SCIENTIFIC OPINION

Scientific Opinion on the pest categorisation of *Ceratocystis platani* (Walter) Engelbrecht et Harrington[1]

EFSA Panel on Plant Health (PLH)[2,3]

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ABSTRACT

The European Commission requested the EFSA Panel on Plant Health to perform a pest categorisation for *Ceratocystis fimbriata* f. sp. *platani* Walter, the fungal pathogen responsible for the "canker stain" disease of plane trees. *C. fimbriata* f. sp. *platani* is listed in Annex IIAII of Directive 2000/29/EC. Recently, the pathogen has been reclassified as *Ceratocystis platani* (Walter) Engelbrecht et Harrington, based on intersterility studies, progeny analysis and the morphology of isolates from different hosts. *C. platani* is a single taxonomic entity and sensitive and reliable methods are available for its detection and differentiation from other related fungal species. The only known hosts are *Platanus occidentalis*, *Platanus orientalis* and *Platanus* × *acerifolia*. The last two plane species are the most susceptible to *C. platani* and are widely grown in most of the European Union Member States. *C. platani* is a wound pathogen causing canker and wilt and eventually death of plane trees. It is currently present in part of the risk assessment area (Greece, France, Italy), where it causes serious consequences on *P. orientalis* and *P.* × *acerifolia* trees grown in natural stands, coppices, and public and private gardens in both rural and urban environments. There are no obvious ecological/climatic factors limiting the potential establishment and spread of the pathogen in the non-infested part of the risk assessment area where hosts are present. *C. platani* has multiple natural and human-assisted means of spread, including waterways, root anastomosis, contaminated pruning tools, insects, contaminated insect frass and sawdust. The movement of infected host plants for planting and wood is considered to be responsible for the introduction of the pathogen into new areas. Cultural practices and sanitary and chemical measures applied in the infested areas may reduce inoculum sources but they cannot eliminate the pathogen. Plane accessions resistant to *C. platani* are available in the European market.

KEY WORDS

Canker stain of plane, *Platanus* spp., distribution, European Union, impact

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BACKGROUND AS PROVIDED BY THE EUROPEAN COMMISSION

The current European Union plant health regime is established by Council Directive 2000/29/EC on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community (OJ L 169, 10.7.2000, p. 1).

The Directive lays down, amongst others, the technical phytosanitary provisions to be met by plants and plant products and the control checks to be carried out at the place of origin on plants and plant products destined for the Union or to be moved within the Union, the list of harmful organisms whose introduction into or spread within the Union is prohibited and the control measures to be carried out at the outer border of the Union on arrival of plants and plant products.

The Commission is currently carrying out a revision of the regulatory status of organisms listed in the Annexes of Directive 2000/29/EC. This revision targets mainly organisms which are already locally present in the EU territory and that in many cases are regulated in the EU since a long time. Therefore it is considered to be appropriate to evaluate whether these organisms still deserve to remain regulated under Council Directive 2000/29/EC, or whether, if appropriate, they should be regulated in the context of the marketing of plant propagation material, or be deregulated. The revision of the regulatory status of these organisms is also in line with the outcome of the recent evaluation of the EU Plant Health Regime, which called for a modernisation of the system through more focus on prevention and better risk targeting (prioritisation).

In order to carry out this evaluation, a recent pest risk analysis is needed which takes into account the latest scientific and technical knowledge on these organisms, including data on their agronomic and environmental impact, as well as their present distribution in the EU territory. In this context, EFSA has already been asked to prepare risk assessments for some organisms listed in Annex IIAII. The current request concerns 23 additional organisms listed in Annex II, Part A, Section II as well as five organisms listed in Annex I, Part A, Section I, one listed in Annex I, Part A, Section II and nine organisms listed in Annex II, Part A, Section I of Council Directive 2000/29/EC. The organisms in question are the following:

Organisms listed in Annex II, Part A, Section II:

- *Ditylenchus destructor* Thome
- *Circulifer haematoceps*
- *Circulifer tenellus*
- *Helicoverpa armigera* (Hübner)
- *Radopholus similis* (Cobb) Thome (could be addressed together with the IIAI organism *Radopholus citrophilus* Huettel Dickson and Kaplan)
- *Paysandisia archon* (Burmeister)
- *Clavibacter michiganensis* spp. *insidiosus* (McCulloch) Davis *et al*.
- *Erwinia amylovora* (Burr.) Winsl. *et al*. (also listed in Annex IIB)
- *Pseudomonas syringae* pv. *persicae* (Prunier *et al*.) Young *et al*.
- *Xanthomonas campestris* pv. *phaseoli* (Smith) Dye
- *Xanthomonas campestris* pv. *pruni* (Smith) Dye
- *Xylophilus ampelinus* (Panagopoulos) Willems *et al*.
- *Ceratocystis fimbriata* f. sp. *platani* Walter (also listed in Annex IIB)
- *Cryphonectria parasitica* (Murrill) Barr (also listed in Annex IIB)
- *Phoma tracheiphila* (Petri) Kantschaveli and Gikashvili
- *Verticillium albo-atrum* Reinke and Berthold
- *Verticillium dahliae* Klebahn
- Beet leaf curl virus
- Citrus tristeza virus (European isolates) (also listed in Annex IIB)
- Grapevine flavescence dorée MLO (also listed in Annex IIB)

- Potato stolbur mycoplasma
- *Spiroplasma citri* Saglio *et al*.
- Tomato yellow leaf curl virus

Organisms listed in Annex I, Part A, Section I:

- *Rhagoletis cingulata* (Loew)
- *Rhagoletis ribicola* Doane
- Strawberry vein banding virus
- Strawberry latent C virus
- Elm phloem necrosis mycoplasm

Organisms listed in Annex I, Part A, Section II:

- *Spodoptera littoralis* (Boisd.)

Organisms listed in Annex II, Part A, Section I:

- *Aculops fuchsiae* Keifer
- *Aonidiella citrina* Coquillet
- Prunus necrotic ringspot virus
- Cherry leafroll virus
- *Radopholus citrophilus* Huettel Dickson and Kaplan (could be addressed together with IIAII organism *Radopholus similis* (Cobb) Thome)
- *Scirtothrips dorsalis* Hendel
- *Atropellis* spp.
- *Eotetranychus lewisi* McGregor
- *Diaporthe vaccinii* Shaer.

Terms of reference as provided by the European Commission

EFSA is requested, pursuant to Article 29(1) and Article 22(5) of Regulation (EC) No 178/2002, to provide a pest risk assessment of *Ditylenchus destructor* Thome, *Circulifer haematoceps*, *Circulifer tenellus*, *Helicoverpa armigera* (Hübner), *Radopholus similis* (Cobb) Thome, *Paysandisia archon* (Burmeister), *Clavibacter michiganensis* spp. *insidiosus* (McCulloch) Davis *et al*, *Erwinia amylovora* (Burr.) Winsl. *et al*, *Pseudomonas syringae pv. persicae* (Prunier *et al)* Young *et al*. *Xanthomonas campestris* pv. *phaseoli* (Smith) Dye, *Xanthomonas campestris* pv. *pruni* (Smith) Dye, *Xyîophilus ampelinus* (Panagopoulos) Willems *et al*., *Ceratocystis fimbriata* f. sp. *platani* Walter, *Cryphonectria parasitica* (Murrill) Barr, *Phoma tracheiphila* (Petri) Kanchaveli and Gikashvili, *Verticillium alboatrum* Reinke and Berthold, *Verticillium dahliae* Klebahn, Beet leaf curl virus, Citrus tristeza virus (European isolates), Grapevine flavescence dorée MLO, Potato stolbur mycoplasma, *Spiroplasma citri* Saglio *et al*., Tomato yellow leaf curl virus, *Rhagoletis cingulata* (Loew), *Rhagoletis ribicola* Doane, Strawberry vein banding virus, Strawberry latent C virus, Elm phloem necrosis mycoplasma, *Spodoptera littoralis* (Boisd.), *Aculops fuchsiae* Keifer, *Aonidiella citrina* Coquillet, Prunus necrotic ringspot virus, Cherry leafroll virus, *Radopholus citrophilus* Huettel Dickson and Kaplan (to address with the IIAII *Radopholus similis* (Cobb) Thome), *Scirtothrips dorsalis* Hendel, *Atropellis* spp., *Eotetranychus lewisi* McGregor *md Diaporthe vaccinii* Shaer., for the EU territory.

In line with the experience gained with the previous two batches of pest risk assessments of organisms listed in Annex II, Part A, Section II, requested to EFSA, and in order to further streamline the preparation of risk assessments for regulated pests, the work should be split in two stages, each with a specific output. EFSA is requested to prepare and deliver first a pest categorisation for each of these 38 regulated pests (step 1). Upon receipt and analysis of this output, the Commission will inform EFSA for which organisms it is necessary to complete the pest risk assessment, to identify risk reduction options and to provide an assessment of the effectiveness of current EU phytosanitary requirements (step 2). *Clavibacter michiganensis* spp. *michiganensis* (Smith) Davis *et al*. and

Xanthomonas campestris pv. *vesicatoria* (Doidge) Dye, from the second batch of risk assessment requests for Annex IIAII organisms requested to EFSA (ARES(2012)880155), could be used as pilot cases for this approach, given that the working group for the preparation of their pest risk assessments has been constituted and it is currently dealing with the step 1 "pest categorisation". This proposed modification of previous request would allow a rapid delivery by EFSA by May 2014 of the first two outputs for step 1 "pest categorisation", that could be used as pilot case for this request and obtain a prompt feedback on its fitness for purpose from the risk manager's point of view.

As indicated in previous requests of risk assessments for regulated pests, in order to target its level of detail to the needs of the risk manager, and thereby to rationalise the resources used for their preparation and to speed up their delivery, for the preparation of the pest categorisations EFSA is requested, in order to define the potential for establishment, spread and impact in the risk assessment area, to concentrate in particular on the analysis of the present distribution of the organism in comparison with the distribution of the main hosts and on the analysis of the observed impacts of the organism in the risk assessment area.

ASSESSMENT

1. Introduction

1.1. Purpose

This document presents a pest categorisation prepared by the EFSA Scientific Panel on Plant Health (hereinafter referred to as the Panel) for the species *Ceratocystis platani* (Walter) Engelbrecht et Harrington in response to a request from the European Commission.

1.2. Scope

This pest categorisation is for *Ceratocystis platani* (Walter) Engelbrecht et Harrington, which was previously named as *Ceratocystis fimbriata* f. sp. *platani* Walter. The risk assessment area is the territory of the European Union (hereinafter referred to as the EU) with 28 Member States (hereinafter referred to as MSs), restricted to the area of application of Council Directive 2000/29/EC.

2. Methodology and data

2.1. Methodology

The Panel performed the pest categorisation for *Ceratocystis platani* (Walter) Engelbrecht et Harrington, following guiding principles and steps presented in the EFSA Guidance on a harmonised framework for pest risk assessment (EFSA PLH Panel, 2010) and as defined in the International Standards for Phytosanitary Measures (ISPM) No 11 (FAO, 2013) and ISPM No 21 (FAO, 2004).

In accordance with the Guidance on a harmonised framework for pest risk assessment in the EU (EFSA PLH Panel, 2010), this work is initiated as a result of the review or revision of phytosanitary policies and priorities. As explained in the background of the European Commission request, the objective of this mandate is to provide updated scientific advice to the European risk managers for their evaluation of whether these organisms listed in the Annexes of the Directive 2000/29/EC still deserve to remain regulated under Council Directive 2000/29/EC, or whether they should be regulated in the context of the marketing of plant propagation material, or be deregulated. Therefore, to facilitate the decision making process, in the conclusions of the pest categorisation, the Panel addresses explicitly each criterion for quarantine pest according to ISPM 11 (FAO, 2013) but also for regulated non-quarantine pest according to ISPM 21 (FAO, 2004) and includes additional information required as per the specific terms of reference received by the European Commission. In addition, for each conclusion the Panel provides a short description of its associated uncertainty.

Table 1 presents the ISPM 11 (FAO, 2013) and ISPM 21 (FAO, 2004) pest categorisation criteria against which the Panel provides its conclusions. It should be noted that the Panel's conclusions are formulated respecting its remit and particularly with regards to the principle of separation between risk assessment and risk management (EFSA founding regulation[4]), therefore, instead of determining whether the pest is likely to have an unacceptable impact, the Panel will present a summary of the observed pest impacts. Economic impacts are expressed in terms of yield and quality losses and not in monetary terms, in agreement with the Guidance on a harmonised framework for pest risk assessment (EFSA PLH Panel, 2010).

[4] Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. OJ L 31/1, 1.2.2002, p. 1–24.

Table 1: International Standards for Phytosanitary Measures (ISPM) 11 (FAO, 2013) and ISPM 21 (FAO, 2004) pest categorisation criteria under evaluation.

Pest categorisation criteria	ISPM 11 for being a potential quarantine pest	ISPM 21 for being a potential regulated non-quarantine pest
Identity of the pest	The identity of the pest should be clearly defined to ensure that the assessment is being performed on a distinct organism and that biological and other information used in the assessment is relevant to the organism in question. If this is not possible because the causal agent of particular symptoms has not yet been fully identified, then it should have been shown to produce consistent symptoms and to be transmissible	The identity of the pest is clearly defined
Presence or absence in the PRA area	The pest should be **absent from all or a defined part of the PRA area**	The pest is **present** in the PRA area
Regulatory status	If the pest is present but not widely distributed in the PRA area, it should be under official control or expected to be under official control in the near future	The pest is under official control (or being considered for official control) in the PRA area with respect to the specified plants for planting
Potential for establishment and spread in PRA area	The PRA area should have ecological/climatic conditions including those in protected conditions suitable for the establishment and spread of the pest and, where relevant, host species (or near relatives), alternative hosts and vectors should be present in the PRA area	–
Association of the pest with the plants for planting and the effect on their intended use	–	Plants for planting are a pathway for introduction and spread of this pest
Potential for consequences (including environmental consequences) in the PRA area	There should be clear indications that the pest is likely to have an unacceptable economic impact (including environmental impact) in the PRA area	–
Indication of impact(s) of the pest on the intended use of the plants for planting	–	The pest may cause unacceptable economic impact on the intended use of the plants for planting
Conclusion	If it has been determined that the pest has the potential to be a quarantine pest, the PRA process should continue. If a pest does not fulfil all of the criteria for a quarantine pest, the PRA process for that pest may stop. In the absence of sufficient information, the uncertainties should be identified and the PRA process should continue	If a pest does not fulfil all the criteria for a regulated non-quarantine pest, the PRA process may stop

In addition, in order to reply to the specific questions listed in the terms of reference, three issues are specifically discussed only for pests already present in the EU: the analysis of the present EU distribution of the organism in comparison with the EU distribution of the main hosts; the analysis of the observed impact of the organism in the EU; and the pest control and cultural measures currently implemented in the EU.

The Panel will not indicate in the conclusions of the pest categorisation whether to continue the risk assessment process as it is clearly stated in the terms of reference that at the end of the pest categorisation the EC will indicate if further risk assessment work is required following its analysis of the Panel's scientific opinion.

2.2. Data

2.2.1. Literature search

An extensive literature search on *Ceratocystis platani* (Walter) Engelbrecht et Harrington was conducted at the beginning of the mandate. Further references and information were obtained from experts and from citations within the references. Information included in the Rapid Pest Risk Analysis for *Ceratocystis platani*, conducted by the Food and Environment Research Agency (UK) for the UK (Woodhall, 2013), was also considered.

2.2.2. Data collection

To complement the information concerning the current situation of the pest provided by the literature and online databases on pest distribution, damage and management, the PLH Panel sent a short questionnaire on the current situation at country level based on the information available in the European and Mediterranean Plant Protection Organization (EPPO) Plant Quarantine Retrieval (PQR) system,to the National Plant Protection Organisation (NPPO) contacts of the 28 EU MSs, and of Iceland and Norway. Iceland and Norway are part of the European Free Trade Association (EFTA) and are contributing to EFSA data collection activities, as part of the agreements EFSA has with these two countries. A summary of the pest status based on EPPO PQR (2014) and the MSs replies is presented in Table 3.

No information was available in the EUROSTAT or JRC databases on the distribution of the hosts of *C. platani* in the EU. Therefore, relevant information was obtained from CABI (2000), Plantwise (2014), IUCN (2014) and the following websites (online): (1) http://science.jrank.org/pages/5250/Plane-Family.html, (2) http://www.polleninfo.org/IS/is/allergy-infos/allergic-persons/profiles/plantain.html, (3) http://en.wikipedia.org/wiki/Platanus_occidentalis, and (4) http://www.monumentaltrees.com/en/europe-platanusoccidentalis/

3. Pest categorisation

3.1. Identity and biology of *Ceratocystis platani*

3.1.1. Taxonomy

Name: *Ceratocystis platani* (Walter) Engelbrecht et Harrington (Engelbrecht and Harrington, 2005).

Synonyms: *Ceratocystis fimbriata* Ellis and Halsted f. sp. *platani* C May and JG Palmer 1959 and *Endoconidiophora fimbriata* (Ellis and Halsted) Davidson f. sp. *platani* Walter 1946.

Taxonomic position: Eukaryota; Fungi; Ascomycota; Pezizomycotina; Sordariomycetes; Hypocreomycetidae; Microascales; Incertae sedis; *Ceratocystis*; *Ceratocystis platani*.

Common names: The common names used in English-speaking countries are canker stain of plane, blue stain canker, canker of sycamore (CABI, 2014; EPPO PQR, 2014).

Originally, the pathogen was described as *Endoconidiophora fimbriata* f. sp. *platani* by Walter (1946) because the pathogen was morphologically indistinguishable from the morphotype and separable only on the basis of host reaction. Later it was transferred to the genus *Ceratocystis* by Bakshi (1950) and

Hunt (1956). The causal agent of canker stain of plane had been included in the *Ceratocystis fimbriata* species complex as *C. fimbriata* f. sp. *platani* (May and Palmer, 1959). More recently, Engelbrecht and Harrington (2005), supported by a previous molecular phylogeny study (Baker et al., 2003), revised the species complex *C. fimbriata* on the basis of intersterility experiments, progeny analysis and morphological characterisation of isolates obtained from different hosts and raised the causal agent of canker stain of plane from a *forma specialis* (i.e. *C. fimbriata* f. sp. *platani*) to the species level, as *Ceratocystis platani*.

The sexual stage of *C. platani* is characterised by perithecia that are dark-brown in colour and superficially or partly immersed in the substrate, with a globose base (120–330 µm), adorned with hyphal filaments (sometimes consisting of the conidiophores themselves) and with a long neck (400–1 000 µm) that is somewhat darker and wider at the base, and lighter and narrower at the tip. The tip of the neck is adorned with erect hyaline hyphae (48–102 µm), among which is the ostiole from which the ascospores are expelled at maturity. Asci are typically evanescent. The genus *Ceratocystis* was linked to the anamorphic state *Chalara* on the basis of the phialidic conidiogenesis (Von Arx, 1974; De Hoog and Scheffer, 1984; Nag Raj and Kendrick, 1992).

In culture (potato dextrose agar, 25 °C), the mycelium is at first hyaline, becoming brownish-green with time and giving off a pronounced banana odour (Jackson and Sleeth, 1935). Mycelial growth *in vitro* is rapid (approximately 0.5 cm after 24 hours). The pathogen produces three types of asexual conidia: (1) hyaline, truncated, cylindrical endoconidia (ameroconidia) with a smooth surface (5–40 × 3–6 µm), in long rigid arched chains on conidiophores 60–90 µm long; these spores are formed in an approximately daily cycle; (2) more rarely, doliform or barrel-shaped, light-brown endoconidia (7–12 × 6–9 µm) with truncated but slightly rounded tips, formed in short chains; and (3) thick-walled, globose or ovoid, dark olive-brown chlamydospores (aleurioconidia; 11–19 × 9–15 µm); these spores are produced either individually or in short chains of two to five spores.

C. platani is indigenous to eastern USA (Walter et al., 1952; Engelbrecht et al., 2004). During World War II, the pathogen is assumed to have been introduced into southern Europe (Panconesi, 1999), where it is still spreading clonally (Santini and Capretti, 2000). A large number of shipments of equipment and supplies was transported to the Mediterranean during World War II from eastern USA, particularly from the Philadelphia area, where canker stain was epidemic in the 1930s and 1940s (Walter et al., 1952). Dead trees in this area were probably used for crating material, and, since the fungus survives well in wood (Grosclaude et al., 1996), it may have sporulated heavily on cut surfaces once it arrived at its final destination.

3.1.2. Biology

C. platani is a wound pathogen causing canker and wilt in plane (*Platanus* spp.) trees. It infects trees through wounds or other injuries made in the branches, trunk or roots by biotic or abiotic agents (Vigouroux and Stojadinovic, 1990). *C. platani* conidia germinate when they come into contact with a wound and the developing mycelium colonises the exposed tissues and advances into the xylematic tissues of the underlying sapwood, where it develops both longitudinally and tangentially. The asexual spores of the pathogen (see section 3.1.1) appear within two to eight days following infection in the form of an ash-coloured powdery layer, mainly on pruning cuts made in infected plant organs (Panconesi, 1999; Engelbrecht and Harrington, 2005). Chlamydospores may also be produced in abundance inside the xylem vessels of the host 10–20 days following infection (Panconesi, 1999). Perithecia with ascospores (sexual stage) are formed abundantly on pruning cuts made on infected organs six to eight days following infection (Panconesi, 1999). Sometimes asexual and sexual reproductive structures are produced inside vessels or wounds and in the medulla (Clérivet and El Modafar, 1994; Clérivet et al., 2003).

Once in the host, the fungus moves through the xylem as a wilt pathogen and also causes cankers. A single infection can cause a canker of 2–2.5 m long within a year, and can kill a tree of 30–40 cm in diameter within two years (Panconesi, 1999). As the host tissue becomes necrotic because of *C.*

platani infection, it is immediately colonised in succession by other fungi, such as *Pestalotiopsis* spp., *Fusarium* spp., *Dendrochium* spp., *Sphaeropsis* spp., *Asterosporium* spp., etc.

The pathogen survives for several months or years as chlamydospores in the wood of diseased trees (Grosclaude et al., 1996; Engelbrecht et al., 2004). *C. platani* can survive for more than 105 days in soil during the winter, but temperatures of 35–40 °C negatively affect its survival in soil (Mutto Accordi, 1989).

The most evident symptom of the disease is the sudden wilting of a portion or of the entire crown (Panconesi, 1999). The wilting is due to host reaction processes (formation of tyloses, gums, etc.) induced by the infection of the pathogen. Crown wilting occurs most often in the spring–summer period when the tree has a high water demand, which the tree is unable to satisfy because of the lack of vessel functionality. As a result, the leaves turn yellow and wilt, but they do not immediately fall and can easily be distinguished from the surrounding healthy crown. When the infection occurs late in the season, the following summer the infected branch or the entire tree may fail to flush, or the buds can burst and the emerging leaves suddenly wither and die. In old trees, the infection may lead to increasing microphyllia, crown thinning and yellowing.

The optimum temperature for the growth of *C. platani* is 25 °C; the fungus does not grow below 10 °C or above 45 °C (CABI, 2014). Maximum germination of conidia and ascospores occurs at 25 °C, but viability is lost after 48 hours of incubation in soil at 35 to 40 °C (Mutto Accordi, 1989; Mancini and Scapin, 1981). High humidity is also necessary for infection and disease development. In Europe, the most favourable period for infection and disease development is May to September. A wound in the bark, roots, trunk or branches is necessary for fungal penetration. The urban environment and human activity (pollution, water deprivation, pruning, digging, etc.) seem to increase the susceptibility of plane trees to infection (Panconesi, 1999).

3.1.3. Intraspecific diversity

The pathogen has two mating types (MAT-1 and MAT-2) and is able to outcross, but the MAT-2 mating type is self-fertile (homothallic) through unidirectional mating type switching (Witthuhn et al., 2000). Because of selfing, an introduced strain of the fungus could spread via both asexual and sexual spores in an essentially clonal manner (Engelbrecht et al., 2004).

The European *C. platani* population is uniform (Santini and Capretti, 2000; Engelbrecht et al., 2004; Ocasio-Morales et al., 2007). Indeed, when invasive species colonise a new environment, they are subjected to a strong genetic bottleneck (Nei, 1972), which, in extreme cases, can lead to clonality. In Europe, in view of the very high susceptibility of *P. orientalis* and *P.* × *acerifolia* to canker stain disease, it is possible that, by chance, only a single strain of the fungus was introduced into Europe (or just one of the introduced populations had the opportunity to establish), where it found conditions extremely favourable for its spread without facing any selection pressure from the host tree (Santini and Capretti, 2000).

3.1.4. Detection and identification

EPPO Standard PM 7/14 (EPPO, 2003) includes several diagnostic protocols for the detection and identification of *C. platani* using classical techniques and molecular methods.

C. platani can be detected in living host material by direct observation under a light microscope of the edge of the lesions for the presence of dark diagnostic chlamydospores or, in the absence of chlamydospores, by isolation on potato dextrose agar, carrot agar or malt extract agar (EPPO, 2003). For the detection of the pathogen in dead wood or soil, a trapping method developed by Grosclaude et al. (1988) can be used (EPPO, 2003). A carrot assay (inoculation of carrots with wood fragments leads to the production of fungal perithecia at the inoculation points) can also be used successfully (Moller and DeVay, 1968; Pilotti et al., 2009). The carrot assay has been proved to be as effective as the microscope assay when applied on infected living hosts (Pilotti et al., 2009). In all the above-mentioned methods, the identification of the pathogen is based on its cultural and morphological characteristics (EPPO, 2003). Nevertheless, most of the classic techniques used for the detection and identification of *C. platani* have strong limitations that lower the effectiveness or the feasibility of the detection, especially when several samples need to be tested. In addition, apart from the microscope assay, all the classic assays require a long time for the detection of the pathogen (one to three weeks, depending on the method) (Pilotti et al., 2012).

Fast, reliable and sensitive molecular methods have also been developed for the detection and identification of *C. platani*. EPPO Standard PM 7/14 (OEPP/EPPO, 2003) also suggests a specific procedure for identification of *C. platani* by a polymerase chain reaction (PCR) assay. The protocol is adapted from the one proposed by Witthuhn et al. (1999) for a PCR-based restriction fragment length polymorphism (RFLP) identification method. The method consists of a RFLP-PCR of the ITS1 gene.

A serological assay has also been optimised to confirm the presence of the ceratoplatanin protein from *C. platani* ascospores and mycelium (Boddi et al., 2004), but it has never been used for diagnostic purposes.

More recently, two different real-time PCR assays were developed for the identification and quantification of the pathogen in infected host wood tissue (Pilotti et al., 2012) and in air-borne environmental samples (Luchi et al., 2013) using conventional TaqMan and TaqMan minor grove binder (MGB) probes, respectively.

3.1.4.1. Similarities to other diseases

Other diseases of *Platanus* spp. with symptoms similar to those caused by *C. platani* are (1) plane anthracnose, caused by the ascomycete *Apiognomonia veneta* (Sacc. & Speg.) Höhn. 1920; (2) massaria disease, caused by the ascomycete *Splanchnonema platani* (Ces.) M.E. Barr 1982 (syn. *Macrodiplodiopsis desmazieresii*, formerly known as *Massaria platani*); and (3) canker and white-rot disease, caused by the basidiomycete *Sarcodontia pachyodon* (Pers.) Spirin 2001. Therefore, for reliable detection and identification of the pathogen in host material, the protocols described in EPPO Standard PM 7/14 (EPPO, 2003) or the real-time PCR assay developed by Pilotti et al. (2012) must be applied.

3.2. Current distribution of *Ceratocystis platani*

3.2.1. Global distribution

According to the EPPO PQR database (EPPO PQR, 2014), *C. platani* is present, with a restricted distribution, in the eastern states of the USA and in California (Figure 1 and Table 2). The pathogen is also present in some EU countries (see section 3.2.2), in Switzerland and in Armenia (Figure 1 and Tables 2 and 3).

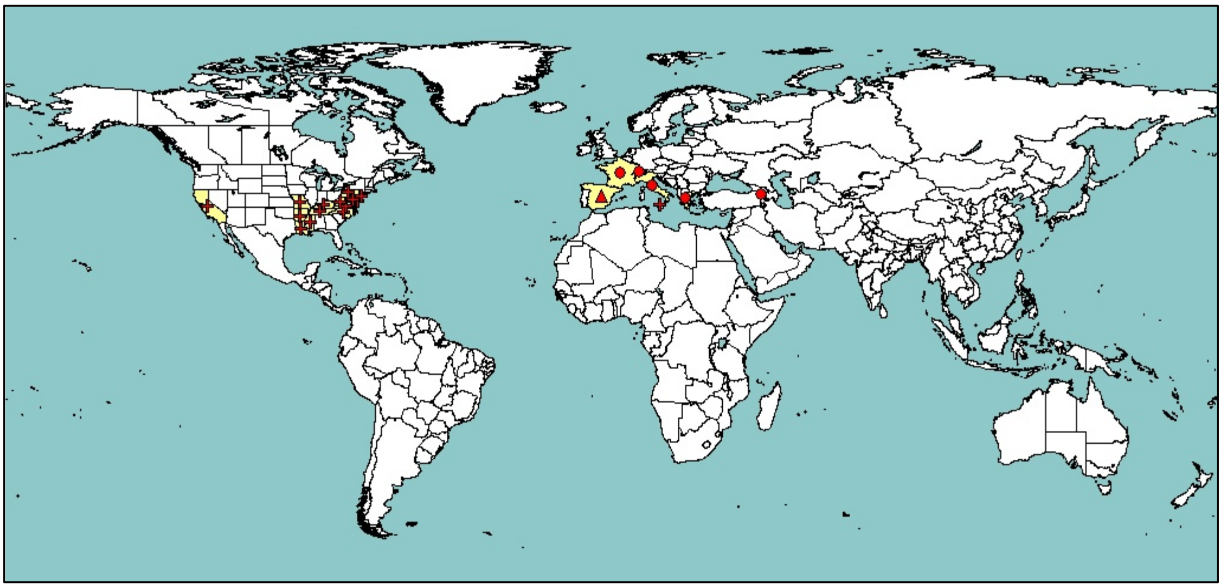

Figure 1: Global distribution map of *Ceratocystis platani* (syn. *Ceratocystis fimbriata* f. sp. *platani*), as extracted from EPPO PQR (2014), version 5.3.1, accessed on 17 June 2014. Red circles and crosses represent national and sub-national pest records, respectively; triangles represent transient pests

Table 2: The status of *Ceratocystis platani* in non-EU countries, according to the EPPO PQR database (EPPO PQR, 2014; version 5.3.1, accessed on 17 June 2014)

Continent/country	Region	Pest status
America		
USA		Present, restricted distribution
USA	Arkansas	Present, no details
USA	California	Present, restricted distribution
USA	Delaware	Present, no details
USA	District of Columbia	Present, no details
USA	Kentucky	Present, no details
USA	Louisiana	Present, no details
USA	Maryland	Present, no details
USA	Mississippi	Present, no details
USA	Missouri	Present, no details
USA	New Jersey	Present, no details
USA	North Carolina	Present, no details
USA	Pennsylvania	Present, no details
USA	Tennessee	Present, no details
USA	Virginia	Present, no details
USA	West Virginia	Present, no details
Europe		
Armenia		Present, no details
Switzerland		Present, restricted distribution

3.2.2. Distribution in the EU

As indicated by the answers to the EFSA questionnaire received from the MSs, the presence of *C. platani* is reported in many regions of Italy, mainly on amenity trees (along the roads) (Table 3).

According to the French NPPO, the pathogen is present, with restricted distribution, in France and absent (eradicated) in Corsica (Table 3). Based on the EPPO Reporting Service database (EPPO RS 2008/029 and 2008/184), in 2008, the pathogen was reported to be present in the southern regions of

France, such as Languedoc-Roussillon, Midi-Pyrénées, Provence-Alpes-Côte d'Azur, Rhône-Alpes and Aquitaine (Anonymous, 2007).

No information was provided by the Greek NPPO (Table 3). However, in the EPPO PQR database (EPPO PQR, 2014), *C. platani* is reported as present with restricted distribution in Greece. The disease was reported for the first time in south-western Peloponnese (southern Greece) in 2003 in natural forests of *P. orientalis* (Tsopelas and Angelopoulos, 2004). In 2010, the disease was detected in north-western Greece (regional units of Ioannina and Thesprotia) (Tsopelas and Soulioti, 2010).

C. platani was first reported in Spain in 1977 (La Porta et al., 2008). Its presence in Spain was officially confirmed in 2010 in a small plantation of *P.* × *acerifolia* in Catalonia, but it has now been eradicated (Table 3).

According to Anselmi et al. (1994) and Soulioti et al. (2008), there was an unconfirmed report of the pathogen being present in Belgium. However, this report is not included in the EPPO PQR database (EPPO PQR, 2014). According to the answer provided by the Belgian NPPO to the EFSA questionnaire, there are no records of the pathogen in Belgium (Table 3).

The pathogen is not known to be present in the UK (Table 3). However, in the Fungal Records Database of Britain and Ireland (FRDBI, 2014) there is one record (FRDBI Record No: 1378905) of *C. fimbriata* (as *Endoconidiophora fimbriata*) on a *Platanus* tree in 1966 in Canterbury, Kent, UK. No further information is available in the above-mentioned database.

Table 3: Current distribution of *Ceratocystis platani* in the 28 EU MSs, Iceland and Norway, based on the answers received via email from the NPPOs or, in absence of reply, on information from EPPO PQR database (EPPO PQR, 2014; version 5.3.1, accessed on 17 June 2014)

Member State	NPPO answer	NPPO Comments
Austria	Absent, no pest records	
Belgium	Absent, no pest records	See status NPPO 2007 in PQR5. In literature, some databases and recent UK PRA, (unconfirmed) findings are mentioned for BE. These might all originate from an article in EPPO bulletin (Anselmi et al., 1994). However, the NPPO has no reports on (un)confirmed findings
Bulgaria	Absent	
Croatia	Absent, no pest records	
Cyprus	–	
Czech Republic	Absent, confirmed by survey	
Denmark	Known not to occur	
Estonia	Absent, no pest records	
Finland	Absent, no pest records	
France	Present, restricted distribution; absent, eradicated in Corse Island	
Germany	Absent, no pest records	
Greece[(a)]	Present, restricted distribution	
Hungary	Absent, no pest records	
Ireland	Absent, no pest record	
Italy	Present in many regions, mainly on amenity trees (along the roads). Never reported in nurseries	
Latvia	–	
Lithuania	–	
Luxembourg	–	

Member State	NPPO answer	NPPO Comments
Malta	Absent, no pest records	
Poland	Absent	In years 2009 -2013 in total 513 visual inspections were carried out by the SPHSIS on *Platanus* plants.
Portugal	No records	
Romania	–	
Slovak Republic	Absent, confirmed by survey	
Slovenia	Absent, no pest records on *Platanus*	
Spain	Absent, pest eradicated	In Spain the presence of *C. platani* was confirmed in 2010 in a small plantation of *Platanus acerifolia* in Catalonia but now is eradicated
Sweden	Absent, not known to occur	
The Netherlands	Absent, confirmed by survey	
United Kingdom	Absent	
Iceland	–	
Norway	–	

(a): When no information was made available to EFSA, the pest status in the EPPO PQR (2012) was used

–: No information available.

3.3. Regulatory status

3.3.1. Council Directive 2000/29/EC

Harmful organism: *Ceratocystis platani*

This species is regulated as a harmful organism in the EU and is listed as *C. fimbriata* f. sp. *platani* Walter in Council Directive 2000/29/EC (Table 4) in the following sections:

Table 4: *Ceratocystis platani* (as *C. fimbriata* f. sp. *platani*) in Council Directive 2000/29/EC

Annex II, Part A	Harmful organisms whose introduction into, and spread within, all Member States shall be banned if they are present on certain plants or plant products
Section II	Harmful organisms known to occur in the Community and relevant for the entire Community
(c)	Fungi
Subject of contamination	Plants of *Platanus* L., intended for planting, other than seeds, and wood of *Platanus* L., including wood which has not kept its natural round surface

Regulated hosts for *Ceratocystis platani*

Below, specific requirements of Annex IV and Annex V of the Council Directive 2000/29/EC are presented for only the host plants and commodities regulated for *C. platani* in Annex IIAII (Table 5).

Table 5: Host plants of *Ceratocystis platani* (as *C. fimbriata* f. sp. *platani*) in Council Directive 2000/29/EC

Annex IV, Part A	Special requirements which must be laid down by all Member States for the introduction and movement of plants, plant products and other objects into and within all Member States	
Section I	Plants, plant products and other objects originating outside the Community	
	Plants, plant products and other objects	Special requirements
5	Wood of *Platanus* L., except that in the form of chips, particles, sawdust, shavings, wood waste and scrap, but including wood which has not kept its natural round surface, originating in Armenia, Switzerland or the USA.	Official statement that the wood has undergone kiln-drying to below 20 % moisture content, expressed as a percentage of dry matter, achieved through an appropriate time/temperature schedule. There shall be

		evidence thereof by a mark 'kiln-dried' or 'KD' or another internationally recognised mark, put on the wood or on any wrapping in accordance with current usage. Official statement that the wood: has been produced from debarked round wood, or has undergone kiln-drying to below 20 % moisture content, expressed as a percentage of dry matter achieved through an appropriate time/temperature schedule, or has undergone an appropriate fumigation to a specification approved in accordance with the procedure laid down in Article 18.2. There shall be evidence of the fumigation by indicating on the certificates referred to in Article 13.1.(ii), the active ingredient, the minimum wood temperature, the rate (g/m ^{3}) and the exposure time (h);, or has undergone an appropriate heat treatment to achieve a minimum core temperature of 56 ° C for at least 30 minutes, the latter to be indicated on the certificates referred to in Article 13.1.(ii)
7.1	Whether or not listed among the CN codes in Annex V, Part B, wood in the form of chips, particles, sawdust, shavings, wood waste and scrap and obtained in whole or in part from: - […]*Platanus* L., originating in Armenia, Switzerland or the USA.	Official statement that the wood: has been produced from debarked round wood; or has undergone kiln-drying to below 20 % moisture content, expressed as a percentage of dry matter achieved through an appropriate time/temperature schedule; or has undergone an appropriate fumigation to a specification approved in accordance with the procedure laid down in Article 18.2. There shall be evidence of the fumigation by indicating on the certificates referred to in Article 13.1.(ii), the active ingredient, the minimum wood temperature, the rate (g/m^3) and the exposure time (h); or has undergone an appropriate heat treatment to achieve a minimum core temperature of 56 °C for at least 30 minutes, the latter to be indicated on the certificates referred to in Article 13.1.(ii)
12	Plants of *Platanus* L., intended for planting, other than seeds, originating in Armenia, switzerland or the USA.	Official statement that no symptoms of *Ceratocystis platani* (J. M Walter) Engelbr. and T. C. Harr., have been observed at the place of production or its immediate vicinity since the beginning of the last complete cycle of vegetation.
Section II	Plants, plant products and other objects originating in the Community	

2	Wood of *Platanus* L., including wood which has not kept its natural round surface	(a) Official statement that the wood originates in areas known to be free from *Ceratocystis platani* (J. M Walter) Engelbr. and T. C. Harr.; or (b) there shall be evidence by a mark 'Kilndried', 'KD' or another internationally recognised mark, put on the wood or on its packaging in accordance with current commercial usage, that is has undergone kiln-drying to below 20 % moisture content, expressed as a percentage of dry matter, at time of manufacture, achieved through an appropriate time/temperature schedule.
8	Plants of *Platanus* L., intended for planting, other than seeds	Official statement that: (a) the plants originate in an area known to be free from *Ceratocystis platani* (J. M Walter) Engelbr. and T. C. Harr. or (b) no symptoms of *Ceratocystis platani* (J. M Walter) Engelbr. and T. C. Harr. have been observed at the place of production or in its immediate vicinity since the beginning of the last complete cycle of vegetation.
Annex V	Plants, plant products and other objects which must be subject to a plant health inspection (at the place of production if originating in the Community, before being moved within the Community, in the country of origin or the consignor country, if originating outside the Community before being permitted to enter the Community)	
Part A	Plants, plant products and other objects originating in the Community	
I	Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community and which must be accompanied by a plant passport	
1.	Plants and plant products	
1.7	Wood within the meaning of the first subparagraph of Article 2(2), where it: (a) has been obtained in whole or part from one of the following genera: - […] *Platanus* L., including wood which has not kept its natural round surface and (b) meets one of the following descriptions laid down in Annex I, Part II to Council Regulation (EEC) No 2658/87 of 23 July 1987 on the tariff and statistical nomenclature and on the Common Customs Tariff: CN code — Description 4401 10 00 — Fuel wood, in logs, in billets, in twigs, in faggots or in similar forms 4401 22 00 — Non-coniferous wood, in chips or particles ex 4401 30 80 — Wood waste and scrap (other than sawdust), not agglomerated in logs, briquettes, pellets or similar forms 4403 10 00 — Wood in the rough, treated with paint, stains, creosote or other preservatives, not stripped of bark or sapwood, or roughly squared ex 4403 99 — Non-coniferous wood (other than tropical wood specified in subheading note 1 to Chapter 44 or other tropical wood, oak (*Quercus* spp.) or beech (*Fagus* spp.)), in the rough, whether or not stripped of bark or sapwood, or roughly squared, not treated with paint, stains, creosote or other preservatives ex 4404 20 00 — Non-coniferous split poles; piles, pickets and stakes of non-coniferous wood, pointed but not sawn lengthwise ex 4407 99 — Non-coniferous wood (other than tropical wood specified in subheading note 1 to Chapter 44 or other tropical wood, oak (*Quercus* spp.) or beech (*Fagus* spp.)), sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end-jointed, of a thickness exceeding 6 mm.	
2.	Plants, plant products and other objects produced by producers whose production and sale is authorised to persons professionally engaged in plant production, other than those plants, plant products and other objects which are prepared and ready for sale to the final consumer, and for	

	which it is ensured by the responsible official bodies of the Member States, that the production thereof is clearly separate from that of other products
2.1.	Plants intended for planting other than seeds of the genus *Platanus* L.
Part B	Plants, plant products and other objects originating in territories, other than those referred to in Part A
I.	Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community
1.	Plants, intended for planting, other than seeds […].
6.	Wood within the meaning of the first subparagraph of Article 2(2), where it: (a) has been obtained in whole or part from one of the order, genera or species as described hereafter, except wood packaging material defined in Annex IV, Part A, Section I, Point 2: - […]*Platanus* L., including wood which has not kept its natural round surface, originating in Armenia, Switzerland or the USA[…] and b) meets one of the following descriptions laid down in Annex I, Part two to Council Regulation (EEC) No 2658/87:

CN code	Description
4401 10 00	Fuel wood, in logs, in billets, in twigs, in faggots or in similar forms
4401 22 00	Non coniferous wood in chips or particles
ex 4401 30 40	Sawdust, not agglomerated in logs, briquettes, pellets or similar forms
ex 4401 30 80	Other wood waste and scrap, not agglomerated in logs, briquettes, pellets or similar forms
4403 10 00	Wood in the rough, treated with paint, stains, creosote or other preservatives, not stripped of bark or sapwood, or roughly squared
ex 4403 99	Non-coniferous wood (other than tropical wood specified in subheading note 1 to Chapter 44 or other tropical wood, oak (*Quercus* spp.) or beech (*Fagus* spp.)), in the rough, whether or not stripped of bark or sapwood, or roughly squared, not treated with paint, stains, creosote or other preservatives
ex 4404	Split poles: piles, pickets and stakes of wood, pointed but not sawn lengthwise
4406	Railway or tramway sleepers (cross-ties) of wood:
ex 4407 99	Non-coniferous wood (other than tropical wood specified in subheading note 1 to Chapter 44 or other tropical wood, oak (*Quercus* spp.), beech (*Fagus* spp.), maple (*Acer* spp.), cherry (*Prunus* spp.) or ash (*Fraxinus* spp.)), sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or end-jointed, of a thickness exceeding 6 mm
4415	Packing cases, boxes, crates, drums and similar packings, of wood; cable-drums of wood; pallets, box pallets and other load boards, of wood; pallet collars of wood
4416 00 00	Casks, barrels, vats, tubs and other coopers' products and parts thereof, of wood, including staves
9406 00 20	Prefabricated buildings of wood

3.3.2. Marketing directives

Host plants of *C. platani* that are regulated in Annex IIAII of Council Directive 2000/29/EC are explicitly mentioned in the following Marketing Directives:

- Council Directive 1999/105/EC[5]

[5] Council Directive 1999/105/EC of 22 december 1999 on the marketing of forest reproductive material. OJ L 11, 15.01.2000, p. 17–40.

- Council Directive 98/56/EC[6]

3.4. Elements to assess the potential for establishment and spread in the EU

3.4.1. Host range

The only known hosts of *C. platani* are three species of the genus *Platanus* (family Platanaceae), namely *P. occidentalis* L. (American plane or sycamore), *P. orientalis* L. (Oriental plane) and their natural hybrid, *P.* × *acerifolia* Willd. (London plane) (Table 6). Although *P. orientalis* and *P.* × *acerifolia* are considered to be extremely susceptible to the disease, *P. occidentalis* has shown some degree of resistance to infection by the pathogen (Panconesi, 1999). No reports exist on the disease affecting the other five species of the genus *Platanus* (i.e. *P. mexicana*, *P. racemosa*, *P. wrightii* and *P. oaxacana*, all from North and Central America, and *P. kerrii*, an ancestral species native to Laos) (Panconesi, 1999).

Table 6: Host range of *Ceratocystis platani*

Hosts	Common name	References
Platanus × *acerifolia*	London plane	Marvin (1939), Panconesi (1999), Panconesi et al. (2003)
Platanus occidentalis	American plane or sycamore	Crandal (1935), McCracken and Burkhardt (1977)
Platanus orientalis	Oriental plane	Jackson and Sleeth (1935), Panconesi (1981), Panconesi et al. (2003), Tsopelas and Angelopoulos (2004)

3.4.2. EU distribution of main host plants

P. × *acerifolia* occurs in Europe, the USA, Argentina, China and the Maghreb (North Africa), at latitudes between 55 °N and 30 °N (CABI, 2000). Based on Plantwise (2014), it is also present in Chile, Brazil, North Korea, Japan, New Zealand, Israel and Zimbabwe (Figure 2). In Europe, it is planted for ornamental purposes, in parks and along avenues, in Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, France (including Corsica), Germany, Greece, Hungary, Ireland, Italy, Monaco, the Netherlands, Poland, Portugal, San Marino, Serbia and Montenegro, Slovenia, Spain, Switzerland, Ukraine and the UK (CABI, 2000). In southern Europe and the USA, it is also planted for coppicing (CABI, 2000).

P. orientalis is very widespread; it is found in the eastern Mediterranean, throughout the Middle East and in the south-east provinces of the Euro-Siberian region. It is native to Afghanistan, Azerbaijan, Bulgaria, Greece, Iran, Islamic Republic of Iraq, Lebanon, Syrian Arab Republic, Tajikistan, Turkey and Uzbekistan. *P. orientalis* was introduced into Pakistan (IUCN, 2014) and Sicily. Its introduction into Sicily dates back to Dionysius the Elder (c. 432–367 BC), and this plane species is, thus, considered naturalised there. *P. orientalis* is often cultivated as an amenity tree in the Mediterranean region of Europe (http://science.jrank.org/pages/5250/Plane-Family.html), but it is rare in Central Europe because of the frost (http://www.polleninfo.org/IS/is/allergy-infos/allergic-persons/profiles/plantain.html) (accessed on 28 August 2014 – both websites).

[6] Council Directive 98/56/EC of 20 July 1998 on the marketing of propagating material of ornamental plants. OJ L 226/16, 13.8.98, p. 16–23.

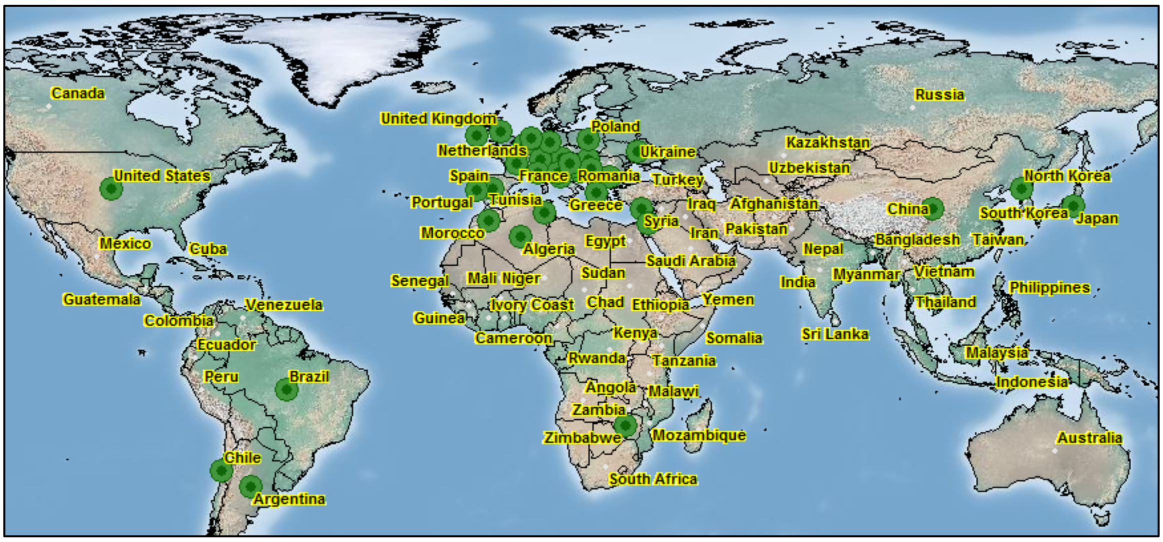

Figure 2: Distribution map of *Platanus* × *acerifolia* (from Plantwise, 2014)

P. occidentalis is native to North America. Its geographical range includes Iowa, Ontario and Maine in the north, Nebraska in the west and Texas and Florida in the south. It is grown for timber, and has become naturalised in some areas outside its native range. It can be found growing successfully in North Dakota. It is also well adapted to life in Argentina and Australia and is quite widespread across the Australian continent, especially in the cooler southern states such as Victoria and New South Wales. It was brought to Europe early in the 17th century (Olmert, 1996), but it has been considered not important from an economic point of view and has been scarcely used as an amenity tree (http://en.wikipedia.org/wiki/Platanus_occidentalis). The presence of monumental trees is reported in France and Slovakia (http://www.monumentaltrees.com/en/europe-platanusoccidentalis/) (accessed on 28 August 2014 – both websites).

3.4.3. Analysis of the potential pest distribution in the EU

In the risk assessment area, *C. platani* is currently present or was present in the past (and is currently eradicated) in some areas of the Mediterranean basin: Italy (including Sicily), southern regions of France, Corsica (eradicated), Greece and the region of Catalonia, Spain (eradicated) (see section 3.2.2).

Based on the climate classification of Köppen–Geiger (Peel et al., 2007), the above-mentioned areas are characterised by temperate climates (C), mainly with dry and hot (Csa) or warm (Csb) summers (Italy, Greece and the Mediterranean areas of France) and, to a lesser extent, with warm summers without dry seasons (Cfb) (part of southern France and Catalonia) (Figure 3).

In the USA, the pathogen is present under a Csa climate type (which is the prevalent climate in California), as well as in Cfa (temperate, hot summers without dry seasons), Dfa (cold, hot summers without dry seasons) and Dfb (cold, warm summers without dry seasons) climate types in eastern states (Figure 4). A few areas in Europe are characterised by Dfa climate types, such as some areas in Switzerland (a country where *C. platani* is known to occur), whereas the Dfb climate type is prevalent in the eastern MSs, where *C. platani* is not known to occur (see section 3.2.2).

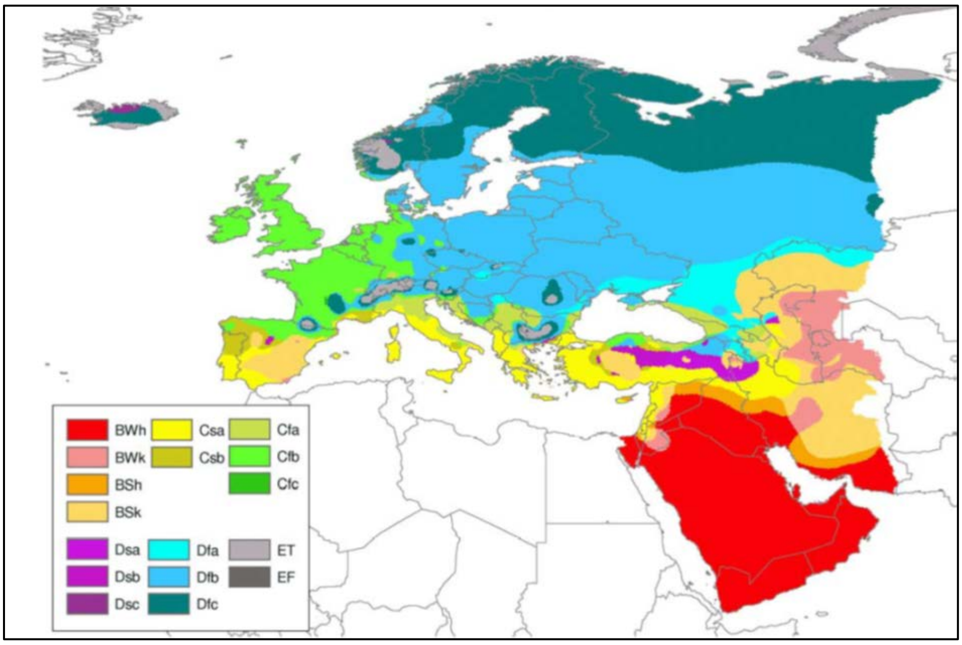

Figure 3: Köppen–Geiger climate map of Europe and western Asia (from Peel et al., 2007)

Considering that the hosts of *C. platani* are present in most of the risk assessment area (see section 3.4.2), the biology of the pathogen (see section 3.1.2) and the matching between the European climates and the climates in the USA—where the pathogen is known to be present (as described above)—the Panel concludes that there are no obvious eco-climatic factors limiting the potential establishment and spread of the pathogen in the, thus far, non-infested MSs, where hosts are present.

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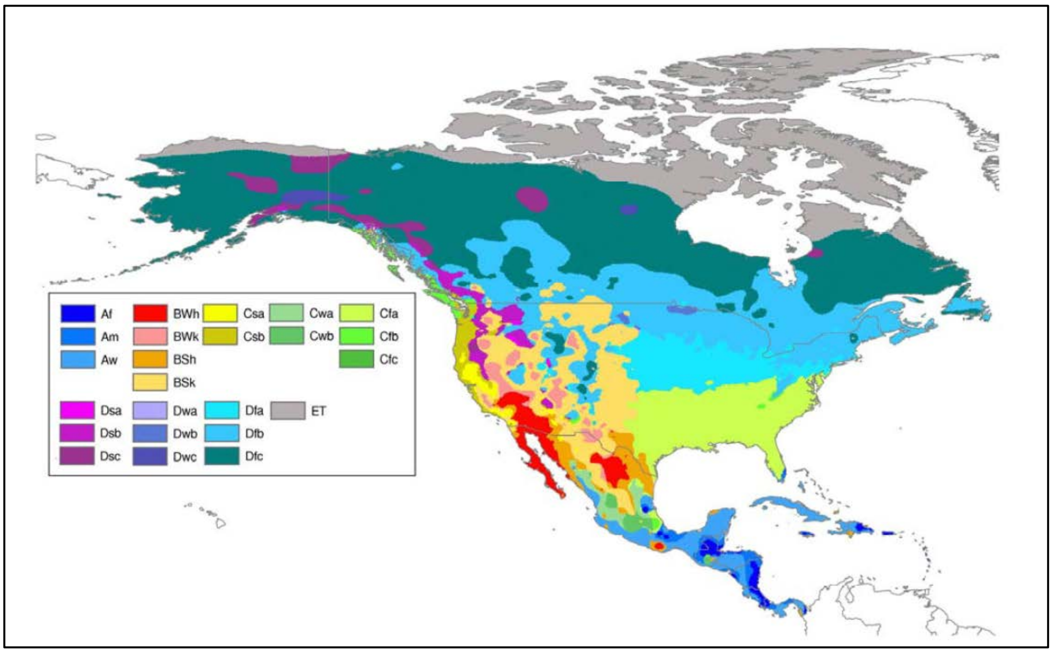

Figure 4: Köppen–Geiger climate map of North America (from Peel et al., 2007)

3.4.4. Spread capacity

3.4.4.1. Spread by natural means

Although it has not been extensively studied, *C. platani* inoculum (ascospores, conidia) can spread by weather-related events such as rain, wind, wind-driven rain, etc. (CABI, 2014). Based on Luchi et al. (2013) studies, air-borne inoculum of *C. platani* has been successfully trapped up to a maximum distance of 200 m from the closest symptomatic infected plane tree. Both conidia and ascospores can be washed down by rain water to the base of the trees, where they accumulate (Panconesi et al., 2003). *C. platani* spores present between cracks in the bark or at the base of the trees, as well as in the debris produced by some insects (nitidulids, wood-dwelling scolitids, etc.), are the main sources of inoculum (Panconesi et al., 2003). This inoculum may be spread, sometimes over considerable distances, by insects, small rodents, birds, etc., that can have either an active role, by wounding the tree and transporting inoculum, or a passive role, by only wounding the tree and leaving infection to chance (Panconesi et al., 2003). Plane wood infected by *C. platani* has a fruity odour that attracts different kinds of insects, and this has also been observed with other *Ceratocystis* species on different woody hosts (Panconesi et al., 2003). In addition, because of the morphology of the pathogen's perithecia (globose base with a long neck), the spore mass is located higher than the substrate, thus facilitating dispersal, especially by insects (Panconesi, 1999).

Crone and Bachelder (1961) and Crone (1962) reported natural spread of *C. platani* by some coleopterous insects, mainly of the Nitidulidae family. However, no detailed studies have clearly demonstrated the initiation of new infections on plane trees through nitidulid activity. Ambrosia beetles (Curculionidae: Scolytinae and Platypodinae) are known to disperse related species of *Ceratocystis* (e.g. *C. cacaofunesta*, *C. platani*, *C. australis*, etc.) through the contaminated frass and sawdust expelled from the trees during tunnelling (Kile, 1993; Harrington, 2000; Engelbrecht et al., 2004; Engelbrecht and Harrington, 2005; Ocasio-Morales et al., 2007). The contaminated frass and sawdust may then be dispersed by wind, rain or running water for relatively short distances and infect healthy host trees (Harrington, 2000). In Greece, Tsopelas et al. (2006) observed infestation of recently dead and dying infected Oriental plane trees by wood-boring ambrosia beetles. *Platypus cylindrus* F. (Platypodinae) has been found to attack diseased Oriental plane trees in Greece, and *C. platani* has been isolated from the frass emanating from the beetle galleries (Ocasio-Morales et al., 2007). However, ambrosia beetle attacks on diseased Oriental plane trees have not been reported from other European countries outside the natural range of this plane species. *Corythucha ciliata* ("tiger of plane tree") is frequently found on the leaves of plane trees and could be a potential carrier of *C. platani* spores, but its role in the dispersal of the pathogen has not been documented so far (Panconesi, 1999; Tsopelas et al., 2006). Of less importance, although not negligible, is the spread of the disease by other insects, birds or rodents (Panconesi and Nembi, 1978).

As *C. platani* conidia are also dispersed in waterways, the pathogen may spread readily via running water of streams, rivers and channels (Panconesi, 1999; Panconesi et al., 2003). Because *P. orientalis* in its native range is a riparian species and *P.* × *acerifolia* is widely planted in France, Switzerland and Italy as a row species along rivers and channels (Grosclaude et al., 1991), water is an important means of dispersal. Dead logs and pieces of branches from infected dead plane trees, as well as spores of the pathogen, may be carried by water downstream, creating new infection foci (Grosclaude et al., 1991; Panconesi, 1999; Panconesi et al., 2003; Ocasio-Morales et al., 2007).

Other means of *C. platani* natural spread is through root anastomosis and root wounding (Mutto Accordi, 1986; Ocasio-Morales et al., 2007). Because of their riparian nature, *Platanus* trees are usually grown together along the sides of streams and rivers with grafted roots (Tsopelas et al., 2006). A similar situation occurs in urban areas, where plane trees are planted in the pavements. In such cases, once the pathogen is established in a tree, it may spread to neighbouring trees through root anastomosis (Mutto Accordi, 1986; Tsopelas et al., 2006; Kamgan Nkuekam, 2007), especially if the trees grow close to each other or if dead or dying infected trees are left standing for a long time before being removed. In addition, plane trees growing on the banks of streams often have the upper roots wounded by sharp floating objects or pebbles rolled along the stream and, subsequently, the roots become infected by the water-dispersed conidia of the pathogen (Panconesi et al., 2003).

3.4.4.2. Spread by human assistance

Although spread of the pathogen by natural means is not as limited as was initially thought, human assistance is the main means by which *C. platani* spreads into new areas (Panconesi et al., 2003). Studies have shown that canker stain becomes epidemic mainly in areas where plane trees require human tending. In large natural forests, where the anthropogenic effect is absent, canker stain is not very common, even though some groups of trees killed by canker stain have been found in some forests in Arkansas (McCracken and Burkhardt, 1977), as well as in riparian forests in the Province of Syracuse (Sicily, southern Italy) (Panconesi, 1999) and in southern Greece (Tsopelas and Soulioti, 2010).

In towns and cities, plane trees are frequently pruned, resulting in wounds which allow the pathogen to enter the tree (Panconesi et al., 2003). Other types of wounds to which street plane trees are subjected are those made to the roots during construction or other work on the soil around the trees (e.g. mechanical weed removal, etc.), but especially when treating or removing diseased trees. Wounds caused by human activities (pruning, sanitary operations, construction work, road maintenance, boats travelling along rivers and canals, etc.) on the crown, trunks or roots of susceptible hosts are responsible for the majority of new infections of plane trees in both urban and rural environments (Panconesi et al., 2003). During sanitary operations, and in addition to wounding of plane trees, considerable amounts of contaminated sawdust may be produced; in this sawdust, the pathogen can survive for long periods (Crone, 1962; Panconesi, 1981; Mutto Accordi, 1988; Grosclaude et al., 1996). Contaminated sawdust may then be transported by wind, machinery, passing vehicles, water courses or, most often, pruning tools and other equipment, and spread the disease over long distances (Walter 1946; Walter et al., 1952; Panconesi, 1999). Plane tree roots and trunks can be wounded by terracing machinery, which may also carry infested soil, thus spreading the disease into new areas (Panconesi, 1999). Tsopelas and Soulioti (2010) assumed that the pathogen was transferred from the Peloponnese (southern Greece) to Epirus (north-western Greece) on road construction machinery and vehicles that had previously been used in infested areas in the Peloponnese.

The pathogen can also spread over long distances via the movement of infected host plants for planting (rootstocks, grafted plants, scions, etc.) (Ocasio-Morales et al., 2007; Liebhold et al., 2012; Santini et al., 2013) and infected wood or wood packaging material (CABI, 2014), as it can survive and sporulate heavily on cut wood surfaces (Grosclaude et al., 1996). Initially, it was assumed that the pathogen was most probably introduced into Greece from Italy, France or Switzerland, as Greece has been importing plane trees, particularly London plane (*P.* × *acerifolia*), from other European countries for the past two decades (Tsopelas et al., 2006). However, a recent study using nuclear and mitochondrial markers confirmed the above hypothesis, as the Greek genotype of the pathogen was identical to the genotype reported earlier from Italy, France and Switzerland (Ocasio-Morales et al., 2007). It is widely accepted that the first introduction of the pathogen from south-east USA and Mexico into Europe (Italy) was with wood used as packaging material during World War II (Panconesi, 1972, 1973, 1999; Cristinzio et al., 1973).

The pathogen is capable of surviving in soil for several months (Mutto Accordi, 1989). Although spread of the pathogen via infested soil/growing media has not been documented, it cannot be excluded.

3.4.4.3. Spread rate

C. platani is able to spread relatively quickly along water courses, and water-borne dispersal is of importance in France, Switzerland, Italy and Greece (Grosclaude et al., 1991; Ocasio-Morales et al., 2007; Tsopelas and Soulioti, 2010). This mode of spread, combined with the aerial dispersal of the pathogen in contaminated frass and sawdust and human-assisted spread, may lead to a rapid spread of *C. platani* within a large area. The association of the pathogen with ambrosia beetles in Greece suggested that the pathogen would spread more quickly in this country than it has in Italy, France and Switzerland (Ocasio-Morales et al., 2007). This hypothesis was later confirmed by the reports of Tsopelas et al. (2007), Tsopelas (2008) and Tsopelas and Soulioti (2010). According to these studies, within seven years following its first detection in south-western Peloponnese (southern Greece) in 2003, the pathogen caused widespread mortality in natural stands of *P. orientalis* grown along the rivers in several regions in the Peloponnese, with thousands of dead and dying trees over several kilometres, and it has subsequently spread to north-western Greece affecting natural stands of Oriental plane trees.

3.5. Elements to assess the potential for consequences in the EU

3.5.1. Potential effects of *Ceratocystis platani*

Plane trees have been planted in many European cities to provide shade and aesthetic value, particularly along canals and rivers. In addition to ornamental use, plane trees are also used for timber and fuel, although it is difficult to determine their importance for these uses. Plane wood is moderately strong and is often used to construct outdoor furniture. The timber is also used for veneers and musical instruments. However, there is no information available in the risk assessment area on the quantities of wood sourced from plane trees.

Canker stain is a serious disease of plane trees in both the USA and Europe. It causes staining of the xylem, disruption of water movement, formation of cankers and eventually tree death (Ocasio-Morales et al., 2007). The pathogen colonises the wound-exposed tissue and it can kill a tree of 30–40 cm in diameter within two to three years (Panconesi, 1999). Infected trees usually die within three to six years (Butin, 1995). The disease has killed tens of thousands of plantation trees and street trees in eastern USA, as well as in California and southern Europe (La Porta et al., 2008).

The disease had a very high impact in eastern USA. In Gloucester (New Jersey), one of the earliest centres of infection (it is assumed that the pathogen was first introduced into that area in 1926), by 1949, 87.1 % of the original London plane trees had already died and an additional 4.3 % showed symptoms of the disease (Walter et al., 1952). In Philadelphia, where the disease was thought to have been present in London plane trees for at least a decade before its first detection in 1935, by 1945 the disease had killed 10 000 out of a total 150 000 plane trees. In subsequent years, the disease spread to almost all eastern states of the USA, from New York to Louisiana. Initially it affected mainly plantings of *P.* × *acerifolia* in cities, but subsequently disease foci appeared in plantations (Ross, 1971; Panconesi, 1999; Panconesi et al., 2003) and natural forests of *P. occidentalis* in Arkansas (McCracken and Burkhardt, 1977). The disease spread slowly in *P. occidentalis* plantations and forests, mainly because this host species is more tolerant to infection than its hybrid *P.* × *acerifolia*.

3.5.2. Observed impact of *Ceratocystis platani* in the EU

The pathogen is a major threat to plane trees in Europe (Engelbrecht et al., 2004). In Italy, as in the USA, damage caused by *C. platani* has been significant (Panconesi, 1999; Panconesi et al., 2003). By the time the pathogen was first detected in Forte dei Marmi (Tuscany, Italy) in 1972, it had already killed many of the 200-year-old plane trees lining the Vialone Carlo III avenue (Panconesi, 1972, 1999). The disease did not assume an epidemic pattern until several years later, when it spread through Italian cities in a similar way as it did in North America (Panconesi, 1999). A survey conducted in Forte dei Marmi revealed that, during the period 1972–1991, 90 % of all plane trees died as a result of *C. platani* infection (Panconesi, 1999). Subsequently, the disease spread out from Forte dei Marmi to other areas of Italy (Panconesi, 1999). In 1986, the first report of *C. platani* invading a natural forest of *P. orientalis* in Sicily emerged (Panconesi et al., 2003). According to Panconesi (1999), canker stain has spread to the whole of Italy from the Alps to Sicily, with the only exception being Sardinia and some other regions in southern Italy where plane trees are not very common.

From Italy, the pathogen probably spread north- and westwards into southern France and Switzerland. In south-eastern France, *C. platani* has caused serious losses to shade plane trees. However, another introduction of *C. platani* with military supplies is supposed to have taken place in Marseille (France), where, after the first phase of infection starting in 1945, 1 850 *Platanus* trees of an average age of 110 years died between 1960 and 1972 (about 13 % of the initial population) (Ferrari and Pichenot, 1974, 1976). The disease spread out of Marseille into the neighbouring area of Vaucluse, where infected trees died within three to seven years. In 2006, the pathogen was found to cause plane tree death along the Canal du Midi, a UNESCO world heritage site in France. By 2011, 2 500 plane trees out of a total of 42 000 grown along the sides of the canal had been felled and replaced with disease-resistant planes. It is speculated that the remaining trees will also have to be felled over the next 20 years (Willsher, 2011).

Since the pathogen was first detected in Greece in 2003, it has had a dramatic impact on *P. orientalis* in the region of the Peloponnese (southern Greece) (Tsopelas and Angelopoulos, 2004). Ornamental *P. orientalis* trees in residential areas and recreational sites have died, with some of them having historical importance, as they were centuries old. However, the impact has been greater in natural stands and oriental plane species in that region. Hundreds of dead and dying trees were found along streams and rivers in the Peloponnese. Patches of 15 to 20 dead and dying trees were often observed (Ocasio-Morales et al., 2007). Such a significant loss of plane trees is expected to have a dramatic effect on the riparian forests of that region. Streams have been found to have stretches of up to 100 m with no surviving plane trees. In 2010, the pathogen was detected in north-western Greece (Epirus region) in the regional unit of Ioannina and along the river Kalama in the regional unit of Thesprotia (Tsopelas and Soulioti, 2010). The infested areas were 30 km apart and, based on the number of infected trees, it was assumed that the pathogen was introduced into that area four to five years before its first detection. The pathogen is still spreading in Greece and, thus, forest composition may change dramatically in the next few years because *P. orientalis* is highly susceptible to canker stain. As *P. orientalis* is an important riparian tree, and is relied upon for shade in the countries of the eastern Mediterranean basin, these losses are expected to have significant negative environmental consequences.

3.6. Currently applied control methods in the EU

So far, prevention is the only management method with positive results in the infested areas (Panconesi, 1999). A key factor in applying effective control measures is the early detection of new disease foci (Tsopelas et al., 2006). Systematic surveillance in the *Platanus*-growing areas of the EU is therefore required in addition to cultural practices, use of disease-resistant planes and sanitary measures that are currently applied in the EU for the control of canker stain.

3.6.1. Cultural practices and sanitary measures

As the disease is mainly spread by human activity, the use of healthy plant propagation material can prevent the introduction of *C. platani* into new areas (Smith, 1985). Therefore, plane planting material should be obtained from regions and nurseries where the disease does not occur (EPPO, 1990).

In the infested areas, the most important sanitary measure is the immediate removal and destruction of infected plane trees and their neighbouring trees that are suspected of being infected (Panconesi, 1999; Tsopelas et al., 2006). Pruning of the infected tree parts can only delay the onset of tree death. However, the removal and destruction of infested trees is likely to produce enormous amounts of contaminated sawdust, which has the potential to allow air-borne dispersal of the pathogen (Panconesi et al., 2003). For this reason, in some MSs (e.g. France and Italy), several additional sanitary measures to be taken during eradication are mandatory. These include the collection of sawdust and all residues during felling operations. Felling operations in outbreaks require the suspension of vehicle traffic, the use of large plastic sheets to catch sawdust under the infected trees and the felling of trees in one piece or with as few cuts as possible (Panconesi, 1999). The wood and all the debris and sawdust should be destroyed by fire or properly buried in sanitary landfills, whereas the felling site, including any debris and sawdust left, must be sprayed with a fungicide (Vigouroux, 1979; Blankart and Vigouroux, 1982; Panconesi, 1999).

If removal is not feasible, any living infected trees and healthy trees neighbouring diseased ones should be killed through injection with a herbicide, thus creating a buffer zone in order to minimise the risk of the pathogen's spread through root anastomosis (Panconesi, 1999; Tsopelas et al., 2006). In France, the herbicide glyphosate is used to kill infected and neighbouring trees (Tsopelas et al., 2006). Non-host plants or selected resistant plane cultivars should be planted in the infested sites instead of unselected plane trees; in this case, and given that *C. platani* is very host-specific, it would not be necessary to completely eliminate all the inoculum sources from the soil (CABI, 2014).

In the infested areas, all the tools, machinery and plastic sheets used during felling or pruning operations should be disinfected before being used for neighbouring trees or should be moved away from the infested site (Panconesi, 1999). In principle, all terracing machinery used in the vicinity of infested trees should be cleaned with water jets and sprayed with disinfectants before leaving the site. In France, ortho-phenylphenol and quaternary ammonium are used as disinfectants (Tsopelas et al., 2006). During pruning, wounding of the trees has to be minimised and any fresh wound must be treated with an appropriate fungicide to prevent subsequent fungal colonisation. Harvesting of plane firewood from infested areas should not be allowed, as the pathogen may survive and spread to new regions on such wood. Alternatively, the infected wood can be used in the woodchip board industry, as the high temperatures (90–100 °C) reached during the manufacturing process are lethal for the pathogen (Panconesi, 1999).

3.6.2. Chemical control

Since externally applied chemical treatments do not appear to be entirely effective, alternative approaches, where the fungicide is brought into direct contact with the pathogen, were also explored (Panconesi, 1999). However, although some of the chemical substances tested (carbendazim, tiabendazole and imazalil sulphate) gave promising results and a good injection technique was also developed (pressure injection), the most that could be achieved was a temporary halt to the infection process; none of those chemicals was effective in eliminating the pathogen (Panconesi 1999).

3.6.3. Host genetic resistance

Host-plant resistance is unknown in the species *P.* × *acerifolia*. However, a natural source of resistance was identified in *P. occidentalis* in the USA (Panconesi, 1999). According to Panconesi (1999), *P. occidentalis* clones resistant to *C. platani* inoculation were selected by McCracken. Unfortunately, these clones could not be cultivated in Europe because of a lack of acclimation and a high susceptibility to *Apiognomonia veneta* (Sacc. et Speg.) Höhn., the agent of anthracnose (Pilotti, 2002; Vigouroux and Olivier, 2004). Subsequently, a genetic improvement programme (Vigouroux, 1992; Clérivet et al., 2003; Vigouroux and Olivier, 2004) exploited this source of resistance by crossing the *P. occidentalis* resistant accession with susceptible *P. orientalis* accessions from Greece. Progeny screening followed by further rounds of inoculations resulted in the final selection of two accessions showing resistance, of which one, *P.* × *acerifolia* "Vallis clausa", was patented and released onto the market in France, Italy, Germany, Switzerland, Great Britain, Spain, Belgium, the Netherlands and Luxembourg (Vigouroux and Olivier, 2004). Additional resistant *P.* × *acerifolia* genotypes suitable for cultivation in Europe were later selected by Pilotti et al. (2009).

3.6.4. Biological control

Methods to control *C. platani* by injecting into the tree bacterial suspensions of *Bacillus subtilis* or spores of *Trichoderma harzianum* (the latter had shown a strong antagonistic effect *in vitro* against *C. platani*) were also tested, but they failed to give the desired results (Turchetti and Panconesi, 1982; Mutto Accordi, 1989). Although the necrotrophic action of *Gonatobotryum fuscum* Saec. (Deuteromycotina Hyphomycetes) and *Hirschioporus pargamenus* (Fr.) Bond. & Sing. (Basidiomycotina Hymenomycetes) against *C. platani* is known, there are no reports on the use of these mycoparasites to control *C. platani* (Panconesi, 1999).

3.7. Uncertainty

The main sources of uncertainty in this pest categorisation are listed below:

- Uncertainty on the precise distribution of the hosts in the EU. No data are available in the EUROSTAT or JRC databases on the distribution of *C. platani* hosts (*P. orientalis*, *P.* × *acerifolia* and *P. occidentalis*) in the risk assessment area. However, based on other descriptive literature sources (see section 3.4.2), at least the two most susceptible host species, i.e. *P. orientalis* and *P.* × *acerifolia*, are grown widely in most of the MSs. The conclusion on the pest categorisation, based on the criteria of ISPM 11, is partially affected by the above-mentioned uncertainty.
- Uncertainty about the reasons why the pest is not known to occur in EU areas where the hosts are present and eco-climatic conditions are suitable for its establishment and spread: scattered presence of susceptible host plants, discontinuity of waterways, EU regulations on the movement of plants for planting and wood, and no movement of contaminated pruning tools and equipment over long distances might be some of the reasons.
- Uncertainty on the water-borne spread capacity of the pathogen. Although running water in streams, rivers and channels is one of the most effective means of natural spread of *C. platani* in the risk assessment area, there are no studies on the survival period of water-borne inoculum. This uncertainty does not affect the conclusion on the pest categorisation, since the pathogen has the potential to effectively spread in the risk assessment area by multiple natural and human-assisted means.

CONCLUSIONS

The Panel summarises in Table 7 below its conclusions on the key elements addressed in this scientific opinion in consideration of the pest categorisation criteria defined in ISPM 11 and ISPM 21 and of the additional questions formulated in the terms of reference.

Table 7: The Panel's conclusions on the pest categorisation criteria defined in the International Standards for Phytosanitary Measures (ISPM) No 11 and No 21 and on the additional questions formulated in the terms of reference (ToR)

Criterion of pest categorisation	Panel's conclusions on ISPM 11 criterion	Panel's conclusions on ISPM 21 criterion	List of main uncertainties
Identity of the pest	*Is the identity of the pest clearly defined? Do clearly discriminative detection methods exist for the pest?*		
	Ceratocystis fimbriata f. sp. *platani* has been recently reclassified as *Ceratocystis platani*. It is a single taxonomic entity and reliable methods are available for its detection and identification as well as for its differentiation from other related fungal species		
Absence/presence of the pest in the risk assessment area	*Is the pest absent from all or a defined part of the risk assessment area?*	*Is the pest present in the risk assessment area?*	
	C. platani is currently present, with restricted distribution, in part of the risk assessment area, namely France, Greece and Italy	*C. platani* is present in part of the risk assessment area (i.e., France Greece and Italy)	
Regulatory status	*Mention in which annexes of 2000/29/EC and the marketing directives the pest and associated hosts are listed without further analysis*		
	C. platani as *C. fimbriata* f. sp. *platani* and/or its hosts (i.e. *Platanus* spp.) are listed in Annexes IIAII, IVAI, IVAII, VA and VB of Council Directive 2000/29/EC (see section 3.3)		
Potential	*Does the risk assessment area*	*Are plants for planting a*	Uncertainty exists

Criterion of pest categorisation	Panel's conclusions on ISPM 11 criterion	Panel's conclusions on ISPM 21 criterion	List of main uncertainties
establishment and spread	*have ecological conditions (including climate and those in protected conditions) suitable for the establishment and spread of the pest?* *Indicate whether the host plants are also grown in areas of the EU where the pest is absent.* *And, where relevant, are host species (or near relatives), alternate hosts and vectors present in the risk assessment area?* The pathogen is present in part of the risk assessment area, namely France, Greece and Italy. Hosts of *C. platani*, and particularly the most susceptible ones (i.e. *Platanus orientalis* and *P.* × *acerifolia*), are widely grown in most of the MSs. The eco-climatic conditions occurring in the, so far, non-infested part of the pest risk assessment area, where hosts are present, are suitable for the establishment of the pathogen. Following its establishment, the pathogen has the potential to spread by multiple natural and human-assisted means, including movement of infected host plants for planting and wood, waterways, root anastomosis, contaminated pruning tools, insects, contaminated insect frass and sawdust	*pathway for introduction and spread of the pest?* Host plants for planting are one of the pathways for the introduction into, and spread within, new areas of *C. platani*	on the precise distribution of the hosts in the *risk assessment* area Uncertainty about the reasons why the pest is not known to occur in EU areas where the hosts are present and eco-climatic conditions are suitable for its establishment and spread
Potential for consequences in the risk assessment area	*What are the potential for consequences in the risk assessment area?* *Provide a summary of impact in terms of yield and quality losses and environmental consequences*	*If applicable is there indication of impact(s) of the pest as a result of the intended use of the plants for planting?*	

Criterion of pest categorisation	Panel's conclusions on ISPM 11 criterion	Panel's conclusions on ISPM 21 criterion	List of main uncertainties
	C. platani causes wilt, cankers and eventually the death of its hosts. Since its first detection in the risk assessment area (Italy) in 1972, the disease has killed tens of thousands of plane trees in the southern MSs (France, Greece, Italy), where the hosts are grown in natural stands, coppices, and public and private gardens in both rural and urban regions. The disease continues to spread into new areas in the EU and has serious consequences, including environmental ones	Initially, it was assumed that *C. platani* was introduced into Greece through the movement of infected host plants for planting which originated in Italy, France or Switzerland, since Greece has been importing plane trees from other European countries for the past two decades. Later studies confirmed the above hypothesis, as the Greek genotype was identical to the genotype reported earlier from Italy, France and Switzerland. Since its first detection in southern Greece in 2003, the pathogen has had a significant impact on *P. orientalis* trees grown in natural stands (along rivers and streams), residential areas and recreational sites; hundreds of those trees have died, with some of them having historical importance, as they were centuries old. The disease continues to spread to new areas in Greece and has serious consequences, including environmental ones	
Conclusion on pest categorisation	*Provide an overall summary of the above points* *Ceratocystis fimbriata* f. sp. *platani*, which has been recently reclassified as *Ceratocystis platani*, is a single taxonomic entity and reliable methods exist for its detection and identification. *C. platani* and its hosts are regulated in Directive 2000/29/EC. The pathogen is currently present, with restricted distribution in only three MSs (France, Greece and Italy). Its hosts, and particularly the most susceptible ones (i.e. *Platanus orientalis* and *P.* × *acerifolia*), are widely grown in most of the MSs. The eco-climatic conditions occurring in the, so far, non-infested MSs, where hosts are present, are not expected to affect the potential establishment and spread of the pathogen. *C. platani* causes death of its hosts and, thus, it has high consequences, including environmental ones, in the risk assessment area	*Provide an overall summary of the above points* *Ceratocystis fimbriata* f. sp. *platani*, which has been recently reclassified as *Ceratocystis platani*, is a single taxonomic entity and reliable methods exist for its detection and identification. The pathogen is present in part of the risk assessment area (i.e. France, Greece and Italy,). Host plants for planting are a pathway for the introduction into, and spread within, new areas of *C. platani*. The recent introduction of the pathogen into Greece was initially assumed, and later confirmed by studies, to have occurred via infected host plants for planting originated in other European countries. Since its first detection in southern Greece in 2003, the pathogen has killed hundreds of *P. orientalis* trees grown in natural stands, residential areas and recreational sites; some of those trees had historical importance, as they	Uncertainty on the precise distribution of the hosts in the risk assessment area

Criterion of pest categorisation	**Panel's conclusions on ISPM 11 criterion**	**Panel's conclusions on ISPM 21 criterion**	**List of main uncertainties**
		were centuries old. The disease continues to spread to new areas in Greece and has serious consequences, including environmental ones	
Conclusion on specific ToR questions	*If the pest is already present in the EU, provide a brief summary of* - *the analysis of the present distribution of the organism in comparison with the distribution of the main hosts, and the distribution of hardiness/climate zones, indicating in particular if in the risk assessment area, the pest is absent from areas where host plants are present and where the ecological conditions (including climate and those in protected conditions) are suitable for its establishment* *C. platani* is currently present with restricted distribution, in part of the risk assessment area, namely, France, Greece and Italy. Hosts of *C. platani*, and especially the most susceptible ones (i.e. *Platanus orientalis* and *P.* × *acerifolia*), are widely grown in most of the MSs. The eco-climatic conditions in those parts of the risk assessment area are suitable for establishment and spread of the pathogen by multiple natural and human-assisted means, including movement of infected host plants for planting and wood, waterways, root anastomosis, contaminated pruning tools, insects, contaminated insect frass and sawdust. There are no obvious eco-climatic factors limiting the potential establishment and spread of the pathogen in the, so far, non-infested part of the risk assessment area, where hosts are present *and* - *the analysis of the observed impacts of the organism in the risk assessment area* *C. platani* causes staining of the xylem, disruption of water movement, formation of cankers and eventually death of the affected plane trees. Since its first detection in Italy in 1972, the disease has killed tens of thousands of plane trees in the southern MSs, where the hosts are grown in natural stands, coppices, and public and private gardens in both rural and urban environments. The disease is still spreading to new areas within the EU and has serious consequences, including environmental ones		Uncertainty on the precise distribution of the hosts in the EU

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ABBREVIATIONS

EFSA	European Food Safety Authority
EPPO	European and Mediterranean Plant Protection Organization
EPPO-PQR	European and Mediterranean Plant Protection Organization Plant Quarantine Retrieval system
EU	European Union
ISPM	International Standard for Phytosanitary Measures
MS(s)	Member State(s)
NPPO	National Plant Protection Organisation
PCR	polymerase chain reaction
PLH Panel	Plant Health Panel
PRA	pest risk analysis
RFLP	restriction fragment length polymorphism