

## Data Sheets on Quarantine Pests

*Ceratocystis fimbriata* f.sp. *platani***IDENTITY**

**Name:** *Ceratocystis fimbriata* Ellis & Halsted f.sp. *platani* Walter

**Synonyms:** *Endoconidiophora fimbriata* (Ellis & Halsted) Davidson f.sp. *platani* Walter

**Taxonomic position:** Fungi: Ascomycetes: Ophiostomatales

**Common names:** Canker stain of plane (English)

Tache chancreuse, chancre coloré du platane (French)

Cancro colorato del platano (Italian)

**Bayer computer code:** CERAFP

**EPP0 A2 list:** No. 136

**EU Annex designation:** II/A2

**HOSTS**

*Platanus* spp. are the only hosts of this *forma specialis*, especially *P. acerifolia* (widely planted as an amenity tree in most parts of Europe) and its parents *P. occidentalis* (McCracken & Burkhard, 1977) and *P. orientalis* (Panconesi, 1981).

**GEOGRAPHICAL DISTRIBUTION**

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 (Panconesi, 1981) and more slowly in France (Vigouroux, 1979a). The rate of spread in France seems to have accelerated in recent years. Only the western part of Vaucluse is severely affected. Eradication measures are proving effective in Marseille.

**EPP0 region:** France, Italy (including Sicily), Spain (unconfirmed), Switzerland.

**Asia:** Armenia.

**North America:** USA (Arkansas, California, New Jersey).

**EU:** Present.

**BIOLOGY**

The fungus may be transmitted by root contact. Anastomosis between roots of *Platanus* trees is possible and the pathogen can infect the uninfested tree (Accordi, 1986). It is certainly transmitted by contaminated pruning tools and terracing machinery which causes damage to the roots. The fungus can survive for 7-15 days on the surface of a wound. Penetration only occurs through wounds, and the fungus colonizes the bark and also the wood. Longitudinal spread can be rapid (50-100 cm per year). The fungus can reach the heart of the tree, along the medullary rays.

*C. fimbriata* f.sp. *platani* can survive for several years at -17°C but will not grow below 10°C or above 45°C. The optimum temperature for development is 25°C. There is apparently no incubation period. The fungus can survive for more than 105 days in soil

during the winter but temperatures of 35-40°C are lethal to the pathogen in soil (Accordi, 1989). Sawdust from diseased trees is highly infective.

## DETECTION AND IDENTIFICATION

### Symptoms

In a row of *Platanus*, isolated trees or groups may be affected. A single branch with sparse, more or less chlorotic foliage is usually seen first. On the side bearing this branch, the tree or the branch itself shows an extensive lesion. In the centre of the lesion, the necrotic bark becomes pale-brown and cracked and adheres to the tree. The margins show no wound callus formation, and often extend in bluish-black filaments or veins, touched with orange. This type of extension is often most marked at the upper edge. Lesions can spread 1-2 m per year. If a lesion girdles the trunk or a main branch, the bark of the distal portions becomes conspicuously reddish-brown. Cross-sections of affected branches show bluish-black, then brown, spindle-shaped patches, extending radially and more or less side by side. For more information, see Walter (1946), Griffin (1968), Vigouroux (1979a), Panconesi (1981).

### Morphology

In culture, the mycelium, at first hyaline and more or less dense, according to the medium, becomes brownish-green and gives off a pronounced banana odour (intensity varying with medium). Growth is rapid (0.5 cm in 24 h at 24°C on potato dextrose agar). Perithecia (200 µm) have a very long neck (400-800 µm); some strains produce none, while others produce only aborted ones. The ascospores are characteristically shaped like a bowlerhat (4-8 µm).

Three types of conidia are formed: (1) hyaline truncated cylindric endoconidia (5-40 x 3-6 µm) in long rigid arched chains on conidiophores 60-90 µm long; these spores are produced in an approximately daily cycle; (2) more rarely, doliform endoconidia, very light, 7-12 x 6-9 µm, in short chains; (3) thick-walled endoconidia (chlamydospores) bulbous, brownish-green, 11-19 x 9-15 µm. Conidia are very numerous in infected wood (and thus in sawdust). For more information, see Hunt (1956), Webster & Butler (1967), Ferrari & Pichenot (1974).

### Detection and inspection methods

*C. fimbriata* f.sp. *platani* can readily be isolated within 48 h, for example on malt extract agar or potato dextrose agar from pieces of wood taken from the edge of lesions. Samples can be taken with an auger (Vigouroux, 1979b). To detect *C. fimbriata* f.sp. *platani* in wood samples or soil, a trap technique has been described by Grosclaude *et al.* (1988): healthy branches of *Platanus acerifolia* are stripped of their bark and placed in close contact with the wood or soil sample and are then incubated in a moist chamber or in water at room temperature. Perithecia develop on the branches within a few days.

## MEANS OF MOVEMENT AND DISPERSAL

Natural spread is very slow and most unlikely to occur over long distances (there are no natural vectors). Terracing machinery may carry infested soil and contaminate healthy areas. The fungus could be spread in *Platanus* wood in countries where this is used. The most probable means of international spread is by trade in infected plants.

## PEST SIGNIFICANCE

### Economic impact

In the eastern USA, before 1950, canker stain attacked 3.8% of the trees, and up to 80% in some towns. However, the disease appears to have lost importance. In south-east France, *C.*

*fimbriata* f.sp. *platani* has caused serious losses to shade trees. In Marseille, after a first phase of infection starting in 1945, 1850 *Platanus* trees of average age 110 years were killed between 1960 and 1972 (about 13% of the initial population) (Ferrari & Pichenot, 1974; 1976). The disease spread out of the city and into the next département (Vaucluse). Infected trees died in 3-7 years. In Italy, the fungus invaded the north of the country in a few years and killed many trees, especially in young row plantings (Panconesi, 1981).

### Control

Apart from phytosanitary measures, control methods are not immediately available. Breeding for resistance and related research are being carried out (Vigouroux, 1986; Vigouroux & Rouhani, 1987).

### Phytosanitary risk

*C. fimbriata* f.sp. *platani* is an EPPO A2 quarantine organism (OEPP/EPPO, 1986). *Platanus* is the key amenity tree species for the urban environment in temperate climates. In view of the speed of spread of the disease and the extent of damage, it must be considered a serious threat to many EPPO countries. The disastrous European experience with *Ceratocystis ulmi* (Dutch elm disease) should serve as an example.

## PHYTOSANITARY MEASURES

Because the disease is mainly spread by human activity, it is feasible to limit the spread by clean propagation and production methods (Smith, 1985). Planting material should be obtained from regions where the disease does not occur and the plants should have been grown in a place found free from *C. fimbriata* f.sp. *platani* during the last growing season (OEPP/EPPO, 1990). All pruning tools should be disinfected with alcohol before the beginning of any pruning operation, even in uninfested regions. In infested regions, this disinfection should be repeated between every tree. In principle, all terracing machinery used in the vicinity of infested *Platanus* trees should be treated before moving to another site. Blankart & Vigouroux (1982) suggest the following treatments: clean machinery with a water-jet and spray with 8-hydroxyquinoline sulfate. When infected trees are felled, all debris and sawdust should be sprayed abundantly with this fungicide before sweeping up and disposal. All wood should be burned.

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