, the UK no longer has a Protected Zone for *C. platani*, and it is now possible to move *Platanus* trees from production sites within infected areas (subject to prescribed requirements being met). Between January 2016 and November 2019, the UK received 1,860 pre-notifications for *Platanus* trees from France, the second largest supplier of *Platanus* to the UK in the EU, and 151 pre-notifications for trees from Italy (Table 1), indicating a pathway for infected plants to reach the UK. It is not known how many trees are imported without being notified.

Table 1: Sources and number of *Platanus* plants for planting pre-notified to UK 2016-2019 (PHSI data).

European country of origin	**Total *Platanus* imports pre-notified to UK** Jan 2016-Nov 2019
Netherlands	6,599
France	1,860
Belgium	629
Germany	402
Denmark	300
Italy	151
Spain	29
Irish Republic	25
Hungary	2
Total	**9,997**

The new EU plant health regulation requirements do not give the same level of assurance as area freedom requirements and new findings of the pest have been confirmed in France, much further north than previous findings. This highlights an increased risk to the UK.

Pest biology and/or lifecycle

Ceratocytis platani can survive for several years in vitro (at -17°C) and in soil and dead trees. The fungus can survive for 7-15 days on the surface of a wound and 30 months in decaying parts of plane trees. Survival of the pathogen is facilitated by the production of numerous chlamydospores (Grosclaude, 1988; Grosclaude, 1995; Woodhall, 2013; CABI CPC, 2019).

The UK PRA (Woodhall, 2013) states that in trees that have been recently infected there may be no visual symptoms of the disease and it could take more than one cycle of vegetation for wilting to occur (which is often when the disease is first noticed). This could mean that infection via natural spread is not likely to be identified in the first growing season after infection. This means that plants could be moved from a place of production before symptoms have developed. Inoculum in the form of ascospores and conidia, and infected sawdust can be spread by wind, and wind-driven rain, and Luchi *et al.* (2013) successfully trapped airborne inoculum up to a maximum distance of 200 m from the closest symptomatic infected plane tree, which means that plane trees, or spores on wood and in sawdust in the vicinity of a place of production could provide a source of infection.

Smaller trees tend to die off more rapidly than more mature trees. Single infection sites can grow up to 2.5 m in one year. The fungus can kill a tree of 30-40 cm diameter in 2-3 years and a large, vigorous tree in 4-7 years (Ferrari and Pichenot, 1974; Panconesi, 1981). Once a tree is infected, the disease is usually fatal. Most UK imported *Platanus* plants for planting are small (PHSI notification data) and the ability to inspect a tree to detect an attack depends on size as smaller plants are easier to inspect. However, plants are usually moved when dormant, which, with the first symptoms to look for being chlorotic foliage and sudden widespread withering of the foliage, makes detection of the disease more difficult (EFSA Plant Health Panel, 2016).

Pest Risk Management

What are the risk management options?

The removal of the Protected Zone for the UK has resulted in the potential import and movement of plants for planting of *Platanus* spp. into the UK from pest free places of production. The previous PZ requirement only allowed plants for planting of *Platanus* spp. to enter the UK from a pest free area.

It is proposed to reinstate the requirement that plants for planting of *Platanus* spp. entering GB have been grown throughout their life in a pest free area, established in accordance with ISPM 4, as it is considered that the pest free place of production does not offer the same level of protection against the pest.

Existing requirements on machinery will be retained, in that machinery and vehicles may only be moved from an area established as being free from *Ceratocystis platani* (in line with ISPM 4), or if they come from an area where the pest is present they must have been cleaned, and be free from soil and plant debris prior to being moved out of the area. This is complimented by awareness raising with industry of the risks of contamination from machinery and pruning equipment which is already ongoing.

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