

# FOREST PEST SPECIES PROFILE



January 2008

## ***Botryosphaeria dothidea* (Moug.) Ces. & De Not. (1863)**

**Other scientific names:** *Caumadothis dothidea* (Moug.) Petr.; *Dothiorella mali* var. *fructans* Dearn.; *Sphaeria dothidea* Moug.

**Phylum, Order, Family:** Ascomycota: Dothideales: Botryosphaeriaceae

**Common names:** Botryosphaeria canker

*Botryosphaeria dothidea* is known in many parts of the world and is commonly associated with cankers and dieback on hundreds of different woody plants, including eucalypts. Eucalypt species are planted around the world which makes this species a major concern to the forest sector. This pathogen is an opportunistic pathogen that attacks stressed trees. The entire taxonomy of the genus *Botryosphaeria* has undergone changes in the last few years (See Crous *et al.*, 2006 for more information). This species was previously considered synonymous with *Botryosphaeria ribis*, so literature on both species is inextricably intertwined, but these are now considered two distinct species.



Cankers caused by *Botryosphaeria dothidea* on *Malus* sp. (L) and Leyland cypress (X *Cupressocyparis leylandii*) with bark removed (R).

(Photos - Bugwood.org: University of Georgia Plant Pathology Archive; R.L. Anderson, USDA Forest Service)

## **DISTRIBUTION**

*Botryosphaeria dothidea* has a worldwide distribution. The origin of this species is unknown although it has been suggested that it is native to the Northern Hemisphere since it occurs on native and cultivated hosts there (Slippers *et al.*, 2005).

## **IDENTIFICATION**

A more detailed description of the morphology of *Botryosphaeria dothidea* can be found in Slippers *et al.* (2004), Crous *et al.* (2006) or CREM (2008).

Asci are produced in fruiting bodies called stroma that erupt through the bark and have multi-layered walls. The fruiting bodies occur singly or in clusters, often intermixed with conidiomata, and are 200-500 µm in

diameter (Slippers *et al.*, 2004; Crous *et al.*, 2006). Asci have two layers (bitunicate) and the inner layer is quite thick. They can be stalked or not stalked, club-shaped, with a well-developed apical chamber, eight-spored, septate and rarely branched toward the tip (Slippers *et al.*, 2004; Crous *et al.*, 2006). Ascospores are unicellular, hyaline, fusoid to ovoid and sometimes have tapered ends giving a spindle-shaped appearance (Slippers *et al.*, 2004; Crous *et al.*, 2006). Once germinated, they turn brown and become septate and even slightly bumpy (Crous *et al.*, 2006).

The pathogen is often diagnosed by the conidial state, *Fusicoccum aesculi* Corda. Conidiomata are flask-shaped and morphologically indistinguishable from the ascomata (Slippers *et al.*, 2004). Conidia are hyaline, unicellular, narrowly fusiform or irregularly fusiform with subtruncate to bluntly rounded bases, 23-25  $\mu\text{m}$  in length and 4-5  $\mu\text{m}$  in diameter and rarely have septums (Slippers *et al.*, 2004). Conidiogenous cells are holoblastic, hyaline, subcylindrical and 6-20  $\mu\text{m}$  in length and 2-5  $\mu\text{m}$  in diameter (Slippers *et al.*, 2004).

Spermatia are unicellular, hyaline, allantoid to rod-shaped and 3-6  $\mu\text{m}$  in length and 1.5-2  $\mu\text{m}$  in diameter (Slippers *et al.*, 2004). Spermatophores are hyaline, cylindrical to subcylindrical, 4-10  $\mu\text{m}$  in length and 1-2  $\mu\text{m}$  in diameter (Slippers *et al.*, 2004).



**Crown thinning and dieback in American sycamore (*Platanus occidentalis*) and apple (*Malus* sp.) caused by *B. dothidea* infection (Photos - Bugwood.org L-R: E.L. Barnard, Florida Department of Agriculture and Consumer Services, US; University of Georgia Plant Pathology Archive)**

## **HOSTS**

*Botryosphaeria dothidea* has a very wide host range of trees and shrubs. It is a major problem in planted forests particularly those planted with eucalypts however susceptibility differs among the eucalypt species.

## **BIOLOGY**

*Botryosphaeria dothidea* is an opportunistic pathogen that becomes more of a problem to stressed hosts. The pathogen infects through wounds or natural openings in the bark, and survives endophytically until the host becomes stressed by drought, late frosts, cold or hot winds, insect damage or pruning (TPCP, 2002; Sinclair and Lyon, 2005).

*Botryosphaeria dothidea* overwinters in dead and infected stems. Spores are dispersed by wind, rain and possibly insects to new hosts where they germinate and invade the host tissues. Pruning wounds are a common infection court. Fungal fruiting bodies produced just under the surface of stems release spores which spread to adjacent hosts. Except for a few weeks in winter, spores are released year-round although infections occur more frequently in early summer.



**Discolouration of the vascular tissue of American sycamore (*Platanus occidentalis*). Only the light-coloured section (¼) is alive. (Photo: E.L. Barnard, Florida Department of Agriculture and Consumer Services, US)**

### **SYMPTOMS AND DAMAGE**

*Botryosphaeria dothidea* causes dieback and canker in hundreds of woody plants and trees. On some hosts, only small twigs die, especially if the host is vigorous. Stressed trees may be unable to compartmentalize the infection, and the dieback progresses into larger branches and trunk.

In *Eucalyptus* spp. infection can result in the death of tree tops and a discolouration of the stem core which can extend throughout the tree (TPCP, 2002). Stem and branch cankers are very serious symptoms of *B. dothidea* infection; the stems and branches often break at the site of the cankers (TPCP, 2002).

### **DISPERSAL AND INTRODUCTION PATHWAYS**

Spores are dispersed by wind, rain and possibly insects to new hosts. Movement of infected trees, plants and wood products is a possible pathway of introduction.

### **CONTROL MEASURES**

Encouraging vigorous growth and reducing damage to susceptible host trees can help avoid infection by *Botryosphaeria dothidea*. Removal of pruned or fallen branches can reduce inoculum. Early detection and the planting of disease tolerant species or clones can help reduce losses in forest plantations (TPCP, 2002).

### **References**

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